Engaging in research through lesson study: Case studies of teacher learning in Singapore schools

Rachel GOH, English Language Institute of Singapore, Singapore
Teacher Quality, Teacher Learning and Development

Abstract

Why should teachers engage in research from the lesson study perspective? This presentation begins with two cases of lesson study in Singapore primary schools. Findings on how lesson study teams, organised by teaching grade levels, used lesson study to mediate the implementation of the national English Language curriculum will be presented. The two case studies point to the kind of research teachers engage in as a lesson study team and the ways in which the group inquiry into their classroom practice helped them and their students. For instance, different teacher knowledge were mobilised, established classroom practices and teacher beliefs were challenged, team capacities were built to implement reform through curriculum deliberation, designing tools and resources, and diagnosing and assessing student learning in new ways to meet the changing needs of today's children. Illustrative examples of teacher learning through lesson study research would be presented, along with related questions we might pose to ask whether lesson study teams are having an impact on teacher teaching, student learning and school improvement. The study has implications on a widened conception of practitioner research and teacher learning from the lens of lesson study inquiry.

Keyword: Professional Community, Professional Development
Development of critical thinkers through case-based learning approach

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Curriculum Development

Abstract

Critical thinking skills are highly valued in educators. Case-based learning (CBL) is one of the pedagogical approaches used by educators to promote critical thinking (Kaddoura, 2011; Choi and Lee, 2009). The CBL approach adopted in one subject offered to a diploma in Temasek Polytechnic was examined through surveys and interviews conducted with two different cohorts of students. A four phases model for the development of critical thinking by Richmond (2014) was used to examine if the CBL approach adopted had been able to develop students into critical thinkers. Based on the students’ learning experiences collated from the two cohort studies, the CBL approach had enabled students to transit from realist to absolutist mental state of a critical thinker and also from absolutist to multiplist mental state of a critical thinker. Although the CBL approach adopted was unable to transit students from multiplist to evaluative mental state of a critical thinker, it had prepared students to be more engaged to changes in the future work such as during internship programme or solving problems during their project work.

Keyword: Critical and Creative Thinking, Curriculum Design/Reform
Assigning Competence to Nonnative Language Speaking Teachers and Students

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Language and Literacy Education

Abstract

Native speakers of a language have historically been favoured in the teaching of that language, regardless of their actual qualifications. For example, in the teaching of English as a Second/Foreign Language, people without any teaching experience or qualifications have been preferentially hired mainly on the basis of having been born and raised in countries where English is the/a native language. At the same time, people who are nonnative speakers of English have been overlooked or paid less, despite years of experience, relevant qualifications and a high degree of competence in the language and in language pedagogy.

This paper provides background on the problem and suggests solutions based on Expectations States Theory (Berger, Wagner, & Zelditch, 1985). This theory comes from sociology and posits that status is a generalised construct with individuals having or lacking power in accordance with their status, regardless of each person’s own characteristics. Thus, people are judged based on the perceived status of their group, not on their actual qualities.

After explaining Expectations States Theory, the paper makes 15 suggestions for changing expectations by assigning competence to nonnative language speakers. These suggestions are relevant both to students’ perceptions of their teachers, as well as students’ perceptions of their own present and potential competence in the second/foreign language.

Keyword: ESL, Postmodernism and Postcolonial theory
Robotics Curriculum in a VUCA World

Swee Hsien POH, St. Joseph's Institution, Singapore
Curriculum Development

Abstract

The world is evolving into one which we are making more and more demands on external help via technology and robots. Are students ready for the changes and disruptions that technology will bring to the workplace? Will they be self-directed learners who are critical, innovative and flexible?

In school, the mode of assessment needs to change according to the curriculum changes that will occur. Are we giving enough weight to the modes of thinking and skills that are important and how will we ensure that the rubrics for assessment will provide both the students and teachers just-in-time feedback to change the curriculum as and when is necessary?

This presentation highlights the curriculum development in robotics in St Joseph's Institution over a span of 2 years and how it is helping our students to develop skills for the future.

Keyword: Curriculum Design/Reform, Curriculum in Classroom
ICT-enhanced Active Collaborative Learning of Entrepreneurship using Computer Simulation Game and Online Tool

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Aloysius THONG, Nanyang Polytechnic, Singapore
Liaw Chun Huei, Nanyang Polytechnic, Singapore
IT in Education

Abstract

The author will share his experience leveraging computer simulation game and online tool for active collaborative learning of entrepreneurship by polytechnic students; facilitated by NYP lecturer. A key emphasis of polytechnic education in Singapore is the development of deep skills and mastery through applied learning in the application of technical and soft skills in a real-world environment. Learning can be enhanced and even accelerated with the use of ICT technology, especially for occasions when it is impractical and impossible to use real-world environment because of the risk involved or because we need to accelerate processes that are not viable to do in the real-world. In the case of teaching and learning entrepreneurship knowledge and skills, the traditional way using textbook and case studies in classroom does not provide students the opportunity to apply what they have learnt in class to real-life situations. In such case, the integration of ICT into the curriculum of entrepreneurship in the forms of computer simulation game and online collaborative tool can help to support the teaching and learning activities that would otherwise be difficult or impossible without the technology. The applied research project is based on final year students from the Diploma in Business Informatics in the School of IT, Nanyang Polytechnic who read entrepreneurship module. SimVenture is the simulation game being used in the module as an active learning platform that mimics real-life situation where students can safely apply what they have learnt and gain valuable experiences. The simulation facilitates students’ construction of entrepreneurship knowledge and encourages higher-order thinking skills and mastery in term of critical thinking, problem solving and making judgement. The use of an online collaborative tool in the form of Canvaniser - web-based Business Model Canvas, further engaged student for greater levels of interaction and collaboration among them. It also allows lecturer to track students’ progress to provide timely feedback on their work and learning. The tool also enhances realism and provides a launchpad for further exploration of entrepreneurship.

Keyword: Information Technology and Education, Internet and Education
Abstract

INTRODUCTION
Is student-centered learning a nebulous ideal? Or does it hold the answer for positive academic outcomes? In a quasi-experimental study a group of teachers sought to investigate the impact of customised learning materials and the use of cooperative learning structures in supporting memory retention and content mastery.

BACKGROUND
In the past 3 years, the performance of Madrasah students in Malay Language at PSLE has been higher than the national average in all topics except for the topic of "Proverbs". An intervention project was designed to examine and address the under-performance in proverbs.

METHODOLOGY
The quasi-experimental approach will be used in this study. Two intervention variables have been designed. Firstly, a set of customised proverbs cartoons was developed to support visual learning. Secondly, cooperative learning strategies for content mastery such as Showdown, Inside Outside Circles and Quiz Quiz Trade were incorporated into a 2-week unit package.

With two sets of intervening variables, 3 classes will be involved in this study. The first class will function as the control group where teaching approach and materials remain as status quo with frontal teaching as the main approach. The second class will also be dominated by frontal teaching, however, it will be supported by the use of the cartoons of the proverbs. In the third class, students' learning will be supported by both the use of cartoon representations of the proverbs as well as cooperative learning strategies.

Pre- and post-tests will be conducted to examine the impact of the two intervening variables on students learning processes and memory retention. Student interviews will also be conducted to triangulate the findings from the test results.

PROJECT IMPLEMENTATION AND FINDINGS
This project will be carried out in February 2017 and the lessons will be carried out in the 3 classes. It is hoped that the findings from this project will help us understand the impact of the use of visual tools and cooperative learning strategies in improving the teaching of proverbs.

Keyword: Cooperative Learning, Curriculum & Pedagogical Innovation
Visualizing and performing character and citizenship through digital storytelling

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Rethinavel SHANMUGAM, National Institute Of Education, Singapore
Galyna KOGUT, National Institute Of Education, Singapore
Civics and Moral Education

Abstract

The teaching and learning of character and citizenship in Singapore aims to develop students’ core values, social and emotional competencies, and civic and global awareness through a carefully crafted and structured curriculum that focuses on building and respecting individual, national and cultural identities. While there is significant and widespread interest in Character and Citizenship Education (CCE) locally, there is still much to learn about what works well, how and why.

Given this background, we describe an on-going innovation research project investigating how Normal (Academic/Technical) stream students can bring together and use digital media and tools to visualize and perform CCE. Using participatory and pedagogical inquiry approaches, we co-designed a series of drama-based lessons and organized out-of-school learning journeys to uncover the kinds of artistic and authoring choices a teacher and his students make in the design and construction of digital stories on local themes and topics.

So far, we have used classroom- and field-based observations, and student artefact analysis to explore how students apply the arts in storytelling and how they communicate their thoughts, feelings and ideas about Singapore, its history and themselves as students, residents and citizens. Using Mediated Discourse Analysis techniques, our findings show that each and every student has ideas to contribute and stories to tell in their own particular ways.

Importantly, we have also noticed that many students’ creativity begins by taking up opportunities in non-verbal communication (e.g., drawings, actions, photographs and movies) rather than via note-taking, script or composition writing.

Furthermore, our transcripts show how our student-participants can aptly plan, interpret expected and unforeseen events, explain and justify narratives, and reflect on their actions through the stories they interpret and create.

The paper closes with a number of evidence-based takeaways in how professional learning and growth can occur in and through digital storytelling. For example, Which pedagogies (practices, values and justifications) can underpin values education? How do drama practices provide spaces for students to explore and voice their opinions and ideas?

Keyword: Citizenship Education, Humanities and Social Studies
Abstract

With the heightened awareness of the benefits of equipping our students with media literacy skills in the 21st century, integration of media communication and subject disciplinary within schools is crucial in developing our students to become self-directed, collaborative and lifelong learners. This design-based research project adopts a mixed method approach to study how creation of Newscasts through a project-based learning approach can enhance students’ cognitive and affective engagement in acquiring media literacy skills over a two-year period. Participants in 2016 include 14 teachers and 25 classes of students (6 Primary Five and 19 Secondary One to Two students) across four schools in Singapore. The project-based learning approach involves exposing students to real world situations and getting them in groups to connect and communicate whilst curating and creating Newscasts in established broadcasting studios to problem-find and problem-solve for an authentic audience. They learn and acquire the habit of being critical, analytical and evaluative and sensitive to the environment. Data collection includes lesson observation field notes, focus group discussions with teachers and students, students’ pre-post quizzes, students’ Newcast artefacts with rubric assessment, teachers’ and students’ responses on surveys/reflections. Qualitative inductive content analysis of the field notes, focus group discussions and responses on surveys/reflections will serve to triangulate the descriptive statistical findings from the quantitative within-group analysis of the quizzes and artefacts; resulting in generating five guiding learning design principles.

Keyword: 21st Century Competencies, Multiliteracies & Multimodalities
Achieving Student-centric, Values-driven education through Transformational and Servant Leadership styles

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School Change and Leadership

Abstract

The Student-centric, Values-driven education, launched at the Work plan seminar in 2012 has the explicit aims of valuing the aspirations, abilities and talents of every student and developing innovative and life-long learners. Using a secondary school in Singapore as a case study, the author documents programmes and practices that are put into place as a direct result of transformational and servant leadership styles of a new school leader and discusses whether certain leadership styles of school leaders that are more human-centred, emphasise community over self-interest and demonstrate behaviours such as inspiring, engaging and coaching staff are more effective in achieving student centricity in the current phase of Student-centric, Values-driven education.

Data drawn from various sources such as year-end reviews triangulate the hypothesis that transformational and servant leadership styles are more aligned with the philosophy of student-centricity and are more resonant with staff, such as building strong and trusting relationships, good communication skills, listening and empathy as they bring the people along with them towards reaching the organisational vision. They have the potential to change the reflective practices of educators as they provide more abundant opportunities to involve all members of the learning community and are more consistent with the move towards distributed leadership in schools.

The paper points out two key challenges in achieving the vision of Student-centric, Values-driven education, the first being inadequate understanding of the nature, attributes, behaviours and benefits of transformational and servant leadership styles. Secondly, the prevalent leadership styles practiced by school leaders and middle managers are more pragmatic and results focussed, which conflict with the more ethical and moral leadership styles such as servant leadership which is needed to inspire, grow and develop students and staff to be creative, critical and innovative thinkers.

The paper recommends that more school leaders and middle managers should role-model and demonstrate more transformational, inspirational and relational styles of leadership in schools and more efforts can be made at national, district and school levels to unpack the notion of student-centricity that are more resonant with stakeholders in the current paradigm of student-centric, values-driven education.

Keyword: Educational Policy/Reform, Leadership
A Pilot Evaluation on the Effectiveness of a Developmental Lesson Package to Develop Skills on Social and Emotional Learning

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POH Zhaoxin, Crescent Girls’ School, Singapore
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Civics and Moral Education

Abstract

In recent years, there has been increasing emphasis on the social and emotional well-being of students. In Singapore, the Ministry of Education provides teachers with lesson packages that aim to equip students with skills to recognise and manage their emotions, develop care and concern for others, make responsible decisions, establish positive relationships and handle challenging situations positively. As these lesson packages are designed for students across Singapore, the lesson packages were adapted and customised in Crescent Girls’ School (an all-girls school with only express stream students) to suit the needs of her students.

In 2014, Crescent Girls’ School conducted a review on the customised lesson packages using data from learning needs survey with students, focus group discussion with students and teachers, as well as consultations with external experts in Social and Emotional Learning (SEL). The review suggested that while the customised SEL lesson packages were useful in letting students understand the various components of SEL, students wished to learn the specific steps that they could take to tackle their socio-emotional issues. The school subsequently revamped the SEL lesson packages following a four-year developmental plan.

The Strong Teens Symptoms and Knowledge tests were used to assess the effectiveness of the revamped lesson packages. Pre-post tests were administered using the Symptoms test to investigate the effectiveness of the revamped SEL lesson packages on 831 Secondary 1 to 4 students’ distress level before and after going through the lesson packages. The Knowledge test was also used to compare students’ ability to recall the SEL skills taught across levels. Details of the result analysis and recommendations for improvement on the lesson packages would be provided during the presentation.

Keyword: Affective Education, Citizenship Education
Abstract

Writing is a complex process. It requires the writer to not only pay attention to the conventions and mechanics of writing, but also to observe the use of appropriate lexico-grammatical choices to express his ideas clearly. Most students struggling with writing experience difficulty developing plans and staying focused on the topic as they write. Research has shown that Self-Regulated Strategy Development (SRSD) writing model has a positive impact on fostering students’ meta-cognition and self-regulation in the planning and composing of writing, and could build their fluency in writing. In particular instructional procedures are scaffolded across six basic stages to meet students’ needs until they are able to use both writing and self-regulation strategies independently. In view of the extensive reports of the benefits of SRSD writing instruction on struggling writers in different age groups and ability levels in the United States, an intervention was conducted to examine the effects of SRSD instruction on a group of Primary 4 middle and low progress students (n = 62) in one Singapore primary school. This paper reports on the findings of the intervention which sought to improve students’ writing outcomes of narrative text over one academic term.

Data for the paper is based on the student’s composition scores collected in the pre-intervention, intervention and post-intervention stages of the study, along with sample analyses of student writing. The findings indicated that there was a significant improvement in the composition scores of low-progress students after the intervention. Detailed analyses of samples of student writing from both middle and low progress students also show the evidence of the use of SRSD strategies, as well as an improvement in word length, quality of ideas and their sequencing, and use of effective vocabulary. The paper concludes that for the intervention to achieve its full impact on the writing performance of either group of students, it would have to be implemented over a sustained period of time.

Keyword: Curriculum in Classroom, Literacy
Teachers’ backgrounds and their influence on pedagogies and perceptions of Social Studies as National Education in Singapore

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Humanities and Social Studies Education

Abstract

Social Studies at the Secondary level has often been identified as the vehicle by which schools socialize young people into a love of Singapore and through which knowledge about Singapore’s history, development and current issues will be promoted (Sim & Adler, 2005). Social Studies has been examined intensively in terms of its implications on students and pedagogy within schools and classrooms, but it should be noted that teachers, too, as individuals rather than as a collective fraternity, influence the delivery of a curriculum that serves as “National Education”. This small-scale study, involving 10 Secondary Social Studies teachers in Singapore, seeks to examine how antecedent characteristics of educators – their race, years of teaching experience, subject majors in University, and their prior experience as Social Studies students themselves – influence how they view the curriculum and hence the ways in which the content is delivered. Specifically, this study examines how Social Studies teachers implement their own views on curricular content and methodologies in the classroom, given extensive governance in public schools as well as the “culture of censorship and restraint” (Cornbleth, 2001).

Through in-depth interviews (both formal and informal) with 10 Secondary Social Studies teachers, this study found that the race of teachers interviewed, as well as their academic backgrounds, had little or no influence on the ways they viewed and delivered the curriculum. On the other hand, it was found that teachers who had relatively fewer years of experience teaching Social Studies were far more enthusiastic and willing to explain to students the enduring ideologies behind the teaching of Social studies, and even provided case studies beyond the syllabus. Also, it was an interesting finding that teachers who had been through the Social Studies curriculum themselves as students were more empathetic towards the subject, and took greater effort and care to ensure students enjoyed it. The findings contribute to the recent calls to adopt greater reflexivity towards curricular instruction and design, which continues to remain contentious in a subject that has been seen as a means to promote, manufacture and legitimize national historical traditions, symbols and values (Hobsbawn, 1994).

Keyword: Curriculum in Classroom, Humanities and Social Studies
Giving Written Success Criteria-Based Feedback to Improve Student Achievement in Algebra

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LEE Wei Leng, Evergreen Secondary School, Singapore

Abstract

The purpose of this research is to investigate the effect of giving written Success Criteria-Based Feedback (SCBF) as a means to improve student achievement in Algebra for students in the Secondary 1 (Express) stream. The aim is to further establish that the students in the experimental group will achieve significantly higher scores in an algebra test as a result of the different treatment condition. In the experimental group, each Secondary One student receives written SCBF on his/her misconceptions, while the students in the control group receive traditional expository instruction where feedback is given to the class verbally as a whole.

There were 60 students each in the experimental and control group. The groups were formed based on similar mean scores of the classes' Continual Assessment of earlier topics. Both groups were then taught how to simplify algebraic expressions by their teachers. The research design was a quasi-experimental one in which both the experimental and control group were intact classes without randomization. Both the experimental and control groups took the same 35-minutes Pre-test. The intervention for Experimental group is to use One-Note for written SCBF feedback while the control group was given group verbal feedback. Post-Test was given to these two groups one week later after the feedback. Interview was conducted to the selected students in the Experimental group.

At the end of the research, both experimental group and control group showed improvement in their post-test results. T-test for independence mean was performed to determine the differences between the means of the test scores of the two groups. The level of significance for accepting or rejecting the hypothesis was set at 0.05 level. Analysis of the data revealed showed that there was a small significant improvement in the mean score of the experimental group in the post-test. However the experimental group students felt that written feedback offers clarity and autonomy in learning, useful resource for self-revision which will help to reinforce their concepts. Also written feedback can be an effective reminders and help them in self-directed learning.

Keyword: Action Research
Promoting creative pedagogies through collaborative application of theories in educational neuroscience – A case of 'Learning Study'

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Teacher Quality, Teacher Learning and Development

Abstract

Despite worldwide attention on teacher collaborative inquiry approaches to improve the quality of teachers, Canadian teachers are relatively unfamiliar with approaches such as ‘lesson study’ and ‘learning study’ (LS). Our study addresses the recalcitrant problem of Canadian teachers working in professional isolation, and how current provisions of collaboration may be limited in promoting teacher learning. Our paper reports the first case of LS to be implemented in British Columbia (BC), where teachers collaborate to conduct research within the loci of their control through learning to integrate educational neuroscience theories with teaching practices; the employment of educational neuroscience theories is novel and deviates from LS’s use of variation theory as the dominant framework. The research question is: What are BC teachers’ experiences of learning when they participate in an educational neuroscience theories-framed ‘learning study’?

The study involved three Grade 1 and three Grade 4-6 elementary teachers in a BC school, where one of the Grade 4 teachers led the LS and is the co-researcher. The LS included five stages, where teachers collaborate to (1) learn about current theories in educational neuroscience; (2) integrate theories into the design of creative pedagogies for teaching English language; (3) enact research lessons; (4) reflect on student learning; (5) share their experiences with teachers in BC. Employing phenomenography as the methodology, we conducted in-depth one-hour individual teacher interviews before and after the study to capture teachers’ views of teaching and learning and their LS experiences. These were triangulated with teachers’ classroom materials, video recordings of LS meetings and research lessons, training resources, and researchers’ fieldnotes. The analysis resulted in categories that captured variations in the teachers’ learning experiences: (1) deepened understandings of how students construct knowledge, (2) creative design of lessons and assessments that were more aligned with student learning, and (3) increased awareness of their own professional development. The findings signal the potential for teachers to utilize current scientific knowledge about the brain in organizing and explaining learning experiences within classroom contexts, which is a gap area in the field of educational neuroscience. Implications for research, policy and practice will be presented.

Keyword: Collaboration/Collaborative Learning, Professional Development
Modelling Students’ Adoption of Cloud Computing Learning Resources in Underfunded High Schools

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IT in Education

Abstract

This study investigated the factors that led to students adopting cloud computing learning resources (CCLR) in underfunded high schools in hopes of informing effective implementation of CCLR for underprivileged students to compensate for the insufficiency of qualified teachers and quality resources. This study was guided by the CCLR Adoption Model adapted from the technology acceptance model 3 (TAM 3) and the unified theory of acceptance and use of technology (UTAUT), and utilized partial least squares structural equation modelling (PLS-SEM) for data analysis. Survey data of 310 students from two high schools in rural districts were finally included in this study. The findings indicated that students’ adoption and use of CCLR was a function of the perceived ease of use of CCLR, external facilitating conditions from schools, and students’ voluntariness. The perceived usefulness of CCLR did not predict students’ use behavior. Self-efficacy in using CCLR and the playfulness of CCLR did not directly predict students’ use behavior, but they, particularly the factor of self-efficacy, significantly predicted the perceived ease of use. With regard to the gender difference, voluntariness more significantly affected female students’ adoption of CCLR than male students; and anxiety in using CCLR more negatively affected female students in adopting and using CCLR than male students. This study should interest educational practitioners and policy makers seeking to promote equity in education particularly in rural districts by effectively implementing new learning technologies.

Keyword: Educational Policy/Reform, Survey Research
Abstract

In response to the Ministry's call for teachers to use more engaging strategies to deliver student-centric education and to promote meaningful learning, ACE (Authentic and Customised Strategies for Engaged learning) was introduced in our school in 2013. This qualitative study was intended to gain insights into 14 Primary 3 and 5 English-medium and Mother Tongue teachers' experiences with ACE when they implemented its strategies for ten weeks in their respective classrooms. Focus group discussions were held with these teachers to collect data on experiences with ACE. We found that teachers embraced the implementation of ACE and could see its benefits and effectiveness. However, they differed in the extent they implemented ACE, in their understanding of engagement, in their preferences when adopting ACE strategies and in their perception of the extent the intent of ACE had been achieved school wide. Though by and large they were comfortable and confident using some of the ACE strategies, nevertheless, they had concerns and faced challenges when implementing ACE in their classrooms. Arising from their concerns and the challenges, the teachers made various recommendations (eg, more in-depth training and peer observation) for the school to better support them in the implementation of ACE.

Keyword: Primary Schools, Qualitative Research
Using Scientific Argumentation to Enhance Understanding of Evolution

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SIM Lea Kheng, River Valley High School, Singapore
Jacqueline LEE, River Valley High School, Singapore
Daniel ONG, River Valley High School, Singapore
Science Education

Abstract

In this session, we focus on the use of scientific argumentation in biology classrooms to enhance teaching and learning of Diversity and Evolution. Scientific argumentation can help students develop the understanding of the role of evidence in science, and enhances their ability to communicate and collaborate with others. These would contribute to students’ understanding of the science inquiry process.

We will share our intervention from an action research study conducted on ‘A’ Level Biology students; participants will gain an understanding on how and why scientific argumentation is applied, and what impact this method has on students’ learning of science.

Our research suggests that the use of scientific argumentation has a positive impact on students’ scientific understanding of the topic. Our treatment group demonstrated improved ability to piece together relevant evidences to support their claim and then link them to evolution theories. In addition, students using scientific argumentation showed improved quality in their classroom conversations. This reflects their elevated understanding of the science inquiry process, allowing them to critically examine evolution theories to achieve understanding.

Participants will take away ideas on how they could adapt scientific argumentation in their classrooms.

Keyword: Classroom Research, Science Education
The use of technology to maximise engagement and learning motivation with Engagement Theory

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MRS LEE MENG CHOO, Singapore Chinese Girls' Primary School, Singapore
IT in Education

Abstract

Vocabulary learning has always been a concern for language learners as the acquisition of the word recognition and its associated meaning is deemed as sheer complexity. The conventional approach to vocabulary learning is usually mechanical and mundane, resulting in little motivation in students’ learning, followed by low engagement and finally led to low learning achievement. Kearsley and Shneiderman (1999) explained that student engagement is essential to the learning process and “technology can facilitate engagement in ways which are difficult to achieve otherwise”. Hence, a case study was conducted delineating the 3 processes (Relating, Creating and Donating) within the Engagement Theory. A web-based gaming platform was used as an instrument to maximize students’ engagement, with the aim to increase learning motivation and learning achievement. In the Relating or collaborative stage, students were “forced” to “clarify and verbalize their problems, thereby facilitating solutions”. At this stage, students discussed questions before exercising their options. As Vygotsky views interaction with peers as an effective way of developing skills and strategies, this learning environment had proven that the less competent students developed with help from more skillful peers within the zone of proximal development. Collaboration among peers is indeed an effective avenue to help student clarify misconceptions. Creating stage involved students participation in the development of their assessment tasks. In vocabulary learning, each assessment period spanned across short durations rather than a long project term. Thus, this stage is deemed as completed when students are confident with the application of the vocabulary after the clarification of misconceptions at the Relating stage. In the Donating stage, students are to make “useful contribution while learning”. As the application aims at vocabulary acquisition, the realistic focus would be an increase in academic achievement and heightening of pupils’ learning motivation. Through observations during the course of web games intervention and qualitative surveys, it was evident that students demonstrated high engagement level and were motivated in their learning. As the quiz can be administered multiple times, students were able to acquire the vocabulary usage at a more competent level after subsequent attempts, thus attesting that technology can facilitate engagement and improve students’ achievement.

Keyword: Information Technology and Education, Motivation
Research and trends in the field of higher education from 1998 to 2012: A content analysis of leadership studies in selected journals

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School Change and Leadership

Abstract

This paper is to provide a content analysis of leadership studies in the field of higher education as published in three specific types of Social Sciences Citation Index (SSCI) journals, including higher education (i.e. Higher Education, Higher Education Quarterly, Higher Education Research & Development, Journal of Higher Education, Research in Higher Education, Review of Higher Education, Studies in Higher Education, Assessment & Evaluation in Higher Education, Teaching in Higher Education, Journal of College of Student Development), leadership and management (i.e. Academy of Management Learning & Education, Leadership Quarterly, Journal of Management Studies, Management Learning, Management Decision, Leadership, Management Communication Quarterly, Educational Administration Quarterly, Educational Management Administration Leadership and Non-profit Management and Leadership), and education and educational research (i.e. Review of Educational Research, Educational Researcher, American Educational Research Journal, Review of Research in Education, Australian Journal of Education, British Educational Research Journal, Journal of Educational Research, Journal of Educational Research, Asia-Pacific Education Researcher, Oxford Review of Education and American Journal of Education) from 1998 to 2012. 88 articles were identified as relevant to the topic of leadership in higher education. These articles were cross analyzed by published years, journal, research topic, and citation count. 32 articles were found in the higher education journals whilst only 15 articles were found in the area of leadership and management. Surprisingly, there were only five articles in the area of education and educational research. Results of the analysis provide insights for educators and researchers into the research trends and patterns of leadership in higher education.

Keyword: Higher Education, Leadership
Using a mixed-method approach to explore Chinese language teachers’ teaching efficacy and beliefs towards differentiated instruction

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Curriculum Development

Abstract

Teaching efficacy and teaching beliefs play vital roles in shaping and sustaining teachers’ curriculum and pedagogical practice. In Hong Kong, differentiated instruction has recently been one of the key recommended strategies to catering to learner diversity in the latest curriculum reform across different key learning areas, including Chinese language education. Past studies commonly focused on teachers’ usage of differentiated instruction including perceived difficulties and its impacts. However, most of the studies were conducted in the western countries and there is a lack of understanding of Chinese language teachers' teaching efficacy and beliefs. Besides, previous studies related to differentiated instruction were mostly carried out in the area of second language teaching. This is thus the aim of the paper to explore Chinese language teachers’ teaching efficacy and beliefs concerning differentiated instruction. Using a mixed-method approach, a questionnaire was first conducted to the teachers in 12 randomly selected Hong Kong subsidized primary schools, as followed by semi-structured interviews with Chinese language teachers. Discussion of the findings about Chinese language teachers' teaching efficacy and beliefs on differentiated instruction is presented. Implications for curriculum development and teacher development, as well as future research directions are then discussed.

Keyword: Curriculum in Classroom, Teacher Education/Development
Making Thinking Visible through the Use of Multiple Representations

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Lynn Ng, National Junior College, Singapore
Learning Sciences

Abstract

The usage of multiple representations is essential in the teaching and learning of Biology to enhance students’ learning as information is being presented in different ways, allowing students to use various senses to explore the content taught to them. This project aims to help students visualize concepts through the use of models (specifically the ball-stick models in biomolecules and structural models in biological system), analogies (especially in cell cycle and DNA packing), videos (for biological processes) and finally, through the use of concept maps to consolidate learning. We will look at the application of multiple representations on Junior High Year 3 and 4 students (Secondary 3 and 4 equivalents) through various Biology topics. In this project, students were first taught concepts through videos and/or direct instructions, before being tasked to organize their content knowledge through the drawing of diagrams and concept maps. In the learning process, misconceptions can be addressed and relationships between the various concepts taught can be delineated to show reinforcement of what was taught to deepen conceptual understanding. The effectiveness on the use of multiple representations as a platform for assessment for learning and feedback to teachers are captured via students’ artefacts and informal discussion.

Keyword: Learning Sciences, Metacognition
Constructivist Approach to Teaching of Hypothesis Testing

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Mathematics Education

Abstract

The teaching of the topic “Hypothesis Testing” in A-Level H2 Mathematics has all along been particularly difficult for educators. The topic involves having the learners acquire many new definitions and terminologies, and to follow standard phrasings and procedures in conducting the statistical investigations. The challenge is heightened further by the nature of the concepts involved – abstract and complicated, and having many cases to consider during the testing.

To help students better grasp the concepts taught, the constructivist approach, brought about through the use of mathematical modelling, was adopted to make learning the topic more accessible and meaningful. Over the course of three years (2014-2016), the year 6 teams in the mathematics department made progressive restructuring and fine-tuning of the content and flow of the teaching materials for the topic with the aim to create an inquiry-based, interactive and reflective learning mode which is in line with the spirit of constructivism.

The end result was an observation by the teachers of a significant drop in the number of student consultations on clarifying concepts in the topic, especially during the initial phase of learning them. Marker’s comments for preliminary examinations also showed that fewer students had mix-ups on the various definitions and terms and/or were unable to state hypotheses correctly. The same constructivist approach was later on applied to tutorial setting where students conducted experiments to make better sense of what they are learning in solving real-life problems.

Keyword: Curriculum & Pedagogical Innovation, Junior Colleges
Solving Real-life Problems through Mathematical Modeling

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Mathematics Education

Abstract

With the aim of exposing students to a problem solving framework and provides authentic learning experience for the students, connecting Mathematics to real-world issues. The team created an item bank of questions suitable for introducing and teaching the various processes of the Mathematical Modelling (MM) framework to students. Team members teaching the various levels also help to provide inputs for the crafting of relevant MM task that requires students to solve real life problem, for the respective level.

Through the modelling tasks, students engage in collaborative discussion in formulating the mathematical model, solving problems and interpreting solutions in real-life context. Unlike textbook Maths questions, they learn to deal with ambiguity, make assumptions to craft a relevant model and most importantly to go through a cyclic process of refinements to seek better solution.

Students also get to equip themselves with a systematic problem-solving framework, as they apply mathematical knowledge learnt to construct relevant models in exploring reasonable solution to real-life problems which they could relate e.g. choice of university tuition loan scheme. In addition, they learn to articulate their thinking through effective and accurate use of mathematical language and notations.

The MM task provides a collaborative learning opportunity for students to search & filter relevant info, handle real-life data and uses appropriate mathematical tools to solve real-life problems. The subsequent project presentation provides a platform for students to highlight and communicate their findings to their peers.

Keyword: Curriculum & Pedagogical Innovation, Mathematics Education
Impact of Philosophy for Children on Students' Reading Comprehension

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Cognition, Motivation and Learning

Abstract

This mixed-method study investigates the impact of a reading comprehension treatment in one Singapore secondary school using Philosophy for Children (P4C) method. The study adopts the Metacognitive Teaching Framework and explores the impact of the P4C method on students’ perception and achievement on reading comprehension. The instructional intervention was conducted over an eight-week period. A pretest-posttest control group quasi-experimental design was used in the study. Qualitative and quantitative data collection techniques (reading comprehension tests, questionnaire and interviews) were used to collect data from 60 middle school students in a mid-tier public secondary school in Singapore. The quantitative results of the study showed that there was no significant difference in comprehension scores between the experimental group and control group when students completed strategy instruction versus traditional teacher-centered instruction using a KWL approach. The qualitative data analyses indicated that students in the experimental group reported positive changes in their perception of their ability to answer higher-order questions. The experimental group reported an increase in engagement when students completed the strategy instruction versus the traditional teacher-centered instruction using the KWL approach. This study discussed implications for teaching, adopting the P4C method as an instructional strategy in the reading comprehension classroom.

Keyword: Curriculum & Pedagogical Innovation, Metacognition
Teaching assistants(TA)' self-efficacy in Hong Kong and training reformation to accommodate students with SEN

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Lum Chun Wai, The Education University of Hong Kong, Hong Kong
Lui Tze Leung, The Education University of Hong Kong, Hong Kong
Special Needs Education

Abstract

This study examined the self-efficacy of TAs in Hong Kong. Quantitative method was adopted. 463 TAs had participated in this study, and their self-efficacy had been tested in 5 domains: teaching support, learning support, behavior management, cooperation and administrative support. The findings were obtained by the means of “Teaching assistant efficacy scale” which was developed by Yan, Lum, Lui, Chu and Lui (2015). Data indicated that TAs were most confident in cooperation and least confident in teaching support and behaviour management. Training to support students with special education needs (SEN) were found to contribute to TAs’ self-efficacy in all 5 domains. However, no differences were found among different training hours because the training cannot meet the needs of TA. This paper suggested reforming the TA training program to increase TAs’ self-efficacy.

Keyword: Special Education, Teacher Education/Development
A mixed-method approach to inquire teacher leadership and professional learning communities in a Hong Kong primary school

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Eunice Wan, The University of Nottingham, United Kingdom

School Change and Leadership

Abstract

The concept of professional learning communities (PLC) has been hotly discussed and recommended in the contemporary curriculum reform over the world. Such a concept is “borrowed” from the western societies and how it is “implanted” in the local Asian societies is still not yet fully investigated. This study thus aims to use social network analysis (SNA) as a framework to investigate how PLC is perceived and practiced in a Hong Kong school. In the data collection, with reference to a wide range of literatures concerning professional learning communities, a self-developed instrument was used as primary data in exploring teachers’ perceptions of professional learning communities, as well as teachers’ social networks in supporting school-based curriculum development. Besides, secondary data such as field notes of one-day shadowing of teachers, together with school official documents, was collected so as to understand teachers’ daily interactions. Findings of teachers’ perceptions and practices of PLC will be presented, as followed by a discussion of issues regarding the development of PLC for curriculum development as well as implications for future leadership studies.

Keyword: Leadership, Primary Schools
A reflective practice: issues to students' learning and pedagogical practices

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Teacher Quality, Teacher Learning and Development

Abstract

Keeping a reflective journal is a good habit for teachers who aspire to equip themselves with authentic learning tasks and to conduct their lessons efficiently. It is a highly recommended practice for beginning teachers as it speeds up the process of adapting to the profession. On the other hand, experienced teachers in general shun away from keeping journals for various reasons. In fact, journals can be a good source to address a number of learning issues in this rapidly changing educational landscape for all teachers.

This study reports about insights gained from a reflective journal which was kept by a practitioner for about six months as he conducted his Grade 11 physics lessons. The journal was regularly updated almost on a daily basis and the entries were stored in a digital format for convenience. Thinking, reflecting and acting on the entries keyed in the journal served not only to identify students’ strengths and weaknesses in understanding concepts in physics but also to improve the teacher’s pedagogical practices such as classroom discussions, peer learning, self-directed learning and direct instruction.

In addition to insights gained from the journal, the challenges encountered to record observations will be discussed in detail. Successful learning outcomes achieved by students will be exemplified. Lastly, the implications for instruction will be elaborated by seeking answers to the question of to what extent such a reflective journal can be useful for all teachers.

Keyword: Action Research, Teacher Education/Development
Understanding the Singapore Economy – use of games to enhance student engagement and achievement

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Humanities and Social Studies Education

Abstract

The A Level Economics syllabus requires students to apply economic principles and concepts to analyse the issues, problems, policies facing the Singapore economy. Yet the use of traditional lecture mode of delivering the content on the workings of the Singapore economy might be too didactic to be effective. This action research project aims to study "the impact of the use of a game show format and quizzes on student engagement and achievement in the understanding of the Singapore economy". A total of 12 classes in Year 6 in River Valley High participated in a series of intervention measures including quizzes, game show competition, academic readings. Quantitative data was gathered through pre- and post-tests of students’ achievement in a written assessment. To measure student engagement, qualitative data was collected through student survey and teacher reflection and feedback. Overall, feedback collected were favourable and paired t-test of the pre- and post-test mean score showed a positive difference which was statistically significant.

Keyword: Action Research, Curriculum & Pedagogical Innovation
Feminist Science Inquiry in the STEM Education of Girls

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Science Education

Abstract

Much has been discussed about promoting STEM (science, technology, engineering, mathematics) education to increase the number of girls/women in STEM fields. There are many different approaches to STEM teaching including inquiry, problem-solving, and case-based learning. However, there is limited discussion about feminist pedagogies in the STEM education literature.

This paper discusses the feminist inquiry approach to STEM teaching in a programme designed for girls aimed to encourage more of them to pursue STEM-related degrees and join STEM-related careers. To my knowledge, STEM for Girls (STEM-G) (a pseudonym), was the only all-girls STEM programme in Singapore. It was conducted by volunteers of a large international non-profit organisation. The research study was conducted in an all-girls Singapore secondary school where Grades 7, 9 and 10 students participated in STEM-G. Data collection included lesson observations, videoing, student interviews, pre-programme survey and post-programme survey. Event oriented inquiry was adopted in the analysis of selected lesson videos using emergent coding and constant comparative approaches. Qualities of feminist inquiry approaches such as valuing of the multiplicities of ideas and acknowledging knowledge is a powerful resource were illuminated. Evidences of positive influences on the girls’ learning such as inciting conversations about interest in STEM careers, acceptance of different ideas, the revision of original ideas, and giving considerations to contextual factors were found.

This study has implications for educators designing, planning and enacting STEM curriculum for girls with the intention to encourage more of them to join STEM-related fields. The findings of this study also push the current boundaries of the literature on inquiry teaching which lacks a feminist perspective.

Keyword: Gender/Gay/Lesbian Studies, Science Education
Abstract

Cook-Sather (2002) once wrote about how authorising student perspectives is highly essential to improve educational practice and inform educational reforms. She argued that teachers' listening and learning from students will help improve teaching and learning practices at the ground level, while potentially impacting educational policies at the systems level. In the local support settings for students with special educational needs, students' voices can also be important elements of success in improving teaching and learning practices, empowering and motivating them to participate constructively towards their educational interventions (Colsant, 1995; Oldfather et. al, 1999; Sanon, Baxter, Fortune & Opotow, 2001; Shultz & Cook-Sather, 2001). This paper presentation aims to highlight how the basic practice of listening to students' voices can potentially contribute to the success of intervention support for special educational needs in local mainstream schools. The presentation will cover how the significance of students' voices was surfaced through a local hermeneutic phenomenological study, where in-depth qualitative interviews were conducted with children and adolescents diagnosed with Attention-Deficit/Hyperactivity Disorders. A sharing session on how this process of acknowledging students' perspectives can be practised within a mainstream school will also be conducted.

Keyword: Special Education
Abstract

This study is aimed to know the differences and the relationship of the students' and teachers' learning styles and self-efficacy. Together with these is to determine the possible predictors of academic performance among its pioneer 428 senior high school students and their 18 teachers. Different tests were administered to them, including the entrance examinations given to the students upon their application for admission. Results indicate that teachers are more visual and kinesthetic learners, while the students are more auditory and kinesthetic learners. Further, teachers show that they are group learners while majority of the students are individual learners. Both the teachers and students have high self-efficacy. Differences between the teachers and students' visual learning styles ($t(444) = -2.487, p < 0.05$, with effect size of 0.117) and self-efficacy ($t(444) = -4.110, p < 0.05$, with effect size of 0.194) were found. Using Chi-square tests of association, it was found that learning styles between the teachers and the students are related $\chi^2 (17) = 27.82, p < 0.05$. Meanwhile, there is no significant relationship between the students and teachers' self-efficacy ($\chi^2 (1) = 0.927, p > 0.05$). Regarding possible predictors of the student's academic performance, it showed that School Ability Index [SAI] ($r = 0.436^*, p = 0.000$) and Academic tracks ($r = 0.131^*, p = 0.003$) are related to academic performance; and are possible predictors ($F(2,425) = 52.912, p < 0.05$). Using the prediction formula of $Y' = 0.204$ (SAI) + 0.243 (academic tracks) + 68.383, possible underachievers were identified for interventions.

Keyword: Assessment, Humanities and Social Studies
UnPEEEELing the PEEEL: An Inquiry into Writing under Examination Conditions

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Language and Literacy Education

Abstract

In framing writing as discourse with focus set on the crafting of body paragraphs in an argumentative essay, one that is written under examination (exam) conditions, this paper evaluates an instructional strategy dismissed by many as a writing template: PEEEL (Point, Explanation, Evidence, Evaluation and Link). Arguing that PEEEL ensures clarity and cogency in the written presentation of an argument (Rosenblatt, 1978; Grimm, 2009; Toulmin 2003, Sprague 2012) while advocating variation in writing style (Flower & Hayes, 1981; Swales, 1990), the paper stresses the need to recognise and address challenges affecting exam-based writing tasks. This includes the difficulty of interpreting terms found in many English language assessment rubrics. Reflecting on the lived experience (Aoki, 1993) of conducting a writing workshop for secondary school English language students in Manchester (January 2016), this phenomenological study asserts the need to pay attention to exam-literacy skills in classroom-based writing instruction, while developing writing pedagogy as a reflective practice.

Keyword: Assessment, Literacy
IMPACT OF TEACHER-STUDENT RELATIONSHIP (TSR): A COMPARISON STUDY BETWEEN STUDENTS WITH AND WITHOUT INTELLECTUAL DISABILITY

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Special Needs Education

Abstract

This is a comparison study conducted between students in the mainstream and SPED schools. In total, there were 364 participants; 200 students from a mainstream secondary school and 164 participants from two SPED secondary schools in Singapore. Specifically, this study examined if students in SPED schools differ from their peers who are in mainstream school in their way of experiencing teacher-student relationships. In addition, this study also looked at which particular domains of the teacher-student relationship that predict both behavioral and socio-emotional adjustment among students with and without intellectual disability. All participants were administered a survey to measure their teacher-student relationships, behavioral adjustment and socio-emotional adjustment in schools. The independent sample t-test analyses showed that students in the SPED schools reported significant better teacher-student relationships, as compared to their typically developing peers in the mainstream school. This finding is interesting as it is inconsistent with past similar research in the literature. This finding could be due to how educational policy for individuals with special needs differ in Singapore context in comparison to other countries such as the America. The multiple regression analyses further revealed that teacher-student relationships have strong influence on students’ behavioral outcomes, both among students in SPED and mainstream schools. Specifically, absence of conflict, presence of nurturance and positive rapport with their teachers and these factors were protective of students from engaging in behavioral issues such as truancy, disobedience, and defiance. In terms of students’ socio-emotional outcomes, the multiple regression analyses showed that teacher-student relationships have influence only among students with ID, but not those in the mainstream schools. Specifically, the findings seem to suggest that it is important for students in SPED school to feel accepted or liked by teachers so as to enhance their emotional regulation and problem solving ability. We will discuss the implications of these findings in the light of teacher education with respective to teacher-student relationship.

Keyword: Motivation, Special Education
Use of Variation Theory in the Teaching of Chemistry: Elements, Compounds and Mixtures

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Science Education

Abstract

Learning Study is an approach to improving teaching and learning with Variation Theory as the theoretical underpinning. Variation theory examines and triangulates the object of learning from these three different perspective: the intended object of learning (what teachers intend to teach), the enacted object of learning (what actually happens in the classroom), and the lived object of learning (what did the students actually learnt) (Bussey, Orgill and Crippen, 2013). Our learning study project focuses on the learning of the topic: Elements, Compounds and Mixtures by the Secondary Three Normal Academic cohort.

The critical features necessary for students to distinguish between elements and compounds were confirmed through the use of a pre-test survey and student interview with questions designed by the team.

During the lesson, critical features of the concept were presented to the students through three patterns of variation: Contrast, Separation and Generalization in the research lesson with Class A. A revised lesson was carried out on Class B with the infusion of See-Think-Wonder Making Thinking Visible thinking routine. The effectiveness of both lessons was measured through the use of a post-test survey and student interview.

Results from the post-test survey showed that students from both classes benefited from the lesson based on Variation Theory. However, students from the revised group showed greater improvement through their post-test survey results.

Keyword: Classroom Research, Science Education
Experiences of Intervention Support Targeting possible Pathological Demand Avoidance (PDA) Syndrome

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Choi Pui Meng, Ministry of Education, Singapore
Special Needs Education

Abstract

Over the past years, children with Pathological Demand Avoidance (PDA) syndrome are increasingly being recognised for their unique profile of needs. The differences between their profile of difficulties and those with classic autism or Asperger’s Syndrome have become clearer than before (e.g.s, Newson, 1983, 1996; Newson & David, 1999; Newson & Le Marechal, 1998; Newson et al., 2003; O’Nions et al., 2014). Newson (2014) and her colleagues (e.g. Christie, 2007) argued that PDA Syndrome should be conceptualised as a separate identity. However, a large proportion of children and adults with symptoms similar to PDA Syndrome had been earlier diagnosed with Pervasive Developmental Disorder Not Otherwise Specified’ (PDD-NOS)’ as classified within the Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition (DSM-IV; American Psychiatric Association, 2000), “a much less helpful diagnosis” (Christie, 2007).

With the diagnosis of PDD-NOS being subsumed within Autism Spectrum Disorders (ASD) in the current Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (DSM-V; American Psychiatric Association, 2013), which is often used by local clinicians for diagnoses of disabilities, students who display symptoms better described by the profile of PDA Syndrome may experience significant school difficulties as their unique needs are not optimally supported through the use of suitable strategies.

This paper presentation involved the case of a Primary Five girl who had significant areas of difficulties, similar to that a child who presented with symptoms attributable to PDA Syndrome (Newson, 1983). Instead of focusing on providing a (currently) unofficial diagnostic label that would be unhelpful in guiding intervention, a group therapy approach was set up to address specifically the areas of difficulties the girl has experienced throughout her primary school years. This presentation focuses on how elements of Circle of Friends (Barrett & Randall, 2004; Frederickson, Warren, & Turner, 2005), cognitive-behavioural therapy, as applied in The Incredible Years® (Webster-Stratton, Reid, & Beauchaine, 2011) were adapted for use to support this girl and her school difficulties.

Keyword: Special Education
Redesigning a module to develop students’ mathematical thinking

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Yanto Jakop, Singapore Polytechnic, Singapore
Mathematics Education

Abstract

School of Mathematics and Science of Singapore Polytechnic offers a range of mathematics modules to support students from various academic schools in their diploma studies. Through these modules, the school aims to develop students’ ability to think mathematically. Adapting ideas from Schoenfeld’s (1992) paper, the school focused on four main categories that make up mathematical thinking i.e. knowledge base, problem solving, monitoring and control and practices. Based on further literature review, specific learning outcomes associated with each category were then developed. Using the backward design approach, curricular and pedagogical elements that will help achieve each learning outcome were then identified and translated into a checklist to help future development and evaluation efforts for the school. The checklist was then used in the revamp of MS0105, a discrete mathematics module offered to students from IT school. Notes, activities and tutorials were modified to train students according to mathematical thinking outcomes. The module was subsequently identified to adopt the Flipped Classroom model. Learning packages comprising of video lectures, lesson plans, quizzes and class activities were developed and also evaluated using the checklist. To assess the effectiveness of the mathematical thinking framework, a multi-faceted approach was adopted. Firstly, examination scores before and after the revamp were compared and analysed. To measure student satisfaction with revamped course materials, feedback scores pertaining to quality of course materials such as lecture notes, tutorial question sets, and learning activities were also analysed. As some categories of mathematical thinking such as monitoring and control and practices can be difficult to measure quantitatively via achievement scores, there are plans to design a performance task and to analyse non-routine examination problems to measure the desired outcomes. It is hoped that as the framework gets refined and validated, it can serve as a useful tool to articulate what “mathematical thinking” is and can guide future development and instructional efforts of polytechnic mathematics.

Keyword: Mathematics Education
Abstract

The constructive feedback of teachers plays an important role in pupils’ psychomotor learning process. Not only does it provide pupils with information about their areas for improvement, but the feedback received will also serve to reinforce pupils’ performance and motivate them in their learning. In an ideal setting, proper planning and organization by the teachers would provide a conducive teaching and learning environment where pupils would be able to receive immediate feedback on their individual performance. Yet, observing and providing feedback to each and every single individual in a Physical Education (PE) class is a major challenge and the verbal feedback provided may at times be misconstrued, resulting in the failure to attain the learning objective. In line with current educational trend of catering to the differing learning needs of pupils, an absence of varied forms of feedback may prove detrimental to pupils’ learning due to the lack of engagement of the pupils’ cognitive processes (Chua & Chang, 2015). Hence, this dilemma presents PE professionals with the opportunity of introducing ICT in PE lessons to overcome the shortcomings of verbal feedback. Our project seeks to explore the affordances of ICT in PE lessons to enhance positive learning experience of students in the area of feedback distribution.

This paper focuses on an exploratory study of Primary 4 students (10-years old) in using ICT mobile applications during PE lessons. It investigates on using the slow motion video analysis - “Hudl Technique” mobile application to enable students to video record their performances and also analyse their performances to achieve the learning outcomes in the PE curriculum. In groups of four to five, students harness the use of ICT mobile application on tablet computing devices to provide students with feedback during their activity as well as to serve as a report card for them to evaluate their overall improvement.

Keyword: Information Technology and Education, Physical Education
Student perception of Investigative Case-based Learning in learning research skills in Madrasah Al-Arabiah Al-Islamiah

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Siti Fatimah, Madrasah Al-Arabiah Al-Islamiah, Singapore
Curriculum Development

Abstract

Investigative Case-based learning (ICBL) incorporates problem posing, problem solving and peer persuasion (Peterson & Jungck, 1998). In ICBL, teachers act as the facilitators and students are given opportunities to direct their own learning to explore authentic problems. This approach is implemented in Madrasah Al-Arabiah Al-Islamiah’s Research Skills Programme during which students learn practical skills required for research in Science. The aim of this study was to investigate students’ perception of this mode of teaching and learning and how the problems that have arisen may be overcome. A mixed method approach was adopted where data was collected in two phases, in the form of an evaluation survey as well as focus group discussions to gain a deeper understanding of the students’ experience. Lower secondary Science students was the subject of the study. The results of this study demonstrated that the students had a good understanding of ICBL and experienced the positive aspects of the approach. Through deeper analysis of the findings, we hope to enhance the programme to align it with our students’ learning needs.

Keyword: Action Research
Supporting and Sustaining Creative Work in Online Discourse using Idea Progress Reports (IPR)

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Learning Sciences

Abstract

The concept of idea improvement is crucial for students in their search for innovative solutions to complex problems, especially in the present knowledge society. Apart from face-to-face discussions in classrooms, the prevalent use of online discourse platforms in schools has provided students with more opportunities to share information within online learning spaces. However, beyond sharing information, it is a challenge for teachers to provide support and sustain creative work in online learning communities that aims at helping students generate and improve ideas. Teachers might require more experience in facilitating for productive discourse and steering students’ discussion towards learning objectives. However, with the gradual influx of learning analytics into the educational sector, technology can be harnessed to assist teachers in encouraging collaborative knowledge sharing and simplifying tedious tasks of assessing and analyzing online discourse assessment. A sample of secondary school students (N=17) was engaged in online scientific discourse and the textual data was analyzed. Using Social Network Analysis and relevant network metrics, an Idea Progress Report (IPR) can be generated for individual or group of students. The IPR consists of information about students’ perceptions and understanding of ideas throughout the discourse. The IPR also charts the trajectory of idea development by depicting how the ideas within discourse evolved over time. The findings are particularly interesting for individual students who may not realise that they have contributed significantly or created impact within the learning community. By showing the progress in idea developments to these students, the IPR can serve as a useful tool for students to discover idea diversity within the learning community and also allow students to assess their level of understanding relative to their peers. Teachers can also monitor the community’s overall level of understanding through visualizations of graphs for a quick class-to-class comparison. This method demonstrates that analytics, when deployed in the context of education and class discourse, is potentially useful for visualizing learning and supporting of creative work in discourse, and consequently encourage students to continually improve their ideas through collaborative efforts to advance the community knowledge.

Keyword: 21st Century Competencies, Collaboration/Collaborative Learning
Abstract

The present research aims to explore the effectiveness of the World Voice program on engaging children with special educational needs (SEN) in mainstream classroom activities. The World Voice program involves the approach of musical training and activity for classroom inclusion. Primary school teachers are encouraged and trained to use singing as a pedagogical tool to enhance pupils’ learning across subjects. In the research, 15 teacher participants attended the training workshop conducted by the native English-speaking trainer. Classroom observations and teacher interviews (twice) were conducted for evaluating the effectiveness. The model of student engagement was used to analyze the qualitative data.

Results showed that the World Voice program worked very well for children with and without SEN in classroom inclusion. It was observed that the approach facilitated students’ behavior and affective engagement. Teachers also reported that the training enhanced the behavior, affective and cognitive engagement of children with SEN and without SEN to a great extent. The presentation will further discuss the significance, limitations, and implications of the World Voice program.

Keyword: Primary Schools, Qualitative Research
A BLENDED APPROACH TO ACTIVE LEARNING IN PHYSICAL EDUCATION: THE ‘HYBRID’ PE LEARNING DESIGN

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Physical Education & Sports

Abstract

In MFSS, the ‘Hybrid’ PE learning design runs in tandem with the unit plan of any sports module in the PE curriculum. Essentially, students log onto Google+, an online community to upload videos of performance task specific to critical skill practice, in line with the new PE syllabus’ learning outcomes. Sport equipment are then loaned to them, and after school hours within the span of 2 to 3 weeks, they will practise for their best attempt and submit online onto Google+. These videos form a snapshot of where the students are at as evidence for formative assessment.

After posting their 1st series of videos, students undergo a rigourous system of feedback to help them improve. There are 3 sets of feedback received for each student – one as a self-reflection, one from a buddy, and one from the teacher. The student will then utilise these constructive, personalized feedback specific to their 1st performance to practise for betterment with their 2nd series of videos.

This practice takes into account the characteristics of the ‘digital natives’ – individuals who are born into the digital age and are conversant with navigating the nuances of technology (Bennett and Maton, 2010). Hence the level of motivation to participate in this project is elevated as students find themselves at ease in traversing through the technological aspect of the learning design.

Furthermore, in the teaching of PE, teachers are often faced with a large class size of 35 to 40 students of a continuum of abilities. A skilful practitioner can often provide feedback for majority of a class, but to reach every student still prove a tricky instructional challenge. Given that feedback has been established as one of the top contributing factors to student learning (Hattie, 2007), it would be beneficial to provide each student with a myriad of individualized feedback in a bid to elevate learning in any classroom through the affordances of technology.

Keyword: 21st Century Competencies
A Questionnaire Survey on Chinese Zhuangang Primary English Teachers’ Perceptions of Their Professional Identity

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Tao Xiong, Guangdong University of Foreign Studies, China
Teacher Quality, Teacher Learning and Development

Abstract

Zhuangang (literally means “transferring post”) English teachers, usually in the primary schools of the rural areas in China, refer to English teachers who used to teach school subjects other than English. Some of them may at the same time still teach other subjects in addition to English. They are a part of the solutions to the shortage of English teachers due to the policy of popularizing English learning in primary schools in China starting from 2001. Although they account for a large percentage of primary English teachers in China, relatively little research has been conducted to investigate the status of their professional development and identity. This study is aimed at presenting a demographic profile of zhuangang English teachers in the rural areas of China and at finding out whether there is a significant difference between zhuangang and non-zhuangang English teachers in their perceptions of professional identity and if it is the case, what may be the possible reasons for it. A questionnaire exploring professional identity was allocated to all the English teachers in a county located in Guangdong Province, south China and 182 responses were obtained. It is found that zhuangang English teachers account for 1/3 of the whole group of English teachers in the rural areas. Besides, a significant difference (p=0.005) was observed between zhuangang and non-zhuangang English teachers in their perceptions of professional identity, and it mainly comes from their distinct views on English teaching and learning, and on the profession of being an English teacher. Most importantly, the reason lies in the unsatisfactory level of their English proficiency. It is concluded that more attention should be given to zhuangang English teachers to build up their professional identity and zhuangang English teachers themselves should be aware of their own situations. Implications for enhancing their professional identity and professional development are also discussed.

Keyword: Language and Education, Teacher Education/Development
**Triple A’s of Mathematics: Analysis, Application and Accountability**

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Chan Ho Lun, Mayflower Secondary School, Singapore  
Mathematics Education

**Abstract**

The team aims to instil the triple A’s of Analysis, Application and Accountability in our students when solving Mathematics problems. The meaning of ‘knowing’ has evolved from being able to recall information to being able to find, use, organise and present it coherently. A shift away from the old mind set of memorising formulae without making meaning of them and practising without deep understanding is necessary.

Preliminary data has shown that students do not believe that doing activities help them understand Mathematical concepts better and are not confident in applying Mathematical concepts to solve real life problems. Activities have been designed to help secondary two students make meaning of Mathematics formulae. Through these, opportunities for students to discover mathematical results are created. To make the learning of mathematical concepts relevant to the students, problems that include situations that arise in their everyday life are crafted. The triple A’s of Analysis, Application and Accountability are used in the solving of these problems. During the first stage of analysis, students are required to understand the problem, state what they need to find and extract the relevant data. After which, they decide on the appropriate mathematical concepts to apply when solving the problems and perform the necessary calculations. To train students to be accountable for their work, they have to check that their solutions are realistic and justify the methods that they have applied.

The team will share the design of these resources, the implementation process, evidence of students’ work and the challenges faced thus far.

Keyword: Curriculum in Classroom, Mathematics Education
Exploring the Meaning of Physics’ Culminating Activity: Physics of Sports

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Science Education

Abstract

Physics, as a specialized subject in K-12, requires in-depth subject integration on everyday activity. This paper explored the meaning of Physics in Sports, students’ culminating activity, in General Physics 1 (GenPhy1) and aimed to widen the knowledge of the students, enhance the attributes and competencies acquired based on the 21st century competencies and to assess the students’ perception on the activity. The paper examined how students integrated the principles of Physics learned in GenPhy1 in the sport of their choice. The objectives of Republic Act 10533 or the Enhanced Basic Education Act of 2013 of the Philippines are to use pedagogy that is reflective and integrative to daily life activities to meet the required content and performance standard and manifest 21st century lifelong learning skill among learners. This paper explored the meaning of Physics in Sports specifically on how the students applied their learning on General Physics 1 (GenPhy1) and an evaluation of the final culminating activity. The study was conducted at De La Salle Lipa, SHS STEM students. Students’ views on the culminating activity were considered for the revision of GenPhy1’s unit plan and curriculum to be implemented on SY 2017-2016. Thus, this paper evaluated students’ reflection and integration of learning to a certain life's activity. The research utilized a qualitative research method particularly axial coding techniques. The study showed that every skill was highly evident on the activity and among all the skills, ICT/Computing skill shows a perfectly evident result at 4.74 mean. All the data gathered were supported by the students’ statements regarding which skills they have used in the activity and skills used to support each other to achieve their desired results like ICT skills to present their data, edit their work and make their report appealing; communication, cross-cultural referencing and collaboration to work well in group, creativity, critical thinking and life-long career as bases of what they should do on the activity.

Keyword: 21st Century Competencies, Science Education
Learning Progressions for Climate Change: How does it look like in Singapore's school geography?

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Humanities and Social Studies Education

Abstract

Students are often befuddled with misconceptions when learning about climate change across various levels based on previous studies by the first author. Despite clear learning outcomes prescribed at each level that appeared to build on students’ prior knowledge, these misconceptions still exist across various levels in school. While learning progressions are developmental stages where the student acquires progressively more sophisticated understanding of a topic or subject matter and involves building complexity on the simpler concepts, learning new concepts and developing affective learning outcomes, the paper will examine Singapore’s school geography curricula with a view to understanding this issue. The paper will present examples on the theoretical learning progressions developed from the educational artefacts within the school subjects in Singapore and how the learning progression framework is intended to help students develop understanding and clarify existing misconceptions about climate change. Among the documents examined are school subject syllabi, textbooks, and test and examination papers. The implications of learning progression on the curriculum making process for teaching climate change in Singapore’s school geography will be presented. The paper will focus on the teaching of climate change based on the key geographical concepts such as space, place, scale, physical and human processes, environmental and cultural diversity and interdependence. For instance, the topic of enhanced greenhouse warming can be organised around the concept of physical processes operating across different spatial scales. The learning progression for this will be unpacked and presented. The key challenges in the development of the theoretical learning progression will also be discussed.

Keyword: Curriculum in Classroom, Humanities and Social Studies
Learning beyond the classroom

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Educational Policies and Practices

Abstract

Learning is both a process and an outcome. The process is about how we learn and the outcome is what we learn. The process of formal learning traditionally starts in the classroom. However, in order to fulfil the needs of a 21st century learning society, learning should not be restricted by the constraints of the classroom. While teachers can harness suitable pedagogical approaches and technological tools to broaden the limits of the classroom, the scope of learning and teaching can be further expanded with out-of-classroom learning programmes. This paper aims to discuss: a) Why is out-of-classroom learning important? b) How can teachers enrich classroom learning and teaching with out-of-classroom programmes?

Handsonlearning (HOL), a content consultancy specialising in out-of-classroom learning, strongly believes that quality out-of-classroom programmes offer great learning and teaching opportunities and rewards to both students and teachers. In this session, HOL employs case studies supported by relevant theoretical frameworks to explain how venues, such as museums and historical sites enrich learning by providing access to a wide range of authentic resources in immersive environments.

Using examples of experiential and inquiry-based activities, HOL explains the benefits of venturing beyond the classroom and tapping on the potential of out-of-class programmes. With their expertise, HOL provides practical tips for teachers to evaluate and select appropriate out-of-classroom programmes, and align them to the school curriculum. Finally, the session ends with HOL’s sharing of key considerations on how to complement classroom learning with out-of-classroom opportunities, and thus expand the limits of the classroom.

Keyword: Curriculum & Pedagogical Innovation, Learning Environments
The use of flipped classroom with a pre-lesson presentation, role-playing and peer feedback on the Case-based Learning approach

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Science Education

Abstract

For education targeted to train healthcare professional, real patient cases are often used. This makes learning relevant to the actual performance of healthcare professionals. The course of Pharmaceutical Science prepares students to be a pharmacy technicians who assists the pharmacist in providing safe medication to patients. Case-Based Learning (CBL) was used in Pharmacotherapy (an application module in the course) because case based approach engages students in the discussion of a real-world example. However, students, who have not experienced the real clinical setting, were overwhelmed by the rich information provided in CBL. They found it demanding to apply the knowledge that they learnt in other modules during the problem-solving process. This study aims to use flipped classroom with a pre-lesson presentation, role-playing and peer feedback on the current CBL approach.

A pre-lesson topic presentation is conducted by students before the case-based tutorial is distributed. The presentation helps the students to obtain some background knowledge before tackling the case. Then, the students complete the tutorial collaboratively in groups. Students also have to role play the case so as to make it authentic and real. To overcome the shyness of role-playing and the time limitation in the class, each group records their role playing and upload it into e-platform, Blackboard®. During lesson, instructor and students give comments and suggestions for shown videos. The unshown video posted in the Blackboard® are commented by the students and instructor later at their free time.

Face validity was sought with colleagues and alumni. Their feedback was positive. Almost everyone agreed that this new approach is beneficial to facilitate learning. This module is conducting currently, hence the students’ perception can only be gathered by questionnaire in mid-February. However, the mid-term viva test showed that there was a significant improvement of the percentage of the students getting grade B (from 25.6% to 39.2%). This increase was contributed by lesser students getting grade C (from 35.9% to 27.4%) and D (23.1% to 19.6%). Based on the assessors’ feedback, the students were more confident during the mid-term test compare to previous year.

Keyword: Higher Education, Problem-based Learning
Designing a Malay Language Comprehension Lesson for Lower Primary through Effective Use Of Technology and SADBBM Technique

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IT in Education

Abstract

This paper aims to share the processes and experiences in designing a Malay Language lesson for Primary Two pupils. The study involved the integration of ICT and a technique, namely SADBBM, that guided pupils in their understanding of the reading passages. Reading comprehension is an integral component in the acquisition of the Malay Language skills. As such, the teaching and learning of reading comprehension is paramount and this entails a proper lesson design that takes into consideration the infusion of technology and a specific reading comprehension technique. This study was conducted on 26 Primary Two pupils with varied learning abilities. A lesson study approach was adopted to improve the design of the lesson. Therefore, it takes the framework of a lesson study cycle such as setting targets based on the curriculum, lesson planning, execution of the lesson, and reflection and creation of a follow-up lesson. According to Stepanek et.al. (2007: 1), “Classroom life is full of habits and routines that pass unnoticed. They will often remain invisible until they are viewed from a different angle or in a new context,” and with this in mind, this lesson cycle had chosen to steer away from the usual classroom teaching approach and instead instilled ICT into the lesson to further maximise and discover the hidden potential of each pupil. It comprised three lesson study cycles, the third being an open classroom. Through the open classroom attended by 20 teacher observers, the lesson design was further improved. The improvements in every cycle will be shared and discussed in this paper presentation. This includes the differentiated instructions designed according to the pupils’ learning abilities and the harnessing of technology to promote self-directed learning and collaborative learning. In addition, application of the SADBBM technique was reinforced and affirmed through online activities such as self-peer editing and rubrics evaluation. Through classroom observations of pupils’ learning, it was observed that pupils were more engaged and actively involved during lessons. Through the pupils’ output, there were vast improvements in the quality of their work at the end of the study. This presentation will be conducted in Malay.

Keyword: 21st Century Competencies, Ability Grouping
Emerging from the shadows: A case study of a private tuition agency in Singapore

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Educational Policies and Practices

Abstract

The increasing pressure to succeed in school has fuelled the proliferation of private tutoring services or what is known as ‘shadow education institutions’ (SEIs) around the world. This is especially so in East Asia, where educational success is often equated with financial stability and social mobility. This study casts the spotlight on one such SEI in Singapore, which has itself been thrust into the limelight for its success in international benchmarking tests. Adopting an instrumental case study approach, it examines the SEI through the analytic lens of Shulman’s Pedagogical Content Knowledge framework. The aim is to illuminate the little known workings of an SEI to understand its ability to thrive amidst a highly competitive educational milieu. Through the analysis of lesson observation and interview data, the study shows that the SEI goes beyond preparing students for examinations to provide opportunities to broaden their current affairs and general knowledge and develop their social and communication skills in an interactive and enriching learning environment. These findings suggest that SEIs are perhaps emerging out of the shadows of the formal school system, and that it may be mutually beneficial for mainstream schools to engage and work with SEIs to meet the increasing needs of students and their parents.

Keyword: Private Education, Tutoring
The facilitative and inhibitive conditions of social support - implications to teaching and learning

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Educational Policies and Practices

Abstract

Social support is a conventional means that help people cope with stressful situations as well as enhance personal well-being. Based on documentary analysis, this paper attempts to build on the empirical literature of social support from the social science disciplines to generate a framework that guides its application in the field of education. However, research on social support in education is relatively scant, while the teaching profession, by nature, involves provision of support to students. Teachers serve not only as imparter of knowledge, but also important figures from whom students could expect nurturance. In this review paper, we delimit the scope on various target groups who are in need of social support in the society to stress on the importance of social support on individual's well-being. Along this line of inquiry, we conclude various facilitative and inhibitive conditions regarding provision of social support. The results show that the relationship between the support provider and recipient affects the effectiveness of support. The outcomes of social support as well depend on timing and appropriateness of such support behaviours, such as support that mismatches with recipient's needs may increase their burden. This review also highlights how gender, cultural and personality context influence the beneficial effects of receiving social support. While the effectiveness and applications of social support is addressed, implications of this breed of study on the field of teacher education are then discussed. A resultant framework is developed based on the findings, which can be used to guide the development of supportive learning environment and increase students' social capital in classroom settings at the background of the twenty-first century in order to enhance their learning and well-being. On the other hand, this review discusses the potential ways teachers could offer more support to students so as to enhance teachers' personal development and well-being.

Keyword: Learning Environments, Teacher Education/Development
Visual Strategies for improving Communication: Ways to index environment

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Abstract

Visual supports are an integral part of the communication process enhancing effective receiving, processing, action and expression according to Hodgdon (2001). Most students with Autism Spectrum Disorder (ASD) and Attention Deficit Hyperactivity Disorder (ADHD) are visual learners (Lim & Quah, 2004) and are therefore able to process information well when information is presented in a visual mode. This is in line with what Grandin (1992) highlighted based on her insightful and introspective accounts of how people with autism, often “think in pictures”. In the ideal educational environment, the curriculum will focus on the teaching of communication skills as the foundation of other learning areas. Visual tools and the use of visually mediated communication will help enhance the learning environment to maximise the student’s communication potential.

There is therefore great value in linking classroom instructions to actual situations as it happens (when possible). Twachman (1990) highlighted this practice as a way “to index the environment”. In the local support settings for students with special educational needs, self-directed learning through common forms of visual tools can be a valuable part of the communication systems. This paper presentation aims to highlight the comprehension of the environment using visuals to enhance expressive language. This also encourages perspective taking through photography in mainstream schools. The presentation will cover how the development of effective communication skills through photography can determine social interactions, precede acquisition of academic skills, and affect students’ self-management and perspective thinking. The students’ communication competence were then evaluated through group presentations. A sharing session focusing on how student’s photography session helped improved his/her verbal and social communication by utilising the natural environment will be included.

Keyword: Special Education
NearPod to promote AfL and 21 CC

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IT in Education

Abstract

It is important for teachers to design ICT lessons that promote AfL and 21 CC in the classroom today as we recognise that the learners of today are different from the past and teaching pedagogies need to evolve.

While teachers need to relearn the art of teaching to pupils and adopt suitable ICT platforms and practices, very often, they faced frustration with the time that is perceived to be wasted when technical difficulties prevented them from carrying out their lessons. They often leave their classroom feeling dejected and depressed leading to a reluctance to explore the use of ICT in teaching and learning. In addition, teachers also only want to use ICT if it is beneficial for pupils' learning. This means that the use of ICT must have an edge over pen and paper. Using ICT to promote AfL and 21 CC is not going to occur if teachers have phobia conducting such lessons.

We, a group of teachers, surveyed Mathematics teachers in our school to find out the frustrations faced by them when trying to incorporate ICT into teaching and learning so that we can minimise the frustrations faced through identifying suitable platform for teaching of Mathematics and also to help "work" on the technical issues faced by the teachers in view of security features that accompany the SSOE framework in school.

We will be sharing our journey on how we encouraged teachers to use ICT and how we resolved some technical issues with the help of HOD for ICT and the TA and how we managed to start the adoption of Nearpod in the upper primary Mathematics classrooms. We will also be sharing how NearPod can be used for AfL within the Mathematics classroom.

Keyword: Curriculum Design/Reform, Mathematics Education
Using the Orton-Gillingham approach to prepare students with dyslexia for the English PSLE paper

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Special Needs Education

Abstract

Students with dyslexia typically struggle with reading, spelling, comprehension and writing. These translate to a difficulty in performing in national examinations in Singapore such as the Primary School Leaving Examinations (PSLE). With the goal of helping primary school students with dyslexia achieve in their schools and national examinations, a group of Educational Therapists in the Dyslexia Association of Singapore (DAS) developed a curriculum suitable for primary school students with dyslexia – The English Exam Skills Programme (EESP). The curriculum follows the PSLE syllabus, and adheres to the Orton-Gillingham (OG) principles. This meant that students were given structured, cumulative and systematic instruction when concepts were taught. Skills taught in the EESP include comprehension, editing, and synthesis and transformation. The EESP curriculum developers used curriculum design processes adapted from Nation & Macalister (2010), and Richards (2001) to as a guideline to ensure that the curriculum designed and administered is in line with the goals of the EESP. This programme was previously evaluated study conducted by Leong (2015) tracking the progress of a single group of students who underwent the programme. This study aims to further explore both the quantitative and qualitative aspects of progress made my students with dyslexia after an OG based English lesson. It follows a quasi-experimental design model where data were collected in the form of pretest and posttest results and transcripts of classroom observations. The results of this study confirms the effectiveness of conducting lessons for learners with dyslexia in an OG based manner and suggests several possibilities and implications in the field of special education.

Keyword: Curriculum & Pedagogical Innovation, Special Education
Assessing misconceptions in primary science using 3-tiered multiple-choice questions and thinking routines

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Abstract

Assessment is important in feeding-forward learning. The most common and easiest form of assessment in schools, the multiple-choice question (MCQ), does not offer deep insights into student's understanding about science concepts. This action research project aims to explore how existing assessment-for-learning (AfL) tasks based on MCQ formats can be modified to reveal students’ understanding and misconceptions in science.

An action research project was carried out with two classes over six months from March 2016 to September 2016 in a primary school in Singapore. Class A was a high-progress lower primary class (n=34) while Class B was a low-progress upper primary class (n=26). Two pop quizzes using the 3-tiered MCQ with confidence-interval and explanation elicitation format was administered in the topic of digestive system, photosynthesis and human circulatory system.

The tests consisted of three MCQs. For each question, students wrote down their answers and the reasons for their answer choice. They rated their confidence level for the question. A framework was then used to analyse student responses to determine the understanding of concepts taught in class. The framework looked at whether (1) the student answered the item correctly (2) decoded the question correctly based on the elaboration given and (3) showed confidence in the answer provided for the item. The test was repeated again with another topic, again to assess students’ understanding.

Based on the results obtained from the research, it was found that more than 50% of the students who answered incorrectly in each question was due to either poor comprehension of question or lack of knowledge for the topic. This was evident in the low-progress class where students generally have poor grasp of the English language. In the low-progress class, close to 50% of students who got an answer correct due to sheer luck. This was true for questions that were indirect and required multiple layers of information processing. For direct questions, the percentage of students who answered correctly through luck dropped significantly. Finally, the information obtained from the analysis provided teachers a clear direction to addressing students’ difficulties in the topic and remediation measures.

Keyword: Action Research, Assessment
From Examination Ready to Future Ready—The Use of Team-Based Learning for Reviewing Answers

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Science Education

Abstract

This study examines a student-centric approach to review answers through the use of team-based learning in a primary school context. Reviewing answers is an important part of the learning process as it provides feedback for students to clear up their misconceptions. Traditionally, it has been carried out using the lecture method. Recent studies suggest that lecture method restrict the chance for every student to ask questions and construct their own explanations. Hence, it is essential for educators to go beyond academic content by preparing students with skills ready for the future, enriching their learning experience. In the implementation of team-based learning, three classes of primary six students worked on readiness preparation by attempting thirty multiple choice questions in a standard science paper out of class. In class, students took turns to share their responses, negotiate and convince their peers on a response scaffold by the Claim-Evidence-Reasoning frame work. Other classes in the level were the comparison groups, reviewing answers using the lecture method. Students’ examination scores, video recordings and questionnaire were analysed to collect data about students’ acquisition of science concepts, engagement in scientific reasoning and their attitudes towards team-based learning. Results showed that students learnt at least as much academic content than their peers did with the lecture method. Students were observed to be more vocal, engaged in perspective taking and worked cooperatively during team discussions. Students were also receptive towards the use of team-based learning as they were able to learn from their peers. In conclusion, team-based learning reduces students’ dependency on teachers when reviewing answers. Students play the role of being an active contributor when they collaborate with others, sharpening their communication skills. An important takeaway is that incorporating a more student-centric approach in teaching helps equip students with 21st century competencies without compromising on their learning.

Keyword: 21st Century Competencies
Bridging the Research-to-Practice Gap for Special Educators in Singapore

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Special Needs Education

Abstract

The use of evidence-based practices with students with disabilities is continually being lauded by special education researchers and policy makers (Cook & Schirmer, 2006). However, many special educators do not consistently use evidence-based practices in their classroom settings (Burns & Ysseldyke, 2009). This lack of translation of evidence-based practices to practical classroom settings, or in other words, the research-to-practice gap in special education, is of grave concern for researchers and policy makers (Greenwood & Abbott, 2001). While special educators are eager to learn about documented evidence-based practices (Gersten, Chard, & Baker, 2000), many are skeptical about research and often choose practices that are familiar and practical, not placing strong emphasis on whether there is research documentation of the effectiveness of those practices (Boardman, Arguelles, Vaughn, Hughes, & Klingner, 2005).

One avenue to bridge the research-to-practice gap is through meaningful and strategic professional development for special educators (Greenwood & Abbott, 1991; Little & Houston, 2003). The National Institute of Education (Singapore) developed a one-year part-time professional development programme, the Advanced Diploma in Special Education, with an emphasis on research-to-practice. This program, which commenced in July 2014, was structured to enable special educators, special school teachers and allied educators (learning and behavioural support), to learn about relevant evidence-based research literature as they plan and implement a research-to-practice project addressing a practical classroom/school-based concern. In the process of planning, adapting, implementing, and evaluating the evidence-based practice, special educators were asked to take ownership of their projects. Throughout the program, special education researchers served as mentors to coach the special educators in their research-to-practice projects.

A research study, utilizing a qualitative research design with the use of grounded theory approach, was conducted to study the effect of the professional development program on the 33 special educators who participated in the program. Data from written reflections, discussion forums, and artifacts from the research-to-practice projects were analyzed. The research questions were:

(1) What impact did the professional development program have on the special educators?
(2) What are the factors affecting the translation of research-to-practice in school settings?

Keyword: Special Education, Teacher Education/Development
Student-centered approaches to CCE: Common Space in Singapore - The design and use of the Choa Chu Kang Community Trail

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Civics and Moral Education

Abstract

This paper looks at how Pioneer Junior College incorporates into its CCE programme, the design and execution of a community trail meant to highlight the concept of common space, a key approach utilized by Singapore in managing racial and religious harmony. The trail was the product of students from the Community Engagement Council, the college’s dedicated CCA to the area of NE. This trail was launched by Minister Ng Chee Meng as part of the college’s Racial Harmony Day Commemoration 2016.

The project was conceived as a means to inculcate student innovation and ownership of learning in the area of CCE by nurturing and strengthening social cohesion and inclusion. It is an original community-based trail different from the traditional heritage trails, conceptualised and run by students for students. It promotes, through the student led process of design, facilitation and debriefing, a student-centred learning process beyond the confines of a classroom. The paper will discuss the process by which the trail was conceived, designed and executed as well as challenges encountered.

The Choa Chu Kang Community Trail (CCKCT) aims to allow students to discover, recognise and appreciate the ‘common spaces’ in our neighbourhoods that facilitate the daily interactions of the diverse ethnic and religious communities, which residents might have taken for granted as a natural feature of Singapore’s socio-cultural landscape. Crucially, students also understand that while there are ‘common spaces’, there is also space for each ethnic-religious group’s unique identity.

The findings from the implementation of the Trail showed that students found it easier to appreciate that in the shaping of our modern Singaporean identity, it is the understated socio-cultural interactions in housing estates such as Choa Chu Kang that fundamentally gels Singaporeans together as one people and one nation. Follow-up activities which allow students to demonstrate their learning indicate that internalisation of learning has occurred.

A community trail concept that can be easily adopted by other educational institutions, the college’s CCKCT holds much potential as we rethink our approach towards the inculcation of citizenship values.

Keyword: Citizenship Education, Identity
Abstract

Writing instruction in secondary schools has been strongly influenced by the genre approach since the 1980s, which has helped students learn the appropriate structural framework and lexico-grammatical features of the various genres of writing they encounter. However, while students often produce writing which resembles the target genre, these are usually unconvincing and lacking in logic - a problem which is particularly acute when dealing with argumentative writing. Concerned with the development of better writing pedagogies, this exploratory study makes a case for including brainstorming tools, modes of reasoning and Toulmin's model as part of writing instruction. This explicit teaching of thinking skills was implemented as part of a series of lessons on argumentative writing for upper secondary students. Qualitative analysis of selected students' writing yielded findings which are initially encouraging; however, there are some limitations which point to the need for further refinement of, and research on, the proposed thinking curriculum.

Keyword: Critical and Creative Thinking, Curriculum Design/Reform
Using Teaching Aids to Teach Fractions to Primary 4 Middle-Progress Pupils

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Zalina Kusnan, Unity Primary School, Singapore
YEONG Soo Leng, Unity Primary School, Singapore
Kenneth Cheong, Unity Primary School, Singapore
Mathematics Education

Abstract

For this mixed methodology study, the pre-experimental component aimed to establish whether the use of teaching aids in the teaching of Fractions to a class of Primary 4 middle-progress pupils will improve their mathematics test scores. The qualitative component sought to understand from the pupils' perspective the usefulness of the teaching aids in enabling them to learn Fractions after the intervention. This study spanned 11 months of an academic year. A Primary 4 class of 39 middle-progress pupils took part in this study. Data were collected through pre- and post-tests as well as through focus group discussions. The intervention of using teaching aids during instruction helped slightly less than a third of the pupils to improve their post-test results on Fractions. Nonetheless, the pupils affirmed that the teacher's use of the teaching aids were useful in increasing their understanding of the concepts of Fractions.

Keyword: Cognitive Processes/Development, Mathematics Education
Investigating the provision of professional learning and development for New Zealand middle level teachers

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Teacher Quality, Teacher Learning and Development

Abstract

Over the last three decades, a wealth of research evidence has shown that young adolescents, encompassing the 10-15 year age group, have specific physical, social, emotional and cognitive needs (Caskey & Anfara, 2014) that are most effectively catered for through middle level teacher pedagogies and practices that are specifically designed to be responsive to these needs (Dowden, Bishop, & Nolan, 2009; Middle Years of Schooling Association, 2010; Pendergast, Main, & Bahr, 2017). Ongoing concerns have been raised in New Zealand (NZ), over the last two decades, about increased student disengagement from learning and deteriorating student achievement, during the middle years of schooling. While specialised programmes of initial teacher education (ITE) and in-service professional learning and development (PLD) have been implemented in Australia and the United States, NZ has not followed suit. Given that considerable research evidence (Hattie, 2001; Hattie, 2012) has identified teacher quality as the most influential factor in improving student outcomes, the spotlight must focus on the extent to which middle level teachers in NZ are supported with targeted PLD.

This paper reports on the findings of two qualitative studies in which six Year 7-8 teachers in NZ schools were interviewed about their pedagogy and practice and their ability to access professional learning opportunities. To obtain comparative insights, a second study, involving interviews with three key informants extensively involved in research and the provision of PLD to teachers within the Australian and American contexts, was conducted. The findings reflect a significant deficit in the provision of targeted PLD support to NZ teachers of young adolescent students. The implications are clear for teacher education providers in NZ. If teachers in NZ schools are to develop depth of knowledge and a nuanced understanding of the developmental needs and concomitant pedagogy and practice for catering for middle level learners, the provision of targeted and effective PLD must be an imperative.

Keyword: Adolescence, Professional Development
Abstract

From a self-determination theory perspective, this study aimed to investigate the relationship between achievement motivation and classroom and homework engagement of Singapore students in their math study. The analysis of this study was based on a large sample of Secondary 2 (Grade 8) students, who took measures of achievement motivation (i.e., external regulation, introjected regulation, identified regulation, and intrinsic motivation), classroom engagement (i.e., classroom attention and classroom disruption), and homework engagement (i.e., homework effort and homework distraction). Confirmatory factor analysis was conducted with the above measures of motivation and engagement and found that the measurement model had a good fit. Structural equation modeling was then conducted to examine the proposed relations between achievement motivation and classroom and homework engagement of students, with gender and previous achievement controlled. It was found that both external regulation and introjected regulation were associated positively with classroom disruption and homework distraction, suggesting that when students have controlled motivation, they tend to be disengaged in both classroom learning and doing homework. The two types of autonomous motivation, identified and intrinsic motivation, showed different patterns of relationship with the engagement variables. Identified regulation was associated with all the four engagement variables: positively with classroom attention and homework effort and negatively with classroom disruption and homework distraction. It was interesting that intrinsic motivation was associated positively with classroom attention, classroom disruption, and homework effort. More research should be conducted to examine the nature of classroom disruption reported by students with intrinsic motivation. The practical implications of the findings are discussed in the academic culture of Singapore.

Keyword: Motivation
Linguistic errors by students in written responses to questions on the circulatory system

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Science Education

Abstract

Scientific language and literacy practices play key roles in students’ science learning. However, students face language challenges that are evident in their writing. In addition, paying explicit attention to language demands students face still remains challenging for many science teachers. This presentation will make a case for the need to address students’ specific language issues in science. The study focused on students’ written responses to structured questions in biology across four secondary three classes in one Singapore school. The aim was to discern the kinds of language errors commonly made by students in assessments. The data was taken from a two-year intervention study to understand how teachers design lessons in response to the language demands in science. For the purpose of this study, students’ responses to structured questions in written tests on the topic of human circulatory system constituted the main data source. Students’ responses were analyzed qualitatively using the Systemic Functional Linguistic framework developed by Halliday (1994). Between-class differences were also considered. Distinct types of language errors were found in the responses for the sub-topics of blood vessels and heart structure. For instance, high frequency language errors related to blood vessels have to do with the use of inappropriate premodifiers (such as “amount” and “level” of blood pressure), while those related to heart structure have to do with the use of non-specific referents (such as, missing out the names of specific valves). The implications for this research include suggestions for teachers to target not only particular science concepts but also the language issues students have in relation to those concepts. Knowledge of underlying language structures in students’ responses could aid teachers in explicitly diagnosing students’ language issues in science in an in-depth manner, so that such language issues can be attended to during instruction and students can be made aware of them prior to their written assessments. (308 words)

Keyword: Classroom Research, Literacy
Mini-Project: How Effective Is It for Developing Process Skills in Life Science Laboratories?

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Learning Sciences

Abstract

Within the context of laboratory lessons of a science module, it is possible that procedural knowledge is emphasised at the expanse of process skills. To address the issue, a mini-project was deployed to develop students' process skills such as critical thinking, problem solving, communication and idea proposing and testing. Compared to a full-scale project which may take several months or more to complete, the mini-project is more flexible and easier to be implemented especially when there is time constraint for practical lessons.

In this study, a mini-project was designed for a biochemistry subject offered in a polytechnic where students spent around 3-5 practical sessions (3 hours per session) to complete the mini-project. Employing a mixed-methods methodology, data were collected through lesson observations, questionnaire (N=82) and focus group interview (N=11). Findings suggested that students were able to justify their experiment designs for the intended purpose. They knew what should be prepared for their designed experiments, and how to analyse, trouble-shoot and present the data. More than 90% of the students agreed that the mini-project stimulated their curiosity to investigate, and improved their troubleshooting skills and data analysing skills. Students also expressed concern of heavy workload and limited time to carry out the mini-project.

This presentation explains the pedagogic design of the mini-project. It discusses how tutors have used this approach to diagnose student's weaknesses and strengths of key process skills to further develop these skills, and to what extent the mini-project has helped students to improve their process skills.

Keyword: Learning Environments, Problem-based Learning
Developing authentic assessment for the changing nature of work

Yang Silin, Institute for Adult Learning, Singapore

Abstract

Authentic assessment is typically indicated by the use of “real work” activities and practices, and/or its embeddedness in a real work environment. They may also include tasks and activities based on models and/or simulations that focus on application of concepts and skills like problem solving, trouble shooting and so on. Authentic tasks may be defined as having “real-world relevance and utility”; “appropriate levels of complexity”, and even be “generative” (Herrington, Oliver, & Reeves, 2002). Assessment through real work activities is found to be a better predictor of performance as compared to many formal or standardized tests (Gardner, 1999). This study undertook six qualitative case studies across different industry sectors using a semi-ethnographic approach to understand how authentic assessment are designed, experienced and put into practice in relation to the changing nature of work. The selected case studies are varied: certification of workplace learning facilitators; introduction of promotional menu items at a food and beverage outlet; certification of rota commanders; a residency programme for doctors; an undergraduate degree programme in aircraft engineering; and a certification in IT network solutioning. A practice-based lens was adopted to analyse 105 pieces of data points collected from the study. Transcriptions from semi-structured interviews and focus group discussions, curriculum documentation, assessment artefacts and field notes were coded using NVIVO (software to assist with organizing and analyzing qualitative data). Data was triangulated from learners, course designers, facilitators, assessors and reporting officers at work. Our findings show that there are different ways in which learning and assessment practices are authentic or demonstrate authenticity. It is not about the presence or absence of authenticity, but about the degree of authenticity and learners’ engagement with the assessment task, scenario and/or process. Our findings also indicate that authentic assessment refers to something beyond “real work”. The social aspects of learning which takes into account factors like situatedness, community and participation, ought to be considered in the design and implementation of authentic assessment. This study also provides suggestions that can be adopted by curriculum designers to design and implement authentic assessment in their programmes to enhance learning.

Keyword: Adult Education/Development, Assessment
Teachers’ Perceived Leadership and Gifted Adolescents’ Roles for the Global Society

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Eunjoo Boo, Seoul National University, Korea (South)
Yun-kyoung Kim, Seoul National University, Korea (South)
Eunsun Kim, Seoul National University, Korea (South)
Taehee Kim, Seoul National University, Korea (South)
Hyunuk Park, Seoul National University, Korea (South)
Jihye Lee, Seoul National University, Korea (South)

Civics and Moral Education

Abstract

The purpose of this study was to examine teachers’ perceived leadership and their expectations for gifted adolescents. Involving 66 teachers having teaching experiences with gifted students, teachers’ conception of leadership, how they characterized great leaders and gifted adolescents’ leadership, and their opinions on leadership programs were identified based on a comprehensive review of literature, a focus group interview, and a survey.

Since previous studies on leadership have focused on achieved individuals, there were inevitable limitations in explaining students’ leadership in the classroom. Therefore, the research on how teachers perceiving and expecting their students’ leadership role was needed to develop and provide adequate in-school leadership programs. Also, revealing teachers’ expectations for gifted students would give new perspectives on education for the gifted populations in order to help fully develop their talents in the global society.

To collect data, the following procedures were applied. A focus group interview with teachers was conducted as a preliminary study to build survey items. The participants were six secondary school teachers (three females, three males) who had experiences in teaching gifted adolescents in South Korea. Using the preliminary results, a survey was developed consisting of 21 items about characteristics of leaders, expected roles for gifted leaders, preferred characteristics of future leaders, and social responsibility for gifted students. The survey was administered to 60 teachers teaching gifted secondary students in South Korea.

Major results included teachers perceived that problem-solving ability, communication skills, and good characters were the core characteristics of “great” leaders for the future society. Also, teachers had high expectations for gifted adolescents to take leadership roles and contribute to the society when they grow up. In this regard, teachers perceived the need of enhancing social responsibilities and leadership competencies for gifted adolescents. Teachers were also aware of the need of leadership programs in school. Especially, they called for the programs aiming to enhance gifted students’ leadership competencies by employing more practical and specified activities. Further details will be discussed at the presentation.

Keyword: Gifted Education, Leadership
Application of Gamified platform to improve student engagement learning

TENG Wei Syan, Evergreen Secondary School, Singapore
Lee Kim Fatt, Evergreen Secondary School, Singapore
Loke Lay Fang, Evergreen Secondary School, Singapore
Yin Xiao Hui, Evergreen Secondary School, Singapore

Abstract

Most of our students are exposed to the idea of gamification at a very young age. The frequent usage of electronic devices resulted in students with shorter attention spans and are easily distracted. In this paper, we experimented with incorporating game mechanics into our Chemistry classes and using the approach to create a more engaging learning environment. We made use of Coursemology, a free online gamified platform, to carry out our holiday self-directed learning lessons. Authentic learning experiences were crafted to engage the students. As students complete their trainings and missions, they are awarded experience points. The experience points allow students to “level-up” in the leaderboard and to unlock certain achievements. Pre-surveys were administered to look into their preferred mode of learning and post-surveys were conducted to look into the effectiveness of our method. From the pre-test and post-test conducted, we found that students who made a wrong attempt in Coursemology, during the pre-test, tends to get the question correct during the post-test. This indicates that the explanations provided once a wrong option is selected helps the students to understand the concept better. Through the surveys and interviews conducted, students welcome the usage of gamification in teaching and learning of Chemistry. Students also expressed that they are more interested to read up more on the chapter. The platform is also useful for their self-directed learning and teachers are able to keep track of the progress of the students. An interesting finding shows that boys displayed more enthusiasm and asked more questions on how to level up in the leaderboard.

Keyword: Curriculum & Pedagogical Innovation, Science Education
Beyond “What, where, why” – Critical thinking in the Lower Secondary geography classrooms

Yeo Li Yong, Singapore Chinese Girls' School, Singapore
Curriculum Development

Abstract

A geographical education can contribute to a large range of 21st century skills – one of which is critical thinking. Equipped with these critical thinking skills, students will be able to navigate the rapidly changing world with the right dispositions. There are three aims of this presentation:

1) To allow teachers to rethink their definition of ‘critical geography’;
2) to discuss the attributes of a critical thinker; and
3) to discuss the development of geography classroom activities to promote criticality. In SCGS, the Lower Secondary geography lessons and curriculum aim to develop criticality through deliberate planning to inculcate the attributes of critical thinkers. For example, for the topic on ‘Deforestation’, a pre-lesson survey suggested that students did not display attributes such as open-mindedness, self-awareness and rationality with regards to the topic, but after the lessons with their geography teachers, students were able to develop some aspects of criticality. This suggests that critical thinking can be taught through deliberate and mindful planning by the teachers. Lesson examples beyond this topic and also in geographical investigations would be shared in this presentation. Participants will be able to adapt some ideas to their own classroom practice.

Keyword: 21st Century Competencies, Critical and Creative Thinking
MULTIMODAL PEDAGOGIC DISCOURSE IN A LOW-PROGRESS CLASSROOM

Ali Haikal, Serangoon Garden Secondary School, Singapore
Victor Lim Fei, Ministry of Education, Singapore
Teacher Quality, Teacher Learning and Development

Abstract

This study analyses a teacher's use of gestures, movement and language within a low-progress classroom as a means of achieving multiple, often divergent, communicative goals in the orchestration of the classroom.

This study builds upon the work of multimodal classroom discourse analysts such as Kress, Jewitt, Ogborn & Tsatsarelis (2001), Kress (2003, 2010), Lim-Fei (2012), O'Halloran (2004, 2005) and Unsworth (2001), who investigate the nature and potential of multimodal semiotic resources as part of a teacher’s pedagogical repertoire. Specifically, this study uses Lim-Fei’s (2012) study on the use of space and language in the classroom as a point of departure to unravel an additional dimension to multimodal communication in the classroom.

Past multimodal approaches to classroom discourse analysis, such as Lim-Fei (2011), have tended to investigate the use of multiple modes of communication in co-constructing a coherent (singular) intended message. Through an analysis of a teacher’s use of movement, gestures and language in a low-progress classroom, this study argues that multimodal communication can also be used by an interlocutor to deliberately communicate multiple different messages to different addressees in the same instance.

It allows the teacher to mediate the two aspects of Bernstein’s (2000) pedagogic discourse – regulative and instructional discourse – at once by enacting different messages across different modes. Gestures and movement enable teachers to interact with segments of the class in a regulative discourse while reserving linguistic communication for an instructional discourse with the remaining members of the class.

An understanding of multimodal semiotic resources allowing a teacher to engage in communicative multitasking augments our current understanding of the multiple functions of multimodal communication in the classroom as uncovered by multimodal classroom analysts such as Daniels (2001), Kress (2005), and Lim-Fei (2012). It highlights the range of communicative resources that teachers can use to orchestrate the learning experience for their students.

Keyword: Classroom Management, Multiliteracies & Multimodalities
Making Thinking Visible Using P.O.E for physics

Mr Mohamad Khaidir, Regent Secondary School, Singapore
Mrs Ivy Lim, Regent Secondary School, Singapore
Science Education

Abstract

This physics project aims to better engage our students and make their thinking more visible through the use of POE (Predict, Observe, and Explain) Approach. By using a more structured way of questioning (written form), we hope to elicit a more visible and clearer thinking from students when conducting demonstrations, videos and simulations.

The group identified 3 topics for our implementation: Electricity, Magnetism and Electromagnetism. For each of the identified topic, students were shown an experiment setup using either simulation, video or through a teacher demonstration. The students were then asked to predict the outcome of the experiment using the POE worksheet. After which, the teacher will show the actual experiment and students will need to record their observations. Students will then attempt to explain the reason behind the observations individually before discussing with their partner to improve on their answers.

In terms of data, we hope to see a progression of levels based on the rubrics we have crafted. Data for the individual components (Predict, Observe and Explain) were collected for all the three experiments and there was a significant improvement in the area of Prediction and Observation.

Through this sharing, participants will have a better understanding on the planning and implementation of one of the visible thinking strategies (POE) as well as the challenges that were faced during the implementation.

Keyword: Curriculum in Classroom
Interdisciplinarity in Design Education

Rachna Johri, Temasek Polytechnic, Singapore
Curriculum Development

Abstract

There is an urgent need for designers to wear many hats or take on a growing list of responsibilities that has led to increased level of collaboration across design disciplines. With these developments on the horizon, Design schools need to prepare design graduates who are able to function fluently in interdisciplinary teams to tackle the challenges they will face in the future. Hence there is a general push to challenge design students to explore the intersections of related disciplines.

The curriculum design demand moving away from fixed discipline boundaries and fragmentary learning experiences to making meaningful connections within and between subjects and disciplines. The challenge then for educators is to eliminate the silos and rekindle student’s interest by connecting the dots and making meaning across subjects and disciplines, only then the students would appreciate the interdisciplinary and integrative learning framework. Much is being missed when knowledge is separated into disciplines and treated hierarchically. The solution to the challenges focus on the reorganization of curriculum and teaching-learning process which is critical to developing a culture that empowers and engages students to make connections and derive new orientation in learning.

The paper highlights the curriculum redesign process administered by a team of educators that focuses on curriculum redesign as a collaborative process. For this to happen, the staff needed to be integrative thinkers themselves, understand how students learn, and feel comfortable with a range of teaching strategies from which they could draw upon. In the process, the staff got rid of being isolated in their own little part of their academic neighborhood by becoming more discursive and collaborative while students developed critical attitudes to synthesize discrete information and connect knowledge across disciplines.

The paper defines a new approach to curriculum development and focuses on how the new integrative model transcends disciplinary boundaries, and encourages students to address real-world problems, to synthesize multiple areas of knowledge, and consider issues from a variety of perspectives. The paper also provides insight to how polytechnic experience can be packaged into a coherent whole with the promise to prepare students for the dynamic world of work.

Keyword: Curriculum & Pedagogical Innovation, Curriculum Design/Reform
A Study on One-to-One Computing in Singapore

Mun Siong KOM, Ministry of Education, Singapore
Seau Yoon FOO, Ministry of Education, Singapore
Ming Yew LEE, Ministry of Education, Singapore
Victor Lim Fei, Ministry of Education, Singapore
IT in Education

Abstract

Recent reviews of studies on learning in one-to-one computing contexts (Harper & Milman, 2016; Zheng, Warschauer, Lin & Chang, 2016) have surfaced evidence in support for the adoption of one-to-one computing environments for teaching and learning. To better understand the benefits for student learning as well as the challenges of implementing one-to-one computing in the Singapore context, the authors initiated a year-long two-phase study to collect and analyse data from Singapore schools. This paper presents and discusses the preliminary findings gleaned from the first phase of the study where school data was gathered via a survey carried out in early 2017. The study offers a system perspective on the benefits and challenges of one-to-one computing in Singapore schools. Specifically, the study presents data and insights on how some schools have used their one-to-one computing programme to deepen subject mastery and develop 21st century competencies amongst students. The study also discusses the perceived conditions and school culture which support the meaningful and effective implementation of one-to-one computing. Insights gained from Singapore schools are discussed in light of the other existing literature on one-to-one technology in K-12 classrooms from other systems. This paper also proposes an initial design of a ‘tool-kit’, with a set of resources and considerations, for teachers who are keen to explore one-to-one computing implementation in their classrooms, as an alternative to teacher-centered instructional approaches.

References


Keyword: 21st Century Competencies, Information Technology and Education
Creating Animated Textbooks Segments for Value Education and Chinese Language Learning

Liu Chang, Yu Neng Primary School, Singapore
Ong Boon Leng, Yu Neng Primary School, Singapore
Yong LinLin, Yu Neng Primary School, Singapore
IT in Education

Abstract

Aim
The objective of this research project is to compliment, enrich and animate the current Primary two textbook, to enhanced students interests and learning of Chinese Language and moral education in the classroom as well as at home. The animated contents are accessible to all pupils with primary two Chinese textbooks in Singapore.

Through the use of the mobile software 'Aurasma', this project explores the possibility of deepening students' learning of the segments on “Real-life Application” and comprehension in primary two textbooks.

In the “Real-life Application” segment, videos were embedded into various pages in the text book, and thus bringing the textbook to ‘live’. This animated segment also provides a moral value based resource which is closely related to the content of the text book. Besides enhancing classroom learning and arousing the interest of pupils in learning the subject, it creates opportunity for parent-child discussion at home, providing ample opportunities for them to practise oral skills and discuss moral values.

In the comprehension segment, comprehension questions and answers with voice recordings were embedded into the main text of the textbook to facilitate learning. Students are able to learn at their own pace by bringing this "mobile teacher" home.

Methodology
Qualitative interviews of about 10 % of the students from one mixed-ability class and their parents. Student responses were collected after lessons conducted with animated segments of their textbooks.

Finding
Through the interviews, there are positive feedbacks from parents and students. Parents felt that the resources for “Real-life Application” segments are useful for their children and had helped them to learn the language and moral values at home. Students felt more interested with regards to the topics presented and through the process, had more opportunity for them to explore the moral values in everyday life with their parents. It is also a bonding time for the parents with their children.

With regards to the comprehension segments, some parents felt that it’s a good resource for their child to understand the text in greater extent. However, some interviewed preferred the written method of comprehension as it's more related to exam format.

Keyword: Information Technology and Education, Moral Education/Development
Abstract

Aims
Traditionally, students find it difficult to understand graphs and to sketch graphs. This paper aims to share the strategy and lesson package used to teach Graphs of Functions to Secondary Three students. The lesson package incorporates self-directed learning, ICT, Mathematical Modelling, oral presentations and 21st Century Competencies.

Methodology
The methodology tapped on students' interest and learning profile in this IT-savvy age to make discovery and construct knowledge themselves where they complete self-directed learning on shapes of basic graphs. They explored mathematical apps and tools to discover the beauty of different graphs to make observations of the characteristics of the graphs themselves.

Next, students were shown an illustration and explanation of a real world context, modelled by a graph. They discussed the accuracy of the graph which models the real world scenario and proposed other shapes / equations of graphs that better model the context or new context they research on. Then, students did oral presentation to explain the shape of the graphs and draw the relevance of the characteristics of the graph to the context.

Lastly, a level Test on the topic Graph of Functions was conducted and the test scores used to validate the effectiveness of the learning package.

Findings
Based on the presentation and class discussion, students showed that they have acquired understanding of mathematical modelling, providing an abstraction that reduces a problem to its essential characteristics. They were able to use Mathematical language to explain the factors affecting the trends and shapes of the graphs.

Based on the facility indexes of the scores in the test, majority of the students were competent in sketching the transformed basic graphs and interpret the graphs. However, transformation of graphs posed a challenge as there were many key features given in the original graph that they would have to know how to address.

In summary, students learnt to see the relevance of knowing the various types of graph through a Mathematical Modelling task and to appreciate the practical application of graphs. Teaching of Mathematics, coupled with teaching of 21st CC helps students find joy in learning.

Keyword: 21st Century Competencies, Mathematics Education
Empowering students in self-assessment: Are our students ready?

Tan Lay Khee, Temasek Polytechnic, Singapore
Gin Hin LOH, Temasek Polytechnic, Singapore
Goh Hoon Bee, Kathryn, Temasek Polytechnic, Singapore
Zhang Pengchi, Temasek Polytechnic, Singapore

Assessment

Abstract

In traditional classrooms where passive transmission is the key mode of imparting knowledge, it is not uncommon to observe students being over-dependent on teachers to navigate their learning (Curdt-Christiansen & Silver, 2012). Boud (2000) posits self-assessment as a form of sustainable assessment that fosters lifelong learning through honing reflexivity and building students’ capacity in making informed judgement. Boud and Molloy (2013) also envision student self-assessment as a means of positioning students as agents of their own change instead of mere recipients of instructions. However Harris and Brown (2013) argue that it is unlikely that students will be receptive and feel confident without sufficient scaffolding. In view of the limited data in the context of Singapore tertiary education, our study aims to investigate the polytechnic students’ perceptions of self-assessment and the scaffolds that may help them evaluate their work more independently.

Qualitative exploratory case study was employed to gain an in-depth insight of the students’ experience in self-assessment. The case study also sought to explore if students perceived the scaffolds to be useful in supporting their self-assessments. The case study involved structured focus group interviews with a total of 24 randomly selected students from 4 different subjects that employed student self-assessment. These students involved were new to self-assessment process.

Analysis of the students’ responses from the focus group interviews revealed that students might be ready for self-assessment but not without some struggles. Students generally acknowledged the value of self-assessment in weaning them off reliance on teachers for diagnosing and addressing their learning gaps. Most students experienced heightened awareness of gaining more control of their learning although some of them expressed concern about the accuracy of self-assessment due to challenges faced in decoding the rubrics fully. Most students reported that they gained more confidence in self-assessment through calibrations of their judgements against teacher’s opinions or observations of their teachers modelling the self-assessment process. While most students recognised that self-assessment pro forma was helpful to guide them in their learning, some students found it tedious to pen down their reflections and articulate strategies to improve their work.

Keyword: Assessment
Abstract

Over the years, we find that majority of the students taking Malay Language do not score well in the comprehension component in paper 2. From the observation, we find that students whom do not score well are either unable to understand the passage given or fail to interpret the questions correctly. Within our Professional Learning Team (PLT), we came up with teaching strategies and techniques to address the above issues faced by the students. Strategies such as the study of character and characteristics, the ‘how’, the ‘why’, the ‘what’ and cause and effect are considered in the package design. After finalising the teaching strategies and techniques, we tested these strategies on the secondary 3 normal academic Malay Language students. Malay Language Learners (MLL) was taught the comprehension strategies which were divided into 8 lessons package and took almost 2 months to complete. Data was analysed to examine the students’ understanding and grasp of the approach built into the package. Findings is based on the pre and post-test as well as their SA2 Exam results.
In this sharing participants can take away on the AFL approach and how the lesson package was implemented during lesson. We will highlight the key strategies which were used in the package to enhance our students’ learning experience.

Keyword: 21st Century Competencies, Professional Community
Recognising and Identifying a problem to address in Project Work

Nirmala Ong, Hwa Chong Institution, Singapore
Edwin Lim, Hwa Chong Institution, Singapore
Eileen Tan-Moh, Hwa Chong Institution, Singapore
Janet Lee, Hwa Chong Institution, Singapore
Curriculum Development

Abstract

An important role of the active citizen or leader in the 21st century is to identify and evaluate problem situations and needs, improve current measures and initiate new approaches to improve communities. One of the most concrete demonstrations of practical creativity, insightful innovation and empathic values lies in problem-solving for societal needs. This makes the teaching and practice of problem-solving skills vital in today’s classroom.

For most problem situations, steps are already taken by government agencies, NGOs, VWOs and private corporations concerned to attempt to solve it. Yet aspects of the problem still exist despite all the attempted solutions because there are inevitable limitations in current efforts. Hence in teaching real world problem-solving, a crucial but often neglected step is how students can effectively locate unaddressed gaps in existing measures. This would ensure that the solutions that students design would not merely replicate existing strategies, but would be truly innovative in the sense that they deal with aspects that have not yet been addressed.

In this Paper Session, we present a specific and precise pedagogical tool that we developed to methodically help students to learn how to analyse the strengths and unaddressed gaps in current efforts. With no irony in mind, we call this the SMUG approach, as a reminder to not be smug and tolerant of problem situations. This method has produced strong outcomes in student learning and academic results. This tool will also help students in real life problem identification prior to managing the problems in real life projects.

This session will be useful for JC and secondary school teachers of Project Work, and also for teachers tasked to facilitate other student projects.

Keyword: Critical and Creative Thinking, Curriculum & Pedagogical Innovation
Learning to Become a Student-Centered Teacher in a Test-Centered Education System: The Case of Korean Novice Teachers

Jina Ro, National Institute Of Education, Singapore
Teacher Quality, Teacher Learning and Development

Abstract

Korea is known as one of the high-performing countries in the world, primarily due to its heavy emphasis on teaching to the test (Kang, 2009; Sorensen, 1994). In this study, I explore the lived experiences of four Korean novice teachers and illuminate their learning through their early years in this system and how they came to reconstruct their beliefs and practice to be centered on students, rather than on the test.

The conceptual framework of this study is grounded in the assumption that teacher learning is a continual process that occurs across teachers’ professional life span and it is highly affected by the context where the teachers work (Cochran-Smith & Lytle, 2009; Feiman-Nemser, 2001). The majority of previous studies suggest that when novice teachers work in a high-stakes testing context, many of them tend to conform to teaching to the test while displacing their constructivist, student-centered beliefs (e.g., Agee, 2004; Gatti & Catalano, 2015; Loh & Hu, 2014).

Using phenomenological research design, four novice teachers who were working in middle or high schools as math or English teachers were recruited. Three in-depth phenomenological interviews were conducted with each participant according to the guidelines suggested by Seidman (2012). Common codes and themes were derived by constantly comparing their lived experiences within and across the participants.

The analysis suggests that although the teachers entered the profession with full of optimism and confidence about their capability in teaching, they soon became frustrated that they were pressed to teach to the test and it did not necessarily utilize and encourage their in-depth knowledge and skills. The teachers also noted that many of their students were stressed out and bored of endless test preparation. Such reality made the teachers deliberate on what their role as teacher should be and what meaningful practice of teaching is in this system. A common change occurred to them was that they came to enact more caring and emotional work to alleviate the stress of their students and enhance their lives in school. Furthermore, the teachers agreed that such practice has more value to the students than teaching to the test.

Keyword: High Stakes Testing, Teacher Education/Development
Use of Visible Thinking in Teaching Higher 1 Chinese Language: Zooming into the Topic of Music & Movie

Liu Chang, Pioneer Junior College, Singapore
Language and Literacy Education

Abstract

In the learning of the topic “Music & Movie” found in A Level H1 CL syllabus, students often find that there’s a lot of content to memorize and the lesson unengaging. Thus, this research project aims to provide a more meaningful framework for students to learn and appreciate the local culture in a more effective and engaging way.

There are three phases in the project:

Firstly, activation of prior knowledge. The successful and familiar Korean-pop culture was used to introduce the concept of “Cultural Exportation” and demonstrate how international image and global influence or a country’s soft power could possibly impact on its hard power. The ideas of soft and hard power are also pursued further to show their interdependence.

Secondly, examination of the local cultural scene. Local music and movies were used to trace the development of the local cultural industry in Singapore and successful examples were highlighted. Students were asked to think why the local culture industry is not as successful as Korean-pop culture and what they could do about it hence encouraging entrepreneurial dare.

Lastly, the extension. Teacher used mainland China’s cultural exportation to show how hard power and soft power could complement each other. China’s economic growth makes people want to know more about Chinese culture highlighting how hard power can trigger off soft power and whether Singapore could learn from this case study.

Visible thinking routines of See-Think-Wonder (STW) and Generate-Sort-Connect-Elaborate (GSCE) were used for the lesson. Through the STW routine, students were able to learn through discovery and collaboration while the GSCE routine help students to make connections of the key ideas. These two visible thinking complement each other to generate active discussion and self-directed learning by the students.

Results based on students’ feedback and teacher’s observation show that students were keen to find out more about the local cultural industry and realized how the unique Singaporean culture is an important factor to boost her art industry. Students also developed greater pride and confidence towards their local culture leading to greater sense of belonging and rootedness to Singapore.

Keyword: Cultural Analysis, Junior Colleges
Collaborative Problem-Finding to Supporting Learning of Novel Science Concepts

Mun Siong KOM, Ministry of Education, Singapore
Cognition, Motivation and Learning

Abstract

Research on Productive Failure (e.g., Kapur & Bielazyc, 2012; Kapur, 2013) has yielded considerable evidence on the preparatory effects of problem-solving to prepare students for formal mathematics instruction. A series of classroom-based studies extended this research by examining problem-finding as an alternative preparatory activity in the context of fifth grade students learning novel science concepts. Specifically, this paper reports a quasi-experimental study carried out to investigate the effect of students finding problems related to basic ideas on electricity before or after receiving explicit concept instruction. Sixty students from two equivalent, intact classes experienced a problem-finding based lesson that differed in sequence of problem-finding activity and explicit concept instruction. A third equivalent class receiving only explicit concept instruction served as the control condition. Findings revealed that students under both pre-instruction and post-instruction problem-finding conditions demonstrated statistically significant improvement in their target concept test performances whereas the increase in test scores for control group was nonsignificant. An analysis of covariance also revealed nonsignificant difference between conditions. A suggested explanation for the between-conditions finding is the moderating effect of activity duration in terms of how long students engaged in the problem-finding activity vis-à-vis explicit concept instruction. This suggestion led to modifications on the problem-finding based instructional design to better extract the efficacy of problem-finding in supporting concept learning. While further studies are planned for more conclusive findings, this study is noteworthy in demonstrating that getting students to find their problems as an initial activity need not be limited to open inquiry learning contexts. In particular, pre-instruction problem-finding can possibly be an alternate, viable instructional design in which students first develop their own problems (i.e., problem-finding) like in open inquiry approaches, but is then followed by receiving explicit concept instruction. Viewed this way, it presents a novel pedagogical option for educators seeking to leverage students’ problems to support their learning of novel science concepts.

Keyword: Curriculum & Pedagogical Innovation, Science Education
Training Pre-Service Professionals to Deliver Family-Centered Early Intervention in Southeast China

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Special Needs Education

Abstract

China is expected to have a rapid growth in specialized early intervention (EI) services for young children ages birth to 6 and their families. A major barrier in the provision of EI services in China is the shortage of well-trained EI personnel. In 2013, a Home-Based Early Intervention Program (HBEIP) was started at South China Normal University (SCNU) in Guangzhou, China to prepare future professionals to use family-centered EI practices adapted from similar programs in the United States.

To help evaluate the HBEIP training format and learn about the training needs of these trainees, a survey was developed to inform more effective practices. The survey was developed with a five-point Likert scale to collect the new trainees’ perceptions of: 1) their needs for each type of training (e.g., lecturing, coaching, and feedbacks on individualized family service plans); 2) their current knowledge, skills and needs for more training in delivering family-centered early intervention services; 3) their current knowledge, skills and needs for more training in supporting young children with special needs; 4) their current knowledge, skills and needs for more training in supporting families, and; 5) their preferred formats of training (e.g., on-site classes, on-line lectures and discussions, group discussions, watching video-taped lectures, home work assignments). In addition to the five Likert Scale items, an open-ended question was included to invite additional comments in the questionnaire.

Data were collected and analyzed with ANOVA to identify the priority of training needs, students’ preferences of training formats, and how various contextual factors impacted the responses to the questionnaires. Results from the evaluation showed that Chinese trainees perceived the family-centered approach to EI as relevant and valuable, and indicated needs for improving supervision and coaching supports in future implementation of HBEIP. Lessons learned from the training experience and implications will be discussed in this session.

Keyword: Early Childhood, Special Education
Evidencing the impact of professional learning development – A critical reflection

Lily Yip, Tanglin School, Singapore
Teacher Quality, Teacher Learning and Development

Abstract

Research has consistently shown that educational leaders lack experiences, skills and tools to evaluate the impact of professional learning development in the schools. How effective are the schools in designing effective professional learning development and evidencing impact of learning is not yet evaluated in Singapore. The local educational arena seeks to find an effective approach to ensure that professional learning leads to demonstrable impact for the learning community. Impact is demonstrated when new understanding, strategies, techniques, skills are put into practice as a result of engaging in professional learning development. The study aims to experiment with Guskey’s framework in search for an effective approach for both designing effective professional learning development and evidencing impact of learning. The study was conducted for ten middle level managers in a special needs secondary school to build middle level managers capacity to improve processes and products, skills that they need for strategic planning. The participants were provided with the training, support, resources and tools they need to become effective in using data to level up their expertise in project management. Data was collected through questionnaires, participants’ reflections and school records. The findings showed evidence on how the participants use the new knowledge and skills they learnt to effect change in their thinking and practice. The study provide grounds to advocate use of Guskey’s framework as it reflects the systematic process applied to evaluate whether professional learning is converted into developed practice, better understanding and raised standards. It is hope of this study to inspire and generate interest to the educational leaders and policy makers to empower the learning community to reflect on and articulate learning so it can improve practice. It also purposes to offer a way to design a sustainable professional development model for schools in evidencing impact of learning for focussing school improvement.

Keyword: Professional Community, Professional Development
Use of Strategic Questions to Enable Close Reading

Danny Chen, Regent Secondary School, Singapore
Language and Literacy Education

Abstract

Close reading is the thoughtful and detailed analysis of a text focusing on details and patterns so as to understand the text in depth and with precision. When students are able to do close reading, they can deeply engage with challenging and high quality texts. Eventually, through close reading practices, students will be able to read increasingly complex texts independently, based on the information provided by the author.

This project aims to provide a short but functional set of strategic questions which students can use while close reading. This set of questions will be purposefully used when students are reading narrative texts with complex vocabulary, expressions and sentence structures.

In coming up with the set of strategic questions, the team combed through several narrative texts of differing difficulty levels and crafted the questions to cover what the text says and how it is said. The questions were tested on a group of students and further refined.

With the use of the set of questions, by the end of the teaching process, students will be able to close read effectively and independently.

Keyword: Curriculum & Pedagogical Innovation
Towards inquiry learning in Science: Innovation as a catalyst for teacher learning and change

Alia Aziz Alkaff, Teck Ghee Primary School, Singapore
Neo Chaw Tee, Teck Ghee Primary School, Singapore
Teacher Quality, Teacher Learning and Development

Abstract

Teacher learning involves community of teachers coming together to identify practical problems in classrooms and engage in a meaning-making process to create professional knowledge and improve practice. Teacher capacity is key for integrating innovation and change into practice. This study shows how one school initiated an innovation by using lesson redesign as means for teacher learning and change. The intent was to get teachers to reflect and redesign Science lessons and shift from teacher-centred to student-centred, inquiry learning. A community of teachers was created with school supports to initiate this innovation. This study will share stories from teachers’ perspectives of how they shifted their views of lesson design from teacher-directed, confirmatory stances towards teacher-guided inquiry. Teachers will also share how they used the 5E instructional framework to guide and plan lessons, their experiences and challenges with enacting student-centred lessons, and how they used students’ artefacts and voices as evidences to reflect and inform their practice. Interviews and quantitative data will be discussed to show how the innovation and lesson redesign shaped teacher change in their identities and roles as teachers as well as student change in terms of science dispositions.

Keyword: Curriculum & Pedagogical Innovation, Learning Sciences
Metacognition in Our Professional Practice

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Mohd Salim B Ramli, Orchid Park Secondary School, Singapore
Ng Song Beng, Northbrooks Secondary School, Singapore
Teacher Quality, Teacher Learning and Development

Abstract

Metacognition is an essential component of the 21st century education that teaches students how to learn. Although the curriculum covers instruction on cognitive strategies, the daily lessons and learning tasks may not provide the explicit teaching and practice students need to learn how, when, and why to use these strategies effectively. Students are not naturally endowed with these metacognitive and cognitive abilities – these skills should be taught and learned.

With the objective of providing this foundation for students through explicit instruction in the mathematics lessons, teachers from seven schools embarked on a project with NIE to focus on how metacognitive strategies can be infused in the teaching and learning of mathematics, and how a metacognitive culture can be developed in the mathematics classrooms. In this presentation, teachers from two schools will share their learning that journeyed through three phases: (1) learning about metacognitive strategies, teacher noticing, lesson play, and mathematical and socio-mathematical norms; (2) designing and implementing lessons with infusion of selected metacognitive strategies; (3) reflecting on and further refining their lessons by looking at video-recordings of their lessons through four lenses (Teaching Lens, Learning Lens, Task Lens and Participation Lens).

The presenters will also be sharing on how this reflective learning journey had paid the dividend of raising their awareness of being metacognitive about their teaching practice as they teach students to be metacognitive and think about their thinking, that as they provided opportunities for students to construct their own learning collaboratively and to develop their metacognitive skills through discourse, the teachers themselves also went through a learning where they reflected on their teaching and constructed their own learning to have a deeper understanding of the concepts they are teaching and how they teach.

Keyword: Metacognition, Professional Development
Emotional Design in Multimedia Learning

Dr Tan Wah Pheow, Temasek Polytechnic, Singapore
Learning Sciences

Abstract

The concept of emotional design is familiar to researchers in the field of human factors and consumer psychology, which states that when products are designed to elicit positive emotions, the likelihood of purchase and subsequent usage of the product are increased. In recent years, some researchers (e.g., Mayer & Estrella, 2014; Plass et al., 2014; Um et al., 2012) have applied the principles of emotional design in the educational domain, specifically in the creation of multimedia learning material. These researchers embedded colors, shapes or anthropomorphizing features that were shown to elicit positive emotions into the multimedia learning material and compared them to multimedia learning material with emotionally neutral stimuli. Generally, these studies have found that applying emotional design principles to multimedia learning materials can induce positive emotions, which in turn facilitates cognitive processes and learning. While these initial studies are promising, there are still some questions about applying emotional design to multimedia learning that remain unanswered. As lesson delivery through multimedia learning becomes more common in the twenty-first century, it is important to understand more about applying emotional design principles in multimedia learning. In the current paper, I describe three studies that builds on previous works on applying emotional design to multimedia learning. In the first study, I extended the investigation of the effects of shapes and colors that induced negative emotions on the cognitive processes of learning, as previous studies only focused on the induction of positive emotions. In the second study, I extended previous investigations of using anthropomorphizing features to depict learning material by investigating whether investigated whether the emotional congruency of the anthropomorphizing features affected learning. In the third study, I explored whether emotional design principles can be extended to the auditory modality by manipulating the affective valence of the auditory narration in the multimedia learning material, as previous studies mainly focused on visual modality of learning materials. I will discuss the findings of these studies, along with findings in the literature, in the context of useful guidelines of employing principles of emotional design in creating multimedia learning material.

Keyword: Learning Sciences, Psychology
Teachers’ TPACK for meaningful learning in different technological environments

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Li Baoping, Beijing Normal University, China
IT in Education

Abstract

The research describes teachers’ technological pedagogical content knowledge (TPACK) for meaningful learning with five dimensions: active, constructive, authentic, intentional, and cooperative. It was conducted by analyzing 104 lesson activities from 20 in-service primary school teachers’ lesson plans in an well-developed area of China. These plans were prepared for participating an creative ICT integrated course design competition and implemented in class authentically.

Qualitative content analysis was used as a research methodology for this study by adopting the rubric system of Koh(2013). The result shows that active dimension ranks the highest while intentional is the lowest. The results were compared with the similar research in Singapore.

The technological environment were classified into 1:1 (each student own an equipment like mobile phone, tablet computers) and non 1:1 and found that teachers’ TPACK in 1:1 environment were significantly higher than non 1:1 environment in terms of constructive, authentic and cooperative. Suggestions for improving TPACK and designing activities in different technological environments were also discussed in the paper.

Keyword: Teacher Education/Development, Teacher Knowledge & Cognition
Pioneer JC’s Work Shadowing Programme – Preparing Students for the 21st Century Workforce

Valerie Tan, Pioneer Junior College, Singapore
Curriculum Development

Abstract

The Work Shadowing Programme at Pioneer JC aims to provide students with the opportunity to experience work life and gain insights to the industry they are attached to, under the mentorship and guidance of a competent professional. Through observation of others at work, participation in various hands-on activities and through discussions and interactions with their mentors, students are able to explore their career interests, understand the demands of the workplace and develop 21st century worker qualities of proactivity, adaptability, resilience and entrepreneurial dare. Through work shadowing in the industry of their choice, students are also able to develop an awareness and understanding of the importance of that industry to the growth of Singapore’s economy, as well as the challenges faced by that industry. Participants of this sharing will learn how the Work Shadowing Programme is being carried out in Pioneer JC, in the areas of linking up with external partners, selection of students, work flow and work processes.

The Work Shadowing Programme, which was started in 2006, has seen much growth and success over the past few years in terms of the number of industry partners coming on board the programme, as well as the number of student sign-ups for the programme. This has led to an expansion of the programme to include overseas partners in 2011.

Student feedback and reflection indicated that a majority of students felt that significant learning took place during their work shadowing stint and that students highly recommended the programme to their juniors. The feedback gathered from students as well as our industry partners allowed the Higher Education and Career Guidance team to constantly review the programme and make the necessary improvements.

The paper will also discuss the challenges encountered by the team in carrying out the Work Shadowing Programme and how partnership with our existing industry partners can be further extended. In addition, we explore the possibility of incorporating student-initiated work attachments in the work shadowing programme.

Keyword: 21st Century Competencies, Curriculum Design/Reform
Igniting Sparks in Chemistry

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Shuryati Bte Mohd Shariff, Woodgrove Secondary School, Singapore
Ng Wah Kian, Bowen Secondary School, Singapore
Tan Kiang Meng, Anthony, Greendale Secondary School, Singapore
Ramesh s/o Ramalingam, Orchid Park Secondary School, Singapore
Science Education

Abstract

It is often viewed by many teachers that the ‘O’ level Chemistry curriculum is strictly stipulated by the Ministry of Education and teachers have little control over how it is to be enacted in the classroom. It is important, however, that teachers take ownership of the curriculum and interpret how it can be meaningfully and appropriately designed to guide students toward the big understandings. Chemistry teachers ought to realize that lesson planning does not merely involve ticking a “strategies to do” checklist to achieve learning outcomes. Rather, in our view, it involves purposefully thinking through how students can be taught to apply key concepts and answer the essential questions that assess their conceptual understanding. As pedagogical leaders, we realized we are in a good position to influence and impact chemistry teachers to develop such a mind-set, and it is with this objective, we set out to carry out our current study.

We began our study by first reflecting how students can be inspired to develop an enduring passion for the learning of Chemistry. We came to an understanding that this can be done by developing our students’ ability to transfer their learning and apply their concepts to solving chemistry problems of different contexts. We propose that the teacher approaches his or her lesson planning by considering Learners and learning, Curriculum and content, Assessment and Pedagogy (LCAP). We also believe the teachers’ pedagogy should focus on developing the ‘big ideas’ embodied in the topic in hand. We have explored instructional methods, planned using the Action, Ethics, Insights and Opportunity (AEIO – Perkins, 2014), which are directed towards finding answers to the essential questions. In this presentation, we aim to share our understandings, along with the experiences of teachers and students in the lessons designed using the AEIO concept, and substantiate our ideas by giving a few exemplars.

Keyword: Science Education, Secondary Schools
Teachers’ Perspectives on Knowledge Construction in Networked Learning Communities in One Portal All Learners

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Judy Lee, Academy of Singapore Teachers, Singapore  
Lim Poh Heng, Academy of Singapore Teachers, Singapore  
Lin Li, Academy of Singapore Teachers, Singapore  
Tan Toh Hwee, Academy of Singapore Teachers, Singapore  
Teacher Quality, Teacher Learning and Development

Abstract

Networked Learning Communities (NLCs) comprise individuals from different schools collaborating with one another in purposeful and sustained professional development where they engage in the co-construction of new knowledge (Jackson & Temperley, 2007). When teachers build upon their practitioner knowledge while being informed by public knowledge derived from theory and research, they can learn with one another, from one another, and on behalf of others. This study explores the perceptions of teachers who were members of online NLCs in One Portal All Learners (OPAL) about factors that support and impede teacher’s engagement in knowledge construction. OPAL is a learning and content management system for all staff of the Ministry of Education, Singapore, to engage in professional learning in an online environment. Guided by Gunawardena, Lowe and Anderson’s (1997) levels of the social construction of knowledge, the study focusses on understanding the nature of interactions among participants in the online NLCs. Data reported were gathered from ten focus group discussions (FGDs) that comprised school leaders, heads of department, teacher leaders and experienced teachers. Qualitative data analysis was carried out to study factors that support or impede knowledge construction in NLCs that used OPAL as a platform for collaboration. Preliminary findings revealed that the majority of the online knowledge constructions were at the level of sharing and comparing of information. Several possible key factors that could affect members’ engagement in online NLCs such that they go beyond this level of knowledge construction were also identified through the FGDs. The factors identified were (1) conducive learning environment, (2) culture of sharing, (3) OPAL as an enabler, (4) organisational support, (5) shared ownership and (6) a structured approach to guide participants throughout their online collaboration journey. The reciprocal relationships among these factors were also studied.

Keyword: Collaboration/Collaborative Learning, Professional Development
Knowledge Construction in Networked Learning Communities in One Portal All Learners: A Proposed Implementation Framework

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Teacher Quality, Teacher Learning and Development

Abstract

One Portal All Learners (OPAL) is a learning and content management system for all staff of the Ministry of Education, Singapore, to engage in professional learning activities in an online environment. It is one of the key enablers for knowledge construction in networked learning communities (NLCs) for teachers' professional development. However, information culled from a series of focus group discussions showed that the OPAL collaboration spaces have been used mainly as a means for resource sharing rather than co-construction of new knowledge. Based on the Interaction Analysis Model by Gunawardena, Lowe and Anderson (1997), the social construction of knowledge involves sharing/comparing of information, recognizing and communicating dissonance, negotiation/co-construction of understanding, testing tentative or new knowledge, and the articulation and application of the newly-constructed knowledge. The proposed implementation framework is intended to support NLCs in OPAL to move beyond resource exchange or sharing and comparing of information to engage in deeper conversations that give rise to construction of knowledge and new approaches to teaching and learning. The development of the framework took into consideration factors that have an impact on teachers' use of the OPAL collaboration space for knowledge construction. The framework proposes a series of steps to facilitate learning and co-construction of knowledge by the NLC members. There may be iterations between steps so that the professional learning of NLC members is sustained and meaningful. For each step, questions are listed to guide NLC members in thinking through how they may wish to implement and sustain their NLCs. A field test of the framework was also conducted with four new NLCs that used OPAL collaboration spaces to support their NLCs.

Keyword: Collaboration/Collaborative Learning, Professional Development
Our students today belong to a generation of digital natives who are constantly connected via the various media. According to Marc Prensky (2001b), “…today’s students think and process information fundamentally differently from their predecessors.” They are “digital natives,” born into the digital age. These digital natives have fundamentally different expectations of access and interactions with technology. Recognising this, there need to be a more holistic approach to develop the students moral character especially in the cyber world as school plays a critical role in shaping one’s attitude and behaviour. The probing questions, among others, include: (1) do we approach Digital Citizenship programme in schools only? and (2) what are the contributing factors should we consider in the design of the Digital Citizenship programme (DCP)?

Educators must equip our students with the necessary competencies to be more discerning with information and be able to make well informed decisions within the peripheral of sound moral values however there must be a concerted collaboration between schools and home. Parenting in this digital age is a brand new challenge. What are the keys to help us ‘parent’ effectively in this digital age? The Ministry of Education, Singapore (MOE) resonates that ‘parents play a key role in their children’s growth. Students benefit the most when the home and school environments are attuned to each other. A number of studies have connected home-school collaboration to better learning, healthy self-esteem, more positive attitudes and behaviour in life.’

In the School of Science and Technology, Singapore the DCP takes a more proactive collaborations through the various parents engagement programmes related to cyber wellness. This programme aims to equip parents with the knowledge and competencies to manage the challenges of raising digital natives. Inevitably, through the DCP we hope to raise a generation of students who think critically, act responsibly, and interact positively in the digital world and beyond.

In this session, we will be sharing the whole school approach to Digital Citizenship through the various parents engagement sessions. Also the involvement and empowerment of Cyber Wellness Student ambassadors in some of these sessions.

Keyword: Affective Education, Citizenship Education
Two Heads are Better than One: Co-facilitating Learning Experiences in the CCE Classroom

Osman Abdullah, Academy of Singapore Teachers, Singapore
Brenda Lee, Academy of Singapore Teachers, Singapore
Civics and Moral Education

Abstract

In most secondary schools, there are two to three teachers in the CCE classroom. Given this unique arrangement, teachers could leverage one another’s strengths to co-facilitate effective learning of values, skills and disposition. Seamless co-facilitation requires careful planning, constant communication, cooperation, collaboration, adaptability and trust between co-facilitators (Lucas & Whitaker, 2014) as the facilitators need to share a commitment to one another and the task of facilitation.

In this session, Master Teachers will examine how co-facilitation optimises teaching and learning in the CCE classroom and how it contributes to positive students’ experiences and learning outcomes. Participants will gain insight into how iterative cycles of improvement can help teachers in the planning and delivery of positive CCE learning experiences. Presenters will also share how co-facilitation process and subsequent post-lesson analyses allowed for critical reflections on content and pedagogies, which provided opportunities for teachers to focus on improving the quality of the CCE classroom experiences.

Keyword: 21st Century Competencies, Collaboration/Collaborative Learning
Abstract

The North Zone Mathematics (Secondary) Subject Group was formed as a networked learning community to promote the co-creation of knowledge amongst its members. Under the guidance of the Master Teacher (Mathematics), for a period of one-and-a-half-years, the eight Lead and Senior Teachers from North Zone schools collaborated within their subject domain of Math to further advance professional knowledge in the teaching and learning of Mathematics, particularly in the areas of Curriculum and Content, Learners and Learning and Pedagogy.

Undergirded by the pedagogy of Team Based Learning (TBL), the group collaborated on the big ideas in Quadratic Equations specifically under the sub topic of Nature of Roots in Secondary Three Level Mathematics. The primary objective of TBL is to go beyond simply covering content and focus on ensuring that students have the opportunity to apply what they have learnt. The team planned pre-reading resources including enactment of the lessons, Individual Readiness Assurance Test (IRAT), Group Readiness Assurance Test (GRAT) and an application problem.

The enacted lessons by the individual members were observed by the team with feedback leading to enhancement of the lesson. This process of collaborative planning, research and study of their lesson instruction enabled these teacher leaders to systematically examine their practice in order to become more effective teachers.

In this session the team would share on the professional learning they have gleaned from this networked learning community, particularly their ideas on Quadratic Equations, undergirded by the pedagogy of TBL.

Keyword: Curriculum & Pedagogical Innovation, Mathematics Education
Abstract

Mathematical communication, reasoning and metacognition are some of the key principles in the Singapore Mathematics curriculum. In our school, students face difficulty in explaining their solutions and giving reasons to support their answers. This translates to students not examining their solutions critically and hence their solutions do not show understanding of Math problems. Lorna M. Hayman, Dominican University of California, in his research on Critical reasoning in Math, states that Critical Reasoning requires students to “chronicle the steps they take to get the answer and detail what strategies they used. This level of attention helps students gain and demonstrate sound foundational knowledge of the concepts, while using reasoning skills that are applicable across all curricula and outside the classroom”.

Using this assumption as a basis, we conducted a pretest using an achievement test designed to measure students’ ability in exploring possibilities and generation of mathematical solutions. Students’ performance in the pretest was measured against a set of rubrics and we confirm the findings that students are at the developing stage of exploring possibilities and generation of mathematical solutions.

The Visible Thinking (VT) routines provide a structure for teachers to elicit ideas from students by using different VT routines for different purposes. For students, it provides a structure to scaffold their thinking and guides them to extend their ideas critically. The use of questioning in VT lessons helps students to articulate their ideas.

True mathematical learning, as identified in numerous reports by the National Council of Teachers of Mathematics (NCTM; 2000) and the National Research Council (NRC; 2000, 2001, 2005), requires visible thinking. Research shows that, in the mathematics classroom, visible thinking is the key to mathematics learning and success.

After a series of intervention, designed based on the VT Routines, was administered to the students, the post-test yielded positive results as the percentage of students who were in the developing stage decreased by 14%. They had progressed to the meeting/competent stage. Students learned to justify their answers and to generate possible solutions to Maths problems as compared to before the intervention. This shows a correlation between Visible Thinking Routines and Critical

Keyword: 21st Century Competencies
Facilitating Singapore Primary Students’ Learning in Mathematics with the implementation of Flipping Classroom & One-to-one Computing

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Doris Choy, National Institute Of Education, Singapore
IT in Education

Abstract

This study examined the changes of the students’ achievements with the implementation of Flipped Classroom and/or One-to-one Computing to facilitate Primary school students’ learning of Mathematics in Singapore. While many research studies discussed the strength and issues related to the use of flipped classroom, most of them were conducted in secondary schools and at the university levels (Cummins-Sebree & White, 2014). One-to-one computing has been one of the key initiatives in Singapore and internationally (Bebell & O’Dwyer, 2010). The availability of technology for students’ learning could be one of the factors that closely associated to the increasing number of educators who are willing to adopt the flipped classroom approach (Roehl, Reddy & Shannon, 2013).

Primary three students from a Singapore school were invited to participate in the study and 78 students voluntarily participated with parents’ consent. The students were divided into three different types of interventions: Group 1: Flipped Classroom only, Group 2: One-to-one Computing only, and Group 3: Flipped classroom with One-to-one Computing based on their intact groups to learn Fractions. Groups 1 and 3 were required to watch teaching videos assigned by the teachers on Fractions at home. Every student in Groups 2 and 3 were equipped with an iPad to learn from applications such as: Show Me and Virtual Manipulative.

The data analysis showed that the means of the students’ achievements increased significantly from pre-test to post-test and retention test in all three groups. For example, the achievement of Group 3 students increased from 2.64 at pre-test to 10.40 and 11.20 at post-test and retention test respectively. During the focus group discussions, students from all three groups enjoyed their learning experiences, such as viewing the teaching videos and using the apps to learn about fractions. Students from Groups 2 and 3 were able to articulate the different types of apps on the mobile devices they have used and how they were able to share their learning process with their peers. Students from Groups 1 and 3 expressed that they continued to view the teaching videos after the lesson. Additional findings will be discussed at the presentation.

Keyword: 21st Century Competencies, Information Technology and Education
On-Demand Learning Using Mini-Projects in the Polytechnic

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Curriculum Development

Abstract

Teaching introductory programming concepts to novice learners remains a challenge. This is more so as programming or coding is increasingly becoming a basic skill in the 21st century for learners and technology is rapidly proliferating every part of our daily lives. Many different approaches have been tried to solve this challenge. These approaches have included the use of engaging platforms and languages to game-based learning and media computation. However, most approaches have had limited success. One critical factor in teaching introductory programming concepts is that students often find themselves learning disparate bits and pieces of programs without seeing them effectively integrated together to achieve a relevant outcome. Further, today's learners live in a climate of instant feedback with easy access to a wealth of on-demand information.

This paper aims to adopt mini-projects coupled with on-demand learning to teach introductory programming, whereby each mini project demonstrates a relevant outcome and requires a specific set of on-demand content that is taught as part of the mini-project. The presentation will highlight the approach used with the mini-projects, the feedback gathered from the students and the staff, and the implication of on-demand learning to the curriculum for 21st century learners.

Keyword: Action Research, Curriculum in Classroom
Evaluating the Effectiveness of Active-Learning and Traditional Instructional Approaches in Higher Education

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Learning Sciences

Abstract

Often perceived as a radical shift from more traditional instructional approaches, active-learning paradigms have received considerable attention in the field of educational practices worldwide. According to this framework, effective learning occurs when the learning experience actively engages the learner with the content and when knowledge is co-constructed through social interactions with other learners (e.g., Bruner, 1961). However, others have challenged the efficacy of such instructional approaches, arguing that they ignore the fundamental structures that constitute human cognitive architecture (Kirschner, Sweller, and Clark, 2006), and thus, are ineffective for learning (e.g., Mayer, 2004; Sweller, 2003).

Accordingly, two separate studies were conducted to examine the efficacy of these instructional approaches with tertiary students. In one study, the influences of social interaction on learning was examined, by manipulating the degree of social interaction (individual work, paired discussion, group discussion) during the learning process. A repeated measures ANOVA was conducted and results revealed that participants who learnt individually (no social interaction) outperformed those who were involved in paired and group discussions, suggesting that introducing social interaction in the learning environment might not promote optimal learning.

In another study, the interacting role of individual learners’ prior knowledge (high vs. low) and teaching approaches (traditional vs. active learning approaches) on learning outcomes was investigated. Results from a two-way 2 (high vs. low prior knowledge) x 2 (traditional vs. active learning) repeated measures ANOVA demonstrated significant interaction effects. Participants with high prior knowledge who underwent the traditional teaching approach outperformed those in the other conditions. However, participants with high prior knowledge who were taught through the active-learning approach showed a significant decrease in post-test performance. Interestingly, those with low prior knowledge and were taught through the traditional approach exhibited the most significant increases in post-test scores. These results highlight that the effectiveness of instructional approaches is contingent on learner characteristics such as their degree of prior knowledge.

Collectively, these findings highlight that the advantages of characteristics associated with active-learning approaches such as social interaction might be limited, and that the ongoing advocacy for its broad implementation in all classrooms and across all learner types, should be re-evaluated.

Keyword: Learning Sciences, Psychology
Abstract

This study focuses on low achieving students’ struggle with the use of language to answer questions as well as convey their ideas in a cohesive and comprehensible manner. The topic on Human Digestion was chosen as students generally have difficulty in the use of the language. A series of activities using strategies such as knowledge building, cooperative learning and making thinking visible were employed. The study was designed to promote the use of the language and literacy to two groups of secondary two students - a control group (N = 27) and an experimental group (N = 20). Intervention activity to close the gap further in students’ ability to acquire the language literacy was carried with positive results.

Keyword: 21st Century Competencies, Classroom Research
Mathematics Reading Strategies of Year 1 Pre-Service Mathematics Teachers in Singapore

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Mathematics Education

Abstract

In undergraduate mathematics classes, students are expected to read various mathematical texts with understanding in order to have a deeper appreciation of the concepts. However, students enter university often uninitiated in this activity; reading mathematics starts out as a struggle for them akin to learning a new language. Experience tells us that some students can develop their reading skills as they progress through the different mathematics courses. But it also tells us that there are students who will continue to be overwhelmed and discouraged with their mathematics learning because of their inability to read mathematics effectively.

We believe that the development of students’ mathematics reading skills should not be left to chance or to students’ self-efficacy. Thus, as part of a curriculum review process, we included the objective of teaching mathematics reading in various courses of our four-year mathematics programme for pre-service teachers.

We are currently in the first year of implementation of the revised curriculum. We collect various data to help us monitor this process. In this initial stage, one area we are interested in is determining the mathematics reading strategies that students utilise. We interviewed nine students during the first semester of implementation. We also asked the students to complete a reading task. In this task, students were given a two-page text that featured a new mathematical concept. They were instructed to read the text until they have sufficiently understood it, and they were asked to think-aloud as they read to understand. The interviews and think-alouds were audio-recorded, which were subsequently transcribed.

The interviews and the students’ utterances during the think-alouds were analysed and coded with the view of determining the students’ mathematics reading strategies. Initial findings show that most of the students are comparable to what Shepherd and van de Sande (2014) described as novice readers of mathematics. Based on this, we identify ways by which we can further the students’ reading skills as they continue in the programme.

Keyword: Higher Education, Mathematics Education
A Comparative Study of the Philosophy programmes in Raffles Institution and Raffles Girls' School (Secondary)

Kristie Chen, Raffles Institution, Singapore
Lim Er Yang, Raffles Girls' School (Secondary), Singapore
Cognition, Motivation and Learning

Abstract

Philosophy is a core component of the Raffles Programme in both Raffles Institution (RI) and Raffles Girls' School (Secondary) (RGS). At the heart of the subject's pedagogy is the Community of Inquiry (COI) discussion, adapted from Matthew Lipman's Philosophy for Children Programme. While the vision, aims and objectives of the COI discussion are similar for both RI and RGS, implementation of COI discussions in the classroom differ in the two schools. Consequently, it is expected that students from the two schools will exhibit different thinking and reasoning behaviours in their COI discussions. This exploratory study aims to compare the effects of different pedagogical tools and practices employed by the two schools in COI discussions on students’ participation and thinking behaviours in a COI-style discourse. The study adopts a descriptive research design with qualitative content analysis to uncover Year 2 (13-14 years old) RI (N = 12) and RGS (N = 13) students' thinking and reasoning in a student-led COI discussion. Each group of participants was provided the same stimulus for discussion, and instructed to conduct an approximately 30-minute discussion as a Community of Inquiry. Transcripts of the discussions were then coded based on five categories of thinking behaviours agreed upon by the two schools and results were analysed. Associate Professor Jude Chua from the National Institute of Education, Nanyang Technological University, Singapore, was invited to view the video and audio recordings, transcripts and analyses, and to provide his independent opinion of the analyses and COI discussions. The study finds that structured discussion plans may assist students to anticipate directions in a discussion and consequently increase propensity to identify lack of clarity, that emphasis on questioning as practice and behaviour may increase propensity to seek clarification through questioning and suspend judgement, and that visual and tactile instructional tools may assist students to remember and increase propensity to exercise metacognition in COI discussions. This study hopes that its findings on COI pedagogical tools and practices will contribute to the growing literature on impact, practices and outcomes of COI-style discussions.

Keyword: Classroom Research, Cognitive Processes/Development
Navigating a Post-Truth World: The Affective Impact of Introducing Literary Theory To Gifted Students

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Civics and Moral Education

Abstract

This research study examines the impact of introducing literary theory to a group of gifted students in Singapore aged fifteen to sixteen. In particular, this study evaluates how the inclusion of literary theory in the curriculum helps to meet the affective needs of these students via the adoption of a critical pedagogy framework.

Critical pedagogy considers how education can provide individuals with the tools to better themselves and strengthen democracy, so as to create a more egalitarian and just society. (Douglas Kellner, 2000). With this pedagogical approach, students are encouraged to perceive social, political, and economic contradictions and to take action against the oppressive elements of reality. This is done by challenging students to question assumptions, explicitly recognise power relationships in their analysis of situations, engage with other students in collaborative efforts to critically reflect on the embedded network of relationships, and consider alternatives for the transformation of that network. The critical consciousness of students is deepened in the process, as they become more aware both of the sociocultural reality that shapes their lives and of their capacity to transform that reality.

The critical pedagogy framework adopted for this curriculum guides students to think through the following three levels so as to reach a deeper level of critical consciousness:

Level 1: Understand the cultural, political, and social practices that constitute one’s world and reality
Level 2: Engage in self-reflexivity in terms of one’s values and how one makes sense of the world
Level 3: Adopt an action orientation by connecting knowledge to forms of power

Using data from student interviews, surveys, class responses and assignments, it will be argued that the affective impact in adopting this approach to the teaching of literature has been considerable, based on the following factors:

a. The capacity for self-reflexivity in the way students are encouraged to challenge their own value system
b. The ability of students to adopt a critically informed perspective when debating about social justice issues
c. The readiness of students to take action that speaks “truth to power”

Keyword: Gifted Education, Literature
Development Support Programme: Exploring its creativity and challenges in implementation

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Curriculum Development

Abstract

Concerted early intervention program in Singapore preschools are a recent phenomenon in Singapore. It was not until 2009 that a better-resourced and integrated plan was put in place. This paper is a study of this phenomenon, or more specifically an early intervention programme that provides identification and intervention services for preschool children with mild developmental needs. The “Development Support Programme” (DSP) is an integrated community-based and family-focused programme in Singapore that aims to provide greater support for young children with developmental needs. It evolved from a pilot project, “Mission: I’m Possible” (MIP), which was spearheaded and conceived by the Department of Child Development in a local major children’s hospital to bring therapy services to the individual child’s community to address their learning needs. Its unique feature is the provision of a learning support educator (LSEd) to work with an individual child and his/her teacher in preschool classrooms through various learning support packages and sessions.

This preliminary study seeks to understand and explore the creative process and challenges faced by LSEds in one preschool institution in developing and implementing the range of support curriculum to children with various developmental delays. The study also aims to explore the sustainability of the skills afforded to the children by the curriculum during and after its implementation. It will also look into contributing factors which may allow for the possible continued effectiveness of DSP.

Data for the study is being conducted through a small-scale ethnographic research using a collective case study design and employing qualitative methods such as interviews, observations, field notes and document analyses to understand the roles, attitudes, creativity and challenges faced by LSEds. Coding will be carried out to identify common themes to shed light on the influences of the creativity and challenges faced by LSEds during implementation.

It is the hope of this study to provide insights into the real issues that LSEds face on the ground in developing their curriculum for each child and the implications of these curricular challenges. The research will also share its recommendations to enhance the quality of DSP services.

Keyword: Curriculum Design/Reform, Preschool
Moderate-to-vigorous physical activity participation by Singapore secondary school students

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Physical Education & Sports

Abstract

Background: Research has shown that regular participation in moderate to vigorous physical activity plays an important role in managing obesity. There is also a positive relationship between physical activity and productivity. For instance, individuals who engage regularly in physical activities experience higher level of psychological well-being are more likely to be productive in numerous settings (e.g., the school or workplace) relative to physically inactive individuals. Singapore Ministry of Education (2014) has set six goals of physical education (PE) and two of them are related to the benefits of living a physical active and healthy life through regular participation in physical activities. However, provision of compulsory school physical activity (e.g., PE lessons) is not associated with participation in physical activities, fitness levels or BMI in adulthood (e.g., Brown, 2009). This inconsistent relationship between school programs and BMI raises questions related to value of school programs. Therefore, the present study aims to explore reasons behind the inconsistent relationship by measuring secondary school student's physical activity and identifying their perceived barriers associated with physical activity participation.

Method: A total of 171 were recruited from local secondary schools. After obtaining consent forms, participants were asked to wear accelerometers to objectively measure the frequency and intensity of physical activity for a week. They also completed questionnaires on their intentions to do physical activity and barriers associated with their physical activity participation.

Results and Conclusions: Initial findings from the study will be presented (e.g., moderate-to-vigorous physical activity for a school and perceived barriers to physical activity participation). The initial findings would be beneficial for PE teachers to a) understand whether secondary school students participate in moderate-vigorous physical activity at the recommended level and b) reflect whether their PE lessons and other approaches are efficient for promoting physical activity in and out of school settings.

Keyword: Physical Education
An Exploratory Study of TiES: A Possible Approach to Teaching and Supporting Normal Course Students in Singapore Secondary Schools

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Curriculum Development

Abstract

From 2014 to 2015, the Educational Support Branch (ESUB) at the Ministry of Education, Singapore, worked with various schools to prototype different classroom management and instructional approaches so as to better design behavioural management and lesson instruction interventions for normal course students in Singapore secondary schools. Learning from the prototype, ESUB consolidated a set of effective strategies into a "Teaching in Educational Support (TiES)" package. The TiES strategies are organised into two main domains, namely, proactive and positive classroom management, and structured yet adaptive instruction. For proactive and positive classroom management, TiES advocates the setting of expectations and routines, and the use of behavioural strategies that maintains students' dignity. As for structured yet adaptive instruction, TiES advocates the articulation of clear lesson goals, and the provision of instructional scaffolds that can be adapted according to learners’ needs. More importantly, the TiES strategies are undergirded by a strong and positive teacher-student relationship. To ascertain the efficacy of TiES in supporting the students in learning, ESUB conducted a year-long trial in 2016. The trial involved 420 seventh to ninth grade students, as well as 59 Form and subject (that is, English Language, Mathematics, and Science) teachers and Heads of Departments from four secondary schools. To ensure implementation of the TiES strategies with fidelity, participating school personnel were supported with training workshops, networked learning sessions, and termly lesson observations. At the end of the trial, qualitative feedback was collected. Teachers shared that the use of TiES classroom management strategies not only addressed off-task behaviours, but also enabled students to be more aware of the behaviours they should adopt during lessons. Teachers also felt that the articulation of lesson goals enabled students to be more focused, and helped them to think about and recall the content and content-related terminology.

Keyword: Curriculum & Pedagogical Innovation
Let's explore talk in geography classrooms.

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Humanities and Social Studies Education

Abstract

With the introduction of MOE’s framework for 21st century competencies, greater attention is placed on enhancing students’ learning through holistic education. While teachers have greater autonomy to design holistic education experiences for students, Hogan et al.’s (2013) findings revealed that Singapore classroom practices continue to prioritise examinations over holistic education. This has resulted in ‘didactic rather than dialogical’ pedagogy, and they asserted the ‘outright contradiction’ (p.60) between teaching for understanding in an examination context and the learning objectives stated in MOE’s 21CC framework. Seen in this perspective, it is important to inquire what is the place of thinking, communicative and global citizenry skills in educating for the future.

Vygotsky (1978) theorised that language use and thinking are dialectically interconnected, and their development is only made possible in a social community. This means that learning (to think and communicate required by any discipline) takes place through the essential aspect of classroom talk. This paper explores the state of talk in a Singapore mainstream secondary school and how it may be influenced by varied question types. In particular, do question types promote domain-specific talk that exhibits the desired knowledge and thinking within the Geography discipline?

A mixed method approach is employed where different question types are planned into the lessons and used by two geography teachers in their secondary three classes. Questions are categorised using Wragg and Brown’s (2001) classification, while coding is carried out to analyse how language use evidenced geographic terms, conceptions of geographical thinking (GA, 2012; Jackson, 2006) and pedagogic purposes.

The study shows that domain-specific classroom talk is monosyllabic, limited or non-existent when the type of questions posed are closed, narrow or rhetorical. However, classroom talk has not exhibited the desired geographical literacy even with broad and open questions. Importantly, teacher’s demonstration of geographical thinking and talking are crucial in promoting similar disciplinary literacy among learners, while the lack of pedagogic purpose in teacher talk inhibits them. The paper closes with a discussion on the quality of teaching disciplinary literacy and the challenges that confronts promoting geographical thinking and talking in Singapore’s classrooms.

Keyword: Student Knowledge & Cognition, Teacher Education/Development
Data Visualisation for Classroom Teaching and Learning

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Science Education

Abstract

This paper describes the use of data visualisation to support inquiry-based learning of ionic compound nomenclature through a mobile app game, wRiteFormula. It discusses how data visualisation was designed for classroom instruction to facilitate students' scientific inquiry processes and enable teachers to gain quick insights about students' learning. The paper also shares practical scenarios and suggests strategies for using data visualisation in teaching and learning.

In a typical learning experience with wRiteFormula, students play the game, engage in group discussions to compare observations made during the game, and then participate in a teacher-facilitated class discussion to deduce the relevant nomenclature rules (Thong, Qiu, & Chia, 2016). During each game, students' choices and responses are captured non-intrusively in a content management system (CMS).

The CMS presents real-time summaries of students' game data in the form of simple charts that capture and organise data in a meaningful way. This provides teachers with on-going information about students' learning to support decision-making throughout the process of teaching and learning. The data visualisation afforded by the CMS enables the graphical display of abstract information to enhance teachers' sense-making and communication (Few, 2013).

The CMS data visualisation features were designed with teachers' input to ensure that teachers would be able to quickly explore and make sense of the information, and use the information to adjust their instructional practices, facilitate subsequent discussions, and provide specific feedback to address students' misconceptions, etc.

This eduLab project was jointly managed by the Educational Technology Division, Ministry of Education, Singapore and National Institute of Education, Singapore, and funded by the National Research Foundation, Singapore.

Keyword: Information Technology and Education, Secondary Schools
Scaffolding Children’s Thinking in Solving an Online Real-World Mathematics Task

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Abstract

In assessment for learning (AfL), feedback is a key factor to maximise the impact of the student learning. The study seeks to examine how teacher scaffolding as a form of Assessment for Learning (AfL) influences Singapore primary 5 students’ thinking in solving an online real-world mathematics task during a 1-week online study. In this case study, the Primary 5 students with heterogeneous learning progress and gender have to complete an asynchronous online real-world mathematical task in Google Docs beyond their curriculum time. Qualitative data from students’ online discourse were collected and analysed through three phases of the problem solving process, namely, Understanding the Problem, Identifying Strategies, and Justifying Proposal over the 1-week duration. The findings revealed that teacher scaffolding as AfL has a key role in students’ successful completion of the online task. As students’ thinking and discussions were made visible in the entire online discourse, the teacher was able to gather evidence of the students’ learning more accurately and timely. The affordance of technology and the use of adapted Fraivillig, Murphy and Fuson’s (1999) Advancing Children’s Thinking (ACT) framework enable the teacher to provide timely adaptive scaffolding as the next move for the improvement of the student’s solution. With the implementation of an online problem solving task based on sound scaffolding pedagogies and the AfL key principles and practices, it was noted students over took the control of their learning as a result. This investigation of teacher scaffolding as a form of AfL on an online platform would offer a new way of assessing student learning beyond the boundaries of the classroom and curriculum time in Singapore. It would also offer a solution to resolve a practical concern constantly faced by most teachers; finding the balance in helping students to achieve good grades in national examinations for public accountability and constructing important learning experience that cannot be tested in examinations. As research in doing online scaffolding is relatively new, more research is needed to expand on this domain as well as expand teachers’ online assessment capacity.

Keyword: Assessment, Mathematics Education
Assessment for Learning in Malay Language Classrooms: From zahir to batin

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Abstract

The context of Malay Language (ML) teaching and learning in Singapore is laden with culture, social etiquette and history. This study explores to what extent secondary school ML teachers in Singapore practise Assessment for Learning (AfL) in their classrooms. The words zahir and batin are traditional Malay words used to convey the extent of belief one has in a certain action. Within the Malay community, a person seeks to carry out his duties not only at the zahir or surface level but also at the batin or internalized level as well. An ML teacher who practices AfL at the batin level has embodied its principles in spirit and truly values it.

A sociocultural perspective is taken in this research and the methodological foundation is built upon the Vygotskian framework, Bourdieusian thinking tools and Fullan’s change theory. Data collection was carried out in two phases. The first phase involved the use of an online survey regarding assessment practices targeted at 150 teachers across 80 schools in Singapore. The survey laid the groundwork for the research and determined the AfL Values-Practice gaps amongst the 121 teachers who responded. The second phase involved 20 in-depth interviews with selected teachers and classroom observations of eight teachers in their classrooms. The interviews aimed to discover the teachers’ habitus and degree to which they internalized AfL concepts and regarded it as important. Metaphors for assessment were sought from the teachers to probe into the their innermost thoughts and beliefs about assessment. Four typologies of ML teachers’ AfL Values-Practice profile arose from the findings. The sociocultural contexts that had a bearing on the four AfL profiles are revealed through a discussion of four focal case study teachers.

The study produces new knowledge regarding AfL in four areas: the impact of a cultural disconnect on AfL practice in Asian classroom settings, the influence of teachers’ early assessment habitus, the significance of moral responsibility as a motivational tool for educational reform and the realization that Singaporean educators deviate from centrally suggested initiatives when the desire to fulfil performance-oriented beliefs about learning is strong.

Keyword: Assessment, Educational Policy/Reform
Abstract

SMU-X pedagogy is a radical approach to preparing university students with future work skills, by combining academic with experiential learning through the heavy use of projects to challenge and inspire them to use their disciplinary knowledge and skills in tackling multi-disciplinary, real issues faced by the partner organizations. Very often there are no immediate answers from the faculty or partner and the three parties have to work together to come up with a viable solution. By deep-diving into current and actual problems and constraints, SMU-X pedagogy can accelerate students’ learning to go beyond hypothetical classroom exercises. Courses span across different disciplines and students get to help improve people’s well-being, contribute to society or help businesses improve processes. Through sharing of two SMU-X courses: ‘Accounting Analytics Practicum’ and ‘Data Warehousing and Business Analytics’, the presenters hope to demonstrate how SMU-X pedagogy may provide an alternative form of learning which can be used to supplement traditional teaching methods as well as internships to help bridge the gap between academia and industry and prepare students for the workplace.

The feedback from both courses suggested that students benefitted from two different perspectives - The theory from the classroom as well as an industry viewpoint from a mentor. Application of the theory was made real and the experiential learning approach was beneficial for their overall learning outcomes such as enhancing their problem-solving, analytical, reasoning and communication skills.

Clients indicated that SMU-X collaboration benefitted them as they obtained a solution to a real life business problem that these companies were facing. In addition, the close interaction with students offered them the opportunity to learn new ideas and knowledge. It was also a new way of recruitment for these companies.

Faculty, too, learned the constraints of the industry to better inform their theory as well as gained rich data and research ideas. This led to the preparation for journal articles and academic cases.

Keyword: Collaboration/Collaborative Learning, Curriculum & Pedagogical Innovation
Using the affordances of technology and environment in making the invisible visible in Science learning.

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Joyce Seow Swee Yin, Zhonghua Primary School, Singapore
Fatimah Abdul Khir, Zhonghua Primary School, Singapore
IT in Education

Abstract

In the teaching of Primary School Science, it is observed that school students were not as interested in learning about plants and fungi compared to animals. Wandersee and Schussler (1999, p. 85) define plant blindness as “the inability to see or notice the plants in one’s own environment, leading to the inability to recognize the importance of plants in the biosphere and in human affairs.” As a result, students are unable to appreciate the biological and aesthetic aspects of plants leading to their disinterest in learning about plants. Plants have become invisible to students. Secondly, due to the nature of teaching plants which is largely fact based in lower primary and the difficulty in creating the appropriate learning environment for students to observe plant phenomenon, teachers have difficulties designing learning experiences and creating opportunities for students to be actively engaged in learning about plants. To address the problem in teaching and learning plants, Science teachers in two schools redesigned their lessons leveraging on the affordance of technology and the environment to create learning experiences that would pique students’ interest in plants by making plant life visible to them. Mobile devices were used with commonly available technology tools to make students’ learning process and thinking visible to their own peers and teachers. The redesigned lessons were enacted over a period of one term with pre- and post-measures of students’ attitudes in inquiry science and conceptual understanding. In this study, the aim is to understand how the affordances of technology and the environment is used in enhancing inquiry-based learning. The design process and enactment of the lessons were observed and documented along with the teachers’ reflection. Students’ artefacts in the classroom in the enactment of the lessons were recorded. The presentation will share teachers’ experiences in redesigning inquiry-based lessons by leveraging on the affordances of technology, design principles that were adopted and the results of the post-measures collected after lesson enactment.

Keyword: Information Technology and Education, Science Education
Students’ perceptions in using Advance Organizers in a biology subject

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Science Education

Abstract

Advance organizer is a tool that could help students to understand subject content (Ausubel, 1960). Besides providing an organized structure for students, advance organizer could help students to construct an overall picture of the topics (Wachanga, Arimba & Mbugua 2013). There are reports in literature that used experimental and control groups to compare the effectiveness of advance organizer as a tool to enhance students’ understanding of content, and often, in terms of students’ test performance (Mayer, 1979). Students’ perceptions of using advance organizers are not as well researched. The main aim of the study is to firstly uncover students’ perceptions of using advance organizers in learning biology subject, and secondly investigate how and why students would use advanced organizers. Qualitative and quantitative methods namely student survey (N=50), individual interviews (N=6) and lesson observations were employed for data collection over a term. The study seems to suggest that students are generally favourable to the use of advanced organizers. The survey results indicated that 96% of the students would use the advance organizer for their subject revision and 78% of the students would continue to improve on the structure of advance organizers for their revision. Some students shared that the advance organizers helped them to know the overall view of the topics and to understand the concepts better. The presentation discusses students’ perceptions in using advanced organizers, attempts to illuminate students’ thinking and possible reasons in using the advance organizers in different ways.

Keyword: Science Education
System theories revisited: Implications of system theories for educational policy decision making

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Educational Policies and Practices

Abstract

In educational policy decision making, the dominant philosophical foundation has been positivism, with the assumption that education is an open system. In positivism, the focus has been on the identification of causal relationships, anticipation of future results, and provision of policy interventions to intervene in the status quo when negative consequences are foreseen. However, it appears that in recent decades, this process of educational policy decision making has been challenged based on the observation that the educational system might not have been very successful in making intended advances - for example, there have been debates over the impact of the No Child Left Behind Act in the United States – which could be seen as an indication that the current approach may have to be reconsidered.

That being said, this theoretical study aims to revisit major system theories in the context of educational policy and attempts to identify potential issues surrounding the current predominant ideas in educational policy decision making.

This study argues that education is a social organization that goes beyond an open system. Different from open systems which emphasize structure, process, and ability for “self-maintenance”, education as a social organization allows us to perceive education as a system that is active and alive, and able to reflect and that consists of roles, not people. In addition, this approach maintains that not every part of education as a social organization communicates.

Moreover, this conceptual review confirms that the current approach to education policy adheres to the future based on the past, is inevitably set up to deal with unknowns and assumes that equilibrium is ideal. This approach further asserts that in the present process, the notion of the quality of the system has not been fully emphasized. In addition, the unit of time in which to discuss changing the system is not clearly defined at the stage of policy making. In the conceptualization of education as a social organization, a linear continuation of the patterns of the past cannot be presumed. And attention should be paid to what has been unchanged as well.

Keyword: Educational Policy/Reform
Theoretical Frameworks for Promotion and Transfer of Teachers

Kyehyeon Cho, Seoul National University, Korea (South)
Teacher Quality, Teacher Learning and Development

Abstract

Teachers as educational human resources, along with their management and development, are an important part of education administration. In spite of this importance, it appears that the characteristics of teachers as human resources for education have not been exhaustively discussed. Also, their promotion and transfer as potential ways to develop their professional value and to enhance the quality of education need further attention. Therefore, this theoretical study aims to suggest 1) two conceptual frameworks to discern the characteristics of teachers as educational human resources and their promotion and transfer, which are strategic human resource management and individual career development, and 2) guiding principles for promotion and transfer.

Strategic human resource management (SHRM) is defined as “the pattern of planned human resource deployment and activities” that supports the successful fulfillment of intended organizational objectives. From this perspective, teachers are human resources, a type of organizational asset, which schools and governments can utilize to implement their strategies. An administrative system such as promotion and transfer of teachers can be a method by which an organization better uses its resources to gain a competitive advantage. Along these lines, development of the professional ability of teachers is likely to be directed towards accomplishing organizational goals. This view of SHRM of teachers appears to be close to Young’s idea of human resources in education administration.

From the point of view of individual career development, teachers can be regarded as self-directed adults who must manage multiple and potentially conflicting values. Promotion and transfer may or may not be pursued as an option for them in advancing their professional careers. In particular, considering that teachers are usually treated as professionals, it is likely that they have developed their own professional value focus which may not necessarily coincide with the strategic directions of the organization.

Based on this discussion, four fundamental principles of teacher promotion and transfer are proposed: “the right people into the right positions,” efficiency and effectiveness, growth, and harmony. Furthering this conversation could contribute to establishment of a more balanced teacher development system.

Keyword: Educational Policy/Reform, Teacher Education/Development
Use of Disciplined Questioning to Promote Meaningful Dialogue in an Inquiry-based Art Classroom for Quality Student Learning

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Visual and Performing Arts

Abstract

This research study seeks to understand how students learnt in an inquiry-based art classroom with the aim of developing students to be self-directed learners. This study used disciplined questioning to generate meaningful dialogue in the classroom to inform the teachers of their students’ learning. The research was carried out with a class of Secondary Three Normal Academic students during the art talk session. Students were paired up to talk about their peers’ work using a set of guided questions provided by the teacher. Paired work was intentional as students’ interaction between their peers allowed them to develop social and emotional competencies as well as 21st Century Competencies. Dialogue between students were video recorded, transcribed and analysed. Besides lesson transcription, other data collected included student’s written notes, reflections and the artworks which the students did during the course of the lesson as well as at the end of the study. Findings from the study showed that disciplined questioning provided a structure for students to engage in meaningful articulation of artistic ideas. This structure empowered students to develop critical thinking skills to probe thinking by exploring and experimenting with artistic ideas. The findings carry implications for teachers to create an environment where disciplined questioning can promote meaningful dialogue in an art classroom. Such classroom environment helps to foster a collaborative learning culture among the students. Moreover, video recording of students’ dialogue is evidence-based data which the teachers can constantly revisit to reflect on the lesson as well as to assess students’ progress in learning. It brings to light the importance of formative assessment in the helping the students to achieve quality learning in the classroom. This necessitates the need for teachers to gain a deeper understanding in the ‘what’ and ‘how’ to conduct formative assessment effectively in order to achieve student-centric art teaching.

Keyword: Arts & Music Education
Abstract

Aim:
The study aims to shed light on the use and impact of diagnostic tools and active learning strategies in addressing alternative conceptions in students' learning of secondary level physics.

Methodology:
The lesson study approach was used and the physics content focus for the study was on Motion and Force. The researchers looked for answers to the following questions:

1. What are some common alternative conceptions on the topic of Motion and Forces surfaced by students?
2. How can active learning strategies be used to address these alternative conceptions?
3. What is the impact of active learning strategies on students' learning?

The Physics Conceptual Understanding (PCU) Test (Ravindran, 2013), an adaptation of the Force Concept Inventory (Hestenes et al., 1992), was adopted as a pre-instructional diagnostic tool to identify the alternative conceptions of our students relating to the topic on Motion and Forces. Specific questions were developed and used to address the 4 identified alternative conceptions using two active learning strategies, namely, peer instruction and Socratic discussion.

Findings:
The researchers discussed ways to improve student learning after each iteration of the lesson package. The PCU Test was administered again as a post-instructional diagnostic tool to assess the extent of how students' alternative conceptions had changed as a result. A survey was also conducted to understand students' perception regarding the instructions. The outcomes of the study suggest that peer instruction and Socratic discussion are viable pedagogical instructional tools that Physics teachers could adopt in their classrooms.

Keyword: Assessment, Peer Interaction
Got A Mole Problem? Bring it on!

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Ong Yu Ni, Yusof Ishak Secondary School, Singapore
Science Education

Abstract

Aim:
This study aims to shed light on the use of a game-based approach in addressing students’ learning of the concepts related to stoichiometry and chemical calculations.

Methodology:
The lesson study approach was used and the essential key concepts covered for the study was on chemical calculations involving relative molecular mass and the relationship between the amount of substance in moles, mass and molar mass. The researchers looked for answers to the following questions:

1. What are some of the misconceptions faced by the students in performing chemical calculations?
2. How can the game-based approach enhance the conceptual understanding of these chemical calculation concepts?
3. How can peer-learning provide greater support in students’ learning for these concepts?

Kiryakova (2014) highlights that gamification seeks to increase student motivation and thus the level of commitment to learning the material. The researchers then went on to adopt the use of the Holey Moley game which is part of the StaR Kits (Science Teaching and Resource Kits) created by a collaboration between Ministry of Education, Singapore and Science Centre Singapore. Adaptations to the game were made through the construction of game handouts for students to include their workings on paper as they solve chemical calculations in the game. This also enabled the teachers to check on students’ progress in learning as they were playing the game. An assessment based on GCE N-level standard questions was given to students before and after the game as a measure on students’ improvement in their learning through the Holey Moley game and also to pick out common misconceptions if any.

Findings:
The researchers discussed ways to enhance the use of the game-based approach to improve student learning and created a lesson package to support the use of the Holey Moley game in class. From the lesson observers’ survey, students’ reflection journals and pre- and post-test results, there was evidence of increased levels of motivation and engagement for the majority of students. The failure rate in the post-test had decreased and more students were able to complete the post lesson assessment in a shorter period of time.

Keyword: Curriculum & Pedagogical Innovation, Peer Interaction
Historical Inquiry Design through Fieldtrips and Graphic Depictions

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Rabiatul Binhan, Yusof Ishak Secondary School, Singapore
Humanities and Social Studies Education

Abstract

Background:
Inquiry-based Learning is anchored in the constructivist school of thought which propounds that “...students better understand what they learn if they are involved in genuine knowledge creation” (CPDD, 2013). Engaging in historical inquiry is a cyclical process that can be characterised by four aspects: sparking curiosity, gathering data, exercising reasoning and reflective thinking.

Aim:
This study focused on designing a historical inquiry which incorporated both fieldtrips and graphic depictions in a cyclical historical inquiry process as part of the students’ historical investigation project. A historical inquiry was carried out where students first went on a fieldtrip to gather data. Following that, the students came up with graphical depictions in the form of drawings as the end product for the historical inquiry after going through the process of reasoning.

Methodology:
Fieldtrips were chosen as part of the historical inquiry process as the potential to engage students in historical thinking meaningfully as well as become more involved in the contemplation of historical questions (Stoddard, 2009) was high. Similarly, graphic depictions in the form of drawings were chosen as the end product for the inquiry as the literature has strong support for the use of visual stimuli which allows students to better comprehend difficult historical concepts such as ‘evidence’ (Davies & Davies, 2003). In addition, visual stimuli also serve as an alternative means of expression (Haydn, Arthur, Hunt & Stephan, 2008). Students’ reflections were collected at the end of the inquiry to determine the effectiveness of graphic depictions as the end product for a historical inquiry.

Findings:
Indications from this study showed that the process of historical inquiry which incorporates both fieldtrips and graphic depictions helped engage students in historical thinking, and this enabled them to acquire conceptual understanding. In turn, this led students to acquire a disposition to engage in historical thinking. Graphic depictions in the form of drawings were also found to be useful in helping students visualise and make historical interpretations of the past.

Keyword: Critical and Creative Thinking, History
Effects of sustained silent writing on Primary 5 pupils’ writing performance scores and writing perception scores

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Claudia Wong Shi-lei, Xingnan Primary School, Singapore
Language and Literacy Education

Abstract

There are extensive overseas research purporting that free writing helps to remove “writer's block” and improves pupils' attitudes towards writing. This is the first local study that explores the differential effects of sustained silent writing (SSW) in the Primary 5 classrooms on pupils’ writing performance scores and writing perception scores across different ability groups.

A total of 4 teachers and 241 Primary 5 students were recruited for this study. Classes were randomly assigned into experimental or control group. The independent variable is the introduction of SSW prior to the start of a writing lesson. The intervention will be introduced from Term 3 to Term 4. There are two dependent measures: writing performance and writing perceptions. The writing performance measure consists of pupils’ English composition content and language scores. The pre-test scores was based on pupils’ SA1 examination. There are two other data points for writing performance scores, CA2 and SA2 scores. The writing perceptions measure will be the average of the scores based on the students’ writing perceptions obtained through the use of questionnaires across 6 domains.

Two sets of analyses were conducted. In the first set, a series of mixed analysis of variance (ANOVA) were used to assess the effects of SSW and student's progressive groups on students' writing scores across the different phases. In the second set, a series of mixed ANOVA were used to assess the effects of SSW and student's progressive groups on students' writing scores across time. When main effects or interaction effects emerged, follow-up analyses were conducted at a significance level of .005. Significant improvements in writing performance scores were observed in low progress pupils. Significant improvements in writing perception scores were observed in high progress pupils.

Keyword: Language and Education, Primary Schools
Redesigning Flipped Learning for Authentic Problem Solving

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Learning Sciences

Abstract

Flipped learning is developed to facilitate deep learning through integrating online learning with student-centred classroom activities. Despite the purpose of flipped learning, teachers are likely to apply it as a method merely to transmit knowledge in both online and face-to-face (F2F) environments. Although teaching more does not guarantee learning more, it is hard to change the pedagogical beliefs and practices of teachers, which often conflict with flipped learning. To resolve this issue, more attention should be paid to redesigning pre-service teacher education through enhancing problem-based and student-centred learning activities in the curriculum. In addition, flipped learning should be modified to focus on authentic problem solving and learning rather than delivering knowledge in the Internet.

In this study, we developed the problem-based flipped learning (PBFL) model and applied it for pre-service teachers as part of their coursework in South Korea. A total of 77 pre-service teachers (47 female, 30 male) participated in two PBFL sessions, collaboratively solving authentic problems about teaching and learning in K-12 school contexts. The PBFL consisted of online and F2F activities; self-regulated learning was carried out to develop individual solutions about a complex, ill-structured problem in the online learning environment. The individual solutions were collaboratively integrated to a group solution in the F2F environment. We also developed an online learning platform that supported self-regulated learning with online lecture video, reading materials, and quizzes as well as interactive learning like asking questions and discussing issues.

Interviews (n=8) and surveys were carried out to investigate the perceptions of participants on the strengths and weaknesses of the PBFL. Pre-service teachers actively participated in the PBFL activities (1st: M=4.27, SD=.57, 2nd: M=4.29, SD=.58), and they were satisfied with the activities (1st: M=4.05, SD=.55, 2nd: M=4.06, SD=.59). Many pre-service teachers also perceived that their competencies of teaching had improved through the PBFL (1st: M=3.89, SD=.59, 2nd: M=4.00, SD=.63). Self-regulated learning and collaborative learning in the PBFL were helpful not only in improving motivation and competencies but also changing pedagogical beliefs. Online lecture video was perceived as one of diverse resources for solving the authentic problem, not the fundamental source of knowledge.

Keyword: Curriculum & Pedagogical Innovation, Problem-based Learning
Redesigning Pedagogy through Design Thinking for Innovations in STEM Education

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Mathematics Education

Abstract

In this work, we will describe a novel pedagogical framework called Design Thinking that provides an integrated STEM (Science, Technology, Engineering and Mathematics) experience in real-world problem solving. This human-centered approach is a methodology for developing innovative solutions to real-world problems in STEM education by drawing on interdisciplinary skills. The fundamental framework involves five key steps that includes empathy, define, ideate, prototype and test. Depending on the type of problem that needs to be solved the design thinking framework combined with effective brainstorming strategies has been well-established in business, marketing and commercial environments and is currently finding its way into STEM education.

In this talk, participants will have the opportunity to learn about how to incorporate a design thinking framework in education to make innovations in their pedagogical practices and enhance student learning. Specific examples and benchmark problems for which this framework has been applied at all levels of students and teachers will be presented. Some of these examples include solving global challenges in food, water and energy systems as well as redesigning educational frameworks including active learning spaces, experiential learning and learning by doing. An example that focused on phenomenological study examining the outcomes from a course designed to promote innovation through an instructional intervention consisting of design thinking and project based teaching practices and assessment methods will also be presented. Participants will also recognize that not only does this integrated STEM experience provides an opportunity for a shared collaborative experience for a team of students, teachers and faculty to develop professionally but also will help to give them an opportunity to become change agents to transform their respective institutional, school district and organizational practices. During the talk, participants will be exposed to the process of design thinking framework along with a few example brainstorming activities that will help them to make innovations in education by a redesign of their pedagogical practices.

Keyword: 21st Century Competencies, Mathematics Education
The Fourth Blueprint: Leading program innovation and educational change in creative STEM learning

Dr Esther Joosa, Arts of the Earth Learning Hub, Singapore
Anna Salaman, Playeum, Singapore
Esther Nai, SalesForce, Singapore
School Change and Leadership

Abstract

We are now living in a world in which vast changes in technology open new intellectual horizons. Creative Science, Technology, Engineering and Mathematics (STEM) are now critical components of learning. Increasingly, educational leaders around the world are in search for new and innovative program frameworks that can include marginalised populations. Since the industrial revolution, the West has passed through three blueprints of leadership in the private sector — those of the classical model, the human relations model, and the systems model (Limerick, Cunningham and Crowther, 1998). The Fourth Blueprint provides ideas that steer ideas educational collaboration, individuality and innovation. This study presents the development of evaluative measures that bring transparency and transferability to educational change.

The featured program study was a collaboration between the private sector and social services providers. The target population comprised of upper primary and early secondary school youth of marginalised backgrounds in Singapore. The aim of this study was to design of evaluative measures to create transparency and build ideas for transferability of this program. The various dimensions of the Fourth Blueprint and the four “Ps” of creativity (Runco & Kim, 2013) provided the base for the evaluative measures. In-situ videography of all meetings, program implementation and daily reflections with the volunteers provided the data. After the program implementation, the video data were reviewed, coded and analysed.

The development of two relatively uncomplicated evaluative measures supported by visual data brought transparency. They provide evidence of the role of creativity and STEM engagement in the positive self-development of these marginalised youth. Within a creative STEM environment, they became active contributors and self-directed learners. The complex dynamical systems transformed the educational experience of these young people into individual success stories. Reflective practices of program designers, volunteers and students enhanced dialogue about visions in education leadership, the application of creativity, and STEM as critical ingredients in future job prospects. This study aids in the transferability of ideas. The innovative nature of this program leads ideas that can build new educational frameworks to creatively address the social imbalances that still affect too many young people in Singapore.

Keyword: 21st Century Competencies, Curriculum & Pedagogical Innovation
Curriculum Innovation: Transforming Design for Pedagogy in Singapore’s Primary School Language Classrooms

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Curriculum Development

Abstract

The proliferation of multimodal texts constructed for a variety of purposes (Arizpe & Styles, 2004; Cope & Kalantzis, 2000, Kress & van Leeuwen, 2006) require school curricula to move towards embracing a more multi-literacy approach to teaching and learning. Picture books (one such source of rich text) provide a rich resource for teachers who are keen on introducing multimodal texts into their language curriculum. The unique combination of words and visuals allow readers to experience an array of meanings. As language curricula across the globe rapidly shift towards more multi-literacy approaches to teaching and learning, there is a pressing need for easy-to-use frameworks to support language teachers as they guide their learners in analyzing, exploring and pursuing deeper interpretations of the myriad of multimodal texts available to them. In this wave of change, no different from others across the world, teachers in Singapore’s primary classrooms are compelled to re-examine how reading and critical thinking is developed in the 21st century language classroom. This paper proposes that a systematic way to do so is via a combination of the 6 Semiotic Modes framework (Chan & Chia, 2014 adapted from Anstey & Bull, 2010) and Critical Visual Literacy framework (Chan & Chia, 2014 adapted from Freebody & Luke, 1990; Janks, 2014). Participants used to the ‘logocentric, book centered, and essay driven’ (Hull & Nelson, 2005) language classrooms, will find the approach (the combined frameworks) a refreshing change. The exploration of multimodal texts through a combination of the 6 modes — Linguistic, Audio, Spatial, Oral, Visual and Gestural and examined through the lens of a ‘text decoder’, ‘text participant’, ‘text user’ and ‘text analyst’ — are used as ‘tools’ to unlock the meanings and veer towards the development of deep understanding and critical thinking in learners who are readers, viewers and decoders. The theme of ‘Courage’ has also been specially chosen to exemplify the enactment of the proposed combined frameworks for this presentation and will enable participants to experience how 21st century social issues can be delicately introduced as part of the language teaching and learning.

Keyword: Curriculum & Pedagogical Innovation, Multiliteracies & Multimodalities
Abstract

Parents’ engagement in their children’s education is considered an important predictor of positive academic outcomes. For students with special needs, lack of parental engagement has also been highlighted as a problematic issue in their academic success. As all parents, parents of students with special needs inhabit multiple roles both at home and in their workplace and can be very engaged in some or in all of them. Given the fact that parents with children with special needs constitute a working population that is considered to have an extra burden in their family lives, it is worth investigating their job attitudes towards their life satisfaction and school engagement. Past research on parents’ school engagement has examined the relationship between parental engagement and students’ academic achievement, parents’ beliefs and behaviours regarding their involvement, responsibilities and activities in children’s education, and parental style and expectations. However, there is currently no research on the job attitudes of employees with children with special needs with regard to the specific job accommodations that these parents might need to respond to the high demands of their child’s education. Thus, this research explores whether specific job accommodations and demographic characteristics are correlated with levels of school engagement of employees with children with disabilities in Singapore. We also assess the relationship between life satisfaction and parents’ engagement in school.

To identify the attitudes of parents with children with special needs, a survey design in the form of a self-administered questionnaire was used to collect data from parents (men or women) of children with special needs/disabilities who are full-time or part-time employees within an organizational setting in Singapore. A total of 113 usable responses were collected. The preliminary analysis of the findings indicates that job accommodations have a positive impact on parents’ school engagement. The findings provide preliminary evidence that life satisfaction of parents with children with disabilities is also correlated with their engagement in their children’s education.

Implications for practice and research are considered and recommendations for future research are offered.

Keyword: Family/Home Education, Special Education
BOTH A BANE AND A BOON Musings on Response to Intervention from India

Ajit Moorkoth, Indira Gandhi National Open University, India
Special Needs Education

Abstract

The boom in the number of children identified with learning disability in the late eighties and throughout nineties saw the emergence of a new approach called the response to intervention (RTI) model. RTI has gained momentum as a means of determining learning disabilities in school-age students in the US and many other Western regions of the world.

It is seen as an answer to the issue of over-identification of LD. The issue has grown so rampant that even calls for eliminating the category of LD has increased in the recent past. In India, prevalence rates for LD are alarmingly high. The prevalence of LD is likely to be closer to 1 to 3 percent of school-age children as opposed to recent estimates of 20 to 30 percent. There is an absolute lack of consistency or precision in the identification procedures used in India across agencies, States and even districts.

However, in India, professionals have so far been less enthusiastic about it. Diagnosticians still largely depend on the IQ/Achievement discrepancy model of the yesteryears. General school teachers are wary about taking responsibility of the tier 1 intervention of the RETI model. Parents, however, prefer the RTI model because it delays diagnosis and labeling but nevertheless their child receives support for learning.

Does a country like India look for a different approach to RTI that is more suitable to the needs of the existing educational system? The paper discusses the core features of RTI and introduces a possible model of RTI for Indian schools to adopt.

Keyword: Special Education
An International Collaborative Model to Monitor and Improve Curriculum Implementation in Indonesia

Dr. Scott Paris, Australian Council for Educational Research, Australia
Curriculum Development

Abstract

Goals
The goals of this project are to improve the quality of instruction and learning in Indonesian schools by establishing tools to monitor and evaluate curriculum reforms, new pedagogies, and new instructional materials. To meet this goal, we will (a) build capacity among Indonesian teachers and educators to monitor, evaluate, and implement Kurikulum 2013 (K13), a national curriculum designed by the Indonesian Ministry of Education and Culture (MoEC), (b) conduct literature reviews of curriculum reform in Indonesia and other countries, (c) participate in study visits to Singapore and the Philippines to learn about curriculum implementation, and (d) hold workshops with Ministry staff to create strategic plans for curriculum reform.

Background
Indonesian education has been influenced by ten significant curriculum reforms between 1964-2013 that addressed changes in the socio-economic conditions and expectations of Indonesian society. The latest curriculum, K13, was a national response to the school-based curriculum introduced in 2006 that decentralized educational responsibilities for improvement. Teachers reported difficulties implementing the 2006 curricula because the standards did not always match the abilities of the students, because the curriculum and textbooks contained too much information, because teacher training was insufficient, and because of the historical focus on rote learning for exam preparation. In response to these barriers, the MoEC developed K13 that specified competencies in each subject area in terms of knowledge, skills, and attitudes of the students. K13 began implementation in 2014 and has been introduced in approximately 25% of schools for the 2016-2017 academic year.

Findings
I will share the insights about curriculum reform gained from feedback gathered from Indonesian teachers and principals in four regions of the country. The data were gathered in focus groups and surveys from schools serving urban, rural, and remote schools in Indonesia. In addition, I will summarize the “lessons learned” from study visits with educators in Singapore and the Philippines who have developed and implemented national curricula. The emerging policies for curriculum reform in Indonesia focus on student-centred learning with emphases on core competencies, 21st century skills, greater alignment between classroom instruction and assessment, and improved materials for teachers.

Keyword: Curriculum & Pedagogical Innovation, Curriculum Design/Reform
Language Anxiety: A case of students in a Public Speaking course at a Bangladeshi University

Nadia Tarique Haque, North South University, Bangladesh
Curriculum Development

Abstract

Although CLT has brought a major shift towards fostering communicative competence and meaningful communication in English language classrooms, speaking in English remains a problematic domain for Bangladeshi students. For the students, just the way good listening and reading skills are integral to the reception of academic knowledge, good speaking and writing skills are essential for the incorporation and production of that knowledge; but these students report to experience a mental-block or anxiety while speaking in English. L2 researchers (Devi et al., 2008; Horwitz et al., 1986; Richmond & McCroskey, 1989) have termed this condition as 'language anxiety', and has identified it as a major affective factor for delaying the ease and efficacy with which English is learned, impeding the development of communicative competence, hampering meaningful classroom interactions, provoking problems pertaining to the acquisition, retention and production of the language, and disrupting productive learning and use of target language.

The major objectives of the current study were to measure the level of language anxiety of 36 ESL students enrolled in a 'public speaking' course in a Bangladeshi private university, and examine their perceptions regarding any connection between their language anxiety and language performance. The data was collected using the FLCAS questionnaire (from Horwitz et al., 1986) and a follow-up focused-group discussion. Based on the findings it appeared that the students experienced moderate-to-high levels of anxiety, and the 'fear of negative evaluation' followed by 'communication apprehension' were the major contributing factors behind their anxiety. Based on result of the FLCAS, 10 students – 5 with high and 5 with low anxiety levels – were selected for focused-group discussion. From the discussion it seemed that students' perception about their own language proficiency, competence and performance seemed to be directly related to the anxiety that they experienced, and speaking in English – both inside and outside of the class – was a major anxiety-provoking factor for them. Not remembering appropriate words, inadequate wait-time, addressing an unfamiliar topic, speaking in front of the class without preparation, immediate follow-up questions were also identified as some of the underlying factors adding to the anxiety of the participants.

Keyword: Adult Education/Development, ESL
Developing Leadership IQ in ELT: A Case Study in China

Abstract

Teachers are now more frequently required to exercise leadership outside classroom than they have been traditionally expected to, since shared decision making and teacher professionalization have long been the elements of many school restructuring plans. It is obviously that education for today and for the future calls for teacher leadership, emphasizing the need for teachers to expand their sphere of influence beyond the classroom to go into the schoolwide leadership activities, rather than just understanding the central position of teaching. This study particularly investigates teacher leadership of ELT (English Language Teaching) in China, since there are more than 300 million people learning English in this country, bringing about larger need for teacher development.

Murphy (1996) had proposed the concept of Leadership IQ, which means “leadership can be defined and measured as a form of intelligence”. Based on his framework of Leadership IQ and eight workleader roles (the Selector, the Connector, the Problem Solver, the Evaluator, the Negotiator, the Healer, the Protector, the Synergizer), this case study was carried out targeting three English teachers from a senior high school in China. It aims to explore how these teachers (with an teaching experience of 1.5, 14 and 33 years respectively) evaluate their performance of leadership roles, what kind of differences there may be between their performance and what possible factors there are to influence that performance.

A Leadership IQ questionnaire adapted from Murphy’ research was used as the investigation tool, and by comparing the teachers’ answers, two major findings have emerged. It is found that teaching and leadership experience does not directly determine one’s leadership IQ, but rather it helps to clarify a teacher’s strength and weakness related to workleader roles. Also, the three teachers’ particularly disappointing performance of the role Selector, can be attributed to the cultural influence of Asian countries.

Keyword: School Change and Leadership, Teacher Education/Development
Understanding Culture; Understanding History: Chinese Music Appreciation as General Education Course in Tertiary Education

Martin Lee, Caritas Institute of Higher Education, Hong Kong
Curriculum Development

Abstract

As a music appreciation course, even though this is just under a general education programme, its implement at a tertiary institution would face several challenges if we want to achieve the learning outcomes and bring meaningful aspects to students as much as possible. The situation becomes more difficult when there is a lack of music resources as in many tertiary institutions in Hong Kong where they do not have formal music programmes or music departments as main users. Libraries and centres may not purchase and subscribe related references, databases, and other electronic resources for students’ studies and collection due to limited budget yearly.

Resources for teaching and learning materials of course are affected but these still can be easily sorted out by experienced and skillful instructors with the help of any online learning platform, e.g. Moodle. However, with respect to the assignments, students need extra resources to learn and study in details that normal lessons would not be able to cover, especially when they are doing some specific topics, which require certain references in the fields.

This paper, therefore, demonstrates a new approach to learn Chinese Music as an appreciation course in the general education programme, i.e. a course designed for non-music-major students. Under this circumstance, instructors should initiate their interests and discussions around the immediate peripherals instead of simply the music itself, which requires long-term training and understanding in music. Besides concert report and final written exam as standard assessments, students are required to design a small-scale research to see how current Chinese music and its related derivatives interact in the society and the people around them. In this light, students would not need relying heavily on music resources but other disciplines e.g. cultural studies and pop culture. Through this new pedagogical approach, students would be able to apply knowledge of other related disciplines and view Chinese music from various angles, know how music contributes to the understanding of others, and understand the aesthetics principles over time and space. In other words, both cultural and historical aspects of Chinese music would be known at the end of the course.

Keyword: Curriculum & Pedagogical Innovation, Humanities and Social Studies
Using multimodal ‘rich texts’ for language teaching and learning

Alexius Chia, National Institute Of Education, Singapore
Caroline Chan, Sembawang Primary School, Singapore
Language and Literacy Education

Abstract

A major challenge for any language curriculum is to ensure that texts used are carefully selected and suitably meet the needs of teaching and learning. More often than not, the success of a unit of work is contingent on the ‘richness’ of the texts that are used. The challenges become greater in a literacy programme that attempts to introduce multimodal texts. That these texts are now used alongside their more traditional black ink-on-paper counterparts, is a reality that any language teacher preparing their learners for the 21st century school/workplace demands cannot ignore. Also, the crucial role that multimodal texts play in a language class is undeniable given the fact that many of our learners encounter them on a daily basis outside of the classroom. While many teachers will readily acknowledge that multimodal texts are important, a sizeable number still do not have the necessary knowledge and skills to use them as resources for the language classroom.

This presentation reports on the findings of a two-part description-cum-intervention project that examined multimodal text use in English classes in a Singapore secondary school. Underpinning the project was Timperley, Parr and Bertanees’s (2009) framework for teacher inquiry and knowledge building to promote better student learning. Data in the form of focus-group interviews, lesson recordings and analysis of teaching and learning materials were collected pre- and post-intervention. The findings revealed that there was a marked difference in the ways teachers made use of multimodal texts. Essential to the success of the post-intervention unit of work was the heightened awareness of the varying definitions of ‘rich texts’ and how the teachers were deliberate in mining these texts to help achieve their learning objectives.

Keyword: Curriculum in Classroom, Multiliteracies & Multimodalities
FROM SEGREGATION TO INCLUSION TO WHAT NEXT! Where Are We Headed?

Ajit Moorkoth, Indira Gandhi National Open University, India
Special Needs Education

Abstract

Education of children with special needs have come a long way. A journey that started from segregation lead to integration / mainstreaming, and has now reached inclusion. However, is inclusion, particularly the original ideas of inclusion, disintegrating gradually? Has the comments of Baroness Mary Warnock of 2010 impacted the current scenario where inclusion is now being increasingly thought of as a “dumping” ground, amongst such other concerns as it being equated with less choice of schools as far as parents are concerned, and an abysmal lack of related services being made available. Twenty years of research has not been able to generate a consensus on a common interpretation of inclusive education.

As recently as in 2016, reports are being published that despite various placements, children with special needs felt “better” in special school placements than in inclusive settings. The United Kingdom saw in 2003 the reopening of the once shut special schools thus advocating a permanent and significant role for such facilities. Europe is not very far behind in opening their facilities too. This is when inclusion is still being supported by the government at policy levels. Access to mainstream education is no longer the call-sign; access to context is instead!

If this is indeed the state of inclusive education in the western world, what about the schools in other parts of the world? Can we not think of special schools promoting inclusive practices and provide for children with special needs and their parents, an array of options that on a spectrum would include inclusive special schools in one end of the spectrum to general schools at the other end? Can we reintroduce the concept of Most Enabling Environment and use it as the benchmark to decide where to place the student on the spectrum of available educational placement options?

Keyword: Educational Policy/Reform, Special Education
Exploring the relationship between curriculum and andragogy in undergraduate economics in the UK and Singapore

Jack, Embry-Riddle Aeronautical University, Singapore
Curriculum Development

Abstract

This investigation of economics education in the UK and Singapore aims to explore the relationship between curriculum and andragogy in an undergraduate economics curriculum. My premise is a belief that young adults have the right to access an excellent economics education at university so that they can better understand the world around them to make informed choices as participants in society.

Although the 2008 global financial crisis and subsequent Euro-zone crisis have contributed to a resurgence of economics at both secondary school and university level, economics as it is currently taught in universities worldwide, is limited in its ability as to explain the crisis. Both students and teachers have combined to synthesise and enact a change in the undergraduate economics curriculum.

My thesis investigates one such curriculum innovation in undergraduate level economics, the CORE project, which as of September 2014 is being piloted at UCL. Taking an analytical approach informed by theories of andragogy and curriculum, I investigate the CORE project and its implications on the teaching and learning of undergraduate economics at a Singapore University. I utilise qualitative data by way of primary data collected using group interviews and email surveys with professors in economics and education and secondary data by way of curriculum artefacts. I collected, transcribed, coded and analysed this qualitative data manually, allowing for a holistic discussion around the critiques, features and educational implications of the CORE project and non-CORE undergraduate economics curriculum.

I observed that while the CORE project is a positive step, it represents an evolutionary change towards a revolution in undergraduate level economics. I argue that the ontological and epistemological basis of neo-classical economics is limited, needs critiquing and possibly reconceptualising. By challenging economics’ reliance on over-simplified theories, concepts and economic models, teachers can create an engaging, dynamic learning environment where students’ understanding of the subject can be deepened. My study recommends the incorporation of the Bhaskarian notion of ‘critical realism’ as the conceptual framework in Economics and in particular, the adoption of a ‘retroductive’ approach (Bhaskar, 1979) to improve the teaching and learning of undergraduate level Economics.

Keyword: Curriculum Design/Reform, Humanities and Social Studies
Student Voice & Advocacy

Jacqueline Anthony, Kheng Cheng School, Singapore
Civics and Moral Education

Abstract

Student engagement maybe defined as the process whereby schools make deliberate attempts to involve and empower students in the process of shaping their learning experience. The Values in Action (VIA) programme (previously known as Community Involvement Programme), implemented across all levels in Primary and Secondary schools since 1997, is one area where student engagement maybe meaningfully applied. It is the contention of this paper that the normative top down instructional approach enacted in VIA programmes throughout many primary schools may not develop the outcome of an ‘active contributor’. This paper therefore looked into how a school’s VIA curriculum centred on student engagement develops awareness of the impact student voice, self-advocacy and greater active citizenry.

The project is a qualitative and instrumental case study to provide insight into the students’ understanding of active citizenry, and how the impact of student voice would enhance it. It was carried out in 2 middle progress Primary 5 classes with a sample size of eight students whose perspectives were sought for the impact of student voice and the awareness of citizenry as a result of it. Data was also collected from teacher participants to understand how their perspectives of the students’ ability to carry out the VIA project, might affect how much autonomy and voice the students are given in class.

The study has proven that student voice was more effective in engaging the students in serving the community, and that involving students has significant positive impact on student voice and advocacy, and enhanced student’s concept of their role as an advocate. The project was successful in nurturing the larger intent of social action as “serving the community”.

The issue of skillsets remain a challenge, and the development of citizenry was found to be tentative. The research shows that it is imperative for schools to adopt a growth mind-set in believing that young children, when given opportunities, would rise above the current limits of a teacher-directed school curriculum. During the presentation, the researchers will share their recommendations and suggestions for primary schools to carry through such a student-engagement approach in VIA in their schools.

Keyword: 21st Century Competencies, Action Research
Abstract

Spectra Secondary School, a specialised school for Normal (Technical) students, uses a 10-week Garden-based Service Learning (GBSL) curriculum to cultivate in students the 3R school values: Respect, Responsibility and Resilience while engaging and motivating them in the process. Under-girded by the Self-determination Theory (Ryan & Deci, 2000), and the Garden-based Learning model of engagement (Skinner, Chi & The Learning-Gardens Educational Assessment, 2011) this innovative Citizenship and Character Education programme is taught to secondary one students. The whole teaching and learning process is aimed at cultivating in students the 3Rs school values through engaging experiences of learning. Through various gardening experiences, students learn the importance of effort, responsibility and resilience, and what they are capable of achieving if they work hard. They understand empathy for the less fortunate. They serve the school's community of needy students by raising funds through sales of their self-grown produce at their own Farmers’ Market.

Two separate quasi-experimental studies were conducted to investigate the efficacy of GBSL on student engagement and motivation, and in cultivating values and attitudes. A cohort of 147 secondary one students were involved. The pilot study involved 79 students in Term 2. The second main study involved 68 students in Term 3. Dependent variables were measured using a 7-point Likert scale at three points of the study: beginning-of-study after completion of the first lesson, mid-point of study, and end-of-study after completion of the last lesson.

Both the pilot and main study showed that GBSL has positive impacts on engagement, psychological needs satisfaction, and values development in Normal (Technical) students, although the degree of significance varied across different measures.

All four GBSL teachers believe that for the GBSL curriculum to be implemented successfully, both heart-ware and hardware have to be present. GBSL teachers must first believe in its efficacy in impacting on the desired outcomes. Without this heart-ware, no amount of hardware that is available will sustain this programme.

Keyword: Citizenship Education, Curriculum & Pedagogical Innovation
Investigating the Normative Role for Intellectual Virtue in Mathematics Education

Steve Thornton, Australian Academy of Science, Australia
Virginia Kinnear, Flinders University, undefined
David Moltow, University of Tasmania, undefined
Mathematics Education

Abstract

In educational philosophy, much has been written on virtue ethics and its role in moral education, with an emphasis on the moral virtues in the development of character. There is, moreover, a growing literature on the intellectual virtues in education, with emphasis placed predominantly on their role in critical thinking and the cultivation of dispositions essential to the education of critical thinkers. However, little has been written on how the intellectual virtues, as good habits of the mind, might apply to specific curriculum areas and the role they ought to play to foster intellectual engagement and, hence, excellent teaching and learning.

In this presentation we start from an account of the intellectual virtues developed by Sockett in which he stresses the overall importance of truthfulness, accuracy, open-mindedness and impartiality. These virtues can be considered as the enabling traits that dispose one to think critically and to engage intellectually with one's learning. In investigating how these virtues might apply to mathematics education, we consider the normative implications that flow from a commitment to the premise that their cultivation is a key attribute of intellectual engagement in that field.

By comparing and contrasting mathematics curriculum documents from Singapore and Australia, we will examine how the intellectual virtues of truthfulness, accuracy, open-mindedness and impartiality might be realised through, and impact upon, school mathematics.

This is a theoretical paper that draws together elements of philosophy and mathematics to examine the implications for curriculum developers and practising teachers.

Keyword: Mathematics Education, Philosophy
Developing Teachers’ Topic-Specific PCK in Lower Secondary Science

S. Ravindran, Academy of Singapore Teachers, Singapore
Lau Chor Yam, Academy of Singapore Teachers, Singapore
Teacher Quality, Teacher Learning and Development

Abstract

From its conception to present, Pedagogical Content Knowledge (PCK) remains of special interest to researchers, teacher educators and policy makers who recognize its potential for providing greater clarity on how teacher knowledge, classroom practice and student outcome are related. However research has shown science teachers’ PCK to be uneven, and the possibility for strengthening teacher PCK through professional development remains a key concern.

Of the many tools currently used to characterize the nature and growth of PCK, one of the most widely known is the CoRe (Content Representation) originally developed by Loughran et al. (2006). A CoRe is a topic-specific representation of a group of teachers’ shared knowledge or collective PCK about teaching and learning of that particular science topic. The CoRe tool, which consists of ‘big ideas’ in the science topic and prompts to elicit pedagogical thinking about instruction, serves to support a group of teachers’ discussion and testing of each other’s pedagogical thinking and reasoning. Through this process, the collective PCK of the group of teachers becomes ‘concretised’ and captured.

This paper presents the researchers’ attempt to gain insights into how teachers’ thinking and classroom practice may change as they go through a process of examining their collective thinking about teaching and learning of a topic in lower secondary science - Particulate Nature of Matter using a CoRe tool, and reflecting on the actual enactment of teaching specific ideas/concepts of the content to a particular group of students. The researchers and teachers meet during school-structured teacher professional development time to collaboratively plan and develop lessons, and consolidate the learning from lesson observations through post-lesson discussions and reflection.

The process of creating the CoRe for a lower secondary science topic as a team, using it to plan and conduct lessons and reflecting on the learning from the experience in teaching that topic through a team colloquium, offers an alternative teacher professional development to enhance the teacher’s PCK that is school-based, on-the-job professional learning for teachers that ensures relevance and applicability.

Keyword: Professional Development, Science Education
Making Connection between Theory and Practice: The Use of Technology To Develop Beginning Teachers’ Practices

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Teacher Quality, Teacher Learning and Development

Abstract

This study explored the use of multimedia representing typical instructional behaviours to deepen beginning teachers’ learning to guide their practices. Primarily the goal is the “decomposition of practice – breaking down complex practices into its constituent parts,” yet without reducing particular aspects of teaching into unconnected, fragmented acts (Grossman, et al., 2009). The impetus for the development of this multimedia resource is to help make the teaching accessible for analysis and reflection by beginning teachers, while still capturing its complexity and without making the teaching too simplistic or a rote endeavor.

In 2012, the Physical Education Sport Teachers Academy developed a glossary for planning and instructional actions (i.e., the Physical Education Lesson Observation Tool), based on research-based knowledge, with the intention that the physical fraternity familiarizes itself with a common, professional language and also recognizes specific characteristics, that describe appropriate planning and teaching in physical education to support practitioners in enacting practice. More recently, the MOE developed the Singapore Teaching Practice (STP) comprises Pedagogical Practices that similarly describe critical teaching actions for teachers in the school system. This multimedia set incorporates the specifics of the PELOT document within the broader framework of the STP’s Pedagogical Practices.

Over a 1-year period, 7 first-year, beginning physical education teachers (BPETs) were involved in professional development, where sample representations of instructional practice were shared for collaborative examination of ideas that were central to the teaching of physical education, for example, the importance of good demonstration and instruction during task presentation, the quality of feedback, etc. The BPETs’ physical education lessons were video-recorded and transcribed. Furthermore, written teaching reflections, open-ended questionnaires, and in-depth, semi-structured interviews to gather qualitative data were also used. The data were analyzed using a constant-comparative method (Glaser & Straus, 1967) to determine patterns and themes.

The results of the study reiterated the importance being able to view critical aspects of expected instructional processes by BPETs, and more importantly, to evaluate their strong and weak aspects in teaching. However, challenges include BPETs’ lack of content and curriculum knowledge that impact on some aspects of their teaching.

Keyword: Information Technology and Education, Professional Development
A Journey through Time – Remembering Dakota Crescent with Student-Designed Web Application

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IT in Education

Abstract

In this community project in collaboration with National Heritage Board for Singapore Heritage Fest 2016, students are the designers of the Heritage Trail @ Dakota Crescent.

Not only are they the content curators who did e-research and present the Dakota Crescent story meaningfully using Mandarin and English Language, but they are also the student docents who guide the public audiences to understand more about the precinct.

In addition to that, students have sprung a pleasant surprise on their guests by creating a user-friendly web application to enhance user's experiences.

The web application is viewable on all mobile devices. Public audiences who have signed up for the Dakota Crescent Heritage Trail could have an overview of the route they will be taking and have basic information of the ten different stations of the trail before even embarking on the journey.

This web application won one of the best entries for the school Y2 Level Computing App-Making Competition.

In contrast with most classroom learning activities that involve theoretical knowledge, students made connections to what they have learnt with real-world content and used the programming skills they have learnt to design the application from scratch. Innovation comes with hard work. Students experiment and customize what they feel as the end-users of this application. They have also sought guidance from their teachers to overcome obstacles in using Python Programming to host their applications.

Public audiences have given positive feedback to the students after the Heritage Trail. Their hard work was recognized and reported in the TODAY Newspaper, the National Heritage Board Publication (MUSE) and South East CDC - Contact Magazine.

The entire project has ignited students’ interest in learning about their community which they did not know much about previously and encouraged them to find out more about Singapore’s heritage. It has also spurred students’ interest in App-making, motivating them to embrace Computational Thinking in their daily life where they break down complex problems into smaller and more manageable parts, developing step-by-step solutions and creative measures to making learning relevant and engaging.

Keyword: Bilingual/Bicultural Education, Information Technology and Education
Being and Becoming an Instructional Mentor: Transforming Experiences into Practice

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Steven Tan Kwang San, National Institute Of Education, Singapore
Edmund Lim Chun Wei, Teck Ghee Primary School, Singapore
Teacher Quality, Teacher Learning and Development

Abstract

The purpose of this study was to identify and examine the transformational experiences (King, 2009) that influenced the learning of a physical education teacher-mentor (the third author) which were articulated into specific instructional mentoring practices. Teachers pass through different phases of learning experiences as they develop to become more competent, experienced teachers (Kumi-Yeboah, & James, 2012). It is no different from learning to be an instructional mentor. Learning to mentor, like learning to teach is something that occurs over time, and not at just a single period of time; a process rather than an event. The researchers (first and second authors) believed that this teacher-mentor also rely on transformational professional experiences, to critically question beliefs and assumptions as he seeks to build a framework that informs his mentoring decisions and actions, that complements his thinking about physical education, teaching, and student learning (King, 2009).

A qualitative, narrative study of inquiry (Creswell, 2007) was used with data sets collected over a one-year period to include: mentoring video-stimulated reflections; audiotaped in-depth, semi-structured interviews, and reflective writings. Data analyzed through the iterative process revealed important relationship between transformational experiences, knowledge and beliefs, and established mentoring practices, beginning from his life as a beginning teacher and continuing into his recent participation as a school-based instructional mentor in a University-Ministry partnership mentoring initiative. Furthermore, dilemmas and contradictions between beliefs and mentoring practices were also articulated. This case study hopes to elucidate how a teacher-mentor views the numerous different experiences throughout his learning-to-mentor that brought insights into his mentoring practice.

References


Keyword: Mentoring, Professional Development
Abstract

Reading comprehension is the process of simultaneously extracting and constructing meaning through interaction and involvement with written language. Dyslexics usually have difficulties processing speech sounds in words, leading to problems with word recognition, which may impede reading comprehension. While dyslexia can be associated with poor reading comprehension, a diagnosis of dyslexia does not always equate poor reading comprehension, as it is possible for some dyslexics to find ways to compensate for their errors in reading individual words during reading comprehension. Thus, it is important to implement relevant intervention programs to train dyslexics metacognitive skills required for proficient reading comprehension. In the current paper, we present the findings of the first phase of a longitudinal collaborative project between the Dyslexia Association of Singapore (DAS) and Temasek Polytechnic. For this project, a new curriculum for teaching comprehension skills was introduced to educational therapists at DAS. To evaluate the efficacy of the new curriculum, students’ reading comprehension proficiency were measured at the start and the end of the project. Concurrently, educational therapists were and will be surveyed on the types of reading comprehension skills taught in the classroom three times over the course of the project (i.e., prior to the new curriculum, six months and one year after the new curriculum). Educational therapists were also surveyed on their perception on the usefulness of different types of reading comprehension skills and the types of learning resources used in teaching reading comprehension skills across for the first survey. As the project is ongoing, we report the findings from the first phase of the project (i.e., students’ performance prior the new curriculum and the educational therapists’ first survey), which provides an overview of the types of reading comprehension skills that educational therapists teach, including their perception on the difficulty and importance of each reading comprehension skill, and the types of learning resources used. We also explore possible relationships between the students’ reading comprehension proficiency and the types of reading comprehension skills that they were taught. The findings provide a better understanding of the local landscape of teaching reading comprehension skills to students with dyslexia.

Keyword: Special Education
Baroque as Catalyst for Artistic Collectives: Turning Problems to Promises

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Visual and Performing Arts

Abstract

Collaborative partnerships between performing and visual Arts seed powerful tools for creative outcomes. The aim of this research addresses three peculiar problems in an arts-based curriculum: first, how different dispositional traits of visual and performing artists can converge effectively for innovative outcomes; second, what pedagogical approaches are effective to promote deeper enquiry into inter-disciplinary learning; and third, how learners may leverage on the values of traditional heritage as creative stimuli for contemporary praxis.

In August 2016, twelve groups of students from the School of Art and Design collaborated with students from the School of Music to integrate the music of late-Baroque with elements of the Baroque East, also commonly known as the Peranakan culture. Using visual language and design principles as basic tools, students arrived at fresh co-relationships between music and art, West and East, individuals and society. Through graphic designs, visual journals and a multi-media performance, the teams demonstrated divergent approaches to proffer interpretations of rhythm, texture and form. As a result of this fourteen-week collaboration, the music of the Italian Baroque composer, Domenico Scarlatti, evinced a local and contextualised outfit through Peranakan jewellery, architecture, fashion and food.

The creative process does not end here. This session will show how an arts-based learning framework has effectively made an impact on artistic developments in both the learning of music and fine art. The success of this pedagogical model lies in a sensitive juxtaposition of studio thinking, visible learning and 5E models of inquiry, grounded by historically-informed musical practices. In the process of discovery, the learning begins to morph into questions of identity, hybridity and articulations of the presence of the past, as how Richard Taruskin (1988) coins historically-informed practices.

Our presentation will cover the types of artefacts that accommodate contemporary interpretations in musical contexts, and how art can be used as a catalyst to return to heritage and symbolic values. The research includes live conversations between student performers and artists, documented interviews, musical performance, analysis of graphic scores, along with concrete examples of digital portfolios that inspire endearing recollections of pastness, for the present age.

Keyword: Arts & Music Education, Collaboration/Collaborative Learning
Nurturing Gratitude in Primary School Students

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Ms Jeannett Lay Jia Xin, Concord Primary School, Singapore
Yap Bao Ping, Ministry of Education, Singapore
Kimberley Croy, Ministry of Education, Singapore
Civics and Moral Education

Abstract

1. Promoting the well-being of our young and helping them to thrive in the future is an important goal of education. MOE continually study approaches relating to our students’ moral, social and emotional development and work closely with schools to introduce them as part of the total curriculum. In Sep 2015, MOE and a group of Primary and Secondary schools had embarked on a pilot project to implement Gratitude practices and study their effects on students and the school.

2. Concord Primary, one of the pilot schools, leveraged on one of its signature programmes, Precious Moments, for this purpose. Precious Moments aims to create a positive school environment where students grow safely, take charge through empowerment and flourish with gratitude. The students were helped to develop an appreciative perspective and sense of gratitude through diversified platforms like the Form Teacher Guidance Period, Character and Citizenship Education and assembly programmes. With the firm belief that teachers are the key drivers, the school adopted the 4As (Awareness, Application, Advocacy and Affirmation) approach to build the capacity of the whole school. Key learning platforms were carefully planned to build a greater sense of gratitude amongst the staff, equip them with skills so that they could ‘cascade’ the positive experiences via explicit teaching and infusion in their classrooms. To enhance teacher engagement, Concord Primary involved a core group of teachers who functioned as the chief planners and designers of the curriculum. In this way, the school groomed teacher-champions for Gratitude practices.

3. After a year of implementation in 2016, the Primary 4 students who participated in the pilot project were found to have deepened in their understanding of Gratitude. There was an increase in the proportion of students who reported that they thought about people, things and events that they were grateful for and took steps to thank others to show their gratitude. At the 30min Paper Session, participants will learn more about the impact on the students and the school community and the key factors that have contributed to effective implementation in Concord Primary School.

Keyword: Curriculum & Pedagogical Innovation
**Nurturing Gratitude in Secondary School Students**

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Mr Aubury Ong, East Spring Secondary School, Singapore  
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Kimberley Croy, Ministry of Education, Singapore  
Civics and Moral Education

**Abstract**

1. Promoting the well-being of our young and helping them to thrive in the future is an important goal of education. MOE continually study approaches relating to our students’ moral, social and emotional development and work closely with schools to introduce them as part of the total school curriculum. In Sep 2015, MOE and a group of Primary and Secondary schools had embarked on a pilot project to implement Gratitude practices and study their effects on students and the school.

2. Guided by the learning points gathered from experts and past Gratitude research, each school developed ways to implement the Gratitude practices effectively in their school. East Spring Secondary School, one of the pilot schools, put in place an approach to systemically embed Gratitude, alongside other school values, within the school culture. Recognising that this cannot be done through the implementation of a programme alone, the school leveraged on existing platforms to promote gratitude as a way of interaction amongst all staff and equipped them with the competencies to facilitate the nurturing of gratitude in students. The school also engaged teachers to infuse the teaching of gratitude practices comprehensively within the formal and co-curriculum. Through these, the students were provided with opportunities to learn about, experience and express Gratitude.

3. After a year of implementation in 2016, East Spring Secondary School has observed improvements in teacher-student and student-student rapport and reported a ‘surge of experience of positive relationships’ in the school community. Overall, the Secondary 2 students who participated in the pilot project were found to have made some improvement in their understanding of Gratitude and awareness of Gratitude practices. There was an increase in the proportion of students who reported that they thought about people, things and events that they were grateful for. At the 30min Paper Session, participants will learn more about the impact on the students and other members of the school community, the challenges faced in nurturing Gratitude in secondary school students and how East Spring Secondary School has addressed some of these challenges.

Keyword: Curriculum & Pedagogical Innovation
Case Study: Student’s Attitude towards Use of Technology in Chemistry “Flipped Classroom”

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IT in Education

Abstract

This study started in 2013 as an exploration of innovative ways to integrate Information and Communications Technology (ICT) in teaching of Chemistry, with focus on the use of Flipped Classroom model to enthuse students’ learning. This model advocates that content learning be done at home whilst curriculum time is used for discussions and hands-on activities, which enables students to reinforce and deepen their understanding of the acquired content, and pick up application skills (Nanna, 2014). Literature has provided a wealth of reasons supporting the use of Flipped Classrooms such as an increase in student engagement (Clark, 2013; Sun et al., 2014), building a sense of responsibility (Pinheiro & Simoes, 2012) and strengthening students’ critical thinking skills (Strayers, 2012).

What started out with simple home-made videos as pre-lesson preparation, eventually evolved and employed the use of a customised website that facilitates students’ participation in learning. The evolution arose from students’ feedback and literature scans to enable effective use of ICT. The website has the capacity to feature quizzes and enable students to pose questions – essentially, creating additional learning spaces so that the focus during curriculum time becomes more targeted. Hence, this research includes a focus on the impact of using small group student-student online communication channels like discussion threads, as well as the impact that online quizzes with customised feedback have on the student’s attitude towards the use of ICT in learning of Chemistry.

A total of 6 students were interviewed in this project, which provided deeper insights on students’ attitude towards the use of ICT as compared to perception survey. My findings showed that students’ motivation towards usage of ICT is equally influenced by software and hardware factors. The former entails high quality teacher-student interactions and sustainable student-student interaction. The data reveals that high quality interaction increased student’s usage of ICT, however, the challenge is to ensure its sustainability. While hardware factors include building a robust system that has the capacity to track the cumulative scores of the quizzes and to make clear of students’ achievement; such a system appeals to the learner’s competitive attitude towards improving their academic performance.

Keyword: Classroom Research, Information Technology and Education
Harnessing ICT to Improve Students’ Cohesion in Writing

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IT in Education

Abstract

The paper aims to share research findings and experiences of 10 schools who conducted a research project in collaboration with Technologies for Learning Branch, Educational Technology Division, MOE. The project aims to investigate the effectiveness of using the annotation tools, together with a specially designed lesson package, in improving students’ ability to write cohesively. This study complements the 2015 Malay Language (ML) Syllabus that requires students to be able to write cohesively at upper primary level.

In this project, students harnessed online annotation tools to highlight and add comment/suggestion without modifying the original text itself. The tools could be thought of as a layer on top of the existing text. This layer was visible to other users, therefore supporting collaborative learning. The tools enabled students to identify cohesive devices used in a text, comment/suggest suitable cohesive devices, and also exchange ideas during online collaborative activities.

This 2-year study started in 2015 and involved five schools with P4 classes. It included pre and post-test, control and experimental groups, lesson observations, surveys, and discourse analysis of students’ compositions. The project adapted the cohesion model of Halliday and Hasan (1976), Sanat (2002) and Nik Safiah, et al. (2011) to suit the needs of P4 ML students. The cohesive devices that this research focused on were ‘additive’, ‘adversative’, ‘causal’ and ‘temporal’. Teachers conducted a one hour lesson twice weekly for a period of 5 consecutive weeks from Term 3 Week 2 until Term 3 Week 6. However, unlike the control group, the experimental groups leveraged the affordances of online annotation tools. The findings from the 2015 research affirmed the effectiveness of harnessing ICT. However, three areas for improvement were also identified: timeframe; scaffolding; differentiated instruction. These were refined for a second cycle in 2016. This second cycle adopted the Design-based Research and involved more than 300 primary four students from 10 schools with no control group. Findings from this second cycle showed that students were able to use all types of cohesive devices to gel ideas in their composition. In addition, they were able to write longer with suitable details to support their main ideas.

Keyword: Information Technology and Education, Language and Education
A case study of the application of Studio-Based Learning pedagogy in Ngee Ann Polytechnic’s Animation and 3D Arts (A3DA) diploma

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Cognition, Motivation and Learning

Abstract

Developing students’ thinking, learning and motivation for work and study in Animation and 3D Arts

This presentation aims to describe the studio-based learning methodology employed in the Animation and 3D Arts (A3DA) diploma at School of ICT to develop students’ thinking, learning and motivation, and the scaffolding and stacking of the knowledge, skills and attitudes across modules, to aid this development. It will examine soft skills development that are intentionally infused into the curriculum.

The Studio-Based Learning pedagogy has been applied at the School of ICT for five years, where students learn under their lecturers and industry partners by working on real-world-derived design problems and projects. The methodology focuses on students engaging in group critiques of their work with peers, and utilises ongoing individual mentorship by their lecturers, who, as advisors, follow them through their 3 years of study. As profession-specific skills and knowledge are developed, this methodology places an emphasis on communication, responsibility and collaboration.

The presentation will trace the intended design for students’ development of both technical and soft skills in this learning approach from their foundational skills-oriented first year, through expansion of skills and specialisation selection in their second year, to team production of their own capstone projects (i.e. creation of a short animated film) in their final year. Internships in professional studios are available, during which students will apply their thinking, soft skills and professional ethics in a real-world environment. Students’ demonstration of creativity, ability to integrate new knowledge, behaviours and skills through design thinking, and real-world problem solving, are evidenced through their final year public graduation portfolio showcase exhibition.

This approach, enabling students to move from being unconsciously incompetent to unconsciously competent in the field of applied design, through education and experience, will be discussed. Through this approach, we have found that students are able to think and act critically, and are highly motivated to produce a project that, in industry, would be a peak of their aspirations, and are actively involved in their own projects beyond curriculum.

References:
'Bloom’s Taxonomy of Learning’ (Dr. Benjamin Bloom) 1956
Revised (Anderson, Krathwohl, Airasian, Cruikshank, Mayer, Pintrich, Raths, Wittrock),

Keyword: Motivation, Student Knowledge & Cognition
Seeing self-assessment and teacher feedback through students’ lenses

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Assessment

Abstract

Assessment for Learning (AfL) tools have been increasingly used in classrooms in a bid to facilitate greater ownership of learning among students. However, the implementation of self-assessment has always been more of teacher-centered, rather than student-centered. As such, little is known about the students’ experiences as active participants of self-assessment, especially in Singapore.

This study explored how students perceive and use self-assessment, i.e. rubrics. As the quality of teacher feedback plays a central role in narrowing the gap between mere self-monitoring of learning progression and actual learning (Quinton & Smallbone, 2010), we also looked into the learning cycle involving student self-assessment and teacher feedback.

The Primary 3 cohort and their Mathematics teachers in a school were involved in the study which used a pretest-posttest design. The students participated in a self-assessment rubrics training and were given opportunities to use the rubrics for their Mathematics school work throughout two semesters. Data was collected using a Self-Assessment Questionnaire in which students reported their perceptions before and after they have used self-assessment rubrics. In order to gain qualitatively rich understanding of self-assessment and feedback in classrooms, student work exemplars and their accompanying rubrics of randomly selected students were collected from each class, and focus group discussions were conducted with these students.

Preliminary findings will be shared in terms of students’ perceptions and experiences on self-assessment and teacher feedback as well as how the students’ learning dispositions, if any, have changed with the use of the rubrics. Additionally, the precision of the students’ self-assessment on their own work using the rubrics will also be discussed.

This presentation aims to provide a valuable sharing for educators and academics who are keen to understand more about how self-assessment and feedback in classrooms are seen through students’ lenses, and who wish to work collaboratively with their students in improving the quality of self-assessment in classrooms.

Keyword: Assessment, Primary Schools
A Review of the Measurement of Teacher and Student Learning Outcomes in Professional Learning Communities

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Alistair Peacock, National Institute Of Education, Singapore
Terence Titus Chia, National Institute Of Education, Singapore
Teacher Quality, Teacher Learning and Development

Abstract

The concept of professional learning communities (PLCs) has garnered much attention and interest amongst researchers and educators for being largely associated with both teacher and student learning outcomes. This has consequently spurred educational institutions and schools internationally to adopt PLC practices. Yet, little is known about how exactly teacher and student outcomes are defined and measured across the various PLC studies. This study aims to consolidate existing PLC articles that have explicitly measured teacher and/or student outcomes, and to document their various definitions and measures through a comprehensive research synthesis. A total of 22 journal articles (including 1 review) were selected and examined based on a specific set of criteria, and their measures of teacher and student outcomes were tabulated in two respective summary tables. Patterns across the literature were identified and the following themes emerged: (a) PLC practices generally predicted positive teacher and student learning outcomes; (b) there was a wide range of teacher learning outcomes across studies but few were empirically measured; and (c) most studies focused on just one form of student learning outcome – academic performance in the form of examination scores. Based on these observations, this paper goes on to highlight and provide suggestions on alternative measures of teacher and student learning outcomes. The paper concludes by acknowledging the limitations of this review and providing suggestions for future research.

Keyword: Collaboration/Collaborative Learning, Professional Community
Supporting “Productive Struggle” in Mathematical Problem Solving: The Case of “Contrasting Examples”

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Cognition, Motivation and Learning

Abstract

Research in cognitive science suggests that struggling to make sense of disciplinary ideas is a necessary component of learning mathematics with understanding. Yet, student’s struggles with problem-solving tend to be focused on the procedures than on the strategy used or its underlying concepts. Even when students are able to solve a problem correctly, explaining what they did is their most difficult struggle.

Struggle should be reframed as both a natural part of the problem-solving process and a worthwhile challenge. When students struggle but continue to make sense of a problem, they engage in ‘productive struggle.’ We posit that ‘productive struggle’ is fostered with effective teacher support and tasks, such as ‘Contrasting Examples’ (CE), which provide opportunities to make deep and robust connections. CE comprises a rich problem with two contrasting solution methods presented side-by-side. CE was chosen as it challenges students to notice, compare and explain critical features to make more informed decisions about problem-solving.

This exploratory case-study, which uses 11 instructional episodes as unit of analysis, investigates how students’ struggles and teacher intervention in CE support flexible problem-solving. The participants were 167 secondary 1-3 school students and their teachers from 5 diverse schools in Singapore. The teachers attended 8 networked sessions on how to design and implement CE with fidelity. Field notes of lessons, teacher interviews and student surveys were used to analyse the student-teacher and student-student interactions.

A Productive Struggle Framework for CE (PSFCE) was developed to capture the episodes of struggle and intervention from initiation, to interaction, and to resolution. Findings indicated that struggle is only productive when students have sufficient prior knowledge to be meaningfully engaged. Students also shared that “when [they] struggle, it helps them remember [concepts].” The modalities of teacher intervention varied with students’ disposition towards struggle. Teachers were more likely to tell or guide struggling students’ thinking, or when the discourse became saturated. Questions which pressed for justifications or afforded problem-posing were critical in helping students transfer what they know to solve non-routine problems.

This paper will also address implications of integrating the PSFCE into textbooks with guidance on when and how to use them.

Keyword: Cognitive Processes/Development, Learning Environments
Joy of learning Science: Active Learning with technology in the Primary Science classroom

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Nadira Noordin, St. Stephen's School, Singapore
Herdawati Suleiman, St. Stephen's School, Singapore
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IT in Education

Abstract

In 2015, Singapore MOE developed the fourth masterplan for ICT in Education which aims to deepen ICT practices into our curriculum through teachers as designers of learning experiences and environment. There are two forms of learning environment, formal and informal, where the learning of science can occur (Falk, 2001). The formal environment refers to the traditional classroom setting while the informal environment can refer to the learning experiences which occur outside the classroom. In this study, we explore using technology to design learning experiences in both formal and informal environments to create a positive and enjoyable learning environment. We want to find out if this design approach, supported with technology, can promote positive attitudes and provide a positive learning environment for Primary 4 students to learn about plant science.

The Active Learning Process framework from MOE ETD was used for the topic “Plant System”. Using the inquiry and active learning instructional approach, we made use of technology to design the lessons to engage students with the science content, teachers and their peers.

To begin with, we aligned the learning outcomes with a relevant context. This serves to activate the learning among the students. As the lessons develop, we designed learning activities which seeks to promote thinking and discussion. Next, we allowed the students to demonstrate their understanding and transfer their new learning by creating a product. Finally, the teachers could monitor and provide feedback to the students to advance their learning. At each stage, the role of technology was identified and suitable technological tools were selected to support the learning activities.

A questionnaire, which comprised of selected scales from the “What Is Happening In this Class?” (Fraser et al., 1996) and an adapted version of a scale from the Test of Science Related Attitudes (Fraser, 1981), will be administered. This modified questionnaire had been validated in a study by Zaragoza and Fraser (2015). Performing the univariate ANOVA on the data collected, we will discuss the effectiveness of using the active learning process in building a positive and enjoyable science classroom.

Keyword: Information Technology and Education, Science Education
Team-based learning (pedagogy used in teaching numeracy for special needs students)

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Special Needs Education

Abstract

Introduction

Team Based learning (TBL) – a modified flipped classroom approach was implemented in 2015 to achieve the following:

• Customise the learning according to students’ abilities and interests to keep students engaged.
• Develop self-directed learners
• Develop social skills.
• Promote staff collaboration to improve their pedagogical practices

Methodology

In TBL, first group of students (2-6) learn content customized for them via videos uploaded online independently. All these video clips are uploaded in google website for students to access from school and from home. They view video-clip several times until they gain mastery. Next, student will attempt an Individual Test (5 MCQ questions). Then students get into their teams to attempt the test as a Group. This segment provides opportunities for students to verbalise their understanding, practise their social skills and learn to compromise to arrive at a final answer. They then check their answer using the ‘IFAT card’ (Immediate Feedback Assessment Technique). If response is correct, a ‘star’ will be revealed on scratching the card and a blank if incorrect. The whole process is repeated until the star is revealed. Students do a peer evaluation to check effectiveness of their teamwork. Teacher gets to evaluate the effectiveness of TBL by observing students in action and viewing scores from both the individual and group tests.

Conclusion

TBL has changed students from passive to active learners. Students can now learn at their own pace in the absence of the teacher using online resources. This is a relevant skill for them to practise continuous learning when they leave school. Through TBL, students can select the content they want to review. In small groups, they are more forthcoming to share their views, learn to accept differing views and make consensus. Survey results show that TBL has made learning more exciting for the students. TBL has allowed staff to do differentiated teaching. While teacher attends to one group, another group can be actively working on their own using TBL. Through preparing the customised TBL resources, staff work as a team, taking collective responsibility for students’ learning and outcomes through actively calibrating their teaching practices with their peers.

Keyword: Collaboration/Collaborative Learning, Curriculum & Pedagogical Innovation
Teaching Division Using the Interactive Unit Method for students who have no access to division using the traditional method.

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Mathematics Education

Abstract

This paper presents the introduction of an alternative method from the convention, to teach division to post-secondary students at Delta Senior School, a special educational institution that serves youths with Mild Intellectual Disability between the ages of 17 to 21, who have not mastered multiplication and subtraction in their prior years. Division is a pre-requisite computational skill required for students to perform numeracy at higher level. In class, students are given opportunities to use calculators to solve numeracy problems when the focus is not on computational skills. However, during Workplace Numeracy (WPN) assessment, students are not allowed to use calculators. Instead of excluding these students from numeracy units involving division as in the past, the Interactive Unit (IU) strategy used in Connecticut was used in this project to give the students access to division. This IU strategy is based on prior knowledge of place value, measurement and partitioning and was modelled in the research done by Teresa E. Foley & John F. Cawley from the Department of Educational Psychology, University of Connecticut. This method does not require students to multiply or subtract, two processes in which students make numerous errors when used as pre-requisite knowledge during division (Miller & Milam, 1987).

This paper traces the attempt taken by a teacher in Delta Senior School to use this IU method recommended by Foley & Cawley to teach division to students who had challenges mastering this skill and how in the process the strategy was modified and customised to suit the unique needs of the students there. The paper concludes by sharing how the promising results of this pilot project helped to extend this strategy to the whole school resulting in more students in Delta Senior School who are currently able to perform division using the modified IU method, which in turn gives them confidence to attempt higher level numeracy questions with greater success. It also encourages trainers to be more alert to the needs of the students and inspires them to be innovative to adapt the mathematics of the lesson to accommodate the student (Foley & Cawley, 2003; Miller & Milam, 1987)

Keyword: Curriculum Design/Reform, Mathematics Education
Linguistic hybridity of a neighbourhood in Singapore: Language use in public signs

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Language and Literacy Education

Abstract

Although linguistic landscapes (LL) around the world have been extensively investigated, most LL studies were confined to a single language use domain, and few have taken a holistic approach to examine multiple social domains comparatively. In Singapore, where multilingual signs abound because of its ethnic diversity and national language policy, there is a paucity of research on language use in public signs. This presentation reports on a corpus-based study designed to investigate the linguistic hybridity of a residential neighbourhood in Singapore. The dataset comprised 317 photos of public signs displayed in six types of public space within a densely populated neighbourhood. These public signs fell into three domains of language use: governmental, commercial, and religious. The data, comprising all the public signs at each site of data collection, were coded for eight types of information, namely language presence, code mixing pattern, text type, form of Chinese characters, script directionality, information coverage, sign texture, and cultural specificity. Qualitative and quantitative analyses revealed that the neighbourhood was linguistically hybrid, where six languages, including Singapore’s four official languages, were used differently in public signs across the examined domains. Moreover, English was the most prominent language in the public signs, closely followed by Chinese, whereas the other four languages (Malay, Tamil, Arabic, and Korean) were far less used. It was also found that bilingual signs accounted for the majority of the public signs in the three domains under investigation and that the bilingual combination of English and Chinese was the most common code-mixing pattern. Furthermore, four writing scripts appeared in the public signs, and four distinct approaches were adopted for presenting code-mixed texts. Finally, cultural identities were marked out mainly through language choices, forms of Chinese characters, and script directionality. The significance of the study lies not only in its comparative investigation into the LL of multiple domains of a residential neighbourhood and its in-depth textual examination of public signs, but also in its contribution to our understanding of the dynamics of linguistic hybridity. This presentation concludes with a discussion of the pedagogical implications of the key findings for language education in Singapore.

Keyword: Bilingual/Bicultural Education, Language and Education
A study on Chinese Singaporeans’ perceptions of the intelligibility of their spoken English in the United Kingdom

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Language and Literacy Education

Abstract

Intelligibility studies have a fundamental place in World Englishes and the English as a Lingua Franca (ELF) discussion (e.g. Berns, 2008; Sewell, 2010). This is a complex matter involving what some linguists refer to as ‘intelligibility’ - recognizing an expression, ‘comprehensibility’ - knowing the meaning of the expression, and ‘interpretability’ - knowing what the expression signifies in a particular sociocultural context (Mckay, 2002). What Jenkins (2006) emphasises that mutual intelligibility is the pronunciation in ELF contexts, which has to be negotiated. This mini research project investigated Chinese Singaporeans’ perceptions of the intelligibility of their spoken English in the United Kingdom. 30 questionnaires and five one-to-one interviews were carried out. The results show that there is a gap between the Chinese Singaporeans’ perception of their intelligibility of their English before and after their arrival in the United Kingdom. The respondents substantiated the presence of a gap by reporting a range of factors, including linguistic backgrounds and exposure. However, it was concluded that it was not the deficiency of their English that affected the intelligibility of their spoken English. It was also reported that there is room for improvement in the curriculum and assessment methods of English Language Teaching in Singapore. The suggested progress to be implemented to the teaching and learning of English language in Singapore are noteworthy and should help Singaporeans become global speakers and users of English.

Key words: intelligibility, ELF, Singaporean English, teaching and learning, language education

Keyword: Educational Policy/Reform, Language and Education
Using Video Forum to Enhance Primary School Students’ Chinese Language Picture Composition Writing Ability (presented in Mandarin)

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Soon Hong Lim, Ministry of Education, Singapore
LEE JO KIM, Ministry of Education, Singapore
Low Tan Ying, Ministry of Education, Singapore
Language and Literacy Education

Abstract

The Primary School Chinese Language picture composition requires students to write a piece of narrative content with logical flow. Students may face challenges as they often cannot identify missing links between pictures and thus not able to articulate logical ideas that connect the missing links. Students could improve in their narrations and descriptions of an event verbally or in writing when teachers use videos in their lessons (Zhang, 2013). Li et. al, 2016 used videos in picture composition lessons for a year, and found that students’ writing improved. The use of videos in teaching picture composition writing is a possible way to help students connect missing links and compose a narrative with richer content and better logical flow. To improve students’ language skills, teachers may also tap on the affordances of online forums. Integrating online forums into language learning is found to aid in developing students’ writing and communication skills (Kaur, 2013). Therefore, to develop students’ ability to write picture compositions with better logical flow, the Educational Technology Division, Ministry of Education Singapore created an online forum with the function of embedding videos, and collaborated with a Singapore Primary school in experimenting the use of videos together with the discussion forum to sharpen students’ observation skills while applying a set of thinking routine through scaffolded video viewing. In addition, it also promoted students working collaboratively and building on each other’s ideas through active discussions in the online forum.

Research design: Single group pre-post-test was carried out. 7 lessons were conducted in a P5 class with 35 students.

Findings: Post-test results indicated that students’ writing scores improved slightly. Teacher observed that the students showed great interest in the lessons, and could build on each other’s idea through the discussion forum. Further research could be conducted with more classes of different levels, and possibly on language skills such as picture conversations.

Keyword: Information Technology and Education, Language and Education
Experiential Learning as a Pedagogy to Enrich the Learning of Malay Proverbs

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Language and Literacy Education

Abstract

The use of proverbs is an indicator of one’s acquisition of the Malay language and critical thought. It is observed that the written application of Malay proverbs has been diminishing amongst Malay Language learners. The oral application of Malay proverbs has been decreasing more markedly. The research team believes that if students can understand the literal meaning of a proverb and connect it with its figurative meaning, they will be able to reach a level of deep understanding that goes beyond memorization of a proverb’s meaning. Students would be able to fluently and regularly apply proverbs in their written and spoken forms.

To address this learning gap, experiential learning was identified as an intervention strategy to enable students to connect the literal and figurative meanings of proverbs in a real-world setting. Lesson activities were crafted and carried out in the school’s Eco Garden to enable experiential learning of proverbs outside the classroom. Quantitative research methods involving a pre- and post-test were applied to one class of Malay language students. A focus group discussion was also conducted to understand students’ attitudes towards proverbs, the way learners connected to proverbs and whether experiential learning facilitated their understanding of Malay proverbs.

Through both quantitative and qualitative means, it was noted that experiential learning facilitated recall, understanding and application of Malay proverbs. The unique characteristic of the Malay proverb is its close relationship with concepts and phenomena found in nature; this nexus between the literal and figurative meanings of nature-related proverbs was made apparent to students through experiential learning. The research found that experiential learning is an effective pedagogy which allows for authentic learning of Malay proverbs and facilitated the forming of meaningful connections for language learners as they interacted with nature. For students to use Malay proverbs as naturally and comfortably as possible, the pedagogy through which proverbs are taught must not be separate from the context in which these proverbs come alive. Only then will our learners view proverbs as relevant and meaningful to their lives.

Keyword: Classroom Research, Language and Education
Morphology and Semantics in Learning Mass-Count Distinction by Chinese-English Bilingual Students

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Language and Literacy Education

Abstract

English and Chinese differ in the location for marking mass-count distinction: via morphology (English) or classifiers (Chinese) (Cheng & Sybesma, 1999). An interesting question is whether this difference might affect learners’ ability to use morphology (e.g., pluralization) to process semantics (e.g., individuation in objects vs substance). Previous research on this issue was conducted on monolinguals and second language learners (Barner & Snedeker, 2005; Inagaki, 2014). We investigate this topic further by examining Chinese-English bilingual adolescents’ knowledge about mass-count distinction in English.

Participants: 228 bilingual students from Singapore took part in a quantity judgment task (Barner & Snedeker, 2005). Participants were divided into two language groups: those dominant in English (n = 135) and those dominant in Chinese or with balanced bilingualism (n = 93), as well as two age groups (11 and 14 year olds).

Materials: Following previous studies, we tested five noun conditions: classical count (CC) nouns (shoe) and substance mass (SM) nouns (milk) both of which instantiate congruent mapping between morphology (e.g., pluralization) and semantics (e.g., individuation), Object-mass (OM) nouns (furniture) which syntactically behave like SM but are semantically similar to CC (incongruent), and Flexible items (string) which can syntactically behave like both CC (Flexible-C) and SM (Flexible-M). Task: The representation of quantity for pictured objects/substance was manipulated for number or combined volume (e.g., two large shoes/portions of milk vs six tiny shoes/portions of milk). Participants were asked to make judgments on the quantity of items, in response to questions presented in a count or mass frame (Who has more shoes/milk?).

Results: Both CC and OM had more number-based judgments than SM (p’s < .001), which suggests that performance on congruent and incongruent items was affected by ontology (semantics). Flexible-C items had more number-based judgments than Flexible-M items (p < .001). Further, 14 year olds and English Dominant students made a sharper distinction between Flexible-C and Flexible-M items (p’s < .001). We conclude that despite L1-L2 differences, our bilinguals are able to use mass-count morphosyntax to process semantics, and that there is a developmental effect for such knowledge.

Keyword: Bilingual/Bicultural Education
Interlacing Assessments through Studio-based Learning in the Diploma for Sustainable Urban Design & Engineering at Ngee Ann Polytechnic

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Abstract

This paper aims to evaluate the effectiveness of three kinds of assessment in a studio-based learning environment in Diploma for Sustainable Urban Design & Engineering at Ngee Ann Polytechnic. Assessments for group work, critique pin-ups and peer grading were evaluated across four design studios for students in the architecture specialization.

Design as a subject has traditionally been taught in studio set-ups with a strong emphasis on mentorship in studio-based learning approaches. Critical feedbacks form an essential component for progress and inter-disciplinary teamwork. To assess subjectivity of a design project a combination of assessment tools are used with balanced assessment criteria examining critical aspects of learning at each stage. The ultimate purpose of such assessments are to develop core values of resilience, design acumen, presentation skills, drawing communication skills and other soft skills pertinent to a professional environment the students will be subjected to in future.

The evaluation of effectiveness of these assessment tools were primarily approached as a case study of student’s works, feedbacks and comparison with similar project-based learning in a different pedagogical set up.

Several course design elements are incorporated to ensure effectiveness of the studio-based learning approach: feedbacks are intentionally designed as an important part of learning and professional development in the course especially in studio-based learning modules; the ratio of mentor-mentee and the time spent under mentorship are also comparatively higher than in other didactic modules. While this intensity of involvement is high, the approach is justified since the mentor is a facilitator for guided thinking and doing. It is observed that ultimately the student’s own self learning skills and peer learning allow them to reach a conclusion they take ownership of. Upon evaluation of assessment types and their effectiveness in student’s understanding of concepts, the paper looks into expanding the studio-based learning pedagogy in theoretical modules which conventionally has less subjectivity in assessment. This is done through interlacing theory modules with design studios and integrating appropriate assessment criteria. The findings of this paper indicates the advantages of different assessment techniques in studio-based learning pedagogy as a learner-centric tool that may expand across different modules successfully.

Keyword: Assessment, Collaboration/Collaborative Learning
A socio-cognitive approach to teaching English language writing: impact on primary school pupils’ compositions

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Language and Literacy Education

Abstract

Most of the existing studies on academic writing were conducted in university settings. Further research targeted at primary schools, which are quite different from the university settings previously studied, for students in different stages of their studies, will advance our understanding of student writing broadly. Therefore, research that investigates how English language writing is taught in primary school classrooms is of much current interest, but sufficient existing knowledge is still lacking. The present study will fill this research gap identified. The aim of the study is to investigate the extent in which the social-cognitive approach can equip pupils with the skills and strategies to write, as the approach would cue pupils to the thinking and writing demands. These skills and strategies, predominantly demonstrated by the more competent pupils, can enable the under-achieving pupils to write effectively. Using a mixed-method approach, data was collected over a year from the class observations, pre-test and post-test. The 5 teacher participants and the 45 Primary Four pupils in a local primary school were also involved in reflections and survey to provide the qualitative evidence. As for the control group, it consisted of Primary Four pupils with similar writing abilities who underwent the traditional approach of writing. The findings of the study indicate that pupils showed significant improvement in their writing during the post-test. Specifically, findings of the study reveal that student participants improved in the clause density (one of the ways to show syntactic complexity). Also, they were more aware of the importance of matching problem and resolution to achieve the rhetorical goal of their writing. Overall, their writing in the post-test showed better elaboration of the ideas which led to greater cohesiveness. Pedagogical implications will be suggested.

Keyword: 21st Century Competencies, Asian Education & Pedagogy
Cosmopolitan Ethical Criticism in the Literature Classroom: Principles of Practice

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Language and Literacy Education

Abstract

The permeation of global risks such as terrorism, fundamentalism, and xenophobia in our everyday consciousness has led to a pressing need for educators to consider how to powerfully cultivate cosmopolitan hospitality towards multiple and marginalized others in the world. Yet, despite growing interest in ethics among literary scholars, theorizations of ethical criticism are predominantly observed among scholars working in university settings rather than at high schools, and major scholarly texts on ethical criticism focus on literary texts that provoke ethical responses rather than on pedagogical strategies. In this paper, I address these two gaps by arguing that cosmopolitan ethical criticism should be central to the teaching of Literature in schools. The first part of the paper provides an overview of the ethical turn in literary studies following skepticism towards post-structuralist criticism from the late 20th century. I then highlight the significance of cosmopolitan ethical criticism distinguishing it from two other disciplinary practices, aesthetic criticism and didactic ethical criticism. The second part describes what cosmopolitan ethical criticism may look like in the classroom by describing pedagogical approaches to teaching Literature employed by four high school Language Arts and Literature teachers in Australia, Singapore, and the United States. For each teacher, one curriculum unit, comprising between four to eight lessons connected by a topic, was observed between 2013 to 2014 and one hour pre and post interviews were conducted. They were selected based on recommendations by their principals who identified them as exemplary in the school and globally attuned in their approach to teaching. A detailed case study report of each teacher observed, including how they developed their unit and lesson plans as well as their teaching approach, was written following the analysis of data. Data from these reports was used to elicit core principles of cosmopolitan ethical criticism highlighted in this study which are broadly: pedagogies that provide opportunities for students to explore practical and virtue ethics; equips them with the language and habits of mind to grapple with ethical philosophy; and activates their keen sense of obligation to marginalized others in the world.

Keyword: Ethics, Literature
Training School Teachers to Develop Local Curriculum in Earthquake Risk Zone

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Curriculum Development

Abstract

Transformative education is best facilitated through curriculum design that is concerned with enhancing the possibilities for personal and social integration, organizing curriculum around significant problems and issues, collaboratively identified by educators and young citizens, without regard for subject area boundaries. Grounded in this approach to area-based curriculum research, I, as a teacher educator in a public research university in Northern Thailand, draw research results from area-based research project that focuses on school-based professional development. The research site is purposively selected based on shared geographical zone which is located at the vulnerable areas for natural disasters. I finally scope my research site into 5 schools in Chiangrai province. Based on my participant observation and informal interviews with school principals, teachers, parents and students in these communities, the schools and communities need practical knowledge, skills, and dispositions that prepare them for living with vulnerable situation. The research steps are presented as follows: First, I study the issues and concerns related to earthquake disaster from participant teachers and use them as a fundamental information for drafting curriculum. Second, I design the training curriculum for equipping teachers with knowledge about disaster preparation and apply the knowledge management approach as a means for engaging teachers to learn how to design area-based curriculum that focuses on authentic and meaningful issues of students in local community. Teachers agree that the enacted curriculum should concern about the local earthquake disaster preparation. Third, I study the implementation results of local earthquake disaster curriculum that are designed and implemented by teachers in their own classroom contexts. Finally, I evaluate the overall aspects of curriculum. Based on the quantitative and qualitative data obtained from the project, I gain insights which can be elaborated further. Participant teachers design curriculum units related to earthquake disaster by using infusing method in science and social studies subject. The local community needs imply that infusion method is not useful enough for equipping peoples with knowledge about disaster preparation. Rather, the local earthquake disaster curriculum should be meaningfully integrated based on thematic-based approach which focuses on culturally-relevant themes drawing upon national standards and authentic issues.

Keyword: Curriculum & Pedagogical Innovation, Moral Education/Development
**Positive Teacher Language: An Intervention to Improve Student Engagement**

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Carol Tan, National Institute Of Education, Singapore  
Tan Cher Chong, Academy of Singapore Teachers, Singapore  
Vasilis Strogilos, National Institute Of Education, Singapore  
Cognition, Motivation and Learning

**Abstract**

Strong teacher-student relationships have been associated with increased academic achievement and reduced school dropout (Murray & Malmgren, 2005). Students who perceive high emotional support from teachers are more likely to be engaged in class (Chong, Huan, Quek, Yeo, & Ang, 2010; Martin & Rimm-Kaufman, 2015). Thus, it is imperative that teachers have the skills to build teacher-student relationships, especially with their low progress learners. One notable example of an evidence-based classroom practice for enhancing teacher resilience and teacher-student relationship is the Responsive Classroom (RC) approach which was developed by the Northeast Foundation for Children (Northeast Foundation for Children, 2007, 2009). Efficacy of the RC approach has been reported in a number of studies in the United States (e.g., Baroody et al., 2014; Rimm-Kaufman et al., 2014). However, the efficacy of the RC approach has not been evaluated in a country like Singapore where the classroom culture and environment is distinctly different from the United States.

In this study, we evaluated the effects of Positive Teacher Language, a key component of the RC approach, on students' classroom engagement using a single-case design, specifically the multiple-probe design across three teachers/classrooms. In addition to the classroom direct observation measures of students' classroom engagement and teachers' use of Positive Teacher Language, these other measures were also be administered to the participants: (a) two teacher-student relationship measures, one student-rated and the other teacher-rated; (b) a student-rated academic self-efficacy measure, and (c) a student-rated social and emotional learning measure. We will discuss the preliminary findings on the effect of the Positive Teacher Language on the students' classroom engagement, academic achievement, and teacher-student relationship. An important aspect that will be discussed is the use of Positive Teacher Language by the teachers. Teachers' perspectives of the acceptability of the intervention, together with the challenges that they faced in increasing their use of Positive Teacher Language, will be also discussed.

Keyword: At-Risk Students, Classroom Research
Online collaboration and its impact on primary 3 Tamil Language students’ composition.

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M Buvaneswari, Sembawang Primary School, Singapore
Mrs Hari, Si Ling Primary School, Singapore
IT in Education

Abstract

Based on our Tamil Language Curriculum, the alphabet introduction runs over a period of 2 years during P1 and P2. Proper composition writing is introduced only at primary 3 level. The feedback collected from teachers in the 10'T programme, an ICT based programme by Educational Technology Division, showed that the P3 Tamil Language (TL) students still lack adequate writing competence at their year-end examinations. With the increasing affordance of educational technologies in classrooms, where users play the dual role of recipients as well as constructors of knowledge (McLoughlin & Lee, 2007), specific technologies that value add to both teaching and learning of composition writing, was explored. Idea generation tool, specifically Post-it, was found to assist with simple online collaboration which was more age appropriate. It also allowed individualized feedback and help the teachers to reach out to all students. A research study was conducted over a period of 2 terms, involving primary 3 students from 10 schools. The total students involved were divided into control and experimental groups. The purpose of the study was to investigate the effectiveness of using online collaboration along with scaffolding strategies to improve primary 3 TL students’ composition writing. Pre and post test results were collected. The study concludes that students’ achievement in post-test compared to pre-test revealed significant improvement in their composition writing. The scaffolding of students’ writing through writing process approach coupled with the online collaboration not only met the students’ needs but also allowed them to express their ideas in writing more confidently. The survey that was conducted for the students further asserted the increase level of confidence in delivering their ideas. Moreover, the online collaboration also fostered individual accountability and positive interdependence among the students. The TL teachers involved also benefited from their experience as they were encouraged to rethink of their pedagogical and instructional strategies when teaching composition.

Keyword: Collaboration/Collaborative Learning, Information Technology and Education
ICT Leadership for Curriculum Development, Lesson Delivery and Teacher Reflection

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Mustafa ALSAGOFF, Madrasah Alsagoff Al-Arabiah, Singapore
IT in Education

Abstract

Embracing technology is no longer an option but a responsibility that has to be undertaken seriously and systematically to match the learning needs of students and to prepare them to be future-ready. As indicated in an OECD (2010) report, “people who do not master these (ICT) competencies may suffer from a new form of digital divide that may affect their capacity to fully participate in the knowledge economy and society” (p.2).

This paper examines the different levels of successes in implementing and sustaining the ICT initiative across 6 schools. Interviews with school principals; focus group discussions with teachers and an online survey were undertaken to identify the factors that are most critical to the institutionalisation of ICT usage for curriculum development, lesson delivery and teacher reflection.

Borrowing from Brown University we examined the articulated thoughts and beliefs; goals and actions in relation to the 6 principles in ICT leadership, namely: (1) vision, (2) access, (3) assessment and evaluation, (4) support, (5) professional development and (6) planning. Preliminary findings suggest that Madrasah Alsagoff stands out as a school with a clear and focused goal on the integration of ICT into their curriculum and school culture. We sought to delineate the reasons for their success for future policy formulation in the provision of funding and resource support.

Keyword: Information Technology and Education, Leadership
The role of international experiences in language teacher education: Focus on qualitative research results

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Teacher Quality, Teacher Learning and Development

Abstract

International experiences can help language teachers explore complex issues around language learning and teaching, interculturality, and personal development. Even though such experiences are considered beneficial for language teachers’ professional development, there has not been a clear focus on the synthesis of research on this specific issue. This meta-synthesis of qualitative research, therefore, analyzed the role of international experiences on the development of pre-service and in-service language teachers. Besides reporting research descriptives in the literature (i.e. foci of the studies, types of the international experiences, duration of the international experiences, participant profiles, and types of qualitative data sources), this synthesis of 25 qualitative studies reported main outcomes of international experiences for language teachers. These outcomes were synthesized under three main headings following a template analysis: (1) professional, (2) linguistic, and (3) (inter)cultural. In the end, further research and practice directions were offered regarding international language teacher education. These directions concentrated on the critical role of peer circles, host communities, program types and structures, preparation and post-program components, guidance and supervision. Since a large proportion of the reviewed studies relied on self-reports, a number of recommendations were also made in terms of future qualitative or mixed-methods designs. In the future, the field needs more longitudinal studies with thick descriptions of intercultural, language, and personal development processes.

Keyword: 21st Century Competencies, Teacher Education/Development
Researching how series books and the peer group motivate nine-year-old children to read

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Language and Literacy Education

Abstract

This paper reports part of a six-month, topic-focused ethnographic project aimed at examining nine-year-old children's reading development and their childhoods in Singapore. Three Singaporean primary schools were studied as sites where children learn to read but the project also included children’s accounts of their reading in other places, for example, at home. Although the study included three specific research questions, this paper reports the findings of one, asking, What are children’s accounts and experiences of their reading education and what texts do children read and why? The study draws on theories of peer group engagement and membership in childhood, critical analyses of series books written for children, and theories of reading education, specifically to do with motivation, to analyze the data.

During the ethnography, a total of 21 English lessons in four classes at the three primary schools were observed, in addition to other lessons. The English teacher of each class was formally and informally interviewed as well as 76 children and eight of their parents. The children were surveyed to validate and contextualize the interview and observation data. Although 36.85% of the children were learning to read in a non-dominant language (English), they were all acknowledged habitual and successful readers by their teachers.

This paper discusses the key findings of the study that all the children whatever their school, language background, or reading level read series books, in addition to other choices, in order to claim membership of their peer group. There were motivational aspects of the peer group as well as the books themselves which encouraged reading. These factors are explicated against theory through a discussion of a selection of the interview data. The paper argues that the children’s eagerness to read can lead to the development of reading fluency; however, it also questions some aspects of example texts which may sit uneasily with parents and teachers in their concern to teach reading and values.

Keyword: Literacy, Motivation
Infusing Ethics and Values in Upper Secondary Chemistry Curriculum

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Civics and Moral Education

Abstract

In 21st century education, there is an increasing need to teach ethics and values in an ever-changing VUCA landscape. The past 20 years has seen a proliferation of alternative lifestyles and changing of social norms, beliefs and values systems. On the political and economic front, we have seen ethical deficiencies in the actions of leaders and institutions leading to global problems and financial crisis.

We are working with a different generation of students with a different set of values. Howard Gardner and Wendy Fischman, having interviewed the brightest students from elite schools, revealed that many students surveyed responded that they could not afford to be ethical because it was more important for them to succeed, to have money, power, prestige, and prominence. Gardner emphasised the importance of teaching and training the Ethical Mind, which is lacking in schools. Yet the challenge remains - how do we effectively teach ethics and values to our students?

Methodist Girls' School emphasises on values education and believes that the teaching and learning of values should be deliberate and intentional in every subject, co-curricular activities and all programmes.

What instructional objectives and desirable outcomes do we hope to achieve in an ethics lesson? What considerations go into the design of an ethics infused Chemistry lesson and how do we frame such a lesson in the context of Chemistry? What are the challenges and common pitfalls that teachers face?

In this paper presentation, we will address the above questions as we share a case study of our recent experience in designing ethics and values based lessons for our Chemistry curriculum. This ethics infused curriculum focuses on cultivating moral and civic competencies such as moral reasoning, perspective taking, reflection and responsible decision making. In the development process, teachers discussed different strategies and considered the types of classroom discourse that could be used to engage students to think more critically and in-depth into the issues involved. We will also give examples of these lessons and show how real events and the life-stories of scientists can be used to make the lessons more authentic and interesting.

Keyword: Ethics, Science Education
A conceptualization of scientific literacy for 21st century science education

William Wong, Victoria Junior College, Singapore
Science Education

Abstract

The knowledge of science and technological artifacts are increasingly entangled with human activity. This blurring of boundaries between seemingly objective science and subjective human culture creates a complex environment of “nature”, human imitations of nature and humans. In addition, the pervasive application of techniques of science and technology to human activity has brought new, complex problems that requires a paradigm shift for the design of innovative solutions. Science education is catching up with the growth at which science and technology are being used in the society and having ever-increasing influence on culture. For example, the Singapore national science curricula at the primary, secondary and pre-university level explicitly articulate Practices of Science and encourage teachers to teach the nature and limitations of science and scientific inquiry. This paper builds on these desired curriculum outcomes and focuses on the idea that production and application of scientific knowledge are social activities. I argue that scientific literacy ought to be conceptualized to achieve a balance between promoting the importance of empirical inquiry and sensitivity to the consequences of applying a scientific paradigm to society's problems and the influence of technological objects on human society. Understanding public consequences of science and technology is important because the concept of scientific and technological literacy can be distorted by a narrow conception of empirical reality and inquiry. This narrow epistemological perspective further constricts students’ ability to recognize how science and technology in society are intricately connected in a vast network of human values, cultural norms and political interests. Based on Latour’s actor-network theory, I argue for a science curriculum conception that is grounded in the ethics of the common good. I propose some preliminary curriculum design features and demonstrate the pedagogical potential of such a curriculum conceptualization using practical lesson ideas. In the final segment, I talk about the possible implications and implementation challenges for such a 21st century science curriculum.

Keyword: Curriculum Design/Reform, Science Education
Transition to Adulthood for Students with Intellectual Disabilities in Singapore

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Wong Meng Ee, National Institute Of Education, Singapore
Carol Tan, National Institute Of Education, Singapore
Lily Yip, Tanglin School, Singapore
Special Needs Education

Abstract

In the area of special education for youth with disabilities, people often think of transition as transition from school to work. However, according to the Council of Exceptional Children’s Division on Career Development and Transition, transition refers to a change in status from behaving primarily as a student to assuming emergent adult roles in the community (deFur, Todd-Allen, & Getzel, 2001). As an emerging adult, youth with disabilities require more that just having employment to function well in the community, they would also need to contribute to maintaining a home, engage in appropriate community participation, and experience satisfactory personal and social relationships, and for some youth with disabilities, taking on an emerging adult role may also include participating in postsecondary education (Wehman, 2006). Transition to adulthood is challenging, not just for the youth with disabilities themselves, but for their families and the larger community as well.

The purposes of this study were to explore (a) how various family and school stakeholders envisioned the future for youth with intellectual disabilities in terms of employment, social relationship and other key aspects of growing up, and (b) what they perceived as enablers and challenges to transition to adulthood in Singapore. The participants in this study were five youth with intellectual disabilities, their parents, siblings and school personnel involved in the transition process. We utilised semi-structured interviews in this study and the data were analysed using a grounded theoretical approach. Preliminary findings suggested the following: (a) employment and safety were key emphases for family and school stakeholders, (b) school-home collaboration was an important enabler, and the main challenges were the lack of post-school options and collaboration with external adult agencies. The findings suggest a clear need for smoother transitioning of support services from school to external adult agencies. Further research is needed on how school, with the involvement of external adult agencies and the community, may support the individuals with intellectual disabilities and their families to achieve their aspirations.

Keyword: Special Education, Vocational Education
Barriers influencing a Blended Classroom Learning Environment: A Case Study

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IT in Education

Abstract

Blended learning classroom environments have brought notable teaching and learning gains in higher education. However, the outcomes of blended learning implementation lie in the hands of faculty, to design and teach the course, the technical support team for the course, and the students’ learning at the university. Having experienced the blended teaching and learning environment, the students’ voices are authentic and critical to the future design and adoption of blended learning courses in the university. More importantly, students’ perceptions of their experienced blended learning environment provide an insight to the instructors, administrators and researchers, how the learning design may ‘add value’ in strengthening the robustness of the current design, and how the facilitation of blended learning can be enhanced. This case study investigates the views of 15 participants who have directly experienced the blended learning in a 13-weeks graduate course. It aims to explore the students' first hand learning experiences in a blended learning environment and the barriers to their engagement in blended learning and to inform the current adoption in the university. Findings reveal that barriers do influence the instructor’s blended course design in terms of flexibility and mobility to foster learners to learn efficiently anytime and anywhere in the midst of their busy work schedule and home commitments in the online course. In the face-to-face classroom, the interactions with peers and instructor were facilitated strategically to promote their self-directed learning among the adult learners’ learning behaviours. This study also suggests that blended learning design with an understanding of barriers (related to pedagogy, technical and psycho-socio learning environment) is a contributing factor to students’ perceptions of the blended learning experience that can further inform instructors and researchers to design high quality blended learning course.

Keyword: Curriculum & Pedagogical Innovation, Information Technology and Education
Learning by Doing: Unlocking the Cultural Puzzles @ Balestier

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Language and Literacy Education

Abstract

1. Aim/Purpose
Aligned with the spirit of “doing better, not more”, the department, since 2015, decided to transform the activity-based MTL fortnight into an experiential learning programme, weaving into the MTL curriculum.

The programme aims to raise students’ awareness of the value and practicality of conversing in their mother tongue using real-word contexts. In addition, they experience their MTL as ‘living languages’ through exploring the history and rich cultural heritage of Balestier so as to understand what makes us uniquely Singaporean. Besides allowing learning to happen outside the classroom, the programme also provides an opportunity for students to take ownership of their learning as well as an authentic learning experience for MTL students at CJC.

2. Methodology
In line with the objective of making Chinese Language alive as well as the MOE 21CC Framework of nurturing students into critical and inventive thinking individuals with information and communication skills, we took a bold move to redesign our pedagogy and set our students on a self-directed learning process through “Real World” performance tasks supported by ICT.

A planned heritage trail-based learning programme aiming to attain high levels of student learning and positive student outcomes in alignment with college goals (C1 – Academic Excellence: Articulate, Creative & Critical Thinker; Self-directed, & Disciplined Learner. C2 – Active and Concerned Citizens Leading with a Global Perspective) was initiated to make the teaching and learning of MTL Languages as practical and authentic as possible. The programme encouraged students through their own efforts using any method in any circumstances at any time brings about any increase in knowledge, skill, accomplishment or personal development. Teachers play the critical role of stimulating thinking and help them to acquire problem-solving skills.

3. Findings
The programme created situations that allowed students to acquire good organisational and planning skills, take on leadership roles, test their ability in taking on pressure, exercising initiative, implementing a project and seeing it through. Learning by doing no doubt deepens their understanding and enriches their learning of MTL Languages and knowledge. Moreover, knowledge and skills (such as oral communication skills) learned can also be transferred to learning of other subjects.

Keyword: 21st Century Competencies
THE COOPERATIVE SUPERVISION TO DEVELOP TEACHERS OF SPECIAL NEEDS STUDENTS IN CHIANGRAI PROVINCE THAILAND

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Curriculum Development

Abstract

The purposes of this research were to develop cooperative working model for special needs teachers and to use Cooperative Supervision Model for increasing teaching ability of special needs teachers. The samples were four teachers in AnubanYanghorm School, Chiang Rai Thailand. The study instruments consisted of 1) Teaching management manual for special needs students 2) Teaching observation 3) Interviews 4) Reflections 5)Cooperative working guideline. Data were analyzed by comparing the findings development working of master teacher and teachers network. Teaching observation, interviews, reflections, suggestions and cooperative development supervision were conducted to develop special needs teachers from Chiang Rai Thailand. The research found that

1. The cooperative development working model: The network consisted of a master teacher and three teachers who cooperate to make teaching management for special needs students better i.e. the joint development of individual educational plans, the collaboration of the students' tasks analysis and classroom research; common problems in classroom teaching management is overcome by the created instruments and later conclude in the classroom research.

2. Teaching management: The network teachers are improved. They share teaching experiences such as activities, resources and teaching materials along with a care plan for individual students consistent with the Individual Education Plan. Consequently, it leads to ultimate learning goals and an ideal relationship between teachers and students which results has happy learning experience.

Keywords: special needs students, supervision model development, cooperative supervision

Keyword: Curriculum Design/Reform, Teacher Education/Development
Metacognitive Reading Strategies in a Blended Learning Environment

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Language and Literacy Education

Abstract

This pilot study will present reflections of the researchers’ experiences in adopting metacognitive reading strategies in two reading and writing courses while leveraging on the affordances of a blended learning environment in a Singapore university. Having realised the importance of providing explicit and student-centred instruction, educators have been designing reading instruction to develop strategies to assist learners in the active process of comprehension (e.g. Pressley, 2002; Block & Duffy, 2008). The recognized need for deliberate and explicit reading instruction has also renewed the focus on providing needs-based differentiated instruction and designing reading instruction that brings together all components of reading (e.g. Sahadi & Ghaleb, 2012; McKenzie, 2011). As such, in higher education, an approach through which the faculty can deliver a student-centred critical reading instruction that is metacognitive in nature is much needed (Hammadou, 1991). Embedded within van de Pol, Volman and Beishuizen’s (2010) scaffolding conceptual model, this study involves faculty and student modelling, guided practice, collaborative and eventually independent use of strategies. The development of these metacognitive strategies is expected to allow students to be able to monitor their reading for meaning, use and create schema, pose inquiring questions, make inferences and synthesize information for deepened understanding of their critical reading. This justifies the relevance and legitimacy of this study's research question on how students’ understanding can be enhanced at a deeper (metacognitive) level in a blended learning environment.

Keyword: Higher Education, Language and Education
Abstract

Abstract: History not only teach about certain facts or event which occur in the past but also teach about empathy since it is emphasize every aspect of human life. Students could learn about historical empathy trough reflective learning. This research tries to explain teaching historical empathy trough reflective learning, especially on social history course. This research conducted by qualitative method with case study design. Researcher collets data by observation and documentation in the Social History Course in the 2016/2017 academic year. Those collected data then analyzed using Miles and Huberman interactive model. It is hoped that this research will provide some data and analysis about how to teach empathy through history and students will be able to respect and have social empathy to people who lives in the past.

Keywords: empathy, social history, reflective learning

Keyword: Higher Education, History
To what extent does computer-based immediate feedback have on the reading proficiency of Primary 3 students?

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Language and Literacy Education

Abstract

This paper investigates the extent of how computer-based immediate feedback has on Primary Three students' reading proficiency and the students' perspectives on how the use of the feedback helps them in reading. This research study examined two intervention programs, computer-assisted and teacher-guided. The participants were from two separate Primary Three classrooms, randomly assigned to either intervention program. There were twenty-six participants in both the computer-assisted group and the teacher-guided group and there was one teacher in charge of each group. All participants did a pre-test to determine scores for their word expressiveness, smoothness of reading, phrasing and pace. For the computer-assisted group, the students were brought to the computer lab once a week to record their readings on the Reading Assistant software. Students listened to the software reading the various passages. Students then recorded their own readings. At the end of the recording, students were given a score on how well they have read in terms of words correct per minute (wcpm). For the teacher-guided group, the students were exposed to various texts and the teacher guided the students' readings in terms of expressiveness, smoothness of reading, phrasing and pace. The overall data was analyzed to determine which program has a greater effect on reading in terms of word accuracy, expressiveness, smoothness of reading, phrasing and pace. Results from post-test scores indicated that after six sessions of students experiencing either of the programs, there was an increase in fluency in both programs. The computer-assisted group showed a significantly higher rate of wcpm. However, the teacher-guided group showed overall improvement in terms of word accuracy, expressiveness, smoothness of reading, phrasing and pace. Results show that repeated teacher-guided reading programs help increase reading fluency. Educators need to see the significance in repeated teacher-guided reading programs and the positive effect it can have on increasing reading fluency.

Keyword: Literacy, School/Teacher Effectiveness
Abstract

Equine-assisted therapy is a form of structured therapeutic intervention which has been used to treat individuals with social, emotional, behavioral, and/or physical difficulty. The current study was conducted to investigate how effective an equine-assisted program in Singapore, EQUAL, utilise equine-assisted activities and peer collaboration to explicitly teach social skills to youths. Specifically, the aims of the study were to (a) examine the effectiveness of the EQUAL programme on the social competence of secondary students, and (b) evaluate the social validity of the EQUAL programme. The study employed a mixed methods approach. A total of 196 Singapore secondary two students at-risk of learning and behavioral difficulties participated in this study. The Social Skills Improvement System Rating Scale (SSIS-RS) was used to evaluate the effectiveness of the EQUAL programme. Qualitative semi-structured interviews with teachers (n=9) and students (n=24) were also conducted to investigate the acceptability of the programme and perception of its effectiveness. Results showed that there were differences on two of the SSIS-RS subscales, with the EQUAL group showing statistically significant gains in social competence as compared to the control group. There were also positive perceptions of the EQUAL programme from both teachers and students. The equine-assisted therapy thus showed promise as a programme for social skills training with at-risk adolescents.

Keyword: At-Risk Students, Interventions
Investigating the affordances of generative tasks and contrasting cases in delayed instruction

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David Junsong Huang, National Institute Of Education, Singapore
Learning Sciences

Abstract

This paper investigates the effect of delayed instruction: students generate their own ideas (e.g., problem solutions) first and then receive instruction (e.g., on the concept that is needed to solve the problem). Productive Failure (2010, 2012, 2014) suggests that although a challenging task (e.g., solving difficult problems) leads to students’ failure in the generation phase, it produces an improved learning outcome after instruction. Loibl, Roll, and Rummel’s (2016) review find that one design feature that makes delayed instruction work is for students to analyze contrasting problems (in addition to problem-solving). While a challenging generative task and contrasting cases are both important, teachers have limited time to cover a curriculum topic. Hence, to optimize the effect of delayed instruction, there is a need to understand the affordances of a challenging generative task and contrasting cases in the generation phase of delayed instruction.

Two studies were conducted. In Study 1, students were given a two-variable algebraic word problem and asked to generate analogous two-variable word problems and evaluate their similarities and differences (SGA2-2), or they evaluated pairs of analogous two-variable word problems that were selected by teachers (TGA2-2). Both conditions were followed by instruction on formulating equations for two-variable word problems. Students in the TGA2-2 condition outperformed the SGA2-2 condition in a transfer test, supporting the providing of high quality contrasting cases in the generation phase.

In Study 2, students were given a two-variable word problem and asked to generate three-variable word problems and evaluate their similarities and differences (SGA2-3), or they evaluated pairs of two- and three-variable word problems selected by teachers (TGA2-3). Both conditions were followed by the same instruction as in Study 1. Students in the SGA2-3 condition outperformed the TGA2-3 condition in a transfer test, supporting the design of a challenging generative task.

As far as we may hypothesize from the two studies, evaluating high quality contrasting cases may work for less challenging curriculum topics (e.g., learning two-variable word problem), whereas a challenging generative task may work for more challenging curriculum topics (e.g., transfer from two-variable to three- or more variable word problems).

Keyword: Cognitive Processes/Development, Learning Sciences
Abstract

In the task-based lesson the teacher doesn't pre-determine what language will be studied, the lesson is based around the completion of a central task and the language studied is determined by what happens as the students complete it. The lesson follows three certain stages; pre-task stage, task cycle stage and language focus stage. Then the purposes of this study were to construct and examine the efficiency of using task-based learning technique to develop English reading comprehension ability of of mathayom suksa VI students at Mae Ai Wittayakom School, and to study the satisfaction of the students from using the task-based learning technique. The samples were 19 students in the academic year 2015 at Mae Ai Wittayakom School. The study instruments consisted of 4 task-based English learning plans, English reading test and a satisfaction questionnaire. Data were analyzed by using mean, standard deviation, and t-test. The research results were found that 1) the efficiency of task-based learning lesson plans was 89.34 / 82.63 which was higher than the 80/80 set criterion. 2) after using the task-based learning technique, the English reading comprehension ability of the students was increased significantly at the 0.05 level, 2) the students' satisfaction of task-based learning was at a high level. Keywords: task-based learning, English language learning, reading comprehension

Keyword: ESL, Language and Education
The Influence Process of Teacher Leadership in Singapore Primary Schools

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School Change and Leadership

Abstract

Teacher leadership, which is not a new concept, has established itself as one of the core leadership models. A number of scholarly works relevant to teacher leadership have been published since the early 1980s. These studies have addressed key aspects of the concept such as teacher leadership roles, conditions influencing teacher leadership, and impact of teacher leadership. Nevertheless, little has been known about the process of how teacher leaders exert positive influences on their colleagues while teacher leadership is influence-based.

This study was therefore conducted to explore the process of how teacher leaders in Singapore primary schools influence their colleagues for improved instructional practices. The study adopted a constructivist grounded theory methodology. Data were collected from 38 intensive individual interviews with teachers and school leaders, 50 visits to four primary schools between 2015 and 2016, and 3 focus group interviews with the participation of around 6 teachers per group. Generally the essentials of data analysis included three main interactive tasks: coding, constant comparison, and memo-writing. Coding data comprised three iterative stages: initial coding, focused coding, and theoretical coding.

Part of the findings of the study will be presented within this paper. Specifically, the study identified ‘persuasion’ as one of the critical forms of teacher peer influence. The author will accordingly elucidate the emergent patterns of persuasion in the school context, namely ‘rational persuasion’, ‘relational persuasion’, and ‘reputational persuasion’. In addition, the factors (e.g., credibility, characteristics of message, and receiver factors) influencing the success of persuasion in enacting instructional changes will be discussed.

The current study seeks to bring out a two-fold value. Theoretically, it will contribute to theorizing the persuasion process in the educational setting by specifying the properties of this concept. From the practical perspectives, the findings would provide teachers insights into how to influence and persuade colleagues to enact the proposed changes for enhanced instruction.

Keyword: Leadership, Professional Development
The Effectiveness of Using Think Aloud to Develop Students' Historical Thinking

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Humanities and Social Studies Education

Abstract

Visible Thinking and Disciplinary Literacy. How can Visible Thinking help students enhance their performance in History? That is what a group of three teachers wanted to find out. A classroom research was set up to evaluate the effectiveness of using the Think Aloud strategy to make thinking visible so that students will be able to understand what it means to think disciplinarily. The research was carried out with a class of 30 mixed ability Express students. The research team consisted of the classroom History teacher and two ‘critical friends’. To better understand the students and their perception of the difficulty of studying history, a pre and post survey were conducted. The classroom teacher provided the intervention, students observe, learn and apply the Think Aloud approach on a task. This process was repeated on a similar task to validate learning and transference. To complete the research, interviews were conducted with the teacher and students to triangulate the pre and post study surveys as well as the evidence of performance.

Keyword: Classroom Research, History
Experiencing the Real Thing: Experiential Learning at the School of InfoComm Technology at Ngee Ann Polytechnic

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School Change and Leadership

Abstract

This paper traces the course review process of the Diploma in Information Technology in the School of InfoComm Technology (ICT) at Ngee Ann Polytechnic, in particular the shift towards and deepening of Experiential Learning as the signature pedagogy for a curriculum intended to develop graduates for an increasingly volatile and complex IT industry.

Responding to industry demands for students to be able to employ agile and flexible methodology to work on real-world issues and develop prototypes, the course shifts its pedagogy towards the Experiential Learning approach to design authentic learning experiences that closely mimic the real world. This approach overcomes difficulties faced by students in applying “textbook knowledge” in didactic approaches to real life by providing them with learning experiences in accurately simulated environments and allowing them to reflect upon and contextualize concepts taught in class. Combined with properly guided critical reflections, students deepen learning and are better able to derive new conclusions and ideas.

The paper documents the use of Experiential Learning in several modules in the Diploma in IT (including programming, user experience and infocomm sales & marketing modules), and discusses the effectiveness of the learning activities adopted (including design and prototype development, role plays and interfacing with real-world stakeholders). Where appropriate, students work on real-life problems using industry-standard software and equipment in a risk-free classroom environment. Projects are usually team-based, which promotes the crucial skills of teamwork and communication. The development of such soft skills are also evidenced in student reflections in debrief activities, where they reinforce what they have learnt and reflect on their performance and actions, allowing them to identify their own strengths and weaknesses in both learning and professional contexts.

The effectiveness of this learning design can be seen in the positive feedback from industry leaders on the performance of Diploma in IT interns, positive student feedback and high Module Experience Survey scores.

The paper also highlights key focus areas in the latest course review, where the Diploma was restructured to introduce Portfolio and Capstone Project modules, with open-ended projects that would provide students with even more opportunities for experiential learning and exploration beyond the classroom.

Keyword: 21st Century Competencies
FOSTERING MEANINGFUL LEARNING BY INTEGRATING CONTEMPLATIVE PRACTICE INTO SUBJECT LEARNING IN THAI TEACHER EDUCATION

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Curriculum Development

Abstract

The purposes of the study were to reveal techniques and method integrated in subject learning and to explore its effects on student’s growth in Thai Teacher Education. The author employed Contemplative Activities to make-the-difference in learning for 52 graduated students. It was 15-week subject course taking 45 hours in class and double-more hours outside class. Qualitative content analysis of students’ learning experiences learned from the assigned activities has been identified in categories and themes. Journal writing was used to express creative expression in aspects of emotion, feelings, thoughts and memories. During the practices, the threefold; personal, academic and professional growth had been explored. During learning process, three steps of learning method together with a range of designed activities for the uplift of student’s mind, brain and happiness have continuously been facilitated by the instructor. Thus, what students learned and how they learned individually and in group with student’s excerpts from written reflection were presented in the study. This implied the integrative subject course design with contemplative practices based on natural human capacity of knowing could enable students both learning content and professional spirit successfully.

Keywords: Contemplative Education, Teacher Education, Pedagogical subject course learning

Keyword: Curriculum in Classroom
Formative assessment in the teaching of forces in lower secondary science

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Wong Kah Yan, St. Joseph's Institution, Singapore
Pek Peng Kiat, St. Joseph's Institution, Singapore
Chong Jun Hien, St. Joseph's Institution, Singapore
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Abstract

The teaching and learning of forces in lower secondary science is often conducted using a typical "textbook problem-solution approach". This is inadequate for teachers to evaluate students' understanding of this abstract topic. Students may not develop an interest in the topic and thus will not develop a deep understanding of the working, practical application to real-life contexts of forces. Undesired alternative conceptions may also surface in the process. Hence, there is a need to explore authentic assessment and alternative pedagogical approaches to the teaching and learning of forces.

An action research (AR) was conducted to explore the effectiveness of introducing authentic assessment to the classroom for the learning of forces. The AR involved over 300 Secondary Two students, where they embarked on a prototype bridge-building project. The topic of forces was also taught concurrently as the project was ongoing, therefore the project provided an authentic context for the students to apply their understanding of forces. This project also introduced some elements of design and engineering to students as they built a bridge capable of supporting a minimum load. Students were given the opportunity to collaborate and learn from one another. The project had two major assessment components: theoretical and practical. For the theoretical component, students submitted proposals and finally a written report. Google Classroom provided a platform for an ongoing feedback loop for teachers to help students refine their understanding of forces while working on their proposals and reports. For the practical component, students had to test-load the bridge prototypes. A set of holistic rubrics was provided to assess them on various skills. Through the implementation of authentic assessment, we found out that communication and collaborative skills between students was enhanced with the fostering of critical and inventive thinking.

Future classroom research may build upon this AR to implement more effective assessment and pedagogical tools for delivering instruction of other topics.

Keyword: Action Research, Assessment
Using 4MAT based on Partnering Pedagogy to Improve Learner Engagement in Science Lessons

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Learning Sciences

Abstract

Teachers in traditional Science classrooms tend to use the lecture format and logical, sequential problem solving as their key instructional methods. These methods often honor only certain learning styles of the learners, while neglecting others. The 4MAT (4 Mode Application Technique), which was developed by Bernice McCarthy in 1987, is an 8-step, sequential instructional model that helps teachers to tap on the unique learning style that each learner brings to the classroom, while helping them to develop in other ways of learning. The 4MAT model is based on Kolb’s Experiential Learning model and the concept of brain hemisphericity.

The purpose of this study is to examine the influence of the 4MAT teaching model on learner engagement in the Science classroom. A team of Biology teachers utilized the 4MAT framework to design two lesson units (one in Coordination & Response and another in Reproduction in Humans) that appeal to all four types of learners – innovative learners (Type 1), analytic learners (Type 2), common sense learners (Type 3) and dynamic learners (Type 4). The activities and tasks were designed to involve both the right and left mode operating techniques of students, so that all four types of learners can learn using their individual type of learning style, and have the opportunity to also develop other learning styles.

In the research lessons, it was observed that learners were more engaged affectively, behaviorally and cognitively. Such partnering pedagogy has transformed the way roles of learners and teachers are set up in a traditional classroom. The primary responsibilities of students in such classrooms include using the technology available to research for information, answering questions, sharing their opinions, creating and refining presentations; while teachers focus on creating and asking the right questions, putting material in context, providing guidance and evaluating students’ work for rigor and quality. Results using t-test indicate that students from the experimental group fared better than regular groups in terms of their performance in end-of-unit assessment. Qualitative data collected in the form of written responses from the students in the project validated their positive response to the 4MAT model of teaching.

Keyword: Curriculum & Pedagogical Innovation, Learning Sciences
Engaging continuous student feedback for pedagogical improvements

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Visual and Performing Arts

Abstract

With globalization and the advancement of technology in recent years, students are presented with ample information before they even come into the classrooms. Instructors are having to compete for attention and engagement in everyday learning. One of the ways to find out whether teaching strategies had worked or not is to review the students’ feedback at the end of a course where instructors are being assessed by learners and informed of their teaching methods. Such an evaluation is however often observed as one-off, provides only a generalized view of instructors’ teaching strategies and do not allow instructor the opportunity or time to make appropriate pedagogical adjustment to address learning issues for the class. This paper discusses an explorative case study of the instructor incorporating regular student feedback that provides in-depth narrative understanding of a group of Art and Design undergraduates’ learning experiences in order to enhance pedagogical strategies. Various concepts of student engagements for teaching and learning are considered. Practical and continuous student feedback collection methods will be highlighted to demonstrate how it could be used for in-class pedagogical improvements for the 21st century learners.

Keyword: Classroom Research, Teacher Research
Connecting U.S and Taiwan Classrooms

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Educational Policies and Practices

Abstract

Connecting classrooms is one of the conduits to build cross cultural competencies amongst students and it is not uncommon for schools in Taiwan to implement such programs. Taking into considerations the constraints in resources such as funding, manpower and time, many schools have attempted to connect classrooms of two different countries through the use of technology. However, while the students enjoyed the authentic setting of interacting with peers of different cultures and languages, the effectiveness and sustainability of such programs have always been questioned. This study aims to investigate, firstly, to examine the effects of connecting Taiwan and U.S classrooms. Secondly, it is to examine the challenges of such programs from the perspective of the foreign counterparts. Lastly, it aims to highlight key points for consideration when connecting classrooms and to propose strategies that could be implemented to improve program effectiveness and sustainability. This study was conducted in the U.S Science classroom for the fifth and sixth graders over a span of 4 weeks, conducted by the Taiwanese teacher researcher with the use of innovative ICT tools and platforms to make connecting the Taiwan and U.S classrooms possible. Through carrying out lessons in the U.S classrooms, interviews with the U.S and Taiwan teachers in the program and from the perception survey completed by students of both countries, it was found that such programs have a positive effect on students' learning. One of such is that students showed high interest and motivation in the course of the program. Time zone, pre-lesson preparation and communication between teachers of both countries are amidst some of the key challenges in connecting classrooms. Based on the findings of this study, recommendations on the use of innovative ICT tools for connecting classrooms were made. The key considerations for a more effective and sustainable program are also being discussed and suggestions have been included for future research.

Keyword: 21st Century Competencies, Comparative Education
Practical Wisdom in a Teacher’s Narratives: Reflections on Development

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Teacher Quality, Teacher Learning and Development

Abstract

A major goal for this study is to concisely convey the voice of an accomplished teacher who has inspired many through her practices that also contributed to equal educational opportunity. Research on teacher education has increasingly acknowledged the importance of studying the nuances of individual lived experiences in the teaching profession (Darling-Hammond, 2016). In the paper, I also explore how the participant’s experiences, current views, and professional aspirations are situated in the plethora of practices that she associates with her development. To investigate the narratives of this teacher, I used a qualitative approach based on a single case study design (Creswell, 2009). The primary data sources were multiple semi-structured interviews, conversations, and observations.

The inquiry into the development and practices of this exemplary teacher led to an in-depth analyses of triangulated data sources with rich descriptions of the teachers’ developmental context. The study generated several important considerations derived from the narratives of this teacher. These can help prospective and beginning teachers to reflect on their own professional development schemes and practices and identities as teachers.

References


Keyword: Identity, Professional Knowledge
Special Education Teachers’ Perspectives on the NAC Artist-SPED School Partnership Programme and Artist-in-School Scheme.

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Special Needs Education

Abstract

Art has been known to produce a variety of benefits and lasting impact on children including those with special needs. In the recent decades, research in arts and education has shown remarkable improvements in academic achievements (Catterall, Dumais & Thompson, 2012), motivation to learn (Chemi, 2015), social skills, self-esteem and confidence (Cumming & Visser 2009) as well as imagination and creativity (La Porte, 2016). However, studies in the arts and special education are very limited in Singapore. To provide a holistic education, the National Arts Council (NAC) has two specially tailored arts programmes for special education schools. These programmes have been well received by the schools’ leaders but no research has been done to look into the teachers’ perspectives. This study examined special education teachers’ perspectives on the NAC Artist-SPED School Partnership Programme and Artist-in-School Scheme (AISS) in improving their pedagogical skills and students’ development. Observable improvements displayed by the students were also gathered. A constructivist design from grounded theory approach was employed in this study. Data were gathered from six teachers of three special education schools through questionnaires and semi-structured interviews. Teachers’ responses were analysed through three stages of coding process and categorized before a theory was generated to explain the benefits of these two NAC programmes. This study has found that the NAC programmes have impacted on teachers and students’ learning. Teachers reported increased confidence, acquisition of art techniques and knowledge as well as the motivation to explore the arts that leads to the empowerment of students. However, the extent of programmes’ impact on teachers is linked to their attitudes. Teachers also recounted observable progress in students such as better engagement and awareness; development of creativity, interest and resilience; improvement in fine motor, communication and social skills; and decline of challenging behaviours. Despite these improvements, teachers noted that the programmes did not have impact on certain students. Data collected also revealed the challenges in programmes’ coordination and partnership between artists and teachers.

Keyword: Arts & Music Education, Special Education
Dialogic Scaffolding: A Multimodal Approach to Pedagogic Discourse

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Language and Literacy Education

Abstract

Recent publications about scaffolding during the teaching of reading focus on creating the conditions where meaningful learning is fostered (e.g. Sahadi, & Ghaleb, 2012). However, while the spoken language is often used as a modality for developing effective scaffolding strategies, there has yet to be research studying the use of gestures as part of a teacher’s development of effective scaffolding strategies within reading instruction. Hence, this study seeks to answer the following research questions: (i) How does the use of gesture complement the teachers’ construction of scaffolding strategies?; (ii) How can teachers and students employ the use of speech and gesture to achieve a dialogic approach to teaching and learning? Case studies of one primary five classroom and one secondary three classroom were used. The mixed methods research utilized an analytical approach, informed by theories of scaffolding and gesture so as to allow for the identification of instances of the use of semiotic resources and scaffolding strategies. An adapted conversation analysis approach was also adopted in order to uncover the moment-by-moment experiences of the students and teachers. The findings show that gestures complement teachers’ construction of scaffolding strategies. Teacher gestures were used as a form of learning support while students used gestures to demonstrate their understanding. Both speech and gestures were effective in supporting students’ learning, facilitating meaning making and developing deeper student understanding. It is through this interplay between speech and gesture that effective meaning making and understanding were achieved. The study offers a redesigned framework of a multimodal approach to scaffolding theory and recommendations on how to develop teachers’ professional learning as task designers of reading instruction with practical strategies for implementation.

Keyword: Classroom Research, Curriculum & Pedagogical Innovation
Abstract

This research Aims to 1) Study the development of student teachers in the enhancement of: thinking, contemplation and cognitive in the course of them learning Design and Management I. 2) Development of learning along; Contemplative Education. 3) The results of the management model of learning along. Contemplative Education. The research has two phases: Phase 1: Development of learning along Contemplative Education and Phase 2: Bringing style to use. (Implementation) and the results of the model curriculum. The researchers used a sample of specific undergraduate students, enrolled in the course of Learning Design and Management I; the second semester of academic 2016, 90 English majors. Using descriptive statistics, the research analyzed: percentage, average, and standard deviation and comparing the results to measure thinking, contemplating and cognitive. The research found the Management model enhanced students' learning development: thinking, contemplating and cognitive of student teachers in the course of Learning Design and Management I. There are six components: 1) the basic concepts and theories 2) objective, 3) the process of learning, which has five stages. 1. O - Open Mind 2. R – Refreshing Ideas) 3. P – Participation 4. L - Learning Reflection 5. A – Application. 4) social system 5) the response and 6) learning management system to support the process. There are three main activities: Contemplation, Concentration, Dialogue 3. Contemplation of Cognitive after high school, before classes The level of statistical significance. 05 and students were satisfied with the style of learning along the Contemplative Studies at a high level.

Keyword: Action Research, Higher Education
Scholarship in Basic Education: The Challenge of Managing Resources and Providing Support

Marita Marcelo, John Dewey School for Children, Philippines
Bryan L. Ignacio, John Dewey School for Children, Philippines
Educational Policies and Practices

Abstract

Education plays a crucial role in getting people out of poverty. Numerous studies show that receiving high-quality basic education leads to success in college and later on, in career and adult life. But education carries a cost and more so for high quality education in the Philippines wherein more than 25 M Filipinos (a quarter of its population) live below the poverty line. Unlike schools in progressive countries, Philippine public schools do not get enough funding from the government which led to problems such as overpopulation, lack of classrooms and facilities, low competency among teachers, school staff, and leaders, etc. Consequently, these factors negatively impacted the quality of education in public schools.

To provide low income students an opportunity to receive better quality basic education, several elementary and high schools offer scholarship services to underprivileged pupils. Also, the government offers financial aid, albeit limited, to some public school pupils both in elementary and high school. But as mentioned these cases are rare, thus, the dearth of research that specifically examines scholarship programs in basic education.

This qualitative case study examines the challenges facing elementary and high schools which provide scholarship to low income students in Quezon City. It carefully looks into whether the interventions, strategies, and support built into a scholarship program by a particular school can offer solutions to meeting the challenges particularly in managing resources and providing support to low income students.

This qualitative research employed data from interviews of scholars, their teachers, parents, and school mates. Likewise, the research proponents sought information and insights from experts in education and scholarship programs to further deepen the understanding of the research topic. Documents and other relevant materials were also used to provide support to the discussion and analysis of the study.

Results of this ongoing qualitative study will be shared in the paper to be submitted in April and in the presentation during the conference.

Keyword: Educational Policy/Reform, Interventions
Enacting the mathematics curriculum with cooperative learning and gradual release of responsibility model – a practical inquiry.

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Preston Tan, Maha Bodhi School, Singapore
Mathematics Education

Abstract

The pentagonal framework outlined in Singapore’s Mathematics Curriculum has provided a structure to approach the teaching of mathematical problem-solving. This paper reports a study by a Grade 5 teacher using Practical Inquiry (Richardson, 1994) as he incorporates the five inter-related components of the framework in his classroom. Noting the increasing challenge of engaging children exposed to the many distractions the internet and mobile devices offered, he seeks to move away from the more traditional teacher-centric, drill-and-practice approach. He classifies his lessons under two main threads: one that focuses more on the components of Attitudes, Concepts and Skills, and the other on the Processes and Metacognition aspects.

For lessons that focus mainly on the first thread, he uses elements from Kagan’s cooperative learning strategies (Kagan, 1994), including Timed-Pair-Share and Quiz-quiz Trade. In a lesson using Quiz-quiz Trade, for example, the students get move about within the classroom as they trade their questions and answers. There is more peer interaction and higher student engagement with the concepts and skills embedded in the lessons. The non-threatening environment help students, particularly the weaker ones, build confidence and interest.

To address the components of Processes and Metacognition, he draws from the Gradual Release of Responsibility Model (Pearson & Gallagher, 1983). First, a repertoire of problem-solving heuristics or strategies is introduced. Then students are taught when each strategy is to be used and how each strategy should be presented during the “I do” and “we do” phases of the lessons. In the “I do” phases the teacher would usually “think aloud” as he demonstrates how he solves a given problem and monitors his own thinking explicitly. In the “we do” phase the “think aloud” involve students responding to the teacher’s prompts and questions. These phases form the instructional scaffolding, the first steps towards self-regulation of learning to solve problems. In the “you do” phase, the “you” could be individual students, pairs or small groups or a mixture of individual and group work.

The Inquiry has resulted in a more disciplined and rigorous approach to incorporating the five components of the pentagonal framework into daily classroom practices.

Keyword: Cooperative Learning, Teacher Research
Challenging Singapore Art Educators to Embrace a Dynamic, Process-Focused and Inquiry-Based Approach to Teaching Art

KokBoon, Singapore Teachers' Academy of the aRts, Singapore
Victoria Loy, Singapore Teachers' Academy of the aRts, Singapore
Visual and Performing Arts

Abstract

In 2015, the Singapore Teachers' Academy for the aRts (STAR) developed an Art Inquiry Model to help art educators across levels in local schools to re-envision art learning as dynamic, process-focused, and inquiry-based. This approach to teaching art was introduced to in-service art teachers through two signature professional development (PD) programmes at STAR: a four-sessions Art Lesson Design Course and a three-sessions STAR Champions Programme.

The purpose of this presentation is to examine the journey of a group of six art teacher-participants in the Inquiry-based Art Lesson Design Course and STAR Champions Programme in adopting a dynamic, process-focused, and inquiry-based approach to art teaching in the classroom. This study takes a phenomenological case study approach to examine the mindsets, tools and activities of the six art teacher-participants who were selected to represent three broad profile of teachers from the two signature professional development opportunities: veteran teachers who had not attended any in-depth STAR-led PD, veteran teachers who had attended at least one in-depth STAR-led PD, and experienced teachers who had attended at least one in-depth STAR-led PD. The qualitative data gathered from lesson observations, co-teaching video recordings, and interviews were then used to examine successes and challenges of lesson preparation, and students' learning when inquiry-based strategies are used. The anticipated outcome of this study is a deeper understanding of the mindsets, tools and activities related to professional development in Inquiry-based learning in the art classroom. The findings may be useful to improve the local or systemic support for art teachers using inquiry-based learning as a pedagogical approach.

Keyword: Arts & Music Education, Professional Development
Neuromyths in Singapore’s Education System: Exploring possible prevalence and their consequences.

Rajvinder Singh Khare, Academy of Singapore Teachers, Singapore
Educational Neuroscience

Abstract

In recent years, the global emergence of neuroscience within education has given us new insights into addressing issues of learning and instructions for both students and teachers’ professional development. However, fundamental scientific differences between the two disciplines could lead to poorly drawn extrapolations that inflate the findings from neuroscience into educational neuromyths. This paper explores the genesis of six common neuromyths prevalent within the educational neuroscience literature (left version right brain, critical periods, enriched environments, synaptogenesis, male versus female brain and learning styles). The possibility of debilitating effects on educational practices and attitudes in Singapore will also be explored. Additionally, this paper seeks to inform readers as to the possible reasons as to why these myths and misunderstandings might emerge in the first place. Specifically, differences in methodology, gathering of data, theory and philosophy between the two disciplines might lead to inaccurate interpretation of results and the subsequent implementation of educational practices that do not work, for both students and teachers. Proliferation of these neuromyths may also have a negative influence in the successful implementation of scientifically validated neuroeducation practices. The author hopes that this paper might provoke an exploration on the breadth and magnitude of neuromyths that might be implanted within the Singaporean educational system and how the construction of neuroscience literacy programs for educators can be an effective counter to such pseudoscience.

Keyword: School/Teacher Effectiveness, Teacher Education/Development
Investigating generativity on the learning effect of delayed instruction

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Mathematics Education

Abstract

Past studies have shown that, compared to problem-solving after receiving instruction, students who solve problems before receiving instruction (i.e., delayed instruction) attain better learning outcomes. This study investigated analogical reasoning (AR) as the generative task in delayed instruction. Secondary Two students participated in an experimental study and were randomly assigned to one of two conditions: Students Generating Analogies (SGA) vs Teacher Generated Analogies (TGA) prior to instruction. In the SGA condition, participants were given a two-variable algebraic word problem and asked to independently generate two-variable algebraic word problems (SGA2-2). In the TGA condition, participants compared and contrasted pairs of two-variable algebraic word problems given by the teacher (TGA2-2). For both conditions, the participants received instruction on how to formulate algebraic equations for two-variable word problems. Immediate and delayed posttests were conducted on formulating algebraic equations for word problems that involved two-, three- and four-variables. Controlling general academic ability, AR ability and Secondary One Math exam scores, students in the TGA2-2 condition significantly outperformed those in the SGA2-2 condition on the immediate posttest, but not on the delayed posttest. Therefore, with the difficulty level of the curriculum topic (i.e., two-variable algebraic word problems) and student ability (i.e., express-stream students from a better-than-average neighborhood school) in this study, the less generative task (TGA2-2) had an immediate advantage over the more generative task (SGA2-2) on learning and transfer, but this advantage was only temporary. This study suggests a need to examine the interaction effect of difficulty of curriculum topic, student ability and task generativity in delayed instruction.

Keyword: Curriculum & Pedagogical Innovation, Mathematics Education
Knowledge Building Pedagogy and Technology Adaptation in History Classroom: Developing Historical Thinking & Empathy in Students

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Melvin Chan, Teck Whye Secondary School, Singapore
Ellie Soh Yu Bin, Teck Whye Secondary School, Singapore
IT in Education

Abstract

History is a subject rooted in humanities. It involves students understanding and dealing with “complex, unruly and perplexing past” (Vansledright, 2010). However, many history classrooms failed to provide the problem-solving experience for our students’. Many students view history as a rote learning exercise of a fixed collection of facts. In recent years, the introduction of source-based questions in history examination has created much anxiety among students; it has also led many history teachers to rethink their role in class.

Discussion on history education surfaced the following characteristics of a 21st century history classroom, it is one where students (a) develop their questions about the historical themes and even questioned the sources presented, (b) built mental maps to tackle the questions and continually shaped their mental map as they read more information; (c) sketched out iterative explanations to the questions with historical contextualization (d) developed empathy, i.e. knowledge of people then and using that knowledge to understand the problems; (e) imagined possibilities to fill in gaps in the evidence trail and remained firm in historical context; (f) presented explanation. So what are the pedagogical practices that would bring about these aspects of history learning?

In this study, we focus on a Knowledge Building (KB) pedagogical approach (Scardamalia and Bereiter, 2003) to historical inquiry. We analyze the pedagogical moves of two history teachers with different years of experience in KB in their Secondary one classes. Data collected includes teachers’ reflections (based on a protocol of designing KB environment and assessment) and students’ learning artifacts. We traced their trajectory in translating KB theories and technology into practice-related strategies. Analysis of teachers’ practice revealed though both considered KB pedagogy, one turned out more focused on historical content and the other more on students’ historical thinking. Semantic analysis of students’ notes on Knowledge Forum showed that students in the latter class, a less academically-inclined class, demonstrated a higher frequency of historical conceptual words throughout the inquiry as well as a higher sense of empathy in the way they contextualize the problems.

Keyword: Curriculum & Pedagogical Innovation, History
FAMILY 'S CARE FOR THE OLDER PERSON IN NORTHERN THAILAND

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Curriculum Development

Abstract

A development of strengthen happiness curriculum by appreciative inquiry process for elderly care giver’ is actually the topic of this study. It has been divided into 3 phases; Assessing family needs and resources, developing training curriculum for care-giver, implementing and evaluating the curriculum. And this is the first phase which aims to find out factors affecting and examine the family potential in caring for older people. Data collection methods included non-participation observations, focus group discussions. Twenty four participants were recruited by using purposive random samplings. Data were analyzed using content analysis. The result was as follows: most care giver are female with an average age of 39 years, were children of the older generation. The factors on the care found that the internal factors, which covered the family relationships between care giver and their elderly relatives was satisfactory in terms of relationships, particularly in respect, obedience and love. The characteristics of the care of older within families requires the principal care giver to take care of food, medication, cleanliness and general health matters. Other members provided support with finance and necessary daily effects. The things given by family to the older covered many aspects such as sanitary health, food and nutrition, cloths and garments, consumer goods and products and accommodation. Taking good care of older people makes them feel more confident that their families can care of them. Nonetheless, today’s situation in the families, they are facing many problems. The double role of care giver creates a conflict and leads to mental health problems such as stress, discouraged, frustrate and bored. Thus older people and care giver require assistance to build on the strong potential which exists to care for older. Therefore, necessary training for care giver to make strengthen happiness care, and the health services should also be available to provide advice to families. Furthermore, the research is exploratory in nature, starting with a very general research topic on a development of strengthen happiness curriculum by appreciative inquiry process for elderly care.

Keyword: Family/Home Education
Sport participation by students in schools has been widely encouraged by teachers, parents, and school leaders as it is believed to lead to improvement in their physical skills, character development, and academic performance. However, results from a number of empirical studies point to sport participation having little or no effect on these measures. Some research studies even show the opposite effect, particularly on character values, as many student-athletes displayed aggression, cheating, and disrespectful behaviors in school. While much is dependent on the implementation of sport programs, the research proponents believe that a sport can inspire and transform students into better learners.

This qualitative case study examines a high school’s floorball varsity program and attempts to explain why this program improves or fails to improve students’ academic performance and development of values such as self-confidence, discipline, responsibility, and leadership. It aims to describe patterns of behavior that athletes in the floorball varsity team exhibit during training and competitions as well as in classes and at home. Likewise, it provides an in-depth understanding of the role of coaches, teachers, and parents play in the success or failure of the varsity program to promote academic excellence, self-confidence, discipline, responsibility, and leadership among student-athletes.

Subjects of this case study are five (5) high school students from a private school in Quezon City, Philippines. Sources of data to measure academic performance and character development, particularly, self-confidence, discipline, responsibility, and leadership, include interviews (of subjects, their teachers, parents, teammates, and classmates), journals, teaching commentaries, observations, and videos.

Overall, the results provide positive evidence that the school’s floorball varsity program has been effective in supporting students to improve academic performance and to demonstrate values such as self-confidence, discipline, responsibility, and leadership in school. Implications of the study, which are particularly relevant to teachers, coaches, parents, and other professionals working with students-athletes, will be discussed.

Keyword: Moral Education/Development, Physical Education
DEVELOPMENT OF AN INSTRUCTIONAL MODEL BASED ON EXPERIENTIAL LEARNING AND COLLABORATIVE LEARNING FOR ENHANCING TEACHING COMPETENCIES OF

Janjira Chaipamornrit, Phayao University, Thailand, Thailand
Teacher Quality, Teacher Learning and Development

Abstract

The purposes of this study were (1) to develop an instructional model based on experiential learning and collaborative learning for enhancing teaching competencies of Teacher students of Chinese and (2) to investigate the effectiveness of the instructional model. The sample consisted of 30 fourth year teacher students of faculty of education, Chiang Rai Rajabhat University in second semester, academic year 2017 which CN4707 learned Chinese Teaching for Basic Education. The research instruments were (1) knowledge of instructional design and instruction test, (2) skills of instructional design and instruction test, and (3) rating scale questionnaire of attitude toward teaching profession. The data were analysed by arithmetic mean, standard deviation and t-test. The research procedure was divided into 2 phases; (1) development of an instructional model; (2) the implementation of the instructional model. The instructional model had been implemented for 15 weeks. The research results were as follows: 1) The instructional model was composed of five-step process (1) concrete experience, (2) reflective experience, (3) abstract conceptualization, (4) active experimentation, and (5) feedback.

Keyword: Instructional model, Experiential learning, Collaborative learning, Teaching competencies,

Keyword: Action Research, Cognitive Processes/Development
A closer look into the characteristics, beliefs, and values of Gen Z students in the Philippines

Rochelle Razo, John Dewey School for Children, Philippines
Marita Marcelo, John Dewey School for Children, Philippines
Civics and Moral Education

Abstract

After Generation X and the Millennials, schools are making way for the newest generation, the Generation Z or Gen Z. Members of this generation are current students in elementary and high schools and the oldest batches have just recently entered the universities.

There is very little research conducted and available about Gen Z and much less about Gen Z in the Philippines. Studies concerning this topic mainly come from market research agencies which focus more on the generation’s behaviors as consumers of goods and services. This descriptive study aims to provide a deep understanding of this generation as it relates to education.

Numerous studies about generations state that each cohort is different — what worked for the past generation would unlikely be effective for the next. Discovering the common characteristics, beliefs, and values of Generation Z is therefore crucial in education as relevant data could provide us with ideas on better ways to engage these learners in the classrooms.

This qualitative research investigates the characteristics, beliefs, and values of 300 Generation Z high school students from five (5) high schools in Quezon City, Philippines. Data were gathered using a survey instrument adapted from the study, Gen Z Goes to College. To provide an in-depth discussion and analysis on values, the study also included selected items in several instrument tools such as the Life Orientation Test, Development of Measure of Personal Responsibility for Adolescence, The Compassion Scale and Compassion Love for Humanity Scale, Competitiveness and Caring Scale (CSS), and the Guide for using the Multicultural Experiences Questionnaire (MEQ) in the survey questionnaire.

Focused group discussion of selected participants was employed to explain further the responses found in accomplished questionnaires. Furthermore, interviews of school leaders, teachers, parents, and other professionals working with Gen Z students were also used.

Results of this ongoing research will be presented in the conference.

Keyword: Adolescence, Moral Education/Development
Abstract

1. Aim/Purpose

As a Senior Teacher, I have been facilitating different PLTs working on various projects; leading different teams presenting various papers at national and international platforms. However, I have come to realise that most of the time, we come together as respective interest groups, each targeting on one thing, be it an issue, a problem, a pedagogy, a skill or a content.

My aim is therefore to re-think:

- Do our teachers not have pedagogy and strategy?
- Do our teachers not have creativity and innovation?
- Do our teachers not have civic mindedness and moral values?
- Are we looking at Creativity vs Innovation vs Values or Creativity, Innovation and Values?
- Do we display creativity and innovation by exploring new inventions or redesigning for integration?

2. Methodology (with demonstrations)

I shared my approach at subject level; I volunteered to work with colleagues in redesigning their lesson plans at Department level; I conducted Good Practice Sharing at College level, etc. All in all, I have led the teachers to realise:

- Doing better ≠ doing more
- Values ≠ CCE
- Creativity ≠ NEW

3. Findings (or its equivalent)

If we want students to take ownership of their learning, we teachers must first take ownership of our teaching by cultivating a grow mindset to be able to reflect and connect so as to offer alternatives for a holistic T&L experience for our students. Although the project is still in progress, by observation and perception, the responses from the colleagues of my Department have been positive!

Thank you!

Keyword: Curriculum & Pedagogical Innovation, Teacher Knowledge & Cognition
MODEL OF ACTIVITY-BASED LEARNING FOR DEVELOPING MATHEMATICAL SKILLS AND PROCESSES FOR ELEMENTARY STUDENTS

Nanthima Nakaphong, University of Phayao, Thailand
Mathematics Education

Abstract

This research aims to; 1. Create the model of activity-based learning for developing Mathematical skills and processes; 2. Implement the model of activity-based learning for developing Mathematical skills and processes; and 3. Evaluate the model of activity-based learning for developing Mathematical skills and processes. The research sample consisted of 84 students at 1-6 elementary level, academic year 2016, Ban Huay Kian School, Muang Phayao district, Phayao province. The data was collected from practice, examination, and questionnaire. Tools used in research as an activity-based learning. The researcher analyzed data using descriptive statistics include percentage, average, standard deviation and comparing the results to measure Mathematical skills and processes by t-test.

The research found that; 1. the model of activity-based learning for developing Mathematical skills and processes consists of five components, which include 1) Objective 2) Mathematical skills and processes are divided into five skills which include Problem-solving, Reasoning, Communication and the Mathematical interpretation and presentation, Linking knowledge of Mathematics and Link Mathematics to other disciplines, and Creativity. 3) The learning process is divided into three stages which include Remember, Understand, and Apply. 4) Learning activities are divided into three categories which include Exploratory activities, Constructive activities, and Expressional activities. 5) Role of a teacher; 2. the students had the Mathematical skills and processes higher than the previous of statistical significance at .05 level; 3. students were satisfied the model of activity-based learning for developing Mathematical skills and processes at a high level.

Keyword: Mathematics Education
Effects of Portfolio as a learning tool on Higher Malay Language students achievements and reflective practice

Nurashikin Binte Hanafi, Raffles Girls' School (Secondary), Singapore
Nuraini, Raffles Girls' School (Secondary), Singapore

Abstract

Portfolio as an alternative assessment was implemented for Higher Malay Language (HML) in Raffles Girls' School for the last two years in response to the increasing different modes of assessment. This research aims to study the effectiveness of using portfolio towards students learning and processes and achievements. Implementation of portfolio also aims to enhance students' disposition in self-directed learning and reflective practices. HML students from Year 1, 2 and 4 were involved in this study. Students had to submit their portfolio at the end of Term 3 in 2016, which included individual goals settings at the beginning of the year, two writing pieces and one piece of Paper II assignment (grammar/ comprehension/ summary). Each entry must be accompanied by a reflection that includes reason of entry choice, self-evaluation of their learning, and strategies for improvement. The Graham Gibbs’ Reflective Cycle Model is used to guide students' reflections. The research procedures involved three stages; Stage 1: Pre-research, Stage 2: Actual research and Stage 3: Collection and analysis of data collection. Quantitative and qualitative data were collected from pre-test and post-test surveys, students marks and reflections. Pre-test and post-test surveys mainly looked at comparison of the old version and new version of Assessment Portfolio. Qualitative data was based on students reflection on their learning processes and achievements. Data collected showed that portfolio reflected students learning processes and development, enhanced students' awareness of their areas of improvement and strengths, demonstrated their commitment to learning especially on self-directed learning and reflective practices. Students also responded positively on the new version of the Assessment Portfolio as a better assessment tool for their learning. This research also found students’ reflections and student learning to be relevant for teachers to have a better understanding of how students’ learning and therefore, how to better adapt to the students' learning styles and abilities.

Keywords: Portfolio, reflective practice, and Self-Directed Learning

Keyword: 21st Century Competencies, Assessment
The Impact of a Gratitude-Based Intervention on Social Relationships and Kindness of Academically At-risk Students

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Imelda Caleon, National Institute Of Education, Singapore
Curriculum Development

Abstract

This study examined the effectiveness of a gratitude-based positive psychology intervention (PPI) on students’ gratitude, caring for others and relationships with significant others (i.e., parents, peers, classmates and teachers). The study involved a sample of Secondary Two students (N=43) attending a specialized secondary school. The participants were randomly assigned to either the experimental group or control group. The students in the experimental group participated in gratitude-based PPI, which consisted of two 30-minute sessions per week for eight weeks. The gratitude-based PPI was not able to generate significant improvements in students’ trait gratitude; however, it was able to generate a significant change in the students’ state gratitude. In particular, the experimental group reported a decline in negative affective reactions towards receiving favors, while the control group did not report any substantial change. The gratitude-based PPI was found to produce promising, yet non-significant results, in relation to promoting social relationships and positive feelings for others. The effect sizes of gratitude-based PPI and control activities were both positive in relation to the students’ relatedness with parents and teachers. But the effect of the gratitude-based PPI was stronger on relatedness with parents and weaker on relatedness with teachers. The gratitude-based PPI produced a small effect size in terms of enhancing positive feelings towards others and a negligible effect size in terms of reducing negative feelings towards others. Overall, this study provided preliminary empirical evidence that gratitude-based PPI could generate positive effects that could potentially seed positive social bonds and interactions for academically at-risk students in Singapore.

Keyword: At-Risk Students, Psychology
Abstract

Character and Citizenship Education (CCE) was implemented to shape a strong sense of citizenship. In schools, Learning Journeys (LJs) form an integral part of a school’s CCE programme. LJs “aim to instil in our students, pride in Singapore’s achievements, to help them understand Singapore’s challenges and opportunities, build their confidence in our future, and nurture a sense of belonging to Singapore”.

Raffles Girls’ School (Secondary) has been implementing a 4-year LJ programme since 2014. The programme seeks to infuse academic disciplines with CCE, thus allowing all students to simultaneously understand how the disciplines are applied in everyday life, as they come in contact with the greater environment. The Experiential Learning Cycle (ELC) framework by Professor Colin Beard was employed to help students become more self-directed learners both affectively and cognitively.

As globalisation presents a challenge to the formation of the Singaporean identity among students, our school’s inter-disciplinary Social Studies and Philosophy LJ provided students an opportunity to make make direct observations and records of the community and environment. They pondered on concepts in a real community setting and understood that community issues were multifaceted and required observation, interpersonal and thinking skills to resolve. Students were then provided with an inter-disciplinary Performance Task (PT) to round up their LJ experience. The PT required them to give a persuasive speech on effecting positive change to a particular situation/issue/concern faced by a community in Singapore, to an identified organisation that could help further their cause. From the activity, students were better able to appreciate the complexities involved as an active citizen advocating for positive change.

This presentation will highlight how students would develop a deeper awareness and sensitivity towards the community and apply classroom-based concepts with outdoor experiences. Specifically, it would show how students understood that the development and progress for the sake of the greater good, might compromise heritage conservation that was necessary to sustain the identity of a place or people. Students would also understand that ethical reasoning facilitated values’ clarification and decision-making. The findings from the student survey would be shared.

Keyword: Citizenship Education, Humanities and Social Studies
Field-based learning as a pedagogy to develop professional competencies

Surinam Sumsudin, Ngee Ann Polytechnic, Singapore
Kan Siew Mun, Ngee Ann Polytechnic, Singapore
Adventure and Outdoor Education

Abstract

The Diploma in Landscape Design & Horticulture (LDH) is a three-year full-time course offered in Ngee Ann Polytechnic. It aims to nurture students to be work-ready by developing adaptable, creative and innovative professionals for the landscape architecture, horticulture and other related industries.

Field-based learning is a signature pedagogy in the fields of teacher education, the geosciences and social work. In the field-based learning approach, learning is extended beyond the traditional classroom, laboratory and campus. Since its inception, field-based learning has been a key pedagogy in the LDH course as it models the nature of work in the various sectors supporting the landscape industry. Classes for various modules are conducted in the polytechnic’s Greenhouse and Shadehouse, outdoor classroom Greenhub at Clementi Woods Park and the Singapore Botanic Gardens. Students are exposed to a real-world setting, which allows them to develop industry-relevant competencies that complements knowledge acquired in the classroom. The authentic learning environment gives students a sense of the real work environment, as well as the non-academic competencies required for the industry. Students are engaged in active learning and are assessed on their fieldwork and technical skills.

By situating the ‘classroom’ in the field, students are familiarised with the work environment in the industry. This allows them to develop industry-relevant competencies that complement knowledge acquired in the classroom. Rather than merely memorising theories and concepts, students apply them and gain technical competencies. They develop problem solving skills when faced with site issues and gain resourcefulness and confidence. This is seen when they undertake their industry internship postings in their third year of study.

Field-based learning has been found to be a valuable teaching and learning approach for LDH. In this presentation, we will illustrate with examples from modules of the LDH course how field-based learning is achieved through collaborations with industry partners and engagements with stakeholders, in areas such as curriculum design and setting up of off-campus lessons. We will provide students’ inputs on their experiences during practical lessons, group projects and the challenges faced.

Keyword: Curriculum & Pedagogical Innovation, Learning Environments
Adopting Art Therapy as an Innovative Approach to Support Dyslexic Students in the Transition from Primary to Secondary School

Chow, Hing-chung, Tung Wah Group of Hospitals Sun Hoi Directors’ College, Hong Kong
Special Needs Education

Abstract

Empirical evidence shows primary pupils experience anxiety and frustration in the transition from primary to secondary school. This may come from a fixed feeling of their separation from the bonding with teachers, peers, known well school environment; and the anxiety of meeting the new ones including the school curriculum. Maladaptation may result in social withdrawn, poor academic performances and even school phobia. It is believed students with special educational needs have to encounter greater difficulties to this transition because compared with mainstream students, they require a deeper understanding from their teachers to their limitations and closer parent-teacher collaboration. Without better understanding of their anxiety, it is difficult to develop appropriate support strategy to echo their need.

Among all, dyslexic students seem to face even greater challenges because their normal intelligence with writing and/or reading disabilities are always misjudged to attention deficit and laziness. As an innovative approach four 30-minute individual non-directive art therapy sessions were deployed to dyslexic students in the S.1 adaptation programme of a Hong Kong secondary school. Since students can easily build up their defense with verbal counselling, it is found that art therapy is a good means to resolve their anxiety. The images, either concrete or abstract, produced by students can create genuine topics for discussion. They reveal how the parental support, primary school learning experience and the student’s personal belief construct the expectation of the dyslexic students to their secondary school life. This paper also discusses the role of creativity in the therapeutic process and the integration of art therapy to the school system in the S.1 adaptation programme. To help build a meaningful and successful secondary school life to dyslexic students, based on the above findings a whole school approach support strategy will also be recommended.

Keyword: Assessment, Counseling
Abstract

This paper intends to explore the dynamics of learning cultures in Hong Kong by investigating the connection of school leadership and learning during the implementation of Secondary School Curriculum Reform. Having reviewed notions presented in pioneer scholarships by Michael Fullan, Andy Hargreaves, Allan Walker, Clive Dimmock, John Macbeath and John Lee, I propose to discuss the concept of learning culture, which frames discussion of possible ways to nurture learning cultures. Then a number of organizational learning conditions, which represent assumptions that hold the potentials to positively influence practice. The bulk of the paper is devoted to an examination of the actions school leaders might take to influence student and teacher learning, by using the cases of secondary school curriculum reform in Hong Kong. This paper yields clear evidence to present a more nuanced view of school leadership in designing, managing and energizing the right connection, in order to demonstrates how motion leaders work on capacity building and school improvement.

Keyword: Curriculum Design/Reform, Leadership
With the advancements in the fields of nanotechnology and material sciences, engineering students from the Diploma in Nanotechnology and Materials Science (DNMS) in the School of Engineering, Nanyang Polytechnic, are expected to solve complex, multidimensional interdisciplinary problems. This paper introduces the concepts of integrating sustainability applied research into the curriculum of DNMS through a newly set up platform - Nanotechnology and Advanced Materials Teaching facility for Urban Environment (NATURE). This multidimensional interdisciplinary platform also allows lecturers to adopt a new pedagogy approach which combines traditional engineering, sciences, business, etc., and work with industry partners for effective problem solving.

In this paper, we will discuss the concepts, applications, and examples in integrating sustainability applied research findings into existing modules throughout the three years of studies. We will also discuss and demonstrate the effectiveness of this approach which allow lecturers, students and industry partners to work collaboratively on multidimensional interdisciplinary applied research projects in NATURE, thus providing a more comprehensive engineering education and making learning more experiential and engaging for students. Some of these applied research studies include Aquaponics System and Organic Matter Drying Chamber in the area of chemical and green technology; Gardening as Therapy in the area of occupational therapy; and Farm-to-Table Dining in the area of food science and nutrition. Finally, we will share the challenges faced and the recommendations for future adoption of this approach in engineering education.

Keyword: Action Research, Curriculum & Pedagogical Innovation
Abstract

There is considerable literature to support the importance of speaking both in oral communication and in thinking and learning. However, studies conducted in English Language teaching have often highlighted the phenomenon of a lack of emphasis given to teaching speaking in English Language (EL) classrooms. This study seeks to gain insights into this conclusion from previous research by examining the teaching of speaking in the context of Singapore secondary English Language (EL) classroom through: 1) an analysis of the English Language Syllabus 2010; and 2) a two-case study involving interviews and continual lesson observations over a period of 20 weeks. The examination of the syllabus showed its orientation towards the notion of oracy as competence although there were allusions to oracy for thinking and learning. Teachers possessed a similar orientation in their teaching and use of talk. Furthermore, there was negligible focus on the teaching of speaking in classrooms and teachers approached the teaching of speaking in a compartmentalized manner in accordance with the intricate workings of their beliefs about themselves, their learners and their schools. This study provides insights into the teaching of speaking in secondary EL education and new understandings about what teachers believe about speaking, the teaching of speaking and the use of talk. The findings will help curriculum developers, policy makers, and teachers in developing crucial speaking skills in students and contribute to the literature on teacher cognition.

Keyword: ESL, Language and Education
Investigating Preschool Teachers’ Perceptions of School Learning Environment and job satisfaction

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Early Childhood Education

Abstract

This paper reports a survey study of 100 preschool teachers from 15 preschools in Singapore using a modified instrument called Pre-School Level Environment Questionnaire (PSLEQ). The aim was to explore the differences in actual and ideal perceptions of preschool teachers’ school-level environment and investigate the relationship among preschool teachers’ profile, preschool learning environments and job satisfaction. Quantitative data using paired samples t-tests indicated that there were significant differences in teachers’ actual and ideal perceptions of their preschool learning environments except for the scale of Work Pressure. Logistic regression test showed a positive influence of Resource Adequacy on preschool teachers’ job satisfaction.

Keyword: Early Childhood, Learning Environments
Exploring Teachers’ Informal Conversations about the Integrated Programme: A Social Network Analysis

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Letchmi Devi Ponnusamy, National Institute Of Education, Singapore
Koh Kar Boon Lauren, National Institute Of Education, Singapore
Curriculum Development

Abstract

Teachers who are accustomed to teaching in the Express Programme usually encounter difficulties when they first teach in the Integrated Programme (IP). Compared to the Express programme that culminates with the GCE “O” Levels, the IP Programme removes this examination requirement in order to allow students to focus on in-depth learning. However, teachers generally find it challenging to deviate from their standard practice and trial alternative teaching approaches for the high ability learners (HALs) of the IP classes. Since such approaches require teachers to modify curriculum and pedagogical practice to suit HALs, teachers who are unfamiliar or uncomfortable with these approaches might reject the goal of in-depth learning and instead fall back on preparing students for the eventual GCE “A” Level exam.

By using social network analysis, we were able to obtain an evidence-based idea of the extent that the IP curriculum is being actively discussed amongst teachers, and who the participants in these conversations are. Our participants comprised about 50 teachers from a secondary school which offered both the IP and Express Programmes. We asked them to nominate up to 10 teachers with whom they had informal conversations on the IP curriculum in the past 10 weeks. Using Ucinet and NodeXL, we were able to generate sociograms and calculate centrality statistics for the teachers involved. Our initial analyses showed that: i) teachers who responded nominated an average of 5.9 other teachers, ii) teachers with higher designations were nominated more often (r = .36), and iii) there was no correlation between years taught and nominations received (r = .00). While result (ii) – that teachers with higher designations are the more active participants in the conversations on the IP curriculum - may be understood positively, result (i) will likely require further investigation to understand whether an average of 5.9 teachers might imply. Further implications of these findings will be analysed and discussed both at the school and departmental level.

Keyword: Curriculum & Pedagogical Innovation, School Change and Leadership
An Experiential Learning approach to develop Professional Competency: Diploma in Business Studies curriculum at Ngee Ann Polytechnic

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Curriculum Development

Abstract

There is a worldwide push for higher education to “shape up” and create stronger links between education and work. Experiential learning has been regarded as an effective approach to achieve this “constructively” (Kolb, 2015).

Diploma in Business Studies (BS) course at NP School of Business & Accountancy heeded this call and prepares students for a business management career through an Experiential Learning (EL) approach, culminating in a for-credit internship program. This program is transformative as students apply concepts learnt in real-world work contexts but it is not a stand-alone EL activity. Early-years learning activities spiral toward this capstone experience. This paper describes the design elements of this curriculum, and articulates how EL cycles in different academic years are designed and delivered, and how learning experiences scaffold learning across the years to develop career interests, professional competencies, mindsets and attitudes in this Spiral Curriculum.

The design elements include scaling of work contexts - from simulated scenarios and cases (Years 1-2) to real-world projects and work/internships (Years 2-3). In each EL cycle, students learn by solving real-world problems in innovative ways, adapting to changing circumstances. Reflecting on their experiences, students deepen learning and make connections of classroom learning to the business world. It is by deliberate design that prior learning and reflections scaffolds the EL cycles in advance years.

This paper also documents the development of professional competency for two professional tracks - Human Capital Management (HCM) and Entrepreneurship, using the spiral EL Approach. In the tracks, Year 3 experiential activities, where students undertake roles of Learning and Development (L&D) Managers or Business owners and integrate professional competencies and mindsets, are built upon experiences and reflections from L&D workshops and HCM scenarios (Years 1-2), First Step! business bazaars and marketing experiences (Year 2). This approach also sees study skills like self-directed and collaborative learning, fostered.

By spiraling learning using the Experiential Learning approach, we found students learnt better about their career interests, fostered mindsets specific to their professions, whilst applying skills and knowledge in real-work and simulated contexts, and making sense and meaning of their work, and for some, launching their careers.

Keyword: 21st Century Competencies, Asian Education & Pedagogy
Redesigning Learning Spaces for Teacher Makers and Innovation in Technology-enabled Pedagogy

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IT in Education

Abstract

The advent of makerspaces in educational institutions is revolutionising teaching and learning approaches and experiences worldwide. A makerspace is a place where people gather to share ideas, resources and knowledge. Makerspaces provide tools and space for experimentation, networking and the making of artefacts. The concept of educational making is built on the theory of constructionism which stresses the role and contribution of hands-on and minds-on learning. To encourage and inspire learners’ interest in STEAM (Science, Technology, Engineering, Arts and Mathematics) subject areas, educators and educational institutions across the globe are leveraging this pedagogical approach. In a makerspace, learners engage in active, authentic, collaborative and reflective learning using new technological tools in creative and innovative ways. This pedagogy is powerful because it transforms learners into makers and creators of their own educational experiences. The learner’s role and disposition is transformed from being teacher directed to becoming self-directed and independent. Maker pedagogy inherently promotes creativity, innovation and critical thinking.

To provide the influential first step in promoting a maker mind-set amongst the pre-service and in-service teachers in Singapore and to encourage innovation in and adoption of pedagogies that promote 21st century quality learning characteristics enabled by ICT, NIE has setup i-Space where student teachers can collaboratively learn and tinker with various advanced technological tools to make both tangible products as well as digital media resources. The prime objective was to help our teachers’ gain experience and expertise in making and maker pedagogy in a safe and authentic learning environment where they can collaboratively explore, experiment and learn making, maker pedagogy and other innovative pedagogies before implementing them in schools.

In this paper, we will share the initial conceptualisation process behind i-Space, various revisions to the design and the final iteration of the i-Space design and its implementation. We will also share the various pedagogical, social and technological affordances of this digital makerspace and identify potential areas of innovation in pedagogy and teacher education based on our initial experiences of using this digital makerspace. We will also share important design principles to aid future implementation of similar technology enabled collaborative learning spaces.

Keyword: Curriculum & Pedagogical Innovation, Information Technology and Education
Use of PRO in structuring students’ answers for open-ended questions

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Science Education

Abstract

Students generally find it hard to answer open-ended “Explain” type questions and they often find it difficult to give a complete answer because of missing components or links in their answers. We used PRO as a structure for Grade 9 and 10 NJC Integrated Programme students to answer open-ended questions. PRO stands for Premise (the known facts such as scientific laws and principles and information related to the given scenario), Reasoning (sequential chain of reasoning that links the Premise to the Outcome), and Outcome (phenomenon to be explained). The effectiveness of the PRO approach was evaluated both using a survey of students’ perception on the usefulness of PRO and a performance quiz on the efficacy of the PRO approach as a tool for students to provide complete answers to open-ended questions. Most students reported that the PRO structure is beneficial in structuring their answers, and are able to correctly utilise the PRO structure in identifying the correct premise for their answers. However, students face difficulty in connecting their points within the Reasoning segment.

Keyword: Learning Sciences, Science Education
Developing a differentiated curriculum: What support can be provided for teachers?

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Letchmi Devi Ponnusamy, National Institute Of Education, Singapore
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Curriculum Development

Abstract

In order to further broaden Singapore students’ learning experiences, the Ministry of Education (MOE) implemented the Integrated Programme (IP) for high ability students, removing the high-stakes ‘O’ Level examination and freeing up time to provide learning experiences that stretch students’ abilities. The removal of a high-stakes examination indicates an education system that is willing to experiment in pedagogical and curriculum innovation. This paper aims to identify and examine the support that is needed for teachers during such a curriculum change. The study, involving four secondary schools, is a mixed methods one and the focus of this paper is on the findings from the qualitative data collected from interviews with school leaders, middle management, teachers and students. The teachers in this study, who were given autonomy in designing and implementing the differentiated curriculum with a view to prepare the students for the ‘A’ Level examination at the end of six years, are essential drivers of change. However, they face struggles in various areas, and they hope to receive support that can extend their zone of enactment, which is the space in which the personal resources of teachers mingle with incentives and learning opportunities brought on by the external environment. An extended zone of enactment can help them change the core of their practice for the differentiated curriculum. Some of the types of support identified include: increased manpower with relevant experience, more protected time for planning curriculum, training and guidance by experts/mentors, and the opportunity to observe lesson by professionals/experienced teachers, such as during an exchange to other schools with IP. These findings suggest that in the initial phases of curriculum design and implementation for IP, some uncertainty due to the exploratory nature of the process is inevitable. This process is, in fact, a way to develop curriculum leadership, and support can be provided to better equip teachers to deal with the challenges and help them change the core of their practice for the differentiated curriculum.

Keyword: Curriculum & Pedagogical Innovation, Teacher Education/Development
GRIT AND INTELLIGENCE AS PREDICTORS OF ACADEMIC ACHIEVEMENT IN SCIENCE

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Cornelia, Education, Philippines
Cognition, Motivation and Learning

Abstract

The purpose of this study was to identify the profile of the students with regards to grit, the behavioral and non-cognitive aspect, intelligence quotient (IQ), the cognitive dimension, and academic achievement in Science that was measured through a standardized test. Grit comprises a suite of traits and behaviors, including goal-oriented, the ability to know where to go and how to get there; motivation, which is having a strong will to achieve identified goals; self-control, the ability to avoid distractions and focus solely on the task at hand; and positive mindset, the courage to embrace challenge and viewing failure as a learning opportunity. This research investigated the predictability of IQ and grit on students’ academic achievement on Science. The research instrument used was the 12-item grit scale survey developed by Duckworth, Peterson, Matthews and Kelly (2007). This grit questionnaire was developed and validated in the study of Duckworth and Quinn (2009). The IQ test results of the students and the Science Diagnostic test scores were correlated with their grit measurement values using Linear Regression Analysis. The predictive relationship of these variables was determined using Statistical Package for the Social Sciences (SPSS) software. Based on the results, both IQ and grit are significantly related to the academic achievement in Science. Grit and IQ are some important aspects that affect and shape the way the learners achieve in school or in any learning environment. These two, among other factors, greatly contribute to the near and far future of the learner, so these are very important considerations that must be looked into by schools and other learning institutions. In addition, there are other factors that can be looked into aside from correlating grit and IQ to standardized test scores. There are other performance measures that are closely associated with the behavior of students and that can make the predictability more useful.

Keyword: Cognitive Processes/Development, Intelligence
A pilot contextual study of the role of Special Educational Needs Coordinators on inclusive practices in Hong Kong school system

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Special Needs Education

Abstract

It has been estimated that over 37,000 students with special educational needs (SEN) study in ordinary mainstream school in Hong Kong, with an average of 37 students with SEN in a school. Since 1997, inclusive practice in Hong Kong has been implemented with great determination and wide school coverage. The Chief Executive of Hong Kong, in his 2015 Policy Address, further announced a HK$200 million three-year programme titled "Provision of funding for ordinary schools to arrange special educational needs coordinators (SENCOs)". Taken together with the previous policy implemented by the Education Bureau in 2008, of funding additional leadership positions in shaping school-wide development in inclusive education, it has become clear that the SENCOs will play an increasingly important role in strengthening the implementation of inclusive education (IE) in Hong Kong. By using qualitative semi-structured interviews of the SENCO, school principal and six students from each participating school in this pilot study, this paper explored effects of the new SENCOs' role on and values added to inclusive practices in support of special educational needs in the pilot schools in contrast to the current practices in non-pilot schools. The contextual difference in support of SEN by the pilot and non-pilot schools was particularly noted. Preliminary findings that have a direct bearing on the effectiveness of SENCO's role, responsibilities and support in the pilot schools that could provide empirical evidences of defining value-added inclusive practices will be discussed.

Keyword: Educational Policy/Reform, Special Education
Teachers’ Teaching Beliefs in an Applied Learning University in Singapore

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Teacher Quality, Teacher Learning and Development

Abstract

Key words: teaching beliefs, teaching and learning, teacher development

Aim:
This pilot study aimed to explore teachers’ teaching beliefs in a Singapore university. Research questions were: what are teachers’ teaching beliefs? What are the factors influencing teachers’ teaching beliefs?

Methodology:
Qualitative reflexive methodology was chosen because teaching beliefs are tacit, subjective and often constructed in their fluid social context (Nespor, 1987; Trumbull and Trumbull, 1990). By using reflexive approach, I acknowledge that myself as the researcher has an active role in the research process (Lincoln and Guba, 1985, p327) and critically check my own assumption and biases (Delanty, 2005; Weber, 2003). A semi-structured interview was used for data collection as it gives the interviewer and the interviewee the flexibility to discuss particular interesting avenues (Smith, 1995), and helps to build an in-depth, comprehensive and contextualized understanding of the issues explored (Lewis, 2003, p52).

Theoretical dimensions of teaching beliefs summarized as a foundation of this study:

• Social context of teaching
• Teachers’ teaching and learning experiences
• Confidence in teaching content
• View on the nature of knowledge
• Beliefs of teaching methods
• Views on teachers’ roles and students’ role in learning
• Views on the goal of education

Two teachers who met the inclusion criteria were recruited. I conducted both interviews and transcribes the recordings. Thematic Analysis was used for systematically identifying, organizing and offering insight into patterns of meaning, identified as themes, across data set (Braun and Clarke, 2012).

Transcripts were coded manually. Codes were sorted into potential themes, and grouped into main themes, which capture something important not necessarily be dependent on quantifiable measures (Braun and Clarke, 2006). Themes were checked against the extracts, to make sure the themes were coherent. Themes were verified by participants.

Findings:
The main themes identified include:

• Teaching is affected by learning experience, teaching load and control over content and assessment
• Teach according to learners’ learning needs
• Applied learning aiming to make learning relevant to practice
• The goal of education should also strive to build students’ social adaptability

Keyword: Teacher Education/Development, Teacher Knowledge & Cognition
Pre-service Science Teachers' Pedagogical Content Knowledge for Nature of Science: Lesson Learned from Action Research

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Science Education

Abstract

The nature of science (NOS) has become a central goal of science education in many countries. This study sought an understanding of the extent to which action research affects pre-service science teachers' understanding and learning of NOS and pedagogical content knowledge for nature of science (PCK for NOS) during their student teaching. A qualitative research approach was employed as a research methodology, drawing upon field notes, interview, pre-service teachers' weekly journal entries and their action research report. Qualitative data were analysed through an inductive process to identify ways pre-service teachers engaged and developed their PCK for NOS through doing action research. The results indicated that pre-service science teachers developed an understanding of NOS and PCK for NOS particularly in terms of knowledge of curricula and teaching strategies in teaching NOS. Pre-service teachers prefer to use explicit-reflective inquiry approach in their teaching to transform NOS concepts to the students. It is also found that action research is a key driving force to shift pre-service teachers' their orientations to teaching NOS. The aim of this study is to help us, as science teacher educators, consider how to support and develop science teachers' PCK for NOS through PCK framework and action research.

Keyword: Action Research, Science Education
Abstract

Second language (L2) listening comprehension draws on learners’ resources such as their vocabulary repertoire, grammatical knowledge, strategies, memory capacity, and affect. This paper reports on an empirical study where several of these resources were operationalized and used to develop a model for L2 listening. The participants were 250 English learners who sat a listening test, a vocabulary test, and a grammar test, and completed the metacognitive awareness listening questionnaire which measures listeners’ problem solving (PS), planning and evaluation (PE), mental translation (MT), person knowledge (PK), and directed attention (DA). To explore the relationship between the variables, I initially submitted the listening data to mixture Rasch modeling, a technique to differentiate listeners based on their listening performance. Among the several models tested, a two-class model had the optimal fit to the data, meaning that two groups of listeners with significantly different listening performances were identified. Using advanced post-hoc quantitative techniques, I found that Group 1 comprised abler L2 listeners capable of multitasking and with high scores on PS, PE, and the vocabulary and grammar tests but with low scores on DA, PK, and MT. By contrast, group 2 comprised low-ability L2 listeners with high scores on DA, PK, and MT but low scores on PS, PE, and the vocabulary and grammar tests. Based on these findings, I propose a model for L2 listening comprehension mechanisms which comprises multiple interdependent components. The model provides a dynamic representation of listening comprehension and is useful for predicting L2 listeners’ performance in academic settings. Implications for language pedagogy and assessment are also discussed.

Keyword: Assessment, Language and Education
Collective teacher efficacy and Student Achievement: A review of the literature

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Teacher Quality, Teacher Learning and Development

Abstract

Teacher efficacy is the belief of a teacher in his or her abilities to induce desired outcomes of student learning and engagement. It has been proven to be significantly related to many desirable student and teacher outcomes such as classroom management, instructional strategies, and student engagement. In addition, due to the individual characteristics of each school, Bandura argued that collective teacher efficacy is a powerful construct which differs among schools. Collective teacher efficacy refers to the perceptions of teachers in a school that the performance capabilities of the faculty as a whole will be able to generate positive student outcomes. Whilst teacher efficacy revolves around the teacher’s own beliefs about their capabilities, collective teacher efficacy is associated with the efforts, level of commitment, persistence, shared ideas, and achievement of groups. In the development of collective teacher efficacy, Bandura proposed four sources of self-efficacy information: Mastery experience, Vicarious Experience, Social Persuasion, and Affective States. Researchers over the past 30 years have established strong links between teacher efficacy and teacher behaviours that nurture student achievement. However, collective teacher efficacy has received little attention during the same time. One of the important challenges researchers face when is to document the impact school organizations have on student achievement. Identifying school characteristics associated with differences in student achievement is key to establishing effective schools. This paper aims to examine the relationship between collective teacher efficacy and student achievement. In this review paper, we analyse the construct of collective teacher efficacy and its associations with student achievement. A total of 5 journal articles were selected for review after using the search terms: collective teacher efficacy and student achievement. This presentation will provide a systematic review of the journal papers selected, identify the limitations of this line of inquiry and suggest how collective teacher efficacy can be explored further in the Singapore context.

Keywords: Collective teacher efficacy; teacher efficacy; student achievement; qualitative; quantitative

Keyword: School Culture & Organization, School/Teacher Effectiveness
ROLE OF TEACHER DEVELOPMENT TOWARDS REDESIGNING COMMUNICATION PEDAGOGY IN PHILIPPINE HIGHER EDUCATION

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Teacher Quality, Teacher Learning and Development

Abstract

This study aimed to analyze the role of teacher development in redesigning communication pedagogy in Philippine higher education. Using a descriptive qualitative design, data were gathered through individual interviews with 24 purposively sampled English faculty who have taught English as a general education course for at least 5 years, who have come from various regions of the country, and who have qualified and thus have participated in the Commission on Higher Education’s (CHED) national trainers’ training for the teaching of Purposive Communication as the redesigned communication course for tertiary level. Consequently, interview data were transcribed and analyzed accordingly using thematic approach. Findings reveal that the respondents’ ages ranged from 34 to 58 years old, 19 female and five male, and with English teaching experience spanning from 5 to 25 years. Themes emerging from the interview data include the following: update teachers with issues and trends in teaching communication; equip teachers with teaching skills relevant for 21st century learners; raise the level of teacher efficacy in embracing educational reforms; and produce teacher leaders of creativity, innovation and values.

Teacher Development (TD) is vis-à-vis the process of continuous professional development undertaken by teachers and is linked to increased student learning. Department of Education’s (DepEd) introduction of K-12 program in 2011 has led to the restructuring of Philippine’s basic educational system. The program has been collectively viewed as a tough but strategic move by the government to ensure it produces competent graduates who can serve as the backbone of a highly skilled and employable work force at the local, national and international scenes. The K-12 program gave birth to the New General Education Courses (NGEC), a modified curriculum for all tertiary students beginning 2018. One of these new general education courses is Purposive Communication—a redesigned communication pedagogy replacing several English courses in the old curriculum. And since this is intended to be authentically purposeful according to the needs of a global citizen among other factors, equipping teachers towards a successful pedagogical redesigning effort is deemed imperative and relevant. Hence, teacher development plays a vital role in redesigning communication pedagogy in Philippine higher education.

Keyword: 21st Century Competencies, Curriculum Design/Reform
Constructivist Guided Discovery Using Pictorial Organizer: Effects on Gender Difference on TUG-K of BS Architecture students of BulSU

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Science Education

Abstract

How to teach is one of the major problems faced by today’s Science teachers. Constructivist approach is one technique wherein the teacher is a facilitator and serves as a guide to learners. She/he helps the students explore and formulate their own ideas, and help them do “learning by doing”. It focuses on an independent learning, be creative and thinks critically. Guided discovery is student-centered teaching approach thru illustrative materials for students to study independently. Pictorial organizer referred to as concept maps or cognitive organizer helps learners depict the relationships between facts terms and ideas within a learning task.

This study aims to investigate the effectiveness of Guided Discovery teaching approach with corresponding exposure to a pictorial organizer and identify gender difference of 2nd year BS Architecture students’ scores using TUG-K.

Results revealed that BS Architecture students, specifically females, performed better than males after being taught with Guided discovery teaching approach and corresponding exposure to a pictorial organizer.

Keyword: Classroom Research, Teacher Education/Development
A Deconstruction of the Issue Investigation Project – Creating Meaningful Learning for our Secondary 3 Students in Social Studies

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Wee Lip Hui, Serangoon Garden Secondary School, Singapore
Toh Jia He Benjamin, Serangoon Garden Secondary School, Singapore
Humanities and Social Studies Education

Abstract

Issue investigation (II) is a compulsory component in the new Social Studies syllabus. Using an inquiry approach, students are required to integrate the knowledge, skills and values learnt from their Social Studies lessons and demonstrate them during the course of the project. In addition, the project provides a platform for students to be active citizens of society as they work in groups to investigate societal issues of significance to them.

All secondary schools are provided with a sample package of the II. The Social Studies team worked together to curate and customise the resources and also developed additional learning materials to better suit the learning needs of our Secondary 3 Express and Normal (Academic) students.

This sharing centres how the Social Studies teachers conceptualised the Issue Investigation (II) for Upper Secondary Social Studies and aims to raise an awareness of a need for a more conscious approach to building students’ social studies literacy. Teachers will share the design and approaches used when designing and conceptualising the package, and challenges that they met. The presenters will share their resources developed and they will discuss and address strategies for bringing social studies relevant and current (for sessions that are essentially engaging and useful).

All in all, the Issue Investigation (II) Project has been chiefly successful in both the developmental and implementation stages. Besides constructive and positive feedback emanating from the majority of students who have undertaken the II task, the teachers involved have also been evidently impressed by the general quality of work and effort invested on the part of these students. Looking ahead, all teachers have come to a general consensus that whilst the project has by and large proceeded smoothly without any major glitches, there remains ample room for refinement and innovation in the future.

Keyword: Humanities and Social Studies, Social Studies Education
Building mathematical comprehension

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Mathematics Education

Abstract

Reading mathematical content materials requires students to focus on the critical skills of clarifying, comparing, connecting to prior experiences, interpreting, making inferences, questioning the text, summarizing and visualizing. Although students may progressively become proficient with the mathematical language (terminologies, numerals, symbols), their comprehension of key ideas in a given text and examples cannot be assumed. In the context of a flipped classroom, how do teachers build students’ comprehension skills to facilitate effective and independent learning? How can students’ mathematical comprehension skills be formatively assessed?

Drawing from the seven comprehension strategies compiled by Keene and Zimmermann (2007), this study examined and adapted those strategies useful for building and assessing students’ mathematical comprehension skills. From the secondary school mathematics curriculum, Functions was selected to provide a rich content area for students to (i) practise thinking routines, (ii) apply metacognitive strategies and (iii) learn from examples through the productive activity of imitation. By making “visible the unseen processes of creating meaning from text” (Murphy, 2010), the discussion focused on the explicit instruction of comprehension strategies, the design and implementation of learning activities and assessment tasks. The findings from 90 secondary three students seek to illuminate on flipped classroom experiences that support and enhance students’ learning.

Keyword: Mathematics Education, Metacognition
Abstract

The Mathematics syllabus in Singapore is moving steadily towards the application of Mathematics to real world context. National assessment is also starting to test on Problems in Real-World Contexts (PRWC). With this, the Ministry of Education is encouraging teachers to expose students to activities/questions that aim to encourage them to think about the Mathematics behind a variety of scenarios. One reason for this move towards applying Mathematics is because of students’ perception that Mathematics is irrelevant and has no applications in real life. Hence, our project aims to engage students in PRWC activities, more specifically Mathematical Modelling (MM), so that students can see the high relevancy and applicability of Mathematics in everyday life.

A mathematical model is a mathematical representation of a real-world situation. MM is a process of formulating and improving a mathematical model to represent and solve real-world problems. This process typically comprises of four elements: formulation, solution, interpretation and reflection.

MM is different from the traditional mathematics learnt in school. The starting point of the MM process is the real world problem. The emphasis on mathematical modelling is on the process of finding and solving the problem than the solution itself. Often, because the problems are in the context of real-life, there is a need to simplify the problem by making assumptions, thereby only obtaining an approximate solution to the problem. Mathematical modelling is actually mathematical problem solving in real-life context.

As the school was relocating to a holding site due to upgrading works, we chose our MM task to be on the financial aspects of the transportation of logistics, tasking students to find the cheapest plan. We present our experience and findings in this project.

Keyword: Mathematics Education
Development of a self-directed learning package for the teaching of Electromagnetism

Lim Leck Lee, Kranji Secondary School, Singapore
Science Education

Abstract

In a traditional classroom, the process of explaining concepts to students is tedious and inevitably not all students are able to grasp them completely after the first iteration. This leads to repeated explanation and continual clarification, which requires a large part of teacher-student time during lesson with very little concept creation or application of concepts to different scenarios. There is a lack of discussion among students about why and how the things work or even where the concepts can be applied. Students are very dependent on the teacher for resources and information. They lack the motivation to do self-directed learning or self-exploration of knowledge.

As we want our students to be independent and active learners with collaborative learning during lessons. Flipped Classroom is used to reverse the traditional classroom set up. The students acquire basic content outside class and work together in class on application-oriented activities. As such, the classroom time can be used effectively and collaboratively. The students could do more collaborative learning tasks which will enhance their learning instead of a teacher-centric lesson. This helps to inculcate Self Directed Learning in students and create flexible space in which students could choose when and where they learn. The technology used for the lesson is also appropriate for the 21st century learning.

This Flipped Classroom is used for the topic on ‘Electromagnetism’ - Sec 3 Express Physics, which students usually struggle in understanding the concepts. The topic chosen was the understanding and application of Fleming’s Left Hand Rule (FLHR). Teachers helped students in developing conceptual understanding by determining what materials students should explore on their own. This gave the students the opportunity to learn on their own and assess their own learning. There is also time for discussion of the application of the concepts to the problems given during curriculum time.

Keyword: Science Education
Infusing Rich Texts into the EL-Literature classroom

Lee Wenting, Kranji Secondary School, Singapore
Language and Literacy Education

Abstract

Rich texts are ubiquitous in everyday life. In the age of digital and disruptive technology today, youths are exposed to and often distracted by a variety of multimodal texts. Gone are the days when students are merely exposed to written (linear and static) texts in the real world. However, students may not draw the necessary cognitive and affective associations between the rich texts encountered in their daily lives via advertisements and the Internet, with their learning in the classroom.

We formulated inquiry questions that broadly provided focal points for our PLC journey:
(1) What constitutes rich texts?
(2) How can we engage our students’ learning of rich texts in multimodal ways, stimulate their interest and further provoke their intellectual curiosities?
(3) How do we expose the students to the less explored fields of rich texts in schools?

To help our students become more discerning readers of information, our group decided to introduce various multimodal texts. Musicals are excellent examples of multimodal texts as they incorporate strong visual and auditory elements. We thought that musicals would be a novel way to introduce students to characterisation and thematic issues embedded in texts. The musical component creates a powerful emotive and affective dimension to students’ learning and the visual element also enables the students to be more sensitised to the performers’ nonverbal cues on stage.

We also decided on a rich animation clip without dialogue and with non-diegetic sound, so that students could focus solely on interpreting the images without being distracted by dialogue.

Our goal is to enable the students to be more sensitised to rich texts and to analyse and appreciate the nuances and subtleties in rich texts. We would like the students to be more discerning and critical readers/viewers of rich texts. While increasing the students’ literacy levels with a wider exposure to a variety of rich texts, the use of rich texts in the EL classroom would help to generate responses which are more authentic, original and in-depth.

Keyword: Language and Education
To design student-friendly assessment rubrics to guide students and to level up their background study work for coursework

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Chia Yew Hwee, Kranji Secondary School, Singapore

Abstract

As an important section of national exams for Aesthetic subjects (Art, D&T, FCE and Music), coursework comprises of different components, with one of it being background studies on the given themes. Often, these researches done by students neither display a deep level of thinking nor reflect thorough investigations. As a result, students are unable to achieve good marks for this component. Hence, to help students form a better understanding of the requirements of a good background study, our team of teachers made up from the different Aesthetics unit decided to pool together our experience and design a student-friendly assessment rubric that will be able to guide students on improving their research study.

While our team aims to help students achieve better marks in this component, we also want to encourage students to be self-directed in their learning and to make better and more informed choices that are related to the given theme in their national exams' coursework.

Through the new rubrics, students' learning was scaffolded by the break-down details of each component of the rubrics to aid students' understanding. Additionally, to help enhance students' skills of identifying errors, our team used peer evaluation to get students to reflect on their works and their classmates' works. We also used Thinking Routines such as 'I used to think, now I think' and 'what makes you say that' to get students to reflect on the rubrics.

Eventually, to test out the effectiveness of our rubrics, we conducted a pre and post test to see if students' works improved after switching over from the national rubrics to our rubrics. From the quantitative data, we found that students' marks have increased by 13% on average after the switch. Furthermore, to consolidate more relevant findings due to the small number of students involved per subject, our team also collected qualitative data in the form of open-ended questions. These helped us to gain valuable insights on students' perceptions of our rubrics.

Keyword: Assessment
The promise of assessment as learning: developing learners' critical thinking and creating sustainable self-regulated assessment

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Assessment

Abstract

Formative and summative assessment are the most commonly used and researched among the types of assessment in education. These types of assessment have their purposes and advantages. However, research suggests that what has been less used among teachers is assessment for learning (AaL), or, more broadly, known as self-assessment. In the context of developing school leavers with 21st century competencies such as self-regulation and critical thinking, it is argued that there is now a stronger case for AaL to be championed as a more sustainable and purposeful means of assessment alongside the more common assessment approaches. This paper presents the case that AaL can be an expedient means to develop critical thinking skills and dispositions as well as self-regulation competencies apart from the other advantages which AaL can offer. It proposes employing intellectual standards as the starting basis to develop AaL rubrics across various subjects which could help develop some of the core 21st century competencies desired in school leavers over time.

Keyword: Assessment, Critical and Creative Thinking
The meanings of Multicultural education: Comparing Perspectives from China and Finland

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Fred Dervin, University of Helsinki, Finland
Educational Policies and Practices

Abstract

The process of globalization inevitably brings together representatives of different groups and people. Thus, scholars worldwide are increasingly interested in the phenomenon of multiculturalism and multicultural education. In today’s societies, multicultural education presents different races, genders, ethnic groups and social classes for the various needs of educational development and aims to promote diversity, quality for all and equity/equality. Multicultural education is a hot issue both in China and Finland, under different guises. In this paper, we examine the similarities and differences in the meanings, aims and practices of multicultural education in China and Finland. This paper compares multicultural education in China with Finland at research, policy and practice levels, with the aim of distinguishing and learning from each other and fostering a cross-cultural dialogue between the two systems.

In the Finnish context the multicultural is often symbolized by the arrival of migrants. Since the 1990s, an increasing number of immigrants have moved to Finland and until 2015 there were about 230,000 foreign citizens living permanently in Finland (Statistics Finland, 2015). Thus, Finland is becoming a multicultural society facing the task of promoting multicultural education. In recent years, Finnish education has had a good reputation because of the high quality and the small gaps between different races, ethnic groups and classes according to PISA results. Finland is often presented as a good example of dealing with both quality and equity/equality in the field of education.

In China diversity is from within (minority groups, inward migrants). China is a land of 56 nationalities. In addition to the Han nationality which constitutes approximately 91.51 percent of the total population, there are 55 national minorities with a total population of around one hundred and thirteen million, constituting 8.5 percent of the total population. China has a long history of multicultural education practices in her long history of multilingual, multi-ethnic and diverse cultures. What’s more, multicultural education in China today has greatly promoted national unity and presented new characteristics and challenges under the conditions of social transformation and educational reforms in the 21st century.

Keyword: Comparative Education, Multiculturalism
The Use of ICT to Facilitate Effective Essay Writing in History

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Keith Liew, Fairfield Methodist Secondary School, Singapore
IT in Education

Abstract

Essay writing is a highly individualistic task, one that leaves students thinking in isolation and working on their own. While there is a general tendency to describe the current generation as being vocal and uninhibited, they are often not able to properly verbalize and commit their thoughts on paper. As a result, essays often seemed to end up being a mélange of different and detached pieces of information patched together using a writing template that only leaves the work disorganized and even incongruent in its response. The integration of ICT and pedagogy has allowed for a more effective teaching and learning experience for both the teacher and student. This presentation is an exploratory study on how the ‘G. Suite’ and the ‘Visible Thinking’ approach can be synthesized and used to facilitate effective essay writing in the history classroom. This would enable the students in mixed ‘ability’ classrooms to work on essays in a collaborative manner while at the same time empowering teachers with the ability to track and provide detailed feedback throughout the writing process. Based on a field study of 2 classes of different learner types, this paper seeks to show how this integration of ICT and Pedagogy enables our students to craft cogent, coherent and persuasive arguments in response to a historical question.

Keyword: Critical and Creative Thinking, History
Antiracism education in and out of schools

Amin A Alem, University of Helsinki, Finland

Abstract

The arguments regarding the crisis of multiculturalism and multicultural education is aplenty, yet surprisingly much is not done with regards to what could replace multiculturalism in and out of schools. Antiracism education seems to be the answer to this. This is not new but has remained seemingly unpopular due to its attachment with race and racism which multicultural politics has replaced with culture to make it palatable for the dominant group. What is Antiracism education and how can it be done in and out of schools considering the sensitive nature of racism. These are the core questions I wish to address based on case studies from Finland.

I approach antiracism as both inter-, multi- and transdisciplinary. Antiracism as interdisciplinary means that it employs multiple interrelated branches of knowledge. Antiracism as multidisciplinary means that it cuts across several academic disciplines e.g. politics, education, art, economics etc. Antiracism as transdisciplinary reflects the different disciplines working together to create new conceptual, theoretical, methodological, and translational innovations that integrate and move beyond discipline-specific approaches to address the issue of racism. Antiracism education (as a specific area of discipline) questions hierarchical racialized structures and their consequences. It seeks to understand, unearth and deconstruct the foundation of racism at a macro level as well as seeks ways to oppose and challenge daily racialized practices wherever and whenever. It is not limited to a mere reaction to issues of racism. It sets out to dismantle structures that (re)produce individual cases of racism. How can this be done in and out of school remains a challenge.

Keyword: Critical Theory, Race
Adaptive Learning Online System

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IT in Education

Abstract

An adaptive online learning system on mathematics and physics was developed to prepare students with diverse competency range to be university ready. A good foundation in mathematics and physics is critical to university studies. The use of traditional teaching methods to bridge these gaps present certain limitations like scalability and logistics. The online adaptive learning system was developed to provide personalized learning pathway to address the needs of every student and to help students bridge any gaps in their mathematics content knowledge. The system also provided an insight into the possible factors that influence students’ learning in mathematics through the use of data analytics.

Students were first provided with access to an online system where they had to complete a pre-test. Main topics were then released for them to “learn, attempt and relearn”. It is expected that every student who goes through this adaptive learning system will achieve the required competency level. With the adaptive pathway, the student will be directed to relevant resources (hints/custom-made videos/e-resources) that will guide him through when he hits a roadblock. A similar question on the same concept will then be asked again to the student to ensure he has really understood the concept. When a student successfully grasps a concept, he will be “fast-tracked” to the next concept to stretch their knowledge. In this way, both fast and slow learners will be motivated and benefit from the learning system. Upon completion, students have to do a post-test to complete the learning process.

This study showed that the online adaptive learning system is able to bring a positive impact to students’ learning, with evidence of a huge improvement between scores in pre-test and post-test. Feedback from students showed that their level of confidence in solving mathematics problems have increased significantly. Topics and concepts which students are weak in are highlighted in the system so that further actions could be taken. The system not only helped students to learn mathematics, it also made them aware of where and how to look for resources when they encounter difficulty.

Keyword: Information Technology and Education, Mathematics Education
Practical Work in Science: Are we doing enough for the “thinking behind the doing”?

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Science Education

Abstract

The framework for 21st Century Competencies and Student Outcomes proposes that students must be developed in “critical and inventive thinking” in order to better prepare them for the future. In response, the latest review of the ‘O’ Level Pure Science Practical Syllabi places high importance on the “thinking behind the doing”. This is justifiable based on the work of Gott et al. (2008). According to the researchers, the “thinking behind the doing” refers to the procedural understanding that will inform critical decisions made by students when they are planning experiments, processing data and using data to support conclusions. They propose procedural understanding as consisting of ideas that underpin the overarching concepts of validity and reliability of experimental evidence that students can use to construct decisions at any stage of their experiment. Students with good procedural understanding therefore will be able to carry out any experiment with understanding by tapping on their “toolkit” of ideas about evidence rather than simply follow a routinized procedure that they have learned.

Although procedural understanding is required alongside conceptual understanding for a student to succeed in completing an experiment, it is often downplayed and given scant attention during practical work in the local educational contexts (Shahrin, 2016). Areas of procedural understanding that are particularly underspecified include ideas about taking repeated measurements and identifying experimental errors, and these, therefore, shall be the focus of this presentation.

To support the claim, this study will present evidence from a qualitative research study that uses questionnaires and interviews with fifty-two pre-service teachers. The results show many have difficulties explaining their ideas about taking repeated measurements and identifying experimental errors implying that little attention was actually given to developing these areas of procedural understanding during the participants’ past school experiences. The findings will also suggest that many participants have only developed a shallow understanding of the two areas and often simply relied on their knowledge of laboratory routines to make procedural decisions. In addition to reporting the findings, the presentation will also share classroom ideas on how to teach the two areas.

Keyword: Curriculum Design/Reform, Science Education
Managing Records and Archives in a Hong Kong School: A Case Study

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Educational Policies and Practices

Abstract

Aims:
This study examines the principles and practices in term of functional analysis for managing records at secondary schools in Hong Kong as recommended by the ISO9001 requirement. Set up by the Geneva-based International Organisation for Standardisation, the ISO9001 addresses the requirements that schools, or any other form of organisation intending to meet the standard, must fulfil. Schools in Hong Kong are required to adhere to the education quality assurance (QA) policy, which emphasises a school’s accountability to the wider community and the development of school education in Hong Kong. The policy requires schools to collect data that can be used to report on the effectiveness of school education and to provide documents for scrutiny by government officials. In response to this (QA) policy, schools in Hong Kong have to manage their records effectively. Record management, as one of the administrative principles in schools, ensures that accurate information of all school activities is kept and can facilitate an effective and evidence-based, decision-making process. Identifying taxonomy and management practices for effective documentation in schools can support planning; assist with organising the continuity of improvement plans; and increase reporting and accountability to the public.

Methodology
This study examines the records management model using a case study that focuses on the experience of implementing records management and knowledge management at school. The case study is a secondary school in Hong Kong which has adopted the ISO standard and is implementing knowledge management. The researcher conducted a series of qualitative interviews at a secondary school, where the ISO 9001 certification had been introduced. The study explores how the records were managed and classified.

Findings
The results show that the case school adopted a hybrid top-down and bottom-up approach to record management, to facilitate decision making and managing knowledge. This study offers a taxonomy and management approach to the literature of records management and the practices for promoting and improving records management in Hong Kong.

Key words: Records management, Knowledge management, Functional analysis

Keyword: School Change and Leadership, Secondary Schools
Analyzing the Nature of Feedback in Classrooms in Singapore

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Abstract

This paper examines the nature of teacher feedback in Singapore classrooms. Framed by Hattie and Timperley's model of feedback (2007; Hattie, 2011), it describes how teachers use feedback for students, when, how, for what purposes, and critically analyses issues around the use of feedback. It also considers how teachers’ different constructs of student ability affect their use of feedback, and proposes how Hattie and Timperley’s framework can be further enhanced.

Based on a large-scale, representative, nation-wide project on classroom practices (Hogan, et al 2012), 114 primary and secondary school teachers were interviewed in a semi-structured format around their assessment practices. Responses were coded for feedback use and analysed using Hattie and Timperley's framework, particularly their notions of “Feed Up” (“where am I going?”), “Feed Back (“how am I going?”) and “Feed Forward” (“where to next?”). These were subsequently examined in relation to teachers’ beliefs about the high stakes testing environment in Singapore schools, about student abilities, about instructional practices and innovative pedagogies, using grounded theory and discourse analysis (Freebody, 2003).

The findings suggest that teachers largely use feedback in highly limited ways. The responses related to goals (Feed Up) are predominantly absent and feed forward is very limited. Teachers seem more concerned with providing student feedback on current levels of performance rather than focusing on their understandings or giving feedback to improve performance beyond existing levels; feedback is necessary only when students perform below expectations. Teachers’ perceptions of their students’ abilities also seems to shape how they use feedback.

Implications on the relationship between useful, effective feedback and teacher beliefs about student abilities will be discussed.

The paper concludes with the suggestion that the Hattie and Timperley’s feedback framework can be enhanced through the consideration of two additional components. Firstly, it can include how teacher beliefs mediate the nature and appropriateness of feedback. Secondly, an additional feedback dimension can provide powerful opportunities for student learning – “how did I get here?” or “Feed In” – which is a feedback that allows students to not just reflect metacognitively, but allows teachers to arrive at a better understanding of student abilities.

Keyword: Assessment
Using Adaptive Learning Approach to Improve Primary Students’ Chinese Language Reading Comprehension Abilities

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Soon Hong Lim, Ministry of Education, Singapore
LEE JO KIM, Ministry of Education, Singapore
Tan Siew Chian, Ministry of Education, Singapore
IT in Education

Abstract

This paper presents preliminary findings on the effectiveness of using adaptive learning approach in improving primary level students’ Chinese Language (CL) reading comprehension abilities. Adaptive learning is a personalised, technology-enabled, and data-driven approach that has potential to deepen student engagement with learning materials, customise students’ pathways and permit instructors to use class time in more focused and productive ways (Learning to Adapt, 4). This study is anchored upon a system that has been developed with capabilities to determine individual students’ levels of reading comprehension through an adaptive placement test, and automatically assign graded CL reading materials based on students’ respective reading comprehension levels. CL reading materials in the system were authored by Singapore CL teachers and had been graded by the system, based on difficulty levels of the vocabulary used and length of the passages. Students are expected to progress to higher levels of reading comprehension as they are continually engaged with self-paced adaptive learning. Initial findings with two classes of Primary Three CL students (N = 70) in a typical Singapore school indicate that students reach higher levels of reading comprehension when they are continually engaged with self-paced adaptive learning. Further analysis of pre-post test scores indicates that this approach seems to benefit the class of students with lower pre-test scores more than the class of students with higher pre-test scores. Standardized mean differences based on pre-post test scores for the two classes are 1.09 (large effect size) and 0.71 (medium effect size) respectively. Ceiling effect of pre-post-tests had been deliberately reduced by including comprehension test items from previous Primary Four school exam papers for semesters 1 and 2. Correlation of number of attempts in completing reading comprehension items and latest reading comprehension levels was made, r = 0.80. Meaning to say, the more students used and attempted to complete items in the adaptive reading comprehension online system, the higher the final reading comprehension level as determined by the system. This is in line with the notion that the more students read, the better readers they become.

Keyword: Information Technology and Education, Language and Education
Coercive governance and the possibilities for pedagogic agency

David Hall, University of Manchester, United Kingdom
Educational Policies and Practices

Abstract

This paper seeks to explore the responses of teachers to what is now a well established neo-liberal policy environment in many educational contexts and seeks to capture how such policies are variously accommodated, embraced and contested (Hall and McGinity, 2016) in ways that seek to challenge more established explanations of teacher compliance and resistance. As such it considers the potential for and limitations upon the development of organisational and pedagogic practices that transcend those that have been officially authorised. The discussions of teacher pedagogic agency will seek to take account of and be sensitive to the various ways in which neo-liberal policies have been re-contextualised and re-translated in different educational settings.

The paper is linked to research sponsored by the UK Economic and Social Research Council (RES 000-22-3610) investigating the social practices of school organization in England. It is based upon multiple interviews with over 80 practitioners, observations of significant processes within participating schools, scrutiny of key documents and the deployment of Q methodology (Brown, 1997, McKeown and Thomas, 1988) to enable detailed comparison of the differences/similarities in perception between different educational practitioners.

Central to the paper will be the examination of new modes of governance within the education sector and the simultaneous rise of coercion as means of securing neo-liberally inspired educational change. It will consider some of the contradictions of this policy landscape characterised as 'coercive governance' particularly the coexistence of controlling and coercive policies and the potential for new and continuing policy actors, including teachers, to exercise agency. Some of the technologies of coercive governance, including the appropriation of participatory by instrumental practices, financial sanctions, reductive performance measurement, psychological and social pressures and social /professional ostracism will be considered as part of an exploration of the possibilities for and limits to resistance within this policy environment.

Keyword: Educational Policy/Reform, Identity
Characterising the explanations students produce of phenomenon of Dynamics

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Science Education

Abstract

The ability to produce scientific explanation is a key learning outcome in Singapore physics curricula at the secondary and junior college levels. Anecdotal accounts and literature suggest that students have difficulty in producing an acceptable explanation. While misconceptions may commonly be thought as the cause, the production of a scientific explanation entails more than conceptual understanding. It involves understanding what a scientific explanation is, the purpose of the question sought, the selection of an appropriate model, and the use of representations to mediate thinking and reasoning. This study thus aims to understand the problems students face with constructing explanations.

This study draws upon Yeo and Gilbert's (2014) framework, comprising of function, form and level (of precision, abstractness, complexity, coherence and completeness), to characterise a scientific explanation. Think aloud interviews were conducted with students from four junior colleges in Singapore. This paper examines the explanations produced of Dynamics, a key topic in H2 physics in the physics syllabus. Fifty nine explanations using Newton's laws were collected and transcribed. Analysis involves identifying the explanatory behaviors using a grounded approach, coding of behaviors in all 59 explanations, applying cluster analysis to group students by their behaviors, and factor analysis to group explanatory behaviors.

The factor analysis yielded two factors in the behaviors identified - which are associated with the modeling and processing stages of mathematical modeling suggested by Redish and Kuo (2015). Ten groups of students' explanatory behaviors were found. Qualitative analysis to identify the differences amongst the 10 clusters show that many had problems with the modeling. These problems include missing justification for claims made, not abstracting from the phenomenon, application of an inappropriate model to make sense of the phenomenon, incoherence in applying scientific knowledge, misinterpretation of question and weak attempt. These problems are related to the various aspects of scientific explanation in Yeo and Gilbert's framework. The multifaceted problems present a complex situation that addressing one aspect (e.g., conceptual understanding) might not be sufficient. The presentation will discuss possible future work to address these problems in a comprehensive way.

Keyword: Multiliteracies & Multimodalities, Science Education
Exploring Teachers’ Facilitation of Social and Emotional Learning (SEL) in Kindergarten Classrooms

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Early Childhood Education

Abstract

Social learning promotes skills for interacting with others while emotional learning promotes skills for recognizing and regulating feelings (Epstein, 2009). In shaping foundation for lifelong learning, early education is recognized in equipping children not only with academic knowledge and skills but also with socio-emotional competencies, values, and dispositions (Wall, Litjens and Taguma, 2015). With reference to the Nurturing Early Learners framework, five areas of competencies for social and emotional development were highlighted: (1) Self-awareness and positive self-concept, (2) Self-management, (3) Social awareness, (4) Relationship management, (5) Responsible decision-making (Ministry of Education, 2013). SEL can be supported in the kindergarten classrooms with planned activities which can be challenging for educators to implement due to the daily curricular demands. As an alternative, SEL can be built upon and facilitated through everyday situations during teacher-child or child-child interactions.

This study, conducted within the scope of the Singapore Kindergarten Impact Project (SKIP), qualitatively analyzes six of the 119 classrooms within SKIP’s Kindergarten One classroom observation database. Adopting an interpretive paradigm, two areas were looked into: (1) The general types of interactions in the Kindergarten classrooms that provide opportunities for SEL; (2) Teachers’ facilitation strategies for SEL according to the five areas of social and emotional competencies in the classrooms. Findings indicate that small group activities provided varied opportunities for SEL, particularly during play periods. Teachers in these classrooms adopted some strategies in facilitating SEL to promote the areas of Social awareness and Relationship management. Interestingly, facilitation to promote competencies in Self-awareness and positive self-concept, Self-management and Responsible Decision-making were minor.

The ultimate goal of this presentation is to create awareness in utilizing everyday opportunities to promote SEL in the kindergarten classrooms. It aims to address the gap in literatures on the types of interactions within daily activities and routines which educators may tap on to encourage SEL. This study will also provide insight into existing teachers’ facilitation strategies according to the five areas of competencies in social and emotional development. Finally, this study enriches the thin classroom-based international literature on SEL in the early years.

Keyword: Early Childhood, Qualitative Research
Snap and Reflect! Facilitating reflections using Instagram

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Dr Juliet Choo , Ngee Ann Polytechnic, Singapore  
Tan Yew Kong, Ngee Ann Polytechnic, Singapore  
Ms Jean Ong, Ngee Ann Polytechnic, Singapore  
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Ms Angel Chan , Ngee Ann Polytechnic, Singapore  
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IT in Education

Abstract

Aims
In this study, we explore the effectiveness of using Instagram, a popular social media among youth, as a medium for conducting reflections with polytechnic students for a module with service-learning (S-L).

Methodology
The participants were students (aged 17 to 20) taking the module Behaviour Modification and Intervention in the Diploma in Psychology Studies at Ngee Ann Polytechnic. Reflection questions were posed to students after each of their four S-L sessions at an after-school care centre. The data was collected from the Year 2 cohort in 2015 (73 students) and in 2016 (75 students). Additionally, students’ views on using Instagram for reflections were gathered through focus group discussions at the end of the semester. The qualitative data was analysed thematically.

Findings
Students found Instagram convenient to use as they carry their smartphones with them all the time. Student engagement is enhanced as they could view their classmates’ posts and further comment on them. Yet, what is most critical in enhancing students’ learning is the reflection questions to help them bridge service and course contents. This is evident through comparing students’ responses between the two cohorts. General questions such as “Reflect on your S-L experience today” were posed to the 2015 cohort and yielded mostly emotion-based responses like “We all felt empty and were already missing the students..... Sighs”. When reflection questions were oriented to the service outcome and personal growth like, “Describe an incident during your service-learning experience that requires you to use what you’ve learned in class. What do you think you have done well for today’s sessions?”, students’ responses were richer: ‘Personally, opening up more and being more willing to converse with the kids is something I have done well as I haven't always liked dealing with children”; “Through the two weeks, I've applied theories that were learnt in behaviour modification module such as modelling, and use of reinforcements to change clients’ behaviour.”

Conclusion
Instagram can be an appealing and collaborative platform to facilitate students’ learning via reflections. That facilitation needs to be in the form of critical reflection questions that target learning outcomes, and personal growth.

Keyword: Curriculum in Classroom, Information Technology and Education


Abstract

Innovation diffusion is not simply a ‘roll out’ of products and artefacts. Situated professional development (PD) complements and drives innovation diffusion. Literature on situated PD has so far focused on understanding core features of teacher learning structures and processes without informing us about how situated PD and practitioners’ roles evolve within innovation contexts. This study contributes to new knowledge by understanding relevant structures and processes for teacher learning as well as how teachers’ and researchers’ roles progress as the innovation grows across classroom, school, and beyond schools in Singapore. The study describes a case study to unpack the evolution of situated PD for one school-based innovation. The innovation is purposively selected because it has demonstrated successes in developing teacher champions and growing the innovation from within school to across schools in the same cluster. Documents that described the innovation from 2008-2016 as well as interviews with researchers and teachers are analysed using qualitative content analysis to get multi-dimensional understandings of their roles in the situated PD and innovation diffusion. Findings show that core principles of the innovation have focused on student-centred learning with particular emphasis on collaborative learning, self-directed learning, and formative assessment regardless of expansion of contexts. The situated PD structure has evolved from researchers-dependent model to a more teachers-driven model where teacher champions take ownership to drive innovation diffusion and capacity building. In the within school context, situated PD processes are embodied in teachers’ teaching cycles by co-designing, implementing, and refining the curriculum with researchers as facilitators whereas in the across schools context, PD processes evolved differently based on each school’s conditions. Discussions are made to highlight the positive and negative PD conditions which may influence the sustainability of innovation diffusion. Implications are drawn to highlight the key tenets of situated PD that drive innovation diffusion.

Keyword: Professional Community, Professional Development
Multimodal composition in the school classroom? Trainee teachers’ views after completing a multimodal assignment themselves

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Language and Literacy Education

Abstract

Research is clear that “literacy” in the 21st century must take into account the increasing influx of technology and multimodality in our society (e.g. Jewitt, 2008). Many benefits have been identified for pupils who are afforded the opportunity to use technology to compose multimodally in school. These include higher levels of engagement because of the alignment of in-class pedagogies with pupils’ lived experiences out of school, the development of crucial digital, information, and critical literacies needed in the 21st century, and the opportunity for students of different types to showcase their learning through different modes. Despite the benefits, however, a significant number of teachers seem reluctant to introduce multimodal composition in their classrooms. One reason for this appears to be their own unfamiliarity with what multimodal composition entails. Understandably, it is daunting to try something with a class of students that one has never experienced oneself.

It was partly with this in mind that I designed a multimodal assignment for the trainee teachers who were enrolled in my undergraduate linguistics class. Wanting these future English teachers to experience the multimodal composing process themselves and to consider what it means to prepare today’s pupils to be “literate”, I asked them to produce an e-poster consolidating our course content, with options to include visuals, and hyperlinked audio and video files. While my students were all ostensibly part of the “millennial generation … [that] thinks of messages and meanings multimodally” (Miller & McVee, 2012, p. 2), few had produced a multimodal text for assessment purposes. In this presentation, I report on the end-of-semester survey that I conducted to elicit my students’ views on the challenges they faced completing the task, and whether the experience made them more or less likely to employ multimodal compositions in their classes in future. The findings revealed, interestingly, that some of my “millennial” students found the technological aspect of the assignment to be tedious and challenging. There were, however, many positive responses about the experience, and more than 50% of my students indicated that the experience made them “more likely” to employ multimodal composing in their future teaching.

Keyword: 21st Century Competencies, Literacy
SMILLA Framework: Bridging the seams among the contexts for second language learning with social media

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Chai Ching Sing, National Institute Of Education, Singapore
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IT in Education

Abstract

This conceptual paper aims to explicate, in ecological and ‘seamless’ perspectives of language learning, a model that applies social media in fostering contextualised and connected second language or foreign language learning communities. The emerging approach of seamless language learning emphasises bridging the multiple forms of language learning and application activities across different learning spaces/contexts. The model seeks to promote social interactions with social media about the learners' day-to-day life in order to foster meaning making and idea sharing with the target language. In this paper, we will first discuss the key features of the language learning approach that we envisage, namely, authenticity, contextualisation and socialization, and relate it to the communicative approach of language learning. We will then explicate how the notion of seamless language learning could inform learning designers and learners in synergising all these desired characteristics of language learning together to facilitate a holistic language learning journey for every learner. Eventually, we will propose the SMILLA (Social Media as Language Learning Artefacts) framework to elaborate a holistic strategy of appropriating social media to mediate such learning processes. Specifically, SMILLA uses microblogs with reply feature (such as status updates on Facebook, tweets on Twitter, etc.) to facilitate activities where language learning and language use co-occur. We distinguish three types of social media (student artefacts), namely, socially-authentic artefacts, learning-intended artefacts, and interventional artefacts, and elucidate their individual roles and how the interplay of such artefacts would facilitate such seamless learning activities. A case of seamless language learning environment design will be described to illustrate the practicality of the SMILLA Framework.

Keyword: Curriculum & Pedagogical Innovation, Media
Making learning visible to promote change in pedagogical practice

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Curriculum Development

Abstract

In 2013, NAPLAN data suggested a gradual decline in writing ability, particularly in Year 9 and Higher School Certificate results demonstrated a similar decline in students accessing the top band, where the capacity for students to represent deep understanding, critical thinking and transference of skills are essential. Considering possible interventions, an investigation into the learning landscape of Oakhill College began with a small team. The team's research highlighted high levels of fear and resistance to the integration of technology amongst staff, increasing student disengagement with material they perceived as irrelevant, and increasing student 'passivity' in a landscape that was encouraging highly teacher-centred instruction. Additionally, there was an identified level of inconsistency in the learning design behind the curriculum for students. Subsequently, a series of recommendations was offered to the College leadership, which culminated in a pilot program known as REAL (Relevant, Engaged, Active Learning), whereby the entire Year 7 curriculum was placed online in a public Google site, visible to all students, teachers, and parents, in some cases in a lesson by lesson format. A pedagogical shift towards increased student-centred learning was also actively promoted and supported through the professional development of the Year 7 teaching cohort. Lessons in this year group were observed and breakdowns of timing and types of learning activity were recorded. This pilot program led to an Association of Independent Schools (AIS) NSW funded research project in 2015/2016. Studying the impact of this transparent, declared curriculum, a more collaborative environment for staff, the public nature of a declared curriculum having forced open the once-closed doors of our classrooms, requiring and enabling empowered dialogue amongst staff, and leading to a more cohesive, considered curriculum. Data on the impact for students is encouraging, with the first demonstration of growth in writing results in a cohort in six years. We believe this application of a transparent curriculum has considerable implications for all schools looking to break down the silos of staffrooms and reconstruct practice for a modernised, more enabled learning community using digital tools for contextually relevant learning management system.

Keyword: Classroom Research, Curriculum & Pedagogical Innovation
The Use of Theory of Mind (ToM) Teaching Programme for Students

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Special Needs Education

Abstract

The teaching package aims to provide teachers with learning and teaching resources to enhance students with ASD social and communicative skills. Our team has developed four “Theory of Mind (ToM)” teaching packages for teachers of students with autism spectrum disorder (ASD) since 2000. The most current teaching package is designed to help children with ASD to differentiate and manage their own emotions, as well as to read other people’s emotions on an interactive computer-based mode. The design is based on the idea of ‘mind-reading’ and the exercises are arranged in different stages, from the recognition of a range of emotions to the reaction to encountered emotions. The teaching package consists of 5 basic games and 95 animation stories in 4 kinds of environments, i.e., domestic, school, community and leisure. In this project, we have designed 5 follow-up activities in each story to analyze the social behavior of the main and supporting characters. The most significant follow-up activity is the use of ‘Think Grid’ to identify the most appropriate solution to the encountered social or communicative problems. Students are required to opt for one of the four choices, i.e., “I win you win”; “I win, you lose”; “I lose, you win” and “I lose, you lose”. This is useful for students to learn to react to the encountered emotions in an acceptable manner. Teachers’ feedback about the effectiveness of the teaching package was positive.

Keyword: Interventions, Special Education
"I Decided to Change... I Started to Focus...": Positive Turning Points of Academically At-risk Adolescents in Singapore

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Imelda S. Caleon, National Institute Of Education, Singapore
Others

Abstract

This study is part of a longitudinal study which aimed to examine the profiles of academically at-risk adolescents and identify the salient factors that contribute to adaptive academic outcomes. The present investigation was an attempt to gain insights into the positive turning points in the lives of these adolescents who were at risk of tracking continued poor academic trajectory but defied the odds and turned around their academic performance. A sample of 396 high school students in Singapore was identified as being at high-risk of poor academic trajectory at the end of Secondary One. Of those who were observed to have turned their academic performance around by the end of Secondary three, eleven students were, through semi-structured interviews, identified as having had experienced a positive turning point. The results of a thematic analysis of the interview data point to two types of turning points that were aligned with the self-determination theory – a satisfaction of need for relatedness and competence. We found a third type of turning point that related to the desire to preserve social identity and fulfil social obligations. The third type of turning point is seen to be reflective of the deep influence of the Confucian emphasis on the importance of education in the society where the study was conducted. Taken together, these results suggest that experiences facilitating positive turning points are indeed varied, with both universal as well as culture-specific elements.

The findings from the study have significant educational implications for promoting educational resilience.

Keyword: At-Risk Students
Professional Conversation in the PLC: A literature review

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Teacher Quality, Teacher Learning and Development

Abstract

Effective Professional Learning Community (PLC) builds the culture to improve pedagogical practice continuously, which benefits student and teacher learning. In Singapore, the implementation of PLC aims to promote collaborative learning among teachers that improve pedagogical practice, which in turn enhances teacher professionalism. Professional conversation is a key feature of PLC. Such conversations require teachers to reflect and examine their current practice. The reflective conversations in PLC develops valuable habits of mind that enables practitioners to question their own practice, developing a sense of problematisation, and to inquire more; hence promoting pedagogical agility. While there are concerted efforts in building collaborative learning, studies on PLC in Singapore underscore the barriers in promoting critical voices in the professional conversation. In view of this pertinent issue, a systematic literature review was conducted to seek conceptual clarity and depth in understanding the concept of reflective conversation. Using specific keywords such as professional learning community, professional conversation, reflective conversation, and reflective practitioner in the databases, relevant articles are identified and analysed systematically. Our analysis is guided by the five antecedents of professional conversations: (1) process – protocols for conversations such as lesson study and action research; (2) knowledge – appropriating knowledge into practice; (3) culture – collaborative culture; (4) relationships – trust and respect to one another; and (5) resources – material artefacts and time to meet. This paper aims to explicate the key concepts of reflective professional dialogue and how reflective professional conversation could be characterised in the Singapore context. This paper addresses the theory-practice gaps emerged in the culture due to the hierarchical structure in schools, and the opportunities costs the system has to pay if these gaps remain in the practice of PLC.

Keywords: Professional Learning Community; Professional Conversation; Reflective Conversation; Reflective Practitioner

Keyword: Collaboration/Collaborative Learning, Professional Community
ATTITUDES TOWARDS ENGLISH-MALAY BILINGUALISM AMONG STUDENTS AND YOUNG WORKING ADULTS

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Language and Literacy Education

Abstract

Singapore is a natural setting for the study of multilingualism given the multilingual composition of its residents, and the state’s language-in-education policy that places a premium on bilingualism (English and a mother tongue). There have been studies on the attitudes of Singaporeans towards English and the mother tongue languages, their differential proficiency in, and affiliation towards, the different languages as well as issues of language maintenance and shift. Attitudinal studies have also begun to investigate students’ perception of their bilingual identity but the focus has been on English-Chinese bilingual. Little is known about the attitude towards English-Malay bilingualism and how this affects learning of the two languages.

This paper surveys the attitudes of 205 English-Malay bilinguals, stratified along gender, socio-economic status, dominant home language and self-rated language proficiency, towards the perceived benefits and advantages associated with English-Malay bilingualism. It also examines their identity as English-Malay bilinguals. The survey employs a 6-point Likert scale online questionnaire comprising questions related to the communicative, cognitive, pragmatic, cultural and religious benefits of English-Malay bilingualism. Follow-up interviews are carried out among willing participants to draw out a more detailed response.

Initial findings suggest that Malay students and young working adults generally have positive attitudes towards English-Malay bilingualism and their identity - regardless of gender, socio-economic status and dominant home language. Despite their positive attitude towards English-Malay bilingualism, Malay students and young adults consider being English-Malay bilinguals as less useful than being English-Chinese bilinguals.

This paper contributes to our understanding of the impact that the language-in-education policy has on English-Malay bilinguals and how their perception of Malay vis-à-vis the other mother tongue languages shapes their attitude towards learning of the languages and their identity.

Keyword: Bilingual/Bicultural Education, Identity
Abstract

Home may be the very first learning environment of children where parents or caregivers provide for opportunities and act as role models influencing children’s learning interest (Shaffer & Kipp 2013). Parental involvement in children’s education is recognized as an integral factor in achieving success at school (Hattie 2009; Hornby & Lafaele 2011). More specifically, the home literacy environment (HLE) was found to relate with and in some studies predict children’s oral abilities, phonological sensitivity and print awareness (e.g. Anthony, William & Anthony, 2012; Scheele, Leseman & Mayo, 2010). We examined (1) the structure of HLE in the Singapore context, to find out if its components are similar to that found in other settings/countries (e.g., Farver, Xu, Eppe & Lonigan, 2006; Frijters Barron & Brunello, 2000); and (2) whether these components may relate to and predict children’s language and literacy abilities. As part of the ‘Singapore Kindergarten Impact Project’ (SKIP), an ongoing longitudinal study, data were collected from 1098 families through a questionnaire where parents responded to questions about HLE, including parents’ literacy habits, parents’ literacy involvement and child’s interests. First, using confirmatory and exploratory factor analysis (CFA, EFA) we found that HLE components for our sample differed from that reported in international literature. Similar to previous studies, three main factors (parents’ literacy habits, parents’ literacy involvement and child’s interests) accounted for variation in HLE. What differed were the patterns of activities that contributed to the three HLE factors. Secondly, using correlational and regression analyses, we found that the three HLE factors moderately relate to one another in addition to being weakly related to children’s oral abilities, phonological sensitivity and print awareness. Our findings also indicated that parent’s literacy habits and parent’s literacy involvement both strongly predict children’s literacy interest. At the same time, children’s literacy interest significantly predicted children’s oral abilities, phonological sensitivity and print awareness. We conclude that as parents’ literacy habits significantly predict parents’ literacy involvement in home literacy activities, both factors are important in contributing to child’s literacy interest which ultimately influence child’s language and literacy outcomes.

Keyword: Early Childhood, Family/Home Education
Abstract

Singapore is a natural setting for the study of multilingualism given the multilingual composition of its residents, and the state’s language-in-education policy that places a premium on bilingualism. There have been studies on the attitudes of Singaporeans towards specific languages and their language proficiency as well as issues of language maintenance and shift. Attitudinal studies have also begun to investigate students’ perception of their bilingual identity and their affiliation towards different languages. However, little is known on the attitude towards trilingualism, particularly English-Malay-Arabic trilingualism and how this affects learning of the different languages.

The madrasah is a unique setup in Singapore. They are private schools that offer Islamic religious education alongside modern knowledge such as the Humanities and the Sciences. In contrast to the national schools where students learn two compulsory languages (English and a mother tongue), students in the madrasah learn three languages: English, the main medium of instruction; Malay, the students’ mother tongue; and Arabic, the language of the Qur’an.

This paper examines how students and graduates of the Madrasah perceive the benefits and disadvantages of English-Malay-Arabic trilingualism and their identity as English-Malay-Arabic trilingual. The sample comprises 80 students from four madrasahs, 60 madrasah graduates (studying in polytechnics and universities) and 60 working adults under the age of 40, stratified along gender, socio-economic status, dominant home language and self-rated language proficiency. The survey employs a 6-point Likert scale online questionnaire comprising questions related to the communicative, cognitive, pragmatic, cultural and religious benefits of trilingualism. Follow-up interviews are carried out among willing participants to draw out more qualitative responses. At the point of submission of this abstract, data is being collected and analysed.

The findings will contribute to our understanding of the impact the language-in-education policy of Singapore and that of the madrasah has on English-Malay-Arabic trilinguals and how their perception of the benefits of the three languages shapes their attitude towards learning of the languages and their identity.

Keyword: Bilingual/Bicultural Education, Identity
Exploring Teachers’ Use of Inferential Questions in Preschool Classrooms

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Early Childhood Education

Abstract

Questioning represents one of the most commonly used discourse forms in the preschool classroom. Existing literature that has examined preschool teachers’ questions focuses predominately on the question form (e.g., open-ended or closed-ended questions), highlighting that teachers tend to ask closed-ended, literal and direct knowledge questions. Moreover, little research has studied how preschool teachers use inferential questions in the naturalistic context of their classrooms. Specifically, researchers have suggested that asking inferential questions can improve children’s learning rather than control their knowledge and language capacity. The intent of this study is to contribute to the understanding of preschool teachers’ use of inferential questions in naturalistic settings and how these may be associated with child responses. Taking the Nurturing Early Learners (NEL) Framework as a reference, the aims were fourfold: (1) to explore the frequency with which Singapore preschool teachers use inferential questions during English language lessons; (2) to determine the relations between teachers’ use of literal and inferential questions; (3) to differentiate the use of inferential questions in whole group and small-group activities; (4) to determine the relations between the frequency and proportion of teachers’ use of inferential questions and children’s language growth from K1 to K2.

A subset of teachers participating in the Singapore Kindergarten Impact Project (SKIP), an ongoing longitudinal study, were selected for the analysis. Video sessions were evaluated from teachers within the top 20% of ‘Quality of Feedback’ scores on the Classroom Assessment Scoring System (CLASS). The dataset comprised 28 teachers with 198 participating children in their classrooms.

Findings indicated that teachers asked more inferential questions during whole group than during small-group activities. This finding suggests that preschool teachers need to ask more inferential questions geared toward the small-group activities. The findings of this study exhibited how exemplary teachers asked inferential questions in classroom activities. The ultimate aim of this study is to provide insights that might inspire preschool teachers to strategically utilize questions in their language lessons. Moreover, this study contributes to the limited classroom-based international literature on instructional strategies.

Keyword: Language and Education, Preschool
Beyond plurilingualism in Education? Exploring the potential influence of robotics and education technology in translanguageing

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Teacher Quality, Teacher Learning and Development

Abstract

This paper presents an exploratory study that examines the role of educational technology, the use of robots and teachers’ professional development as a means of applying critically and reflexively translanguageing in teaching and learning. The context of the study is the Nordic country of Finland, which is increasingly investing in digital technologies and robotics in education.

Bilingualism and plurilingual methods have been at the center of the European Union educational policies for over 20 years now. Furthermore the new national curriculum for basic education in Finland emphasizes plurilingualism and multiliteracy (FNCBE, 2016). However the vast majority of approaches in Finland have focused on the foreign languages taught at school and thus not necessarily accommodating the use of home languages (often minority or migrant languages).

By translanguageing methods we refer to dynamic processes whereby multilingual language users mediate complex social, emotional and cognitive activities through the strategic use of multiple semiotic resources to act, to know and to be (Garcia & Li Wei, 2014). This type of approach requires parent involvement in promoting the home language use while learning the language of the school.

The data consist of observations and testing the use of translanguageing methods, teachers’ professional development course outcomes and teachers’ attitude surveys. The results show that despite the fact that home language use is recognized as important in learning, it is not properly applied in schools. In addition, teaching Finnish as a second language is promoted, and lack of Finnish language is considered as a deficit, instead of recognizing the language diversities of students and their families. Applying translanguageing requires new type of pedagogies to involve parents and home languages in teaching. During the next phase the use of robots in teachers’ professional development for reflecting on the importance of translanguageing is tested in collaboration with students and parents.

Keywords: Translanguageing, Teachers professional development, Education technology, Robotics, Participatory research methods

Keyword: Curriculum & Pedagogical Innovation, Professional Development
Navigating the Technicality of Mathematical Language in Teaching

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Mathematics Education

Abstract

Recent research has suggested that different disciplines have unique and specific literacy practices, and “disciplinary literacy” thus encompasses not merely the acquisition of specialist content knowledge but also ways of using disciplinary discourse appropriately. Within the discipline of Mathematics, mastering the technical and multi-semiotic nature of mathematical “language” is a defining characteristic of disciplinary literacy, and Mathematics teachers in particular are in the challenging position of needing to be familiar with mathematical discourse themselves, while also modelling the technical discourse and making mathematical content knowledge accessible to their students. While experienced Mathematics teachers may be adept at juggling these discourse demands, it is possible that student-teachers who are themselves still working towards their first degree in Mathematics may find this difficult.

In this presentation, we report on a study that we conducted to investigate the emerging disciplinary literacy of a group of Mathematics student-teachers studying in the National Institute of Education, Singapore. The data included four videos, each featuring a student-teacher conducting a short simulated lesson on a Secondary School mathematical concept as part of their teaching methodology class. These videos were transcribed and analysed for potentially salient ways in which the student-teachers’ disciplinary literacy was or was not being demonstrated. One aspect of language use that emerged from the analysis as a possible indicator of the student-teachers’ disciplinary competence was the degree of technicality exhibited by student-teachers in their classroom talk. It was observed that while they were generally technically accurate in their use of the mathematical register, they occasionally made unwise discourse choices. For instance, as they reformulated technical terms into everyday language, some reformulations were helpful in making mathematical terms more accessible to students, while others were problematic as they had the potential to create misconceptions about certain mathematical concepts. These findings suggest the need for a strong focus on language awareness as part of the disciplinary training of Mathematics student-teachers, and the need, in particular, for them to learn how to make optimal choices regarding using and reformulating the technical language of Mathematics.

Keyword: Literacy, Mathematics Education
Sources of teachers’ self-efficacy in formative assessment: A qualitative study of Secondary School teachers in Singapore

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Teacher Quality, Teacher Learning and Development

Abstract

The use of formative assessment in the classroom is an emerging trend. Formative assessment is becoming increasingly important because of the information it is able to provide to teachers to modify their teaching to meet students’ needs. However, the successful implementation of formative assessment in the classroom depends very much on the teachers’ ability to implement it well. Self-efficacy beliefs come into play as they describe the teacher’s cognitive perceptions of competence in formative assessment. The strength of the teacher’s conviction in his/her own ability to affect the desired outcome will influence their will to cope with given situations. Self-efficacy is formed through a long process of selection and reflective interpretation of enactive, vicarious, persuasive and physiological events (Bandura, 1997).

The aim of this study is to investigate the sources of self-efficacy in formative assessment for teachers and their relative importance. This study used a qualitative approach to examine these sources of self-efficacy. Interviews were carried out across subject domains with eight full-time teachers of various backgrounds from different Secondary schools in Singapore. Results show that the teachers relied heavily on mastery experiences as their most influential source of self-efficacy, followed closely by vicarious experiences. On the other hand, social persuasions and physiological states were not as impactful. Implications for schools and staff development in the area of formative assessment are discussed in the light of these findings.

Keyword: Assessment, Teacher Education/Development
The Value of Process Drama in the Chinese Language Classroom

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Language and Literacy Education

Abstract

The Mother Tongue education fraternity has been making concerted efforts to make teaching and learning of the Mother Tongue languages interesting and effective, through periodic curriculum reviews and suitable pedagogical approaches. As trends reveal a declining use of Mother Tongue as a home language, which has become more apparent in recent years, it remains a mindful challenge for Mother Tongue educators to continue developing engaging and effective lessons despite the trends.

This study features Process Drama as a pedagogical approach with its own niche, and aims to investigate the mechanisms, functions and characteristics revolving around Process Drama, and how it impacts on the teaching and learning of CL.

This is a single-case qualitative study involving 2 classes of Sec 2 CL Express students. Multiple sources of evidence were collected for triangulation purposes, including participant observations of class lessons in videos, field notes, semi-structured interviews with students, students’ written work with reflections, and students’ survey.

Process Drama constructs authentic settings for the active use of language, and creates a learning environment which focuses on interaction, participation, spontaneity and creativity. It involves the use of the multi-sensory and psychomotor domains as catalysts in the course of language learning.

Findings from this study have shown that Process Drama does provide a comprehensive learning space to develop the integrated language skills in students. Through make-believe drama worlds with authentic settings, Process Drama has offered multi-dimensional interactions between teachers and students, both in-role and out-of-role. It is observed that students have developed affectively and cognitively through in-depth studies of lesson topics. The active participation of students during Process Drama lessons have enabled them to construct their learning, relate their life experiences with the learning settings of drama, and developed their sense of empathy.

While the findings from the study have shown the different affordances which Process Drama is able to offer in the Chinese Language learning, there is room for further development of Process Drama as a pedagogical approach to be actively engaged in the Chinese Language classrooms. This can be explored in further studies.

Keyword: Affective Education, Language and Education
Abstract

The Nanyang Girls' High School Lower Secondary Mathematics Curriculum aims to use concept based teaching and learning to enable students to see connection between mathematical concepts and across disciplines through macro-concepts. To evaluate the effectiveness of using the concept-based approach to teaching and learning, a classroom research was conducted. Before the introduction of concept based teaching, students were observed to be strong in procedural skills. We also noted that they had difficulty answering questions which require them to apply their learning in unfamiliar contexts. They also had difficulties with questions which require them to apply their understanding of the concept of the topic.

To develop deeper understanding of the subject matter, we incorporated concept-based teaching and learning. Macro-concepts were identified for every chapter, so as to help students see the connection between mathematics and other disciplines. In-house lesson notes were designed to incorporate inquiry-based activities. Students have opportunity to construct knowledge and not be mere recipients of knowledge. There is an effort to design and include conceptual questions. Time was also set aside in the classroom for teachers and students to engage in rich discussion of the conceptual questions. Students also have opportunities to develop note-taking skills, where they consolidate key learning points. At suitable junctures, students also reflect on their learning points and make meaningful connections.

After the implementation of concept based teaching and learning, classroom observations were made. We observed that students demonstrated higher engagement and motivation when given the opportunities to participate in class discussion involving conceptual questions. A quiz was also conducted to evaluate the effectiveness of the use of concept based teaching. Results of the quiz also further support that students have develop a deeper understanding of the subject matter.

Keyword: Critical and Creative Thinking, Curriculum in Classroom
Empowering individual well-being through Home Economics education

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Curriculum Development

Abstract

Empowering individual well-being through Home Economics education

Home Economics education has become microscopic in its curricula emphasis, focusing mainly on technical and factual knowledge (Gale, 1991). System of actions regarding communication of values within the family and society as well as the liberation of individuals, families and society from exploitative social forces, appear to have lost an explicit foothold in most school’s curricula for Home Economics Education. This could cripple the discipline’s mission to effectively facilitate the maturation of the individual’s ego identity, which, according to Brown (1980), is paramount to building a person’s capability for achieving personal happiness and their ability to contribute toward the happiness of others. The idea of happiness here as proposed by Brown holds a strong synonymy with positive psychology’s current definition of well-being, put forward by Seligman (2010) - which illustrates a more in-depth and encompassing perspective of happiness.

There is a synergistic connection between sustainable education and Seligman’s concept of individual to collective well-being. These align seamlessly with the philosophy and body of knowledge upheld by Home Economics, and thus presents the discipline as an opportune platform upon which these conceptual frameworks could be mounted. However minimal research has been done to see if schools maximise the delivery of the program to achieve this end.

This paper will examine the evolution of the Singapore Home Economics syllabus over the years and the impact it has on student perception regarding the subject’s role in the area of educating for sustainable living and well-being. Changes made to the curricula over the years were implemented with the intention to equip students with the necessary skills and knowledge that would enable effective living, moving toward and for the 21st century. By examining the implementation impact of Singapore’s Home Economics curricula, it would provide the fraternity with a sample insight as to how efficaciously Home Economics education today could be in fulfilling the discipline’s mission of empowering individuals to experience, create and contribute toward the well-being for self and the community.

Keyword: Curriculum in Classroom, Secondary Schools
Does the Big-Fish-Little-Pond-Effect exist in the computer-based assessment? : PISA 2012 Korean data

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Cognition, Motivation and Learning

Abstract

Based on the previous study (Kim & Ham, 2014), which confirmed the negative effect of the school average ability on students’ individual self-concept(i.e. the Big-Fish-Little-Pond Effect, BFLPE) using PISA 2012 paper-and-pencil assessment results, the purpose of this study is to investigate the existence of BFLPE in computer based assessment. Based on PISA 2012 data set which was composed 1,443 students aged 15 at 134 secondary schools for computer-based mathematical assessment, we employed two level hierarchical linear model. First, in the self - concept of mathematics, the proportion of between school variance in total dispersion is as small as 6%. Second, the assumption that the main individual and school characteristics are the same, the higher the school average achievement, the lower the self-concept of mathematics, which supports that the BFLPE existed for both assessment. This implies that the affective characteristics such as the self-concept of mathematics formed over a long period of time are influenced by the reference group, and that this phenomenon exists regardless of the type of assessment. Our results support the computer-bases assessments involve similar social comparison as traditional paper-and-pencil tests. Third, there were school type, educational computer for students, parent counseling participation, class atmosphere, and belonging sense of school, which had significant influence on self-concept of mathematics.

Keyword: Assessment
Developing 21st Century Dispositions through Peer-Directed Sectionals: A Case Study of a High Performing Primary School Band

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Visual and Performing Arts

Abstract

Over the past decade, educational initiatives, policies and reforms have placed increasing emphasis on “21st Century Competencies” (21CC) such as creativity, critical thinking, communication and collaboration (Voogt & Roblin, 2012). These skills are of crucial importance given the increasingly globalized and fast changing world in which we live (Trilling & Fadel, 2009). In line with this movement around the world, the Singapore Ministry of Education stresses the development of 21CC through performing arts co-curricular activities such as the school band. More specifically, the Handbook for the Co-Curriculum provides guidelines and ideas on the creation of “authentic opportunities” for students to develop 21CC (Ministry of Education, 2014, p. 16).

This paper reports findings from an on-going funded study on 21CC and the school band. In particular, it examines how peer-directed sectionals facilitated the development of 21CC among 70 participants from a high performing Primary School Band in Singapore. The research questions were: (a) How did peer-directed sectionals facilitate the development of 21CC? (b) What were some of the challenges to developing 21CC through peer-directed sectionals? Data were collected via fieldwork using ethnographic research techniques, and included field notes from observations over one school semester, material artefacts, audio and video recordings, and focus group discussions with students. Data were coded using the MOE 21CC framework and analyzed for emergent themes. Findings indicated that peer-directed sectionals were useful avenues to develop 21CC; however, there were also some notable challenges. Implications for teaching using peer-directed sectionals and policy curriculum development for the nurturance of 21CC will be offered in light of the findings.

Keyword: 21st Century Competencies, Arts & Music Education
Purpose and school experiences among adolescents in Singapore

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Abstract

At a time when school reforms in many educational systems are driven by performance outcomes, some scholars argue that we should be asking bigger and more fundamental questions. What are schools doing to help students use the knowledge and skills they learn in school in their own lives and aspirations? This study seeks to find out the purpose behind why schooling remains relevant and why students should care about what they learn. This study is one of the first studies in Singapore to find out from adolescents the purposes that underlie their learning, school and life experiences.

Purpose is defined as a long-lasting intention to accomplish something that is meaningful not only to self but to the world beyond self (Damon, 2008). All young people are capable of discovering life purposes, and purpose is positively related to life satisfaction or well-being (e.g., Damon & Brosnan, 2009).

This study investigates several urgent questions concerning whether adolescents in Singapore schools have positive purposes to commit themselves to, what the nature of adolescent purposes might be that inspire them, how adolescents have developed such purposes, and what schools can do to help more students find purpose in life. Questionnaires examining youth purpose (Bronk & Finch, 2010), social support (Malecki & Demaray, 2002) and life satisfaction (Diener, Emmons, Larsen, & Griffin, 1985) were administered to 577 adolescents in Secondary 3 and 4 in two schools in Singapore. Clinical interviews (Ginsburg, 1997) were conducted with 28 individual students (with high or low scores on at least one survey). Interview questions were drawn in part from Damon’s study (2008); interviews were audio-recorded, transcribed and coded for themes. Cluster analysis was conducted on the survey data.

Findings showed four purpose clusters: Self- and Other-focused, Self-focused, Other-focused and No orientation. The purpose groups differed on life satisfaction: Self- and Other-focused was highest, followed by Self-focused and Other-focused; the No orientation group was lowest. Students would like teachers to talk to them about their learning experiences. Students also highlighted that accountability measures in school-based community service projects detracted from deeper learning goals. We discuss implications for schools and policy-makers.

Keyword: Adolescence, Teacher Education/Development
Abstract

Several theoretical frameworks support the positive relationship between a discussion-based approach and student learning. In fact, numerous research papers demonstrate how classroom discussion promotes cognitive gains in complex reasoning, integrated thinking and decision-making.

However, promoting productive discussions can be difficult for even the most experienced teachers. Often, discussion in the classroom falls into all-too-familiar patterns: silences, exclusions, and coercive or co-opting elements in dialogue, which challenge the ideal concept of discussions as something open, neutral, and inviting to all.

Despite Singapore’s highly successful school system, one educational expert observed that classroom practices “have continued to drive teachers to teach in ways that prioritise coverage of the curriculum, knowledge transmission and teaching to the test over the quality of learning” (Hogan, 2014). Even as student talk is considered a plausible vehicle to achieve 21st Century competencies such as effective communication and active citizenry (Teo, 2014), classroom talk continues to be dominated by the teacher and extended discussion is avoided (Teo, 2016).

The problem, we posit, resides in how discussion is merely seen as a tool. Without a fuller understanding of the tenets and principles undergirding discussion design and implementation, the classroom discussion experience lacks a coherent design that caters to specific learning outcomes for the learner.

This action research incorporates an on-going study in a spread of schools in Singapore with students from the Normal(Academic), Express streams and school-based Gifted Programme classes, as well as Junior College. It is geared towards understanding how a discussion approach that is designed and implemented with the philosophy and context of discussions in mind can help to create an engaged student who values the inclusive element of the discussion space. This would serve to enhance the meaning of the discussion experience in class, and broaden and deepen his/her thinking disposition. It will also broaden and deepen his/her discussion abilities as well as the values such as being respectful and inclusive of diverse ideas in the construction of knowledge and understanding.

Keyword: Cognitive Processes/Development, Collaboration/Collaborative Learning
Abstract

In 2014, the Ministry of Education initiated a new framework for game-centred teaching in the Physical Education Teaching and Learning Syllabus. This presentation explores the implications of the syllabus specific to the teaching and learning of games in schools. First, it explains how the Movement Skills and Concepts component and the Games Concepts component fit within the four developmental stages in games teaching and learning across the educational system that meets the vision of physical education for both primary and secondary schools. In the first two stages, learners need to acquire the fundamental movement skills (FMS) and learn how to execute these skills in combination through the Movement Skills and Concepts component. In the following two stages, learners acquire tactical knowledge through situational games posited by the Games Concepts component, before moving on to the recreational versions of the game.

Second, the presentation describes how the physical education teacher education (PETE) programme in NIE may be re-designed and aligned to the rationale and structure of the new syllabus. With the introduction of the single subject specialization for PETE in 2017, new physical education teachers will now need to develop the values, skills, and knowledge to teach physical education across the school spectrum, i.e., from primary to secondary level. The single subject specialization for PETE has important implications as to how beginning teachers are to (a) develop their own levels of skillfulness; (b) learn to plan developmentally-appropriate learning tasks that mirror game-like situations to highlight generalized games constructs for relevant skill practices; (c) practice the use of problem-solving pedagogical approach across the different games categories, (d) analyze game play to support authentic assessment of student learning, and (e) motivate student’s love and appreciation of games through games invention.

Throughout this presentation, explanations elucidating the importance and relevance of the frameworks will be provided, with descriptions of how they help inform curriculum decisions within exemplary courses to facilitate beginning teacher’s own personal learning and development. Issues in implementing this re-designed PETE programme will also be discussed to highlight constraints and challenges at the individual and institutional levels.

Keyword: Physical Education, Teacher Education/Development
High School Students’ Moral Judgment on GMOs Issues

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Science Education

Abstract

Moral judgment is a powerful determinant of ethical actions. It should be examined and developed in the first place by a teacher. This study aims to explore high school students’ moral judgment on bioethical issues of GMOs. The respondents were 191 high school students in science-oriented program from three schools in Saraburi, Thailand. They had studied basic genetic concepts and genetic engineering in the previous semester. The instrument was an open-ended and situational judgement test employing four scenarios: Screening for Down Syndrome, BT cotton, GM cows for Cystic Fibrosis patients, and Golden Rice for Nutritional Enhancement. The respondents were asked to give their position and reasons on the issue. Their responses were interpreted and classified to one of the four types of moral judgement. Across scenarios, 30 percent of the students used their intuition in their reasoning while others were a rationalist taking into consideration potential consequences for each choice. Only a fifth of which used ethical principles in their judgement. It is noted that contexts have influence on students’ judgment as they were more likely to go against GM that might have harmful effect on human health. Implications for the teaching Bioethics were discussed.

Keyword: Ethics, Science Education
Education for sustainable food consumption in Singapore schools

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Others

Abstract

Food is arguably the social and cultural cornerstone of Singapore, and over 95% of food in Singapore is imported. Practices in food production, sales and consumption will have an impact on food security and sustainability in the future of Singapore. It has been proposed that sustainable development can be enhanced by providing education for sustainable consumption for one hour per week for all grades (UNEP, 2010). This study examines the extent to which the formal school curriculum and public programmes in Singapore addresses sustainability with specific reference to food consumption and the impact of education on consumers’ knowledge. A scan of the current science, geography and food and consumer education (FCE) syllabi implemented after 2008 was used to identify related topics taught in the formal curriculum. A quiz was used to determine the knowledge levels and the awareness of public programmes of sustainable food consumption. A total of 333 consumers, aged 15 to 25 years old educated in the current school syllabus, were surveyed. The scan showed that the geography and science syllabi taught sustainable living through interactions with the environment. In FCE, the emphasis was on nutrition with no specific topic related to sustainable food consumption. More than 50% of the consumers were aware of programmes that were publicised in school textbooks, at supermarkets, or on national TV channels and prints. Only 20% of the consumers were aware of programmes that were less publicised in the same media. Quiz results showed that 64.5% of the consumers could answer more than half of the questions in the quiz, while 66% of the consumers could identify that meat production and consumption were most detrimental to environment. Fewer consumers (15.8%) could identify the types of sustainable fish. Sixty percent choose produce made from nearby countries as more sustainable than imports from countries further away from Singapore. The results of this study are indicative of the current state of the education and can serve as a baseline for future revisions to include sustainable education in the curriculum in Singapore schools.

Keyword: Curriculum Design/Reform, Survey Research
Effects of E-Counselling on iZ Hero Portal

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IT in Education

Abstract

Navigating and communicating on the internet is not only a fad but an essential way of learning and social life for young children today. The internet brings positive experiences if children are not addicted or being bullied. It is within the schools' and parents' abilities and effort to advise their children and to plan their time in a manner that addiction might not occur. However, to protect their young charges from cyberbullies is not quite within the caregivers' control. DePaolis and Williford (2015) reported that only 38% of cyber victims had knowledge on the perpetrator and 50% refrained from reporting the incidents of bullying behaviors. This project aimed to provide young internet users with e-counselling on an existing iZ Hero project (Liau, Park, Gentile, Katna, Tan, & Khoo, 2015; Park, 2016a, 2016b) which educates young school children in Singapore on cyberbullying on an educational gaming platform. Ethics review, consent and assent forms were completed for all primary 4 and 5 students in one neighbourhood school. Students, whose parents gave consent, and had interacted with online counsellors on their own volition formed the experimental group (n=33); and those who did not interact with the online counsellors formed the control group (n=112). E-counselling was conducted via email and live chat in a single session. Results of pre- and post-tests showed that students in the experimental group had significantly more positive emotion, lesser negative emotion and greater self-regulation immediately after e-counselling. Compared to students in the control group, these students also appeared to level up in their positive emotion at the end of the intervention.

Keyword: At-Risk Students, Counseling
Teaching science using an image to writing approach: a case study on heat and temperature in a Singapore primary classroom

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Daniel Tan, National Institute Of Education, Singapore
Tan Poh Hiang, Academy of Singapore Teachers, Singapore
Science Education

Abstract

Concept learning approaches that involve students in drawing pictorial models and building physical three-dimensional models have drawn increasing attention in science education research. Although work on science modelling and using images are not new, previous studies tend to pay little attention to the transition of such representations to written text, which is the most common mode of representation with which science knowledge is inscribed. More recent work suggests that there is also unfamiliarity of conceiving concept learning in terms of its representations among science teachers and such a pedagogy can be challenging for them. In this intervention study, we attempt to design and implement a science unit using an image-to-writing approach. The topic is on heat and temperature and grade level is primary 4. This paper presents our design of an instructional unit on heat and temperature that comprises a series of inquiry questions, key ideas, learning tasks and assessments. Using a case study of one teacher and a primary 4 class that she taught, we illustrate how an image-to-writing approach was enacted in the classroom and we draw on samples of students' work to illustrate their science learning through translation of pictorial representations into words. Interview findings suggest that the teacher perceived the design of lesson activities and the support in terms of resources and workshop training positively. However, her reported challenges included the unfamiliarity of using representations to explain science concepts and students' difficulty in interpreting representations and expressing their ideas in writing. We discuss areas of improvement for the second phase of our study and possible implications for research and practice.

Keyword: Primary Schools, Science Education
Exploring the factors relating to transition to adulthood for Adolescents with Autism Spectrum Disorders In Hong Kong and Singapore

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Lily Yip, Tanglin School, Singapore
Special Needs Education

Abstract

Leaving high school and transiting to adulthood can be particularly difficult for many adolescents with Autism Spectrum Disorder (ASD). As defined by Hendricks et al (2009), transitions to adulthood is defined as to include education, employment, and community living and community integration. A review of literature related to the transition from school to adulthood for adolescents with ASD in the context of Asian settings have been limited. Therefore, this article mainly focus on exploring the teachers or school personnel's beliefs in the factors relating to the transition success (e.g. residential placement, job opportunity, socialization and quality of life) for adolescents with ASD. Semi-structured interviews will be conducted to find out their perspectives. The interviews will be transcribed and being coded. The themes will be analyzed under the theme of individual, as well as environment and culture factors relating to transition success for adolescents with ASD. This article will fill in the literature gap by exploring the transition service for adolescents with ASD in Asian settings, as well as providing insights on how to build up a more effective service delivery practices for the future.

Reference:
Hendricks, D. R., & Wehman, P. Transitions From School to Adulthood for Youth With Autism Spectrum Disorders: Review and Recommendations

Keyword: Special Education, Vocational Education
Abstract

Objectives

The teaching and learning of Outdoor Education is now a compulsory component of PE lessons. However, many students find this new content too dull, complex and technical. Many teachers also find it challenging to design engaging lessons to deliver the desired learning outcomes. If not done right, we may potentially lose precious ALT-PE as students are made to listen to “lectures” as teachers try to impart the required knowledge to the students.

Through the proposed interventions, it is hoped that ALT-PE can be increased and students can be taught to self-direct their own learning. More importantly, we hope that students find the activities meaningful and fun.

Approach, Method and Design

Instruments

10 sets of iPad mini. Students work in a group of 4 or 5 to ensure that everyone has a chance to contribute in the group setting.

Mobile apps installed: Sworkit Kids and QR Scanner

Perception survey via AskNLearn. Students are required to complete a perception survey at home upon completion of the lesson.

Instructional Strategy Used

1. Flexible/Strategic grouping – effects of choice and perception of control
2. Student self-assessment and goal setting – choice on degree of effort and type of activity
3. Activating prior knowledge and building on each other’s strengths
4. Reinforcing effort and providing recognition

Conclusion and Recommendations

Through the survey, some students did not perceive the warmup routine using Sworkit Kids app as a good platform to foster teamwork. Moving forward, teachers will need to consciously speak to the students about the importance of encouraging one another when working in groups.

Fitness training can be re-packaged or incorporated into other PE modules (like Outdoor Education) in interesting ways so that students do not get bored with the activities. Deci & Ryan’s (1985) self-determination theory states that increased motivation will lead to increased behaviour. However, in the physical education setting, we have to note that this does not always equate to higher levels of physical activity.

Keyword: Information Technology and Education, Physical Education
Enhancing Teacher Learning: Problematizing and interrogating conceptual thinking in the primary classroom

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Teacher Quality, Teacher Learning and Development

Abstract

Policy makers and researchers are today keen on teachers adopting pedagogies that empower and encourage young children to become confident and natural life-long learners. A deeper concept-focused approach is instrumental in helping learners to make connections and comparisons in and across the disciplines, and therefore foster their natural tendency to create patterns, connect old with new knowledge and transfer learning to new situations. However, despite the greater space given to schools to develop and implement such curricula, teachers are challenged by issues such as developing a deeper conceptual focus around the subject matter and adopting appropriate pedagogies to promote conceptual thinking during the lesson. This paper presents the experiences of two teachers as they undertook the process of developing and implementing two concept-based units in their primary 3 and 5 science classrooms respectively. Beginning with a short professional learning session, the two teachers and the research team collaboratively re-designed two existing units over one term, working on new activities and assessments. The redesigned units focused on the ability to increase ‘visible’ thinking in students and to build on their background knowledge. The units were then implemented, with each unit lasting between four to six lessons. The research team observed the implemented lessons, and feedback was provided by way of an observation scale. This feedback, along with a copy of the lesson video were given to the teachers to reflect on their instructional practices. Teachers were also interviewed during and after the implementation process and these interviews were analysed to gather teachers’ perspectives on implementing concept-based curriculum. The findings indicate that during concept-based curriculum development and implementation, the lesson videos and lesson feedback allowed teachers to develop a new language by which to interrogate and problematize their lessons. While the feedback provided the teachers with fresh insights about their strengths and weaknesses, they also allowed teachers to articulate what conceptual thinking is. Reviewing their own lessons through videoing gave teachers more insight into exploring the alternative uses of their concept-based instruction strategies. Therefore, this paper shows how videoing and instructional feedback can foster conceptual thinking and teaching in the classroom.

Keyword: Curriculum & Pedagogical Innovation, Curriculum Design/Reform
Learning Centre Time in Singapore Preschools: What Does Purposeful Play Look Like in Practice?

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Early Childhood Education

Abstract

Contemporary kindergarten curriculum frameworks present different perspectives on the goals of play and what play should look like in early childhood education. The view adopted in Singapore’s Nurturing Early Learners (NEL) framework is that of ‘purposeful play’, in which children engage in ludic activities intended to foster specific learning outcomes, predominantly within environments carefully designed by the teacher: the learning centers.

This study, conducted within the ‘Singapore Kindergarten Impact Project’ (SKIP), describes the landscape of pedagogical practices during learning centre time in Singapore preschools. We analyze: (1) the types of learning centres most commonly available; and (2) the roles adopted by teachers and the quality of instructional support provided during learning centre time. Out of the 108 teachers videotaped in K1, we focused on the 36 teachers that included learning centre time in their daily schedule (33% of the initial sample).

Findings revealed that: (1) Learning centres containing academically-related materials and activities (e.g., literacy, numeracy, blocks, science) are more common that non-academic centres (e.g., dramatic play, arts). Teachers typically pre-assign children to the various learning centres and do not allow children to visit several centres throughout the same session. An additional group of children purely focused on academic learning, under direct teacher supervision, was observed in all classrooms. (2) Teachers’ most common roles are activity participator and stage manager, followed by academic-focused, director, administration-focused, and finally uninvolved. However, the quality of instructional support, as measured by the ‘Classroom Assessment Scoring System’ (CLASS), was mostly in the low range.

We conclude that the enactment of the notion of purposeful play within learning centre time in Singapore preschools is overly focused on academic knowledge/skills and overly structured, restrictive and rigid. Preschool teachers need support to adopt more active and instructionally supportive facilitative roles. We argue that initial teacher preparation programs and professional development in-service courses should better prepare preschool teachers to interact with children in ludic learning settings.

Keyword: Early Childhood, Professional Development
Understanding math achievement through motivation, self-efficacy and self-regulation

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Melvin Chan, National Institute Of Education, Singapore
Jennifer Tan, National Institute Of Education, Singapore
Cognition, Motivation and Learning

Abstract

Aims
Empirical studies have consistently indicated that student motivation, self-regulated learning and self-efficacy are strong predictors of academic outcomes. However, while the effects (among the predictor variables) are often expected to be in the positive direction, a review of the literature suggests that there are considerable variations with respect to the significance and size of the predictive effects. Therefore, the aim of this presentation is to provide empirical findings to explain the extent to which motivation, self-regulation and self-efficacy help to promote better academic outcomes, both independently and jointly. Moreover, as self-beliefs and regulation are often developmental in nature, a second aim of this study is to report on findings from a longitudinal analysis based on data collected from the same students at two time-points: Primary Six and Secondary Three.

The research questions are:
1) What is the relationship between motivation, self-regulation and self-efficacy and Secondary Three math achievement?
2) Does motivation, self-regulation and self-efficacy in Primary Six have an influence on math achievement in Secondary Three?

Methodology
871 nationally-representative Secondary Three students from 30 schools who were part of a larger NIE Core research programme were surveyed in Primary Six and Secondary Three. The sample comprises 541 males and 330 females, with 622 Chinese, 150 Malay, 76 Indian and 23 students of other ethnicity.

Regression analyses were conducted to understand 1) what demographics 2) whether self-efficacy, 3) motivation and 4) self-regulation, were related to math achievement in Secondary 3.

Findings
Results from preliminary analyses found that students with better letter grade in PSLE, as well as females and Chinese students tend to do better in S3.
Students who demonstrated greater self-efficacy in P6 were more likely to do better in S3.
In terms of self-regulation, students who regulated their effort in P6 and S3 were more likely to fare worse in S3.
In terms of motivation, performance avoidance goal in S3 was significantly related to poorer math achievement in S3.
Contrary to previous studies, we did not find mastery approach goal and positive self-regulating to have a positive relationship with math achievement which might suggest an indirect relationship. Further analyses will be ran to understand the indirect relationship.

Keyword: Motivation, Secondary Schools
Deciphering diversity from PISA 2015: A cross national comparative analysis of top diverse countries

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Educational Policies and Practices

Abstract

In an ever-increasing diversifying global landscape, the need to equip teachers with competencies and skills to engage students from different backgrounds becomes progressively important. With the recent release of 2015 PISA results, a particular point of interest is the rapid diversification of student demographics occurring within classrooms due to unprecedented rates of student immigration and its impact on teacher preparation. Based on OECD definitions, an immigrant student is a "student whose mother and father were both born in a country/economy other than that where the student sat the PISA test (OECD, 2016)". This paper aims to decipher the diversity of immigrant students in Luxembourg, Canada, and Ireland -- three OECD countries possessing the highest percentage increase of immigrant students from collected student data in PISA 2006 to PISA 2015. A focus will be placed on each country’s set of circumstances and obstacles facing immigrant students and the policies adopted to meet growing needs. In Luxembourg, the creation of a new teacher training institute and unrolling of new plurilingual early childhood education programs. In Canada, initiatives to better understand beliefs of refugee students as well as continued support for Aboriginal students. In Ireland, a partnership with an American university to develop culturally responsive practices and introduction of innovative pedagogy to discuss issues of poverty. With the three countries boasting different aspects of diversity from immigrant students, different strategies to prepare pre-service teachers have been adopted. A cross-national comparative analysis (Parkyn, 1977) will be undertaken through research and document analysis of respective country reports, OECD publications, and education ministries websites. This paper will explore how pre-service teacher training policies have been affected by the rise of immigrant students. By comparing these three systems and their respective resulting policies created from growth in diversity, themes around best practices of teacher training for diversity will be documented in order to draw conclusions that provide foundations for future analysis on equitable education practices.

Keyword: Comparative Education, Immigration/Immigrants
Evaluating narratives: developing multiple perspectives in a lower secondary Normal Academic classroom

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Humanities and Social Studies Education

Abstract

Dreikurs and Goldman once said, ‘Never do for a child what he can do for himself. A “dependent” child is a demanding child… Children become irresponsible only when we fail to give them opportunities to take on responsibility’. As teachers, it is our responsibility to equip students with the necessary skills to learn to discover for themselves. In other words, we need to equip our students with critical thinking skills that would serve them well in life.

In a history classroom, this may take the form of enabling students to think critically about sources of information and representations of events. Existing literature has suggested that students understand that history is made out of multiple perspectives, and that no one perspective is complete. Rather than simply absorbing information taught, students should be challenged to think critically about the information received. This can be done through evaluating reliability and biasness of sources including textbooks and national narratives.

Many of the necessary skills to evaluate sources are already incorporated into Singapore’s Secondary history curriculum. However, students frequently perceive these skills as a form of assessment, and do not recognise the value of these skills as part a historian’s craft. As such, answers given can be superficial, and lacking in sound reasoning. In addition, these methods of developing critical thinking assumes that students can comprehend sources to begin with. This is frequently untrue in a lower secondary Normal Academic (NA) classroom where literacy standards tend to be lower. It can be difficult to get lower secondary NA students to think critically about history, when they do not understand the sources they are given to begin with.

This paper presents the outcome of the use of strategies such as Questioning the Author, to engage students in understanding sources. Other strategies to make thinking visible, such as ‘True for Who?’ and ‘Tug of War’ were also introduced to allow students to see multiple perspectives of parties involved as well as aiding them to evaluate material to come to a judgement.

Keyword: 21st Century Competencies, Critical and Creative Thinking
Abstract

Picture books in Tamil are used extensively by Singaporean early childhood educators and parents to help develop reading skills and critical literacy amongst young children. Despite their use in aiding young children learn the Tamil language, these picture books are set in contexts that are alien to the environment in which Singaporean children live in, let alone pay attention to the practices and beliefs of Singaporean society. While children's literature should promote universality of beliefs and cross-cultural understanding, this paper asserts that children's language acquisition is dependent on language-settings that resonate with communities and the wider society in which children are part of (Bronfenbrenner, 1979). With children moving through a series of life transitions, all of which necessitate the use of language to gain access to social support and coping skills, understanding the interconnectedness between people and environment will help children understand how Tamil is identified and used in the Singaporean context (Lakshmi, S & Saravanan, V, 2011). Hence, how can Tamil language picture books help promote the use of Standard Spoken Tamil (SST)? What kind of picture books are needed in the Tamil language to help Singaporean children distinguish SST from the Tamil language varieties used in Tamil Nadu?

Assessing fifty Tamil language children picture books published in Singapore through process-based analysis, (Hearne, 1993; Johnston, Bainbridge & Shariff, 2007), this paper emphasises the need for picture books to promote SST in a climate where Singaporean Tamilians no longer view themselves as part of a Tamil Diaspora but a community that is Singaporean in both belief and practice.

Keywords: (i) Tamil Language; (ii) Singapore Picture Books; (iii) Early Childhood Literacy; (iv) Standard Spoken Tamil; (v) Identity

Keyword: Bilingual/Bicultural Education, Children's Literature/Media
The Role of Art Textbooks in the Singapore Context

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Visual and Performing Arts

Abstract

This research analyses the textbooks with reference to the syllabus aims as well as literature written about the key roles of art education. It aims to assess the effectiveness of using art the local art textbooks in the classrooms.

To analyze the textbook, we first used Jennifer Attridge Stirling’s (2001) thematic networks to categorize the roles of art reflected in the art syllabus as well as in the literatures. Subsequently, we then used the created web-like framework to match it against the texts in the textbooks so as to evaluate if using art textbooks in our classrooms achieve the key roles of art.

This textual analysis suggest that while “Cognitive development” seems to be of focus in the texts examined as they reflect the highest occurrence across all 3 textbooks, it is limiting to use the textbook as a main teaching resource. This is due to the fact that the texts has tendency to suggest that the outcomes are more product focus then process focus and lack focus on domains such as 'problem solving' and 'tolerating ambiguity.'

Keyword: Arts & Music Education, Primary Schools
Blending Formative Assessment in Collaborative Technologies: A new age approach in Learning Science Process Skills

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Justin Ng, Springfield Secondary School, Singapore
Zulaiha Osman, Springfield Secondary School, Singapore
Learning Sciences

Abstract

Imbuing science process skills in our students has always been one of the most important goals in the Science curriculum. This project sought to integrate learner-centered formative assessment in collaborative technologies to learning science process skills. The project defines science process skills in three stages, planning an experiment, carrying out the experiment, and evaluating the results. To achieve a more contextualised approach in discovering scientific content and acquiring science process skills, the package designed weaved in elements of the Investigative Case-based Learning where students became subject matter experts that proceeded to plan and conduct experiments to solve a given conundrum. Students used Seesaw, a digital portfolio, to document the experimental process and thereafter presented their work in a virtual classroom. Scoring rubrics and checklists were devised for students to formatively assess both themselves and others. Using collaborative technologies provided a platform for students to learn to give constructive feedback. The effectiveness of the assessment task was measured based on three categories – student feedback, teacher feedback and summative assessment analyses. Results indicated improved comprehension of scientific concepts and articulation of science process skills. Students displayed heightened interest and enjoyment in the subject topic while becoming more reflective in their thinking process. These results show evidence that learner-centered formative assessment strategies do provide support for students to acquire science process skills as well as apply their scientific knowledge beyond clinical contexts, while the usage of collaborative technologies does enhance students’ experiential learning. Innovating by blending strategies and tools supports the new-age approach in learning while developing a creative classroom.

Keyword: Assessment, Learning Sciences
An Investigation of Chinese Composition Writing Processes and Difficulties among Lower Secondary Students in Singapore

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Language and Literacy Education

Abstract

This study investigates Singapore lower secondary students’ writing processes and difficulties in Chinese narrative essay writing. Using both quantitative and qualitative research methods, we examined the strategies students used through think-aloud data and the difficulties they encountered through text analysis.

The analysis results indicate that students used idea generating strategies, idea organizing strategies, text generating strategies, task examining strategies, text revising strategies, and process controlling strategies, which provide supporting evidence for the model we proposed before the study. It was also found that students’ writing proficiency level is closely related to their strategy use. Text generating strategies were used more frequently than other types for students of all writing proficiency levels. Regarding the difficulties students are faced with, the results showed that the lower the writing proficiency level, the more difficulties students encounter in writing. The most serious difficulties high-proficiency writers encounter most frequently are those in vocabulary, grammar and sentence structure, followed by those of character writing and punctuation, while low-proficiency writers are faced with difficulties in vocabulary, grammar and sentence structure, idea organization and content as well as character writing and punctuation.

The findings about students’ writing strategy use and problems faced in writing Chinese narrative essays gives us a thorough understanding about the process and product of Singapore lower secondary students’ Chinese essay writing. More importantly, the insight into students’ writing strategies and difficulties encountered will give us useful clues as to how to help Singapore lower secondary students improve their Chinese essay writing ability. It is expected that the research findings from this project will provide important and insightful implications for the construction of the ICT-mediated essay guiding system under design and development in the Singapore Centre for Chinese Language.

Keyword: Assessment, Language and Education
Investigating the affordances of outdoor learning: Revisiting the value of field trips in Geography

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EDWIN T H CHEW, Serangoon Garden Secondary School, Singapore
Peter Wang, Kranji Primary School, Singapore
Adventure and Outdoor Education

Abstract

This paper reports the findings of part of a larger study that investigates how affordances in learning contexts such as field trips mediate and enhance students’ participation in instructional education. Field trip or fieldwork inquiry, as it is known elsewhere, has been an extant practice within the secondary Geography curriculum in the schools in Singapore, though not often assessed formally by teachers. In the past year, there has been a renewed interest in outdoor education as a means to build pupils’ confidence, resilience and their participatory teamwork, and of strengthening their holistic development (Ministry of Education [MOE], 2016). More recently, interest in promulgating a values-driven education through the values-in-action programme in the schools in Singapore has been strong. Increasingly, schools have innovatively drawn upon their school-based non-instructional organised activities such as applied learning programmes, co-curricular activities and fieldtrips as ways of providing holistic education and developing pupils’ life skills and character that go beyond the demands of academic curriculum.

This paper demonstrates how one teacher tapped into the affordances of field trips in Geography to engage two classes of academically less inclined to access the disciplinary knowledge and concepts of Geography. Using New Literacy Studies and social learning as the theoretical framework, and an ethnographic perspective to research, we observed and studied how the teacher involved the pupils in learning about the geographical concepts and how pupils experienced their role as geographers during their field trip at the Singapore Botanic Gardens. Interviews were conducted with the pupils to gain an insight into their outdoor learning experiences and the relevance of this to classroom learning. Artefacts such as pupils’ reflections of their learning experiences at the Botanic Gardens and their responses on how to keep the place environmentally clean, both in linguistic and non-linguistic modes (e.g. drawings), were analysed to reveal the learning potentials of field trips.

Through discourse analysis, the findings uncover field trips as a powerful educational tool for generating pupils’ interest in learning Geography, deepening their understanding of the geographical concepts taught, and in providing pupils with an alternative platform for developing their social and emotional competencies.

Keyword: Holistic Education, Literacy
Teacher leadership vignettes

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Teacher Quality, Teacher Learning and Development

Abstract

In Singapore, every teacher is called to “lead, care, inspire” (Academy of Singapore Teachers, 2012). From this perspective, every teacher can exercise teacher leadership from where they are. At the heart of teacher leadership, its very essence speaks of teachers leading within and beyond the classroom, in their own ways, exercising their unique form of influence towards improving educational practice, professional learning and teacher professionalism, regardless of rank position or seniority (Katzenmeyer & Moller, 2001). As teacher leadership is affected by the context in which it operates, is practised and demonstrated (Wilkinson, Olin, Lund & Stjernstrøm, 2013), it is best studied and understood from within the contexts they unfold. To understand the ways teachers can lead and the teacher leadership they exercised, four teacher leadership vignettes were constructed from the observations by the researcher and triangulated with stories told by the teachers themselves during interviews and focus group discussions, which can shed light on the nature of teacher leadership as practiced in the schools. Using a case study approach, this paper explores how teacher leadership is practiced by teachers, and discusses what inhibits or facilitates teacher leadership through the observations and stories gathered from teachers during interviews and focus group discussions, as part of a larger research study on teacher professional learning communities. Findings from this study revealed that leadership is a process of influence. The four vignettes highlighted the key factors for teacher leadership which impacts the ability of teacher leaders to influence through the (a) personal power, (b) professional learning, (c) professional culture and (d) organisational support. In conclusion, the implications for developing teacher leadership in Singapore will be discussed.

Keyword: School Change and Leadership, Teacher Research
Abstract

Both creativity and critical thinking have been flagged as essential 21st century skills, yet some people think of them as being as separate as oil and water. What's your take?' (Azzam, 2009)

The presenters will discuss approaches in teaching science creatively while infusing critical and creative thinking, in a unit on Ecology in Integrated Science. These approaches were carefully designed to engage students in active learning through the practices of Science, as they acquire competencies for critical and creative thinking. Time will also be allocated to discuss various approaches to monitor students' learning, and to reflect on future actions for the teaching of the Integrated Science unit.

Reference

Keyword: Critical and Creative Thinking, Curriculum & Pedagogical Innovation
Better, as opposed to merely Correct: The Scholarship of Teaching and Learning for Teachers

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Teacher Quality, Teacher Learning and Development

Abstract

Randy Bass states: “Changing the status of the (teacher’s) problem in teaching from terminal remediation to ongoing investigation is precisely what the movement for a scholarship of teaching is all about.” (1999) Teachers today undertake professional development and engage in learning team projects and activities that seem to manifest the three key characteristics of scholarship: being public, being susceptible to critical review and evaluation, and have findings that are accessible for exchange and use by other members of the scholarly (teaching) community. (Schulman, 1999) Nonetheless, the end product for a great deal of teacher development is to use learning techniques to conveniently identify and solve problems - an emphasis on methods, rather than theories of learning. The scholarship of teaching and learning, however, arises directly from and within disciplinary practice, and is defined by the immediacy of its practical intent and application. (Looker, 2011) It is ‘evidence-based critical reflection on practice aimed at improving practice.’ (Prosser, 2008)

It is the intent of this paper to explore the shift to “seeing …teaching problems that can be investigated as scholarship, and not merely for the purpose of ‘fixing’ them.” This posits the set of problems encountered in one’s teaching as “being worth pursuing as an ongoing intellectual focus.” (Bass, 1999) Investigating the experience of critically engaging with one’s own disciplinary expertise and practice (expressed here in the teaching of Literature in English), in order to making one’s teaching better, as opposed to adopting notions of what right or merely competent teaching looks like wholesale, is empowering. This paper discusses the affordances of the model of scholarship of teaching and learning for teacher practitioners, supporting the critical reflection on practice into educational outcomes desired in classrooms.

Keyword: Teacher Education/Development, Teacher Knowledge & Cognition
Agents of Resilience: Examining The Factors that Influence Shifts in the Academic Trajectories of Academically At-Risk Students

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Nur Qamarina Bte Ilham, National Institute Of Education, Singapore
Others

Abstract

The present study forms part of a longitudinal study which aimed to identify factors that promote academic resilience of students facing the risk of continued low achievement. In this study, academically at-risk students are those who scored below the cohort mean in a national test taken at the end of primary education. This study was an attempt to identify significant others who have supported these students to deal with school challenges and improve their academic performance. This study also aimed to surface how these significant others have facilitated the upward shift in the students’ academic trajectory and their capability to navigate adverse events in school. Another goal of the study was to examine factors that could have hindered the progress of students who were not able to deviate from the path of low achievement after three years in secondary school. To address these objectives, a sample of 1326 academically at-risk secondary students were asked to complete a questionnaire containing open-ended questions that elicited students’ perspectives in line with the objectives of the study. Thematic analysis was used to identify themes and patterns in the students’ responses. The results of our preliminary analysis revealed the key role that peers, parents and teachers play in improving students’ school outcomes; and the importance of marshalling cognitive resources (e.g. focusing attention) and adopting positive behavioral strategies (e.g. attending classes regularly, note-taking) to address school challenges. The potential implications of the findings for research and practice will be discussed.

Keyword: At-Risk Students, Longitudinal Studies
Motivational profiles in mathematics learning and their correlates with student background, student outcomes, and classroom instruction: A latent profile and multilevel modelling approach

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Cognition, Motivation and Learning

Abstract

Education scholars have long considered motivation an important and widely studied explanatory variable that explains why students do well and succeed in school. Previous research have consistently demonstrated strong positive associations of motivation on students’ overall cognitive performance and post-school success, even after controlling for within-individual factors (Lipnevich & Roberts, 2012).

Among the most active research in motivational sciences is the study of achievement motivation, defined by two types of learning orientations: mastery and performance. The mastery-performance dichotomy have since been expanded to account for variations across different levels of motivational valences: adaptive (approaching competence) and maladaptive (avoiding incompetence) goals.

Although previous research has largely focused on variable-centred approaches (i.e., associations among variables), this presentation adopts a person-centred approach (i.e., associations among subgroups based on a set of variables) to investigate students’ motivational profiles, and to test whether and the extent to which these profiles differed by 1) personal and academic background, and 2) positive and negative student outcomes. Background variables were gender, prior attainment and socio-economic status. Positive outcome variables were mathematics achievement, conscientiousness, and academic resilience. Negative outcomes were fear of failure and mathematics anxiety. Finally, multilevel latent profile analysis was used to investigate the influence of a range of instructional practices and classroom climate.

Data was drawn from a large-scale study on learning and instruction across Secondary Three mathematics classrooms in Singapore (N~3000). A latent profile analysis was conducted on 12 items that assessed students’ achievement motivation. Findings indicated three distinct profiles. Students in low (36%) reported the lowest mean scores, those in optimal (16%) had the highest mean scores for the adaptive but distinctively lower scores for maladaptive items, and students in competitive (48%) reported higher ratings for adaptive and maladaptive items. Comparison of means revealed significant differences across different background and outcome variables. Optimally motivated students consistently achieved more positive outcomes, while those in the competitive motivation group reported higher fear of failing and anxiety. Results from multilevel analysis are consistent with current theory. Conducive classroom environment and more engaging instructional practice significantly predicted higher probability of optimally motivated classrooms. Implications for practice will be discussed.

Keyword: 21st Century Competencies, Motivation
Synchronous Collaborative Mathematics Learning in Early Primary School Grades: Challenges and Opportunities

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Natasa Hoic Bozic, University of Rijeka, Croatia (Hrvatska)
IT in Education

Abstract

This paper presents the results of a mobile learning research project in Croatia, Europe with a special focus on synchronous collaborative in-class learning. As part of the project, technology for learning mathematics in pairs and triplets was developed and used in first, second and third primary school grades in a neighborhood primary school in Croatia. Students were learning through digital lessons by engaging in group work in different roles: editors and checkers when learning in pairs; and authors, editors and checkers when learning in triplets. Digital lessons were co-designed with the help of primary school teachers so that the contents were aligned with the lesson plans and the curriculum. In order to examine the effectiveness of the technological solution and the approach undertaken, software log files were collected, videos of each lesson were recorded and interviews with the teachers and the students were conducted. The collected data was then triangulated with the student background information consisting of their academic success, engagement, socio-economic status, family support and work habits. On a macro level, the analysis shows that students, even first-graders, are able to successfully engage in synchronous collaborative math learning and that their success in synchronous collaborative learning correlates with the majority of measured background characteristics. Such results indicate the need for a more intelligent group and role assignment mechanisms to better support learners in different stages of their learning. From a collaborative activity design perspective, differences in patterns of synchronous collaboration were detected between working in pairs and working in triplets mainly due to the author role that was added to the activity of working in triplets. Such a change allowed student to deeper engage in mathematical problem solving.

Keyword: Collaboration/Collaborative Learning, Primary Schools
Creating Virtual Classrooms Using Smartphones and Facebook in Mongolia

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Christine Shin, Mongolian International University, Mongolia
Shinae Lee, Mongolia International University, Mongolia
Nomin, University/ Mongolia International University, Mongolia
IT in Education

Abstract

This research program aims to address the public education crisis in Ulaanbaatar, Mongolia, especially the climate situation and the quality of education, leveraging the affordance of social media and mobile technologies. Mongolia’s extreme climate and the recent economic crisis have created a unique emergency situation that people in the rural area have been abandoning the nomadic lifestyle and moving to the capital city. This recent phenomenon has been heavily influencing Mongolia’s public education system. Due to an insufficient number of public schools that can accommodate the rapidly increasing student population in Ulaanbaatar, most K-12 students have to share school buildings and can only receive 4 hours of education a day on average. To address this dire issue, this research aimed to improve the quality of English education in Mongolian public schools by suggesting an alternative solution: “virtual learning space” where students can learn and communicate with their teachers better and seamlessly via mobile phones and social media.

The participants of this research program include three English teachers and their students (N=67) from three public schools in Ulaanbaatar. The students used their mobile phones with the Internet access to participate in various English learning activities in Facebook. The learning activities were co-designed by the researchers and the teachers, with a particular focus on creating seamless learning experiences in and out of classroom. To examine the efficacy of the proposed digital learning solution, we have collected data from Facebook postings, interviews, and other student-created artifacts. Overall, the results show that as their virtual classrooms on social media evolved, there were significant increases in the amount of student participation, collaborative learning, and communication between the teachers and the students. In conclusion, this project demonstrates the potential of coupling social media and mobiles to create a virtual learning environment where students and teachers can be seamlessly connected and communicated under the crisis situation.

Keyword: Internet and Education, Learning Environments
Supporting Immersive Participatory Learning in an Augmented Reality Environment from Embodied Cognition Perspectives

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Min-hwi Seo, Ewha Womans University, Korea (South)
Seungjae Oh, Pohang University of Science and Technology, Korea (South)
IT in Education

Abstract

This study aims to examine how the affordances of gesture-based computing and Augmented Reality (AR) can be utilized to design an immersive participatory simulation. From the perspectives of embodied cognition, which foregrounds the interwoven nature of body, mind, and knowledge, we have designed a participatory simulation called ARfract where visitors can learn about complex scientific concepts on the reflection of light through full-body immersion mediated through augmented-reality (AR) glasses and gesture technology.

This study includes two phases: Phase I for the visitor interaction study in science museums; and Phase II for the design and evaluation of an AR participatory simulation. In Phase I, we conducted a visitor interaction study in two science museums in Korea to examine how visitors perceived the property of gesture-based exhibits and interacted with them. The interaction analysis with 14 visitor groups indicated that the total amount of interaction time between visitors and gesture-based exhibits was not high, indicating that these exhibits provided visitors with little opportunities for immersive engagement.

In Phase II, drawing from the key findings from the Phase I research, we developed an immersive participatory simulation called ARfract where visitors can experience the phenomenon of complex scientific concepts on the reflection of light through full-body gestures. The ARfract is a room-sized simulation environment with three key components: a) optical see-through AR glasses, b) projected AR on the floor, and c) physical space.

To examine how the ARfract can support interactive and embodied learning experiences, we conducted a user study with 10 dyads. The participants wearing AR glasses were asked to freely interact with ARfract. The interaction log and conversation among dyads were captured throughout the experiment sessions. The participants were also asked to complete a survey instrument to measure their embodied learning experiences with ARfract. Overall, the results indicated that the participants were satisfied with the agency to control the difficult scientific phenomenon and with the collaborative meaning-making process with their partner through gestures. In conclusion, this study suggests that the affordances of AR and gesture computing can be utilized to support strong congruency between bodily actions and conceptual learning.

Keyword: Information Technology and Education, Learning Environments
Problem posing in Mathematics Teaching and Learning—What does it afford the teacher and the learner?

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Mathematics Education

Abstract

Past studies on Mathematics problem posing has shown that problem posing strategy could be perceived in various ways. It could be (1) a means to improve students’ problem solving, (2) a feature of creative activity, (3) as a window into students’ Mathematical understanding, (4) a means of improving students’ disposition towards Mathematics, (5) a means to increase students’ confidence in raising questions.

In this study, students from five year four classes were first introduced to the strategy of problem posing and problem variation by their teachers. They were then asked to practice and apply problem posing when appropriate to new topics that they would learn. The questions that they posed were then collected and analyzed qualitatively with regards to their complexity. Students’ perceptions of advantages and disadvantages of the PP activities and the reasons behind them were collected through surveys. The research questions are

1) How does the teacher’s Problem posing impact the students’ Problem solving?
2) How does the students’ Problem posing impact their Problem solving?
3) What can the students’ Problem posing inform the teacher about the students’ learning of concepts and their level of synthesis?

Keyword: Classroom Research, Mathematics Education
Ready to be Engaged? - The Primary 3 Mathematics classroom in Singapore

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Mathematics Education

Abstract

This paper examines how and to what extent teachers’ enactment in two Primary 3 Mathematics lessons in Singapore facilitates their students’ conceptual understanding particularly, as the lesson transits from the ‘Readiness’ to the ‘Engagement’ phase of learning. Drawing on data from a recently concluded qualitative study of teaching and learning in Primary 3 Mathematics classrooms (2014-2016), and based on the Readiness-Engagement-Mastery (REM) learning cycle outlined in the syllabus (MOE, 2013), a key research question is explored: How do teachers enact the Readiness-Engagement-Mastery phases of learning in Primary 3 Mathematics classrooms? Based on classroom observations, transcripts of classroom talk, interview data and student artefacts, the paper highlights the varying effectiveness with which each teacher prepares her students for the topical focus in the initial lesson of their respective curriculum ‘units’ on Multiplication.

The study broadly focuses on teachers’ understanding, interpretation and enactment of the revised Singapore National Curriculum for Mathematics (MOE, 2013). Based on a representative sampling of 9 primary schools, a good lesson-level balance in the learning phases becomes evident: Readiness to prime students before teachers move into the core teaching mechanism of Engagement followed by opportunities for students’ Mastery. However, the learning phases typically, unfold in strict sequence (R à E à M), indicating teachers’ tendencies to steer away from diagnostic repair to address students’ ongoing learning needs in the classroom. Germane to the current focus, teachers mainly encourage student participation, organize resources, and establish norms for a conducive learning environment in the Readiness phase while much less time is spent on activating students’ prior knowledge or creating a motivating context for learning through stories or play-based activities.

The valuable insights gleaned from this case, suggest the need for greater pedagogical agility on the part of teachers in being responsive to students’ ongoing learning in the classroom. As one teacher noted, she had used the “wrong example” to tune in students and had to “keep on prompting and guiding them what to do.” The issues raised have obvious implications for teachers’ classroom practice and professional development programmes of primary Mathematics teachers in Singapore. Finally, some areas for improvement are discussed.

Keyword: Curriculum in Classroom, Mathematics Education
Positioning the science learner: Get the marks or think about how to solve it?

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Science Education

Abstract

The classroom is a ‘community of learners’ (Wenger, 1998) - learning is characterized by participants’ interactions rather than individuals’ intellectual activities (Sfard, 1998), and what is learned are the norms and practices of a community (Sfard, 1999). Employing socio-cultural perspectives and positioning theory (Harré & Gillett, 1994; Harré & van Langenhove, 1999) as an analytical framework, this paper presents illustrative glimpses of classroom discourse in two Secondary science classrooms in Singapore. Drawing on data from an ongoing baseline investigation of science pedagogy, an attempt is made to unpack classroom norms and interactional patterns particularly, how teachers position students, influencing students’ participation and opportunities to learn (OTL), and mediating student identity as science learners. Based on lesson videos and transcripts, and interview data from two thematic units in Physics, the specific focus is on whole class discussions, repeated interactional patterns, and episodes of teacher positioning in view of alignment with teacher beliefs about teaching and learning science.

Yamakawa (2014) argues that students do not have the same OTL just because they are exposed to the same information or subject matter. Also, students’ OTL is largely influenced by the ways they are positioned with teachers playing a significant role. Relevant to the present focus, one teacher positioned students as catering to the requirements of high-stakes assessment with frequent references to the approved terminology and answering techniques in the examiners’ report as they “study under O-level” and need to “get the marks during the exam.” In another classroom, students exercise a fair degree of control over classroom talk as their teacher reinforces their identity as thinkers: “you guys are physicists” and should “think about how to solve it.”

The issues raised have obvious implications for teachers’ classroom practice and professional development. Given the centrality of “the inculcation of the spirit of scientific inquiry” in the science syllabus (MOE, 2014, p. 1), the discussion elucidates how student positioning in the classroom possibly, constrains or endorses the success of inquiry-based strategies teachers use. On a broader level, the paper stimulates our thinking about students’ equitable access to content in the classroom (Schoenfeld et al., 2016).

Keyword: Curriculum in Classroom, Science Education
CEIBA Center for initial stimulation and food wellness in an indigenous Tenek community

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Dra. Silvia Romero-Contreras, Universidad Autonoma de San Luis Potosi, Mexico
Early Childhood Education

Abstract

This study was carried out in the community of Tocoy, San Antonio, S.L.P., Mexico, population work will be children from 0 to 5 and their parents or caregivers includes 43 pairs within this community.

The inclusion criteria will be the written permission of parents or guardians children to participate in the study, be students of indigenous initial school or preschool community, involve the parent or caregiver for filling instruments and participation in the activities of intervention program.

The study develop under the approach of a mixed methodology, which follows a longitudinal quasiexperimental design by the method of interrupted time series. It is expected, due to the implementation of the intervention, the data reflect this interruption showing a level change in the development of children and will have two phases.

The first phase aim to make a diagnosis on child development, nutritional status of participants the study and characterization of parental models of parents or caregivers of children 0 to 5 years of community Tocoy. The second phase aim to the design and implementation of an intervention program based on scientific evidence and semiannual program monitoring child development and nutritional status.

Second phase implementation of intervention program. It was carried out over three years by means of a community model and with an empowering purpose of the participants and the environment that surrounds them.

When analyzing the development of children there is a decrease in the percentage of children who have some risk of developmental delays from 34% to 22%.

In the community of Tocoy it has been found that although there are compromised conditions such as the limited economic income or the high price of the basic food basket, there are also windows of opportunity such as the interest of the caregivers to be trained in the promotion of Child health.

Keyword: Indigenous Peoples, Interventions
Psychometric properties of instruments to measure positive youth development through sports in Singapore.

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Physical Education & Sports

Abstract

Despite studies establishing the positive impact of sport participation on youth development, there has been increasing evidence that mere participation in sport does not ensure the delivery of positive youth outcomes. Moreover, critics have highlighted how the unique policies related to youth sport implemented in Singapore has created an environment that has been associated with negative experience. Yet, there has not been systematic protocols or instruments to ensure that school sport training is indeed contributing positively to the development of youth athletes. The purpose of this study is to 1) examine if measures of positive youth development that has been established in the western context can be used as assessment tools in Singapore, 2) to survey the impact of youth sport training on the indicators of youth development in Singapore. 540 students from secondary school sport teams in Singapore completed the Positive Youth Development Toolkit and Perceived Motivational Climate in sport-2 questionnaires. Confirmatory factor analysis was conducted to find out if the factor structure of framework behind the questionnaires is valid in the Asian context of Singapore. The internal reliability and validity of the measures are examined. Results are discussed in relation to the appropriateness of using the instruments to assess youth development through sport in Singapore.

Keyword: Assessment, Physical Education
Learning analytics for enhancing formative feedback and pedagogical adaptivity in nurturing collaborative critical literacy skills: Teachers’ accounts of potentials and pitfalls

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Learning Sciences

Abstract

Teachers play a crucial role in providing feedback and supporting learning by adapting teaching strategies to meet students’ needs. However, many teachers currently lack access to real-time proximal data indicators on students’ learning behaviors. This in turn constrains pedagogical decision-making on how best to address diverse learner needs. Learning analytics (LA) dashboards, powered by automated and semi-automated modes of capturing, analysing and visualising appropriate forms of learning data, can potentially allow teachers to monitor their students’ learning in real-time, provide more meaningful formative feedback, and adapt teaching strategies to support diverse learners during the learning process. There is, however, a lack of empirical studies in existing literature on how teachers interpret LA dashboards and the extent to which these support their pedagogical decision-making and adaptivity. To address this knowledge gap, our paper examines how English Language (EL) teachers interpreted and used real-time LA dashboard visualizations to support and scaffold their students’ development of collaborative critical reading skills in their EL classes.

Specifically, this paper draws from classroom observations, teacher interviews and focus group discussions data generated through an edulab-funded research project—WiREAD—a computer-supported collaborative reading and learning analytics environment aimed at nurturing students’ collaborative critical literacy skills. Using a design-based research approach, WiREAD’s formative feedback affordances, in the form of real-time teacher and student LA dashboards featuring relevant EL discourse, dispositional and social learning network analytics data, were developed and improved in iterative cycles. This paper foregrounds participant EL teachers’ user experiences, reflections and evaluations of the WiREAD LA dashboard, and the extent to which it informed their pedagogical decisions and improved their pedagogical adaptivity in supporting and scaffolding diverse learners in their EL classes. We conclude by discussing the pedagogical promises and tensions arising from the use of LA as a form of techno-pedagogical innovation for promoting 21st century multiliteracies in Singapore’s mainstream secondary schooling context.

Keyword: 21st Century Competencies, Curriculum & Pedagogical Innovation
Promoting student engagement: Interplay of perceived self-beliefs and teacher support in fostering positive youth development

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Gregory Arief D Liem, National Institute Of Education, Singapore
Rebecca Ang, National Institute Of Education, Singapore
Vivien Huan, National Institute Of Education, Singapore
Cognition, Motivation and Learning

Abstract

Promoting school success and academic achievement is an enduring topic of interest in education because of its usefulness as an indicator of student adjustment to school and as a predictor of future success. A student engagement perspective posits that active engagement in school is critical to foster student learning and adaptation, and academic success. Students who attend school regularly, have acquired the ability to self-manage their studies, adhere to school rules and are active in after school curricular activities generally perform better. Indeed, a growing body of research has attested to its emergence as a key summary marker of the quality of students’ experiences in school that contributes to learning and achievement. Through a cross-sectional self-report student survey study, we examine the interrelationships between students’ perceptions of academic efficacy and teacher support, student engagement (affective, behavioral and cognitive) and adaptive competencies (affective strengths; future educational aspirations, academic buoyancy). Participants consisted of 3776 lower secondary students from 11 participating schools in Singapore. The findings showed academic efficacy and teacher support to have different direct relationships with various student competencies and that these were also facilitated through different affective and cognitive engagement pathways. Academic efficacy was a more pervasive predictor across the identified outcomes as well as with behavioral engagement. Cognitive engagement mediates the effects of academic efficacy and teacher support on student competencies and behavioral engagement. The mediational role of affective engagement was only evident with academic buoyancy. The findings highlight the tenacity of the engagement construct in an East Asian school context, and its relevance and utility in understanding engagement with positive youth development.

Keyword: Adolescence