

## EZ Research Monograph Vol. V, 2017

### English Language and Mathematics

No	Title	Abstract	School	Author
1	Relationship between English Language and Mathematics Performances of a Cohort of Primary School Pupils	Concern over our pupils' Mathematics performance led us to undertake this correlation research. The study sought to determine whether the English Language and Mathematics performances of the same cohort of pupils over a five year period, starting from the second Semestral Assessment (SA2) in 2009 to SA2 in 2015, was positively related. Due to fluctuations in enrolment, the number of pupils who sat for SA2 across the five years varied between 193 and 203. Archival data was used for this study. The yearly English Language and Mathematics assessment results of this cohort of pupils were utilised to plot the relationship between their performances in the two subjects and to compute Pearson's correlation coefficient (r) in order to determine the strength, form and direction of their relationship. Data analysis showed that there was a strong positive relationship between the pupils' English Language and Mathematics results throughout the five years. The correlation coefficients ranged from 0.76 to 0.89. We found that pupils who were weak in their English Language tended to perform poorly in their Mathematics as well.	Chongzheng Primary School	Maznah Binte Yusak Farah Syed Haider Alsagoff Neo Li Hoon

## Mathematics

No	Title	Abstract	School	Author
1	Low-Progress Pupils' Experiences in Learning Mathematics	<p>The purpose of this research was to understand the mathematics experiences of our pupils with the view to identifying the mediating factors affecting their success or failure in the subject. 33 participants for this study came from a cohort of Primary 6 pupils who started their Primary 1 (Grade 1) schooling in year 2009. They had failed their Primary 3 (Grade 3) and Primary 5 (Grade 5) Mathematics examinations. Focus group discussions were conducted with the selected participants to collect data on their experiences in learning mathematics. While the pupils liked Mathematics, many of them were anxious when faced with challenging problem questions and concepts. Some of them attributed their past failures in Mathematics to their own lack of good study habits. They liked Mathematics lessons which incorporated hands-on activities, authentic data, and stories or analogies as they were engaged and were able to learn. Mathematics teachers who inspired them to learn mathematics were strict and firm yet understanding, patient and caring, and utilised co-operative teaching strategies as they preferred group work to individual seatwork (work that can be done by a pupil at his or her seat in school without supervision). Out of the three factors affecting underachievement in mathematics, namely, the pupil factor, the teacher factor and the environmental factor (Suan, 2014), this study showed that the pupil factor and the teacher factor strongly affected the Mathematics performance for this group of pupils in our school.</p>	Chongzheng Primary School	Maznah Binte Yusak Farah Syed Haider Alsagoff Neo Li Hoon
2	Enhancing Primary Math Problem-Solving Competencies – the Flipped Classroom Approach	<p>Making meaningful connections, understanding complex relationships and exercising analytical thinking are some of the skills sets which upper primary pupils (11- and 12- year olds) in Singapore need to acquire if they are to solve mathematical problem sums successfully.</p> <p>As Singapore moved into the second millennium, changes were made to the educational landscape such that the teacher-centred experience in a traditional classroom was gradually evolving into one which was more student-centric. The Singapore Ministry of Education's (SMOE) new initiatives, such as "Teach Less, Learn More" (SMOE 2004) and "Thinking Schools, Learning Nation" (SMOE 1997), which sought to better engage and encourage critical thinking in pupils, were a reflection of the new direction.</p> <p>It was against such a backdrop that the researchers at St Hilda's Primary School decided to use the Flipped Classroom to facilitate the ACTS Thinking Tool in improving pupils' mathematics problem-solving abilities. This paper, therefore, is an attempt to assess the efficacy of the Flipped Classroom in enhancing pupils' problem-solving competencies through the above-mentioned strategy in the following areas: pupils' attitudes (engagement and motivation), metacognition, concept-attainment and academic achievement. It also sought the parents' views on the Flipped Classroom as a pedagogical approach.</p>	St. Hilda's Primary School	Long Hian Kum Sri Asilah Binte Subari

## Mother Tongue

No	Title	Abstract	School	Author
1	Employing Videos as Stimulus to Cultivate Students' Oral Skills	<p>Psycholinguistics posits that oral expression is the external manifestation of language, and that there is an internal mechanism which brings about the spoken language. In this article, teaching methods aim to follow the three stages of this internal mechanism: (i) the planning of speech, (ii) the construction of speech patterns and (iii) the execution of the planned speech. Employing videos as media sensory aids, we aim to explore ways to effectively enhance the oral expressions of Secondary Three students.</p> <p>As an introductory medium, videos are better able to provoke thought due to their dynamic, lively characteristics that enable one to be immersed in specific scenarios. As such, it is easier to induce and provoke thought, as well as better encourage students to express their ideas.</p> <p>Firstly, when students watch the videos, we want them to pay attention to the plot, provide a simple summary and draw out the theme of the video. Next, we want them to share their viewpoints, and employ the theories of argument to elaborate on their viewpoints. Finally, we want students to succinctly conclude their arguments.</p> <p>In the course of teaching, one can better refine and aid the students' learning experience by also using mind maps as a supporting tool.</p>	Coral Secondary School	Xia Shuang

## Music

No	Title	Abstract	School	Author
1	Music Lesson Study: Binary and Ternary Forms	<p>Based on prior years' observations during teaching, and the review of music listening test scores by pupils, the music teachers realised that the Primary Three (Grade 3) pupils have difficulty identifying the musical form of a song (binary vs. ternary form) aurally. Hence, a lesson study on this topic was initiated to address this concern. Lesson study is a teaching improvement process that involves teachers working in a small group, collaborating with one another, meeting to discuss learning goals, planning an actual classroom lesson (called a "research lesson"), observing how their ideas work in a live lesson with pupils, and then reporting on the results so that other teachers can benefit from them. After ascertaining the link between movement and musical understanding via literature review, the Music teachers decided to create a lesson package using actions and movement to teach musical forms. The aim of the lesson study was to find out whether the use of actions and movement helps pupils aurally identify the musical form of a song. Detailed lesson plans and resources were developed. Peer observations and video tapings were completed for two of the Primary Three classes. Pre- and post-listening tests were administered to the pupils and the data collected was collated and analysed. One challenge faced was time constraints due to school events and the long break in between the two parts of the lesson study. A suggestion for the future lesson plan is to include the teaching of musical phrasing before introducing musical forms in order to help pupils appreciate the music further. Analysis of the pre- and post-listening test scores shows that 45% of the pupils have improved in their scores, which indicates that the use of actions and movement in teaching musical forms is indeed an enabler for pupils to aurally identify the musical form of a song.</p>	Canossa Convent Primary School	Wong Yann Yuh Evelyn

## Science

No	Title	Abstract	School	Author
1	Using the Flipped Classroom Approach in the Teaching of <i>Light and Heat</i> to Increase the Depth of Learning in Science	This mixed methodology study comprising both causal and qualitative research was conducted in 2015. The causal research (the investigation into an issue or topic that looks at the effect of one thing or variable on another) used post-test between-group to investigate the effectiveness of the Flipped Classroom approach for improving the performance of Primary 4 (Grade 4) middle-progress and high-progress pupils in Science, while the qualitative research (the investigation to gain an understanding of underlying reasons, opinions, and motivations with a view to acquire insights into the problem) examined the pupils' experiences with the Flipped Classroom approach. The intervention for the causal research consisted of a series of 10 one-hour lessons that were spread over a period of 10 weeks. The subjects in this study were 154 Primary 4 middle-progress and high-progress pupils. There were 77 high-progress and middle-progress pupils in the experimental group and the same number of 77 high-progress and middle-progress pupils in the control group. The quantitative data for this study was collected through post-tests while the qualitative data was collected via focus group discussions (the gatherings of pupils from similar backgrounds or experiences to discuss a specific topic of interest). The effect of the Flipped Classroom approach was measured by comparing the combined Light and Heat post-test scores of the control and experimental groups. The pupils' experiences with the Flipped Classroom approach were derived from the data from 4 focus group discussions. The results showed that, when using the Flipped Classroom approach for learning Light and Heat in Science, the experimental group of pupils had better post-test results than the control group pupils. The majority of the pupils in the experimental group liked the Flipped Classroom approach and had benefited from using it to learn about Light and Heat. However, some pupils did encounter difficulties in using the Flipped Classroom approach and these pupils also gave practical suggestions to improve its implementation.	Chongzheng Primary School	Lim Winnie Lim Yen Peng Linda Luo Youde Bryon Ng Zonghui Tan Mei San
2	From Theoretical Understanding to the Practice of Science as Inquiry	This study sets out to achieve two things. Firstly, it gets to the core of what the researcher is trying to do – revealing in a visible and tangible way, rather than on a theoretical basis, what an inquiry-based lesson can look like. Secondly, the researcher provides a framework in the form of a term's unit plan to guide a Head of Department of Science on how to design an inquiry-based curriculum that incorporates the academic rigour necessary in the Singapore milieu. The researcher, in his unique position as a Head of Department of Science, does the above by being fully cognizant of the challenges faced by both a curriculum-maker as well as a classroom Science teacher.	unggol Green Primary School	Long Soo Chiang, James

## Geography

No	Title	Abstract	School	Author
1	A Writing Framework for Level of Response Mark Scheme Questions in Secondary Geography – The Connective Approach in Geography Education	This research was carried out over a two-year period at Hai Sing Catholic School in Singapore. The aim of this research was to look into how best to enable students to score well in their examinations and develop the essential critical evaluation skills required for examinations and future employment as per the education directive. This paper discusses the problems faced by students when tackling the LORMS question (Level Of Response Mark Scheme question as specified by the Ministry of Education, Singapore) and the steps taken to overcome these problems. The desired outcome was to create a Writing Framework for student implementation. Throughout this research cycle, the Writing Framework was adapted according to students' needs. The paper later discusses the relevance and potential that the Connective Approach has within geography education. In particular, the students I taught improved almost immediately following the implementation of the Writing Framework. In addition, I was able to use the Connective Approach to instruct my students clearly and concisely on how they could achieve full marks for each LORMS question.	Hai Sing Catholic School	Hodkinson, Natalie

## Chemistry

No	Title	Abstract	School	Author
1	Teaching for the Understanding of Chemistry at the Three Conceptual Levels	Chemistry is perceived as a difficult subject by many secondary school students. It is highly conceptual and involves many abstract concepts. It is known that chemistry has to be understood on three conceptual levels – the macroscopic, sub-microscopic and symbolic levels. Adeptly linking the three levels is essential for a thorough grasp of concepts in chemistry. With the goal of developing a methodological approach to augment students' understanding of chemistry, we proposed a new lesson design framework that incorporates the three conceptual levels. This framework was aptly applied to the teaching of two concepts, namely, the strength of acids and the precipitation of salts. We envisage that the resources and samples of students' work shared in this paper would inspire like-minded educators to be more deliberate in applying the three conceptual levels of learning chemistry in their daily lessons.	Pasir Ris Secondary School	Koh Bing Qin Wong Yoke Ung

## Humanities

No	Title	Abstract	School	Author
1	Enhancing Students' Performance by Involving Them in Error Analysis	There are several learning gaps that History students face in their attempts to answer source-based History questions. Many lack the disciplined thinking needed for the subject, and as such, they are often unsure of what the questions are asking them to do and how to go about writing quality answers. To address these learning gaps, a team of History teachers from Damai Secondary carried out Action Research in 2016 and 2017 to investigate if error analysis would help students in Grades 10 and 11 write better answers. The team developed a 4-stage Package Approach to error analysis which was carried out during the school terms. Bite-sized learning was carried out before the error analysis package. In the process of the research, we have found that we were able to induce double-loop learning in our students. Moreover, students who have gone through the packaged lessons had improved in their academic scores.	Damai Secondary School	Ms Norharyati Hassan (1st Principal Investigator) Ms Rossana Ros (2nd Principal Investigator) Miss Abigail Tan (3rd Principal Investigator) Mr Chan Yong Hong Mdm Mariana Yunus Mr Zach Chong Wensheng

## Physical Education

No	Title	Abstract	School	Author
1	Apply Tabata as a Means to Get Students Active	Students' perception of participation in a specific high-intensity interval training (HIIT) was examined. Although traditional steady-state running has been proven to be effective for improving physical fitness, it requires a substantial time commitment. This research study adopted an extremely low volume HIIT to help students improve their fitness during their recess time. 44 lower secondary students (age: 13 and 14 years old) performed 10 days of supervised Tabata, a form of low volume HIIT, comprising a total of 4 minutes of exercise per session, where sessions of 8 reps of 20s sprints alternated with sessions consisting of 8 sets of 20s bodyweight exercises. The responses from this study suggest that Tabata serves as a means of getting students active.	Ngee Ann Secondary School	Tan Hee Pheng

## Physics and Biology

No	Title	Abstract	School	Author
1	Teaching Students to Apply Evidence and Reasoning in Supporting their Claims in Physics and Biology	This paper reports the findings and results of a framework aimed to support the students in crafting a scientific explanation comprising evidence and scientific knowledge. Motivated by the Singapore Ministry of Education's framework for 21st Century Competencies and Student Outcomes, Tampines Secondary School introduced the Claim-Evidence-Reasoning (CER) framework to the Secondary Three (Year 9) students during science lessons.	Tampines Secondary School	Ng Weilun Joshua Chow Weiliang