Nurturing The Reflective Practitioner

InSights

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- An Inaugural Issue -

RGS PeRL
Pedagogical Research Lab
Uncovering Wisdom Through Pedagogy

RAFFLES GIRLS' SCHOOL

RGS Pedagogical Research Lab (RGS PeRL)

A school based research centre set up in January 2010 which seeks to engender a culture of informed practice by nurturing the reflective practitioner who constantly seeks to refine his or her craft.

Ultimately, its goal is that the pupil – the purpose behind our practice – should learn better. With RGS as a test-bed for a host of pedagogical strategies and approaches aimed at high-ability Asian girls, RGS PeRL wants to build an inclusive network of like-minded educators interested in theory and evidence-based educational best practices, as well as cutting-edge programmes and innovative curricula.

Uncovering Wisdom Through Pedagogy

INSIGHTS

An initiative of RGS PeRL, an in-house publication which aims at sharing research contributions with the educational fraternity. In this issue, our contributors share their research findings, describe their pedagogical inquiries or reflect on their pedagogical practices.

We wish to extend a warm invitation to educators in RGS as well as from other educational institutions to share their research findings in subsequent issues of this publication.

Editorial Team


Mary George Cheriyan (Chief Editor)


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Foreword

Welcome to the inaugural edition of INSIGHTS, proudly brought to you by RGS PeRL. A few months ago, Director PeRL, Mrs Mary George Cheriyan, set in motion the planning and design process for INSIGHTS, with a deep conviction that, as educators and professionals, the RGS fraternity is at an important set of crossroads, asking of ourselves, "What next?". Let me set on record my congratulations to Mary and her team for their vision in this endeavour.

The questions we are now asking ourselves, as educators, fundamentally, are "how do we know what we are doing works?" and "what is our legacy, as educators, to the body of knowledge about what works in Singaporean – or even Asian – classrooms?"

INSIGHTS seeks to give voice, volume and timbre in the answers that RGS faculty members are seeking by providing a much needed platform for discourse on:

- their pedagogical inquiry, i.e., research findings from RGS, and
- their pedagogical practices; i.e., strategies that promote effective learning in RGS.

In this edition of INSIGHTS, you will find a treasure trove of research briefs, articles on best pedagogical practice field tested across different disciplines, guest articles by NIE researchers as well as a captivating insight on RGS Research Studies from both teacher and student perspectives. Each is carefully curated to provide a meaningful articulation of the multi-faceted and oft implicit and tacit practices that have been built up over the years.

If this inaugural edition is indication of what we can expect from INSIGHTS, I am confident that our collective voice, as a fraternity, will grow from strength to strength; we will make meaningful contribution to the education community; and we will certainly grow the level of professional satisfaction within the RGS community.

Welcome to INSIGHTS.

Filiae Melioris Aevi.

Mrs Julie Hoo
Principal

Foreword

When RGS became an independent school in 1991, we embraced the imperative to introduce innovative practices that fit our context. In 2004, when we embarked on the Raffles Programme, we decided that our learning environment will be unequivocally hinged on evidence-backed principles and theories; namely, in Gifted Education.

The setting up of RGS PeRL builds on this momentum of innovation and review. Our vision is driven by the school's strategic goal of being a world class educational institution for young women. We articulated it in the following manner:

Vision: To establish RGS as a reputed centre focused on research and pedagogy for the education of high ability girls.

Mission: To cultivate a culture of informed practice that promotes student learning and forms the basis for educational policy in RGS.

But we still pondered over the philosophy that will sustain our convictions in this new organization. After all, we are educators, not content with the ephemeral. Through a process of arduous discussions and ruminations, we finally articulated the following philosophy:

Uncovering Wisdom Through Pedagogy

This statement attests to the depth of thinking and persistence required of educators who wish to ignite learning, both for the students as well as for themselves. Robert Sternberg, who advocates teaching for wisdom, defines it 'the application of intelligence and experience toward the attainment of a common good.' A teacher who uncovers wisdom through pedagogy is not content with the coverage of facts and details but will explore ways of linking the knowledge to the real world, of applying the moral-ethical dimension to teaching and learning. The teacher reflects on the effectiveness of the strategies, gaining satisfaction from the effort and the successes.

There is an artistry involved in the effort.

This inaugural publication of INSIGHTS encapsulates the Voice of the RGS educators. The objective is to articulate facets of RGS' professional practices that are often, implicit. By so doing, we share our insights not only on good practices but also the impulses and convictions that drive and uncover wisdom through pedagogy. Our goal is to contribute to educational discourse within the RGS community as well as with the larger educational fraternity.

I wish to express my gratitude to the contributors to this publication and look forward to more articles from our colleagues, both in RGS as well as beyond.

Mrs Mary George Cheriyan
Director, RGS Pedagogical Research Lab

Performance Task as an Alternative Assessment: Contribution to Teaching and Learning

By Mary George Cheriyan, Tan Yen Chuan, Masturah Abdul Aziz, and Lucille Yap (RGS PeRL)

This paper was presented at the Redesigning Pedagogy Conference, Singapore, 2011, the Teachers' Conference, Singapore,2012 and the joint International Conference of the Australian Association for Research in Education (AARE) and the Asia Pacific Educational Research Association (APERA), Sydney, Australia, 2012.

Abstract

The objective of this research is to identify the key issues of using Performance Tasks (PT) as an alternative mode of assessment through teachers' and students' perceptions. The research followed a sequential exploratory strategy in which focus group interviews and surveys for teachers and students were conducted. Findings revealed that teachers and students recognise the Performance Task as a multi-dimensional and integrated approach to assessments, providing real-world scenarios for students to demonstrate their communication skills as well as critical and creative thinking skills. The study also identified challenges in the implementation of the Performance Task and crafting of the rubrics as well as adaptive measures that are needed to ensure consistency of practices in the school-wide implementation of the Performance Task.

Introduction

Educational researchers and practitioners have over the last few decades increasingly realized the limitations of traditional assessment methods which primarily involve memorization of knowledge. Such methods are perceived to be limited in their effectiveness in assessing the full spectrum of students' learning experience such as conceptual understanding, higher-order thinking skills such as critical and creative thinking, problem-solving, and soft skills such as communication and information technology (IT) skills. This has given rise to the need to have a multi-dimensional and integrated approach to assessments, in which students are allowed to represent their understandings in multiple forms such as visual, auditory, mathematical, scientific and literary (Eisner, 1999). The Alberta Assessment Consortium also asserts the importance of a 'balanced classroom assessment' in which a range of assessment strategies is used to ensure alignment between evidence of learning required and the assessment strategy selected. Moreover, the reliance on a high-stakes standardized testing has cultivated curricular practices that focus on the attainment of test scores rather than on meaningful learning (Tomlinson & McTighe, 2006). Such practices fail to acknowledge diverse learning styles as well as intangible but essential life skills such as verbal communication and responsible decision-making.

In Singapore, new strategies for assessing students' learning in classrooms have also received attention from educational policy makers, administrators, researchers, and practitioners, particularly since the mid-1990s (Fan & Yeo, 2000; Yeo, 2001; Gopinathan, 1999, Goh, 1997; Filer, 2000). However, in general, there has been a lack of research in this area, particularly on school-wide implementation of educational innovations within Singapore's educational context.

This project sought to investigate the implementation of a school-wide curriculum innovation in Raffles Girls' School (RGS), Singapore. Since 2006, RGS has implemented the "Performance Task" as part of the school's assessment framework, a performance assessment which involves demonstration of understanding in a real-world context.

The rationale behind this initiative was the need to recognize the different ways in which students display their understanding. This calls for more varied and authentic assessments to capture a complete spectrum of students' abilities and capabilities. Thus, instead of relying solely on intelligence and achievements test scores, alternative assessments will enable the use of multiple criteria and non-traditional measures to allow students to interact with a variety of learning opportunities (Passow & Frasier, 1996).

Another reason behind the implementation of the Performance Task is its alignment to the Integrated Curriculum Model or ICM (Van Tassel-Baska,1986, 1995, 2002) which forms the basis of the RGS curriculum. The 3 elements of this model are:

- Advanced Content
- Higher order process and product
- Overarching concepts and themes with salience to the real world.

The Performance Task, which allows demonstration of conceptual understanding and real world context, is well-aligned to this model. Schools have also subscribed to performance assessments as a strategy to strengthen holistic education (Harp, 1991).

The overarching research question in this project is:

"How does the school-wide use of Performance Task as an alternative assessment contribute to the quality of teaching and learning?"

The research questions that guide the study are as follows:

a) What are teachers' and students' perceptions of the implementation of Performance Task as a school-wide alternative assessment mode?
b) In what ways does Performance Task accommodate students' diverse expressions of understanding?
c) What are the factors contributing to the sustainability of the school-wide implementation of Performance Task?

Literature Review

Importance of Teachers' perception

Studies stress the need to take into account teachers' perception when implementing a school-wide educational innovation. Bloomer and James (2001) states that classroom practices are shaped by the values, beliefs and expectations of teachers, which include beliefs about teaching and learning, political and moral values relating to the purpose of education and expectations concerning the feasibility of certain educational innovations. It has also been acknowledged that teachers' perceptions and their differences in classroom practices are two fundamental factors that influence the way they teach, and how they motivate and engage their students (Brophy & Good, 1974; Skinner & Belmont, 1993; Hardre & Sullivan, 2008).

Value of Performance Task as an alternative mode of summative assessment

To develop competent students in preparation for the demanding and complex working world, many researchers have observed that the goal of assessment has shifted from the knowledge acquisition to higher-order thinking processes and competencies. Hence the Performance Task as an alternative mode of summative assessment is required because standardized tests such as multiple choice and timed assessment may not be able to achieve this goal.

As defined by the Alberta Assessment Consortium, Performance Assessment is a meaningful, real-life task that is based on real-world situations in which the student creates products and/or performances that demonstrate her key understandings of the big ideas in the topic. Performance Task also allows multiple measures of students' learning (Eisner, 1999; Tomlinson & McTighe, 2006) as the assessment allows demonstration of critical thinking (Howell, Brocato, Paterson, Bridges, 1999; Foo and Fan, 2007) and requires content mastery & conceptual understanding (MacLellan, 2004).

The nature of Performance Task allows students to see relevance in their learning, as they demonstrate their understanding by applying their knowledge and skills in a real-world scenario. Sambell & McDowell (1997) states that it is crucial that students perceive a task as relevant, that (a) they see the link to a situation in the real world or working situation; or (b) they regard it as a valuable transferable skill. McDowell (1995) also stressed that students should see a link between the assessment task and their personal interests before they perceive the task as meaningful.

Sustainability of educational innovative practices

To implement an educational innovation school-wide and to ensure its sustainability is not an easy feat. Recent assessments of a large number of educational innovations indicate that these innovations have been generally unsuccessful in achieving their goals (Berman & McLaughlin, 1976; Boyd, I979; Goodlad & Klein, I970; MacDonald & Walker, 1976; Stenhouse, i975).

In many cases this lack of success has been attributed to the fact that the innovations have not been implemented, or, at best, only partially implemented (Anderson & Robert, 1979; Charters & Jones, I973; Hall & Loucks, 1977; Paul, 1977; Rand, I975-78).

On the other hand, Performance Task, as an education innovation, has been successfully implemented school-wide in Raffles Girls' School since 2006. Hence, this study aims to investigate factors contributing to the sustainability of the Performance Task as a curriculum innovation.

Methodology

The research followed a sequential exploratory strategy in which focus group interviews for teachers and students were conducted, followed by surveys for teachers and students. The focus of the data analysis is primarily on the qualitative aspect, with the quantitative data used to support the qualitative findings.

Results and Discussion

Findings from the study are clustered around five significant themes which have been derived through the rigorous research process and analysis of data.

1. Performance Tasks as a multi-dimensional and integrated approach to assessments

Findings have indicated that the school-wide implementation of the Performance Task has achieved a multi-dimensional and integrated approach to assessments.

Teachers feel that the Performance Task allows students more opportunities to demonstrate creative thinking, while Pen-and-Paper Assessments (PPA) allows assessment of specific skills measured in a content-based context.

Similarly, students feel that the Performance Task allows different range of skills to be tested through the various modes of presentation, such as critical-thinking skills and oral skills. It also allows them more flexibility in finding different solutions to a single problem and therefore students feel that they are able to gain more experience and knowledge about the topic.

Discussion

As the Performance Task and Pen-and-Paper Assessments

assess different sets of skills and abilities, the study shows that having both modes allow students to display their best based on their different learning styles. While Pen-and-Paper Assessment assesses students' factual knowledge, Performance Task allows them to apply knowledge and skills in a real-world context, using higher-order thinking skills and problem-solving skills. Students are also able to develop their interests in a subject through exploration in the Task.

2. Performance Task as a Summative Assessment

The data have also indicated that the Performance Task, as an assessment of learning, complements Pen-and-Paper Assessments in enabling students' demonstration of their understanding. It is measured by how well students are able to apply their knowledge and skills through these assessments.

Students however, have a different interpretation of the concept "demonstration of understanding'. Some feel that these assessments may not truly demonstrate their understanding as it consists largely of "copy-pasting", ranging from the regurgitation of memorised answers, or lifting of information from other resources, to spotting questions and memorising the expected answers.

Discussion

Performance Tasks complements Pen-and-Paper Assessments, as both assessment modes are equally important in enabling the demonstration of different aspects of students' abilities. As students need to be aware of their thinking process, they will require the meta-language to articulate this process of thinking in the Performance Task as well as in other assessment modes.

In order to be able to differentiate the levels of "copy-pasting", students will need to be accustomed to the different levels of thinking in Bloom's revised taxonomy (1956).

Teachers may then need to makes a clear distinction between synthesis of information from various sources and work that is simply put together from resources without any synthesizing. To ensure fairness, both the Performance Task and the rubrics must be carefully designed to ensure that mere regurgitating of facts (copy-pasting) will not suffice in the first place. This is also applicable through all designs of assessment modes.

3. Sustainability of School-Wide Implementation of the Performance Task

3.1 Organizational Communication

It has been reflected that the concept and rationale of the Performance Task as a school-wide summative assessment have been clearly communicated to teachers and students. However, both groups raised the need to clearly define the assessment terminologies.

Discussion

The lack of clarity may have arisen due to the unfamiliarity with the RGS assessment framework or a dilution of the concepts of Performance Task and Alternative Assessment with the progression of time. Therefore, a common meta-language is needed in the articulation of assessment modes in the school. Nomenclature has to be clearly defined to both students and teachers.

Students will also need to understand the objectives of the various assessment modes in order for them to be able to fully optimize the benefits of these assessments.

3.2 Pedagogical Practices and Classroom Instructions

Teachers change their classroom practices to align with the requirements of the Performance Task. For example, when a Performance Task requires a demonstration of empathy, pedagogical strategies are put in place to develop the soft skills required of students.

Students have also acknowledged that there are different classroom instructions and teaching strategies in place to prepare them for the Performance Task, and that they have benefited from it.

Discussion

The importance of teachers' consciousness of the principle of alignment between instruction and assessment in the implementation of the Performance Task is highlighted, and this is also a key feature in the Understanding by Design (UbD) framework (Wiggins 2005).

(Eisner, 1999) has also argued that Performance Assessments afford an opportunity to use evaluation formatively and to treat them as an educational medium. This includes showing examples of good products, going through rubrics with the students and providing formative feedback to students, for example through drafts submission and clarifications.

3.3 Reliability and Validity of Rubrics

Findings indicated that the design of the Performance Task rubrics must ensure alignment to key understandings and that teachers would need to have the same expectations and understanding about the topic in order to design a rubric that is objective and reliable. Benchmarking is also an important factor to facilitate this understanding and expectation when assessing students' work.

There is also evidence which shows that the rubrics help students to understand the purpose of the Performance Task as well as give them the space and time to develop a solution that fulfils the requirement of the authentic

problem. However, some students have voiced out that the rubrics may have some ambiguity and they have trouble interpreting the rubrics even with the preparation given by the teachers.

Discussion

Teachers' consciousness of alignment of the assessment to key understandings is important when designing rubrics as this minimizes subjectivities.

(Wiggins, 1992) had recommended the use of multiple judges where possible and requiring inter-rater reliability, as with most teachers now testing and grading in isolation, students often end up with wildly varied grades for what is really the same quality of work. Therefore, measures such as benchmarking have proven to be an effective measure to reliably assess students' work.

(Wiggins, 1992) had also specified that in the "real" problem, the task is ill-structured but well-defined; the goal, specifications, or desired effect is known but it is not obvious how to meet it. This should be communicated to students to address their discomfort with the inherent ambiguity and open-endedness of the Performance Task rubric. Both teachers and students should understand that explicit assessment criteria should be available at the point when the assessment task was issued, and at the same time, recognise that broad and general criteria are also needed to capture what is important in understanding and thinking (Maclellan, 2004).

Recommendations

To ensure that RGS's assessment policy holds up to professional scrutiny, the use of assessment nomenclature will be grounded on established principles and concepts in the educational field. Nomenclature for both assessment terminologies and purpose of different modes of assessments should be clearly communicated to students so that students can articulate the language of the assessment.

It is also timely to review teachers' expertise in rubric construction to ensure that the design of Performance Task encourages conceptual understanding and ensures alignment to key understandings. The rubric should focus on higher-order thinking. Leithwood (1994) has argued that academic heads who are knowledgeable about the changes being proposed in their school, can provide evaluative feedback effectively to teachers. Hence, a refresher session on Performance Task design and coaching for all vetters is proposed to maintain standards in supervisory practices. In the refresher course, there is also a need to look beyond the Performance Task design format, and consider training in the articulation of higher order thinking in assessment and classroom instructions.

Based on the maturity of the Performance Task implementation in RGS, it may be timely to consider student involvement or feedback in the design of the Performance Task. Effie MacLellan (2004) noted that teachers should continue to be the major players in the assessment but students should have some say in the assessment of their work so that the idea of assessment does not remain foreign and abstract to them.

Different disciplines should consider wider practice of using multiple modes of presentation across all the Performance Tasks in order to ensure the context of the task is rich and allows different solutions to a problem. (Wiggins, 1992)

Conclusion

In general, the Performance Task complements Pen-and-Paper Assessments in providing a multi-dimensional and integrated approach to assessments. The real-world dimension of the Performance Task provides a level of richness and complexity that enables students to demonstrate their understanding in multiple platforms and accommodates different learning styles, while the standardized testing of factual knowledge and key concepts allows students to develop a set of skills and competencies required for mastery of the subject.

While the sustainability of implementing the Performance Task school-wide can be attributed to several factors, conscious alignment of classroom instructions and pedagogies to key understandings and assessment criteria is one of the key factors in preparing students for Performance Task. Also, on-going communication and review about the school's assessment policy is critical to ensure sustainable practices and belief about assessment innovations.

Limitations of Study

Results may have been affected by the one-year gap between focus group interviews and survey distribution. Initial findings from the focus group discussions have been reviewed and used to update training in Performance Task workshops, and thus these improvements could have been reflected in the survey responses. Also, as this pioneer project was re-framed in the later phases of the study, due to staff movement, there may be some loss of data and change in focus.

The data collection processes could also have been more rigorous. For example, while students' survey responses were optimal; a higher rate of teachers' responses would be more desirable.

Research techniques and design is also an area to be looked at for improvement.

Teachers working on rubrics

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The Qualities of Effective Teachers of High Ability Female Secondary School Students in Singapore: Teachers' and Students' Perspectives

By Dr Christopher John Slatter, ex Teacher-Specialist (Currently the Subject Head of Chemistry, Science Department, School of Science and Technology)

Introduction

Gallagher (2000) notes that gifted education programmes should be delivered by specially trained teachers who are able to identify and meet the particular requirements of gifted students, such as acceleration and differentiation. Stronge (2007) also notes that the classroom teacher is the single most important factor in a child's academic development. The logical conclusion is that gifted students should receive special education programmes that are delivered by specially trained teachers who are able to cater to their students' academic and possibly socio-emotional development. Their education – and whom it is delivered by – should not be left to chance.

It is clear that the identification of the qualities of effective teachers of gifted studentsis an important area of research. However, a review of the literature shows that it is an area in which authentic empirical research is lacking. Sternberg (2010) notes that, "…the field of giftedness has been less blessed by strongly designed research than have some other fields in education…"

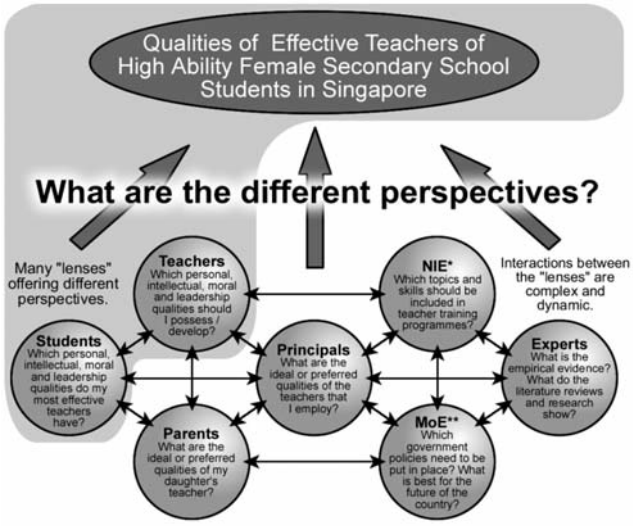


Figure 1.A conceptual framework to guide research into the qualities of effective teachers.
*Note. *NIE stands for National Institute of Education, a centre for research and teacher training in Singapore.*
*Note. **MoE stands for Ministry of Education, a government body in Singapore.*

The purpose of this study is to make a positive contribution to the literature that already exists on the qualities of effective teachers of high ability students. Figure 1 illustrates the different perspectives that can be explored when considering the qualities of effective teachers of high ability students. As a classroom teacher, I was interested in the teachers' and students' perspectives as the interaction between them is at the centre of all school based education and therefore, the focus of my research.

The results from this study can be used for the following: (a) To offer an Asian perspective on the discussions that surround the qualities of effective teachers of high ability students; (b) To improve teacher training courses; (c) Allow teachers to reflect upon, and improve, their own classroom practice; (d) To develop classroom observation scales in order to evaluate lessons.

Methodology

This research followed a sequential exploratory strategy (Creswell, 2009) which employs a three phase approach; collection and analysis of qualitative date (Phase 1) which is used to development an instrument (Phase 2) which is then used to collect quantitative data from a sample (Phase 3).

A convenient sample (n = 32) of high ability female students (mean age = 15 years) wrote essays to describe the qualities of their most effective teachers. The students were asked to describe the teachers' qualities in four domains: (1) Classroom management and leadership; (2) Intelligence and thinking skills; (3) Moral and ethical qualities; (4) Personality and socio-emotional qualities. They also had the option to write comments that could not easily be categorised into any of these domains. The students' hand written essays were coded in accordance with the guidelines suggested by Miles and Huberman (1994) in order

to identify significant, unique and mutually exclusive themes that best described the qualities of effective teachers according to the students' perceptions.

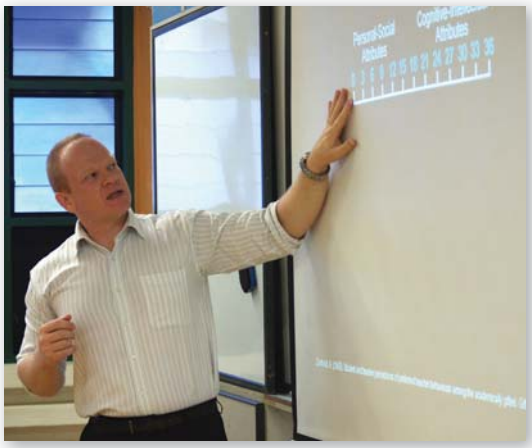
Results

The findings indicated that students respect their most effective teachers, and these teachers respect their students in return. The most effective teachers engage their students' attention through their knowledge and enthusiasm for their subject. They are able to give their students clear instructions while remaining cheerful, friendly and approachable. The most effective teachers are responsible individuals who are always calm and patient with their students.

Teachers believe that their most effective colleagues engage their students in the classroom and challenge them to think. They have a passion for teaching which is reflected in the enthusiasm that they infuse into their lessons. They are knowledgeable in their subject area and this allows them to provide clear instructions to their students. These teachers are professionals who are honest with their students and tolerant of their ideas, all of which allow professional relationships to develop between the teacher and their students.

A comparison of the teachers' and students' responses to the survey showed that both groups perceived that the ability of the teachers to explain complex ideas clearly and to engage students' attention as well as their enthusiasm and knowledge are important qualities. No qualities from the moral and ethical qualities domain were ranked in the top 10 qualities by both teachers and students.

The most statistically significant difference between teachers' and students' responses to the Likert scale survey were in the sub-scales for 'Cheerful Personality' and 'Responds to Questions, ' which the students perceived to be more important than the teachers.



Discussion

It can be concluded that high ability secondary school girls appear to value teachers who are approachable, caring, cheerful, enthusiastic, humorous, passionate about teaching, patient and tolerant of new ideas. However, this may not be unique to high ability students, but something that is simply endemic in human nature.

Results from this study may contribute to the development of existing teacher training programmes. Although it may be impossible for a person to learn how to be cheerful, enthusiastic or humorous, teachers can make a conscious effort to be more approachable, patient and tolerant of new ideas – qualities that may be developed through workshops, role-play and reflective practice.

Results from this study may also help to refine instruments for teacher evaluation; namely, greater value placed on teacher's personal skills and relationship with the class in addition to their pedagogy and cognitive skills.

This study shows that students do not value moral and ethical qualities in their teachers as highly as the other qualities that were investigated. This may be because the students have other people in their lives, such as parents, older siblings and friends who play a significant role their moral development.

The study also shows that teachers do not perceive high intelligence as a quality that is essential for all teachers of high ability students to possess. This may be because they believe that effective pedagogy is more important as it allows them to communicate ideas clearly and effectively to their students. Likewise for responding to students' questions, teachers may believe that their role is to use effective pedagogy, such as critical thinking and Socratic questioning, to encourage students to answer each other's questions rather than answer the questions directly themselves.

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Facilitating Interdisciplinarity in the RGS Curriculum

By Michael Francis Jalleh, Director of Academic Studies

Abstract

Can interdisciplinarity be taught and assessed in Raffles Girls' School (RGS)? The findings in this research suggest it is viable to design and assess interdisciplinarity. Defining interdisciplinary skills, developing strategies that inculcate them and assessment are all challenging issues. However, this research shows that a high level of inter-rater reliability can be attained using an adapted version of Boix-Mansilla's Targeted Assessment Rubric. The qualitative and quantitative data gathered through action research also strongly suggests that, interdisciplinary skills can be understood and applied meaningfully by 15-year old RGS students. Overall, the research challenges the perception that, as a concept, interdisciplinarity is nebulous and, thus, too difficult to be implemented as an educational approach for teenagers.

Introduction

School-based discussions about interdisciplinarity and inter-departmental efforts at conducting interdisciplinary Performance Tasks suggested that there were many interpretations of what an interdisciplinary task is and what the observable outcomes are when it is performed well. As a result of the lack of clarity, it was anticipated that it would be challenging to establish criteria for assessment and reliability.

The overarching question of this study is whether interdisciplinarity can be taught and assessed reliably in Raffles Girls' School. A number of sub-questions were necessary to uncover the answer.

The questions that guided the study are:

1. How should we define interdisciplinarity? How is it different from multidisciplinarity?
2. Using Boix Mansilla's Targeted Assessment Rubric, as a means of assessment,
   a. To what extent does a sample of RGS students demonstrate the acquisition of interdisciplinary skills after an interdisciplinary Social Studies lesson unit based on the Interdisciplinary Teaching Framework?
   b. How reliable is the Rubric when used by different teachers assessing the students' interdisciplinary products?
3. What are some of the factors that may influence the successful implementation of an interdisciplinary lesson? What were the difficulties faced by students in the interdisciplinary lesson?

Literature Review

A review of the literature uncovered general agreement on the importance of developing interdisciplinary skills but also a plethora of definitions of interdisciplinarity and, thus, differences in approaches.

As the accumulation of knowledge accelerates and intensifies in modern society, there is a need to be able to sift through information, integrate knowledge and provide coherence. Educational psychologists such as Howard Gardner advocate the need for developing interdisciplinary skills. He argues that there are five "minds" for the future – the Disciplined Mind, the Creating Mind, the Respectful Mind, the Ethical Mind and the Synthesizing Mind. He refers to the Synthesizing Mind as the "ability to knit together information from disparate sources into a coherent whole" (Gardner, 2007, p. 46).

These arguments for interdisciplinarity are echoed by a host of educational psychologists and practitioners including Lynn Erickson, Robin Fogarty and Heidi Hayes Jacobs (Erickson, 2002, 2007; Fogarty, 1997; Jacobs, 1989). Their terminology may differ but the essence of the argument is identical –interdisciplinarity is critical.

Moreover, if we consider the array of associated concepts like discipline, subject, multidisciplinary, cross-disciplinary, pluri-disciplinary and trans-disciplinary, the attempt at defining the concept is further stalled in a morass of semantic exercises. I decided to then focus on definitions that allow the development of performance-based assessment criteria.

One of such definitions is provided in BoixMansilla, Miller and Gardner's performance-based view of interdisciplinarity (BoixMansilla, Miller & Gardner, 2000, p18).

"Individuals demonstrate interdisciplinary understanding when they integrate knowledge and modes of thinking from two or more disciplines in order to create products, solve problems, and offer explanations of the world around them, in ways that would not have been possible through single disciplinary means."

It incorporates the elements of interdisciplinarity as elucidated by other researchers and, most importantly, it emphasizes performance and, thus, allows for the identification of specific learner outcomes. The outcomes are presented in Boix—Mansilla's Targeted Assessment Rubric:

a) The ability to select relevant knowledge, skills and insights from disciplines to inform the research question at hand or to solve a problem.
b) The ability to accurately employ disciplinary ideas, methods, findings and forms of communication from more than one discipline.

c) The explicit integration of knowledge in a way that is important in resolving the problem or in answering the question.
d) The ability to clearly articulate the need for interdisciplinarity in solving the problem or answering the question.

Methodology

Apart from identifying the factors for designing, implementing, monitoring and evaluating the interdisciplinary lesson, the key element in the research was the reliability test for the rubric.

The action research comprised of mixed methods in the collection of quantitative and qualitative data. The focus of the research was on the inter-rater reliability of assessments of interdisciplinary student products based on the Targeted Assessment Rubric.

The chronology for the milestones in data collection is represented in Figure 1 below.

Survey on students' attitudes + Interviews with students + Interviews with school leader
↓
Lesson Design based on Interdisciplinary Teaching Framework, Principles of Gifted Education and Understanding by Design
↓
Lesson Implementation
↓
Interdisciplinary Assessment
↓
Evaluation of Student Products using the adapted version of the Targeted Assessment Rubric
↓
Checks for Inter-Rater Reliability
↓
Interviews with teachers
↓
Interviews with students

Figure 1: Milestones in the research.

Results & Discussion

The evidence suggests that that the explicit development of interdisciplinary skills can be achieved in RGS students' interdisciplinary products and they can be reliably assessed. The students performed well in the assessment using the criterion-referenced rubric. The inter-rater reliability exercise strongly indicated a high level of reliability.

Whilst the Teaching Framework provides the specific learning outcomes that define a successful interdisciplinary lesson, there is strong evidence that the rubric is a very useful tool for assessing the acquisition of interdisciplinary skills. It can be used with a high degree of inter-rater reliability.

The literature review and the findings of this research point to a number of steps and approaches which can be taken to enhance the successful implementation of a lesson unit which seeks to develop interdisciplinary skills in a secondary school programme. These can be categorized into Curriculum, Instruction and Assessment.

Curriculum

The curriculum in the school needs to be based on disciplinarity. Students need to know what is at the heart of the discipline – the unique content, skills, methods, perspectives, key questions and modes of communication. As Gardner suggests, this may entail teaching less content. With fewer topics covered, curriculum designers should plan for greater depth (Gardner, 1999, 1991, 2000).

A process of metacognition or self-critique should be central to the educational process. The Philosophy for Children Programme in the school seemed to have had a positive effect on the students and facilitated the metacognition process, which was essential for interdisciplinarity. Metacognition is central to interdisciplinary thinking. Without it, students would not be able to demonstrate the relevance of the interdisciplinary effort and how the concepts and skills from two disciplines have been integrated.

Conceptual understanding, especially the notion of Macroconcepts, which is integral to the RGS curriculum, needs to be re-emphasized. Although students in the research expressed some skepticism towards the Macroconcepts , the literature review indicates that the ability to link seemingly disparate pieces of knowledge holds any student who does interdisciplinary work, in good stead. As Erickson and Gardner argue, the emphasis on conceptual understanding (and the use of Macroconcepts should facilitate this) enables the transfer of learning. This surely, is another prerequisite for interdisciplinarity– when students are able to see how elements in one discipline can be applied in an authentic situation or problem. Similarly any other effort at multidisciplinarity like the use of themes to link subject matter builds student capacity for interdisciplinarity.

Curriculum design for interdisciplinarity needs to take into account maturity, prior knowledge and experience and the learning preferences of students. As the research suggests, students in the Gifted Education Programme (GEP)had higher levels of interest in complex problems and in trying to resolve them. Non- GEP students may require more scaffolding and activities to generate interest. In line with this, it is also recommended that a gradual process of skills build-up be planned for students as they progress from Years 1 to 4. The focus in Years 1 and 2 should be on multidisciplinarity or exposure to analogical concepts, assuming that some efforts are simultaneously taking place in grounding the students in the disciplines. They then progress to interdisciplinary efforts where there is knowledge integration - building of ontological concepts. This should take place in Years 3 and 4.

Instruction

Time must be spent to develop interest in the subject and in the topic that is used for interdisciplinarity study. The students must care about the topic or

problem scenario on which the interdisciplinarity lesson in built on. Alternatively, the students must be sufficiently interested in the subject. Given the tedious and complex nature of interdisciplinarity research, students are unlikely to persevere if they are not driven to solve the problem or understand the topic. Teachers cannot expect interdisciplinarity efforts to be a means of building interest. When the pre-lesson and post-lesson survey results were compared, student interest did not increase. Interest is a precondition for and not an outcome of interdisciplinarity work.

The topic or problem must be multi-faceted and complex. It should be evident to the student that a single disciplinary approach would not suffice.

Curriculum differentiation must be present in lesson delivery. Some classes would require more scaffolding and guidance in analyzing the sources and developing disciplinary perspectives. Efforts at interdisciplinarity would fail if they do not take into account such differences.

A class culture of student-centred activity has to be built up. This is a necessary condition for interdisciplinarity to take place. Students have to work independently and in groups. The ability of the teacher to develop this and to facilitate group discussion is critical.

Assessment

As students are pragmatic and may take the cue on what is important from what counts towards their Progress Reports, the school should eventually assess students on their interdisciplinary skills. An interdisciplinary lesson may fail if students are unmotivated and performance is not tied to academic reporting.

To facilitate the assessment of interdisciplinary skills, a document providing a detailed description of scaled students' outcomes and standards for interdisciplinary skills at different levels should be prepared. This would act as a guide on what exactly is to be assessed and suggest how it could be measured.

Similarly, the use of Macroconcepts or any similar effort at multidisciplinary outcomes, should be assessed.

Challenges & Limitations

The nature of the study was dictated by the school schedule, schemes of work and the need to ensure consistency in teaching approaches. A number of factors influenced the approaches and strategies used in this research:

1. The school term and the scheme of work allowed for a specific window for the research only.
2. The topic of multiculturalism in Social Studies was identified as a topic that was most suited for interdisciplinary approaches. Not all topics were equally suitable.
3. The mode of assessment for Multiculturalism – Stimulus Response Essay complements interdisciplinarity. Other modes of assessment scheduled at other times in the academic year were deemed less appropriate for interdisciplinary approaches.
4. The academic year and summative assessment cycle only allowed for some experimentation to be done in the months July to September.
5. The reliability and validity of Summative Assessments dictates the need for uniformity in lesson delivery and materials issued to students. Interdisciplinarity is not a central assessment objective for Summative Assessment but is expected to complement the attainment of the leaner outcomes that would be assessed.

These factors precluded the possibility of experimental research with a control group.

Conclusion & Recommendations

There is room for improvement in the research on lesson design and assessment for interdisciplinarity. This includes the terms of the procedures as well as the scale of the research done.

Although much has been gained from the action research carried out, design research with a control group may provide more conclusive evidence of the benefits and outcomes of such a lesson.

A lesson design that seeks to integrate two distinctly different subjects is a more accurate measure of the difficulties in interdisciplinary understanding and skills. The current lesson design researched on required students to integrate knowledge from two similar disciplines – History and Geography. Both are within the Social Studies curriculum that also belongs to the same family of subjects under the umbrella of the Humanities.

There is a need for benchmarks in student performance. As some of the students pointed out, it was difficult for the students to figure out what the descriptors in the rubric meant and the standard that was expected. There is a need for exemplars. Thus, if similar lessons can be conducted in other schools and at other Levels within the school, it would be possible to make a finer calibration of the marking and of the rubric. More discussion and research are needed to work out the differences between student responses and the level of depth and understanding by students from different academic streams and age groups. It may also be useful to benchmark JC students' performance in interdisciplinary work with that of Secondary school students.

A larger number of markers from more contrasting disciplines need to be involved in the rating of student products. The number of scripts marked "blindly" should also be increased. Assuming that similar significant correlations are established, the findings would certainly strengthen the argument for the reliability of the instrument.

How Teachers' Disciplinary Background and Teaching Experience Influence the Type of Written Feedback Given to Students

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This paper was submitted to National Institute of Education, Nanyang Technological University, in partial fulfilment of the requirement for the degree of M.A. (Applied Linguistics).

Abstract

Given that written feedback has the potential to live well beyond the teachers' time with their students, it is imperative that teachers give quality feedback that will benefit students and support their learning. This paper reports findings from a study designed to examine how teachers' disciplinary background and teaching experience may influence their use of evaluative language resources.

Literature Review

Against the backdrop of a widespread acceptance of student-centred instruction and an intensifying drive for alternative assessments whereby students' learning can be evaluated in a relevant and valid manner, research has shown the importance of complementing classroom instructions with quality feedback from teachers (Hattie &Timperley, 2007; Guskey& Bailey, 2010; Power & Chandler, 1998).

Research from the last two decades has recognised the need for teachers to write effective feedback reports (Shirran, 2006) but has given scant attention to what evaluative language resources teachers actually use and how various evaluative resources can contribute to effective qualitative feedback. In addition, research shows that many students in secondary schools do not understand the feedback they get from teachers as a result of a lack of guidance on how to improve (Lee, 2008).

In a bid to address the problems identified above, this study was designed to examine how teachers' disciplinary background and teaching experience may relate to their use of evaluative language resources. Specifically, the research team was interested in exploring the linguistic aspects of teacher feedback by investigating whether teaching experience and disciplinary background have an effect on teachers' use of evaluative language in the evaluative reports they craft in response to their students' project work.

Methodology

Written evaluative reports on research projects done by students from Raffles Girls' School were collected from 84 teachers in the school, sampled according to their teaching experience (experienced vs. novice teachers) and disciplinary background (hard vs. soft disciplines). The teachers' use of evaluative resources was identified and coded according to the Appraisal framework developed by James Martin and Peter White (2005).

Appraisal theory

In a nutshell, the Appraisal framework is a theory of language resources employed in communicating evaluation, explaining how texts/speakers convey attitude (emotion, judgement of people and appreciation of objects), engagement (assessment of the evaluations of other people) and graduation (how writers may modify the strength of their attitude/ engagement).

The Attitude subsystem covers three areas: Affect (which deals with emotion); Judgement (which deals with human ethics and behaviour); and Appreciation (which looks at aesthetics). These areas further branch out into smaller subcategories.

In addition, an Attitude is further classified as either positive or negative. For example, with regard to Affect, a teacher may write:

> **"The team's effort was laudable." [positive satisfaction]**

Conversely, to express dissatisfaction, a teacher may write:

> **"It was a disappointing full-dress rehearsal." [negative satisfaction]**

The following is a further explanation of two other key areas in the attitude subsystem:

Judgement deals with the author's attitude towards human behaviour and in this case, relates to how teachers applaud or reproach the actions of the students. It could be a judgment on the group's capacity (i.e. their capability) such as:

> **"They were able to think outside the box."**

It could also be a statement reflecting the perceived lack of capability:

> **"The team started out with a slight misrepresentation of the problem."**

Judgement covers the following subcategories:

- **Normality** - how unusual someone is: "The group did not wish to be repetitive."
- **Tenacity** - how resolute, dependable and determined a group is: "This level of

commitment helped the team to pull through its toughest moments."

- **Veracity** - how truthful the students are: "The team members managed each other's weaknesses with frankness and tact."
- **Propriety** - how ethical and beyond reproach they are: "The team failed to complete a task despite repeated prompting."

The third area is **Appreciation**, which includes the following three subcategories:

- **Reaction** (Did the project, report or presentation grab me?)
- **Composition** (Was the report easy to follow? Was it consistent and logical) and
- **Valuation** (Was the project worthwhile?)

The 84 evaluative reports constitute the data set for this study and apart from those, an in depth understanding of the Appraisal framework was necessary for the textual annotations and analyses of the evaluation reports. Quantitative analyses of the data were carried out and qualitative analyses further revealed how disciplinary background and teaching experience may have influenced teachers' use of specific evaluative resources.

Results

With reference to Appreciation, quantitative data analyses showed that experienced teachers across disciplines used positive Appreciation more frequently than novice teachers (teachers with less than 3 years of teaching experience). One possible explanation for this could be that focusing on the processes, the artefacts and the research project (realised as Appreciation) instead of human behaviour (realised as Judgement) requires skill, pedagogical knowledge and strong subject mastery – areas in which experienced teachers may be more adept than novice teachers. Douglas (2009) argues that while experienced teachers are familiar with the institutional focus and the standards of assessment, non-experienced teachers may need to adjust to the

needs and expectations of the departments since they have been based in subject departments for a relatively short period of time.

This study also found that teachers with a soft disciplinary background (e.g.: Languages, Humanities) use Affect more frequently than teachers with a hard disciplinary background. A plausible explanation for the way teachers use Affect stems from the nature of the knowledge particular to a discipline. Hard disciplines are concerned with universals, quantities, simplification and tend to be impersonal. On the other hand, the soft disciplines are "concerned with particulars, qualities, complication(s) and tend to take into account the "personal" (Becher&Trowler, 2001, p.36).

Discussion

The findings reveal a need for teachers to be mindful of what should be included when they write reports and draw on evaluative resources. Teachers' written feedback should cater to the diversity of learners and reflect individual student's learning process. In the case of the RS report, as it is a summative piece of feedback with teachers rarely following up on the same group of students, the comments should provide specific feedback on the student's attainment of outcomes, as well as suggestions on areas to note for students' subsequent research.

Recommendations

In a schooling context where students' academic progress is measured by intra-school projects and assessments in lieu of nation-wide examinations, it is imperative that the evaluative report is an accurate representation of the students' unique learning processes and a genuine reflection of their needs as learners, while at the same time reflecting the rigor of the integrated programme, and providing useful feedback that can be acted on by the students in their quest "to become creators of knowledge beyond what a standard curriculum would allow" (Raffles Girls' School, 2010).

Although the present study has found significant differences in the way teachers across disciplines and levels of teaching experience use evaluative language resources, the Appraisal framework has a much wider scope beyond the category of Attitude. Consequently, more research is needed to investigate how teachers moderate the degree of positive and negative Attitude in their evaluation. Future research may also focus on training teachers in the use of evaluative resources and the effects of such training.

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Service Learning Experiences in Developing Altruism in Gifted Female Adolescents

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This paper is part of a dissertation submitted to the National Institute of Education, Nanyang Technological University in partial fulfillment of the requirement for the degree of Master of Education. The full dissertation entitled FACTORS INFLUENCING ALTRUISM IN GIFTED ADOLESCENT GIRLS- A QUALITATIVE STUDY was also presented at the Asia-Pacific Conference on Giftedness, Australia, 2010.

Abstract

This study aimed to identify the effect of Service Learning in developing altruism amongst gifted female adolescents in Singapore. The respondents were ten teacher-nominated gifted adolescents between the ages of 15 to 17 who had exceeded the mandated hours (12 hours a year) of voluntary community service in their school . Data were analyzed using a grounded theory approach. The study showed that service-learning experiences contributed to acts of altruism among gifted female adolescents. Results can be used as a guide to structure educational experiences, help foster a caring and socially-responsive classroom for gifted pupils, enabling them to use their talents for the betterment of society.

Introduction

Gifted children are characterized as possessing a more pronounced caring and moral ethic especially when contrasted with same-aged peers (Silverman, 1994; Roeper, 1992). The higher the child's IQ, the earlier moral concerns are said to develop (Silverman, 1994). These compassionate acts of altruism have been highlighted in a study by Terry and Bohnenberger (2003) where they cited the experiences of altruistic adolescents in their service learning projects in the community.

The Gifted Education Program (GEP) for high-ability students was launched in 1984 to provide them with an education that stimulates their individual growth and helps them to realize their full potential. Besides developing intellectual rigor, other primary objectives include developing humane values and creativity among the Singaporean gifted youth (Ministry of Education, 2009). Hence, the goal of the GEP is to prepare students not only with the mind (intellectual tools and attitudes to cope with the challenges of a fast changing society) but also the heart to develop values and abilities so that they can be in the forefront for the betterment of society (Quek, 1997). Although much has been written about creativity and giftedness especially in the Singapore context (Tan, Ho& Yong, 2007; Ee, Seng&Kwang, 2007), basic questions about what factors influence some gifted and talented people to become more altruistic than others have not been adequately answered (Terry, Bohnenberger, Renzulli, Cramond, & Sisk, 2008).

Our own observations on dealing with the gifted suggest that not all gifted youth who are exposed to service learning pursue it to what is beyond school requirements. But there are quite a few who appear passionate about serving others and voluntarily spend hours benefitting others. This observation led us to ask questions such as how service-learning activities could potentially bring about a change in gifted youths' attitudes towards serving others. More importantly, why do some individuals become motivated to serve others while others do not? This study seeks to find how Service Learning experiences contribute to the development of this helping behaviour (altruism) in female gifted adolescents.

Literature Review

Studies on altruism have so far focused on young children (Ma, 2003), adolescents and older children from Hong Kong (Ma & Leung, 1992; Chou, 1998) and non-gifted adolescents (Chiu &Nevius, 1989). Some empirical work was also presented on Chinese children and adolescents (Ma, 2003; Ma & Leung, 1992; Chou, 1998) regarding their altruistic intentions. A comparative study was conducted on the moral attributes of gifted and non-gifted students in primary schools in Singapore and China (Teo& Cheng, 2009) – but a similar study has not been conducted among gifted adolescents. Although a comparison study between gifted and regular children regarding their 'altruistic wishes' has been done by Chiu and Nevius (1989), research involving altruism among gifted adolescent Asians remains lacking in the literature.

Methodology

Ten intellectually gifted adolescent girls were selected as participants for the study. The girls, identified by their teacher mentors, were volunteers in overseas and local service learning programs. They fulfilled more than 100 hours of voluntary community service in the school while the average hours expected are around 50-60 hours. At

the time of the study, the respondents' mean age was 16 years.

The purpose of the data collection was to understand the motives of students and their experiences in regard to community work. Data collected was in the form of interviews, and a survey questionnaire was also administered to enhance the reliability of the study

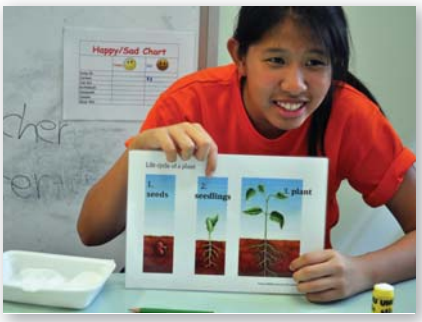
Results

The narrative themes which were derived from the interview transcripts point out that Service Learning experiences influence altruistic behaviour among these gifted adolescent girls from Singapore.

All the participants shared how service-learning transformed their thinking and developed them morally to become more responsive and empathetic towards communities in need. The overseas service-learning trip to Cambodia made an immense impact in creating awareness and sensitizing participants about real community problems and needs:

"I think I started OSL (overseas service learning) with quite selfish reasons. Like things I thought of was like it will a good experience, you will learn more and there was a lot of self-centred approaches and after going for OSL, one of the reasons it compelled me to sign up as a mentor was because I wanted to see people in Singapore, people around me empowered to be able to do the same thing and to go through the same experiences and to have their own learning and be compelled to serve other people in the future and not just take it as a one way thing. It comes naturally for me to be compelled to serve. "(RY, 16 year old student)

The data in the survey questionnaire indicated that 8 participants aspire for community service in the future. Seven of the ten participants stated that they treasured the experience and nine out of the ten reported feeling a sense of satisfaction while serving others.



"It all started with OSL Cambodia last year that exposed me to service and inspired me. Before that I wanted OSL for experience, I was not into service yet but after I went to Cambodia and all our reflections sessions, service became a bigger part of my life." (SH, 16 year old student)

Discussion

Research findings by (Terry, 2001) on the impact of service-learning on those served indicate that youth involved in service-learning positively affect the community. This is consistent with findings from this study where the benefits of service-learning were clearly illustrated in the experiences shared by the participants. Five of the participants were honest in admitting that they signed up to go to the overseas service-learning trip mainly due to personal reasons such as self-development, external motivation by peers and curiosity about the trip. However, they returned with a transformed mindset and volunteered to continue their services. They explained the sense of satisfaction they derived and happiness they felt as they helped their beneficiaries. The joy and gratitude exhibited by the beneficiaries were also heartening and a humbling experience for most participants. One of the participants shared the opinion that the gains in service-learning were intangible but powerful.

Reflection is an important component of service-learning when students process and synthesize the information and ideas gleaned during their service-learning projects. Reflective activities can help pupils to prepare for, be successful in, and learn from their service experience (Kinsley & McPherson, 1995). In service-learning, the reflection facilitated by the teachers enable students to synthesize their learning and see things from multiple perspectives and judge based on reasoning and evidence (Terry &Bohnenberger, 2003). Participants from this study spoke about how the reflection sessions conducted by the teachers were effective in making her think through her actions. These sessions helped to frame their experiences, change their attitudes towards service and made them think about what they can change within themselves.

Service-learning is one educational reform that has the potential to transform, not only our gifted youth, but society, as well, by creating a more caring, compassionate citizenry (Terry &Bohnenberger, 2003). The results indicate that service-learning cultivates caring youths who are determined to help underprivileged community.

Terry &Bohnenberger (2003) noted that good citizens are made, not born - as youths need to be provided with opportunities to care, to participate and to practice as members of a democratic society before they become good citizens. The narratives of the students indicated that their demonstrated moral development and passion for serving were largely brought about by their experiences in overseas service-learning activities. This differed from their experiences in community service in Singapore where students observe that the basic needs of underprivileged communities are usually taken care of by the government. When students raised in Singapore visit communities overseas, they realize how privileged they are and they feel a greater need to be of service to the people.

Conclusion

This study shows that service-learning provides a platform for the participants to demonstrate their concern for the community and subsequently empowers them to be more involved in activities that help people. The participants claimed that it was not easy to transform the community they served but yet they

persevered because they witnessed the impact of how their small actions may add to a big difference.

While the school strives to nurture gifted youths to have peaks of excellence in academic studies, a differentiated curriculum pathway for youths who have gifts such as empathy and sensitivity to human concerns must also be recognized and nurtured. The school's identification process for the gifted must allow for selection of gifts in this domain in young children. Educational objectives and approaches may do well to include service-learning as part of the school curriculum which can be tailored according to age, to provide opportunities and experiences to such potentially gifted pupils, who are often ignored because of an overemphasis in identifying and developing cognitive and leadership traits. As part of the development of this gift, the school needs to provide a structured learning experience and serving opportunities to scaffold the students in applying their talents for the good of the community.

Recommendations

This study focused on a small sample of female gifted adolescents who were nominated by teachers as having a passion for service-oriented activities. A comparative study between gifted and non-gifted adolescents can also shed light on whether the gifted have a greater propensity for altruistic behaviour.

A longitudinal study with gifted adolescents (both males and females) currently demonstrating altruistic behavior will be helpful to detect the full potential effects of service learning programs. This will help understand how students' civic behaviors change with continued exposure to service-learning activities, and further shed light on whether the hardware (infrastructure) has indeed led to a more nuanced and meaningful development of the heart-ware (greater social and moral awareness and empathy) among the gifted teenagers in Singapore.

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The Use of Self and Peer Evaluation Rubrics to Improve Scenario Writing Skills using Voicethread

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This paper was presented at the 5th International Chinese Conference, held in Hong Kong, in December 2011.

Abstract

Assessment for learning (Black and William, 1998; Black et al, 2003) contributes to good teaching and learning practices. This article reports findings on the efficacy of the use of self and peer evaluation rubrics via ICT tool (Voice Thread) and conventional method (hardcopy) to develop students' self-evaluation and peer-evaluation skills in order to improve their skills in scenario writing. The study was undertaken with Year 2 Higher Chinese students (aged 13-14) in Raffles Girls' School (Singapore). It involved 51 students from 2 classes, which comprised1 class of "1-to-1 learning environment using the AppleMacbook" and 1 class with a "traditional classroom setting" .

Introduction

In this study, the students adopted a systematic approach in their evaluation and reflection: exchange of essay / upload individual's essay to VoiceThread→ evaluating other's essays → self-evaluation → monitoring → planning → rewriting the essay based on feedback, with a greater amount of attention devoted to the monitoring strategy.

The intervention focused on scaffolding students' reflection of their written essay via self-evaluation and peer evaluation. The main sources of data were the recorded comments on the VoiceThread (class 210) and comments on the hardcopy rubrics (class 201). The mean scores of pre-to-post test of scenario writing were used to indicate the benefits of this approach.

The study was interested in answering the following:

- What is the impact of students' self-evaluation and peer-evaluation in helping them write a better essay?
- How effective is self-evaluation and peer-evaluation in improving the students' skills in scenario writing?
- How does the use of ICT tools (VoiceThread) improve students' writing skill as compared to the conventional method?

Generally, students face difficulty in ensuring that the message of the story is coherent and logical in Scenario writing. We wanted to find out whether self-evaluation and peer-evaluation are effective in improving students' skills in scenario writing.The intervention involved scaffolding students' learning by providing them with rubrics and a feedback template so that they can learn to do self-evaluation and peer-evaluation of the scenario essays. In line with MOE's ICT Masterplan 3 objectives, we also wanted to find out if the use of ICT tool in this intervention enhances students' learning.

We hypothesised thatthe students did not internalise both the learning objectives and the assessment criteria.

Literature Review

Literature review suggests that self-evaluation and peer-evaluation via a ICT platform is a viable learning tool. The VoiceThread allows users to comment on the essay by typing, voice recording and scribbling on the platform and they can do this anywhere and anytime. Thus, the students are likely to receptive to this intervention as a platform for peer evaluation and self-evaluation.

What does the literature suggest?

- Black and William, 1998; Black et al (2003) notes that assessment for learning (FA)aims to change teachers' classroom practice that can make teaching and learning more effective.
- Gibbons (2002) defined self-directed learning (SDL) as any increase in knowledge, skill, accomplishment, or personal development that an individual selects and brings about by his or her own efforts using any method in any circumstances at any time. Teaching SDL is about teaching the skills and providing the experience that students need to guide their own learning lives.
- The essential elements of SDL include student control over as much of the learning experience as possible; skill development; students' learning to challenge themselves to their best possible performance; student self-management: management of themselves and their learning enterprises; self-motivation and self-assessment.
- Chai and Tan (2010) defined collaborative learning as social interactions that are targeted towards deeper knowing.

Methodology

The study adopted a mixed methods approach in order to answer our research questions. We administered a survey for the participants after the first cycle of peer and self-evaluation, recorded the scores of pre-test and post-test and then, we did a comparison.

The survey was designed to collect both quantitative and qualitative

feedback from the students. Feedback was gathered on their perception of peer evaluation and self-evaluation and the challenges faced, from both the classes.

Through comparing the scores of pre-to-post test of scenario writing, we took note of the change of the mean scores as an indicator of the benefits of this approach. We also analysed the students' learning attitude and perception of using peer-evaluation and self-evaluation for formative assessment. In addition, we analysed students' feedback on using VoiceThread as an ICT platform for commenting and writing feedback.

Limitations/ Challenges

This was an exploratory study and hence, formal instruments of measurements were not used. The results of study are conditional due to the research design and procedure. It can be also be argued that self-evaluation and peer-evaluation are not the only factors that affect performance improvement. In addition, we overestimated students' language competency as well as the ICT skills. There were technical problems with Chinese input and so, a lot of time was spent solving these problems and teaching students how to use VoiceThread. Finally, the sample size was small.

Results and/or Discussion

The findings suggest that:

- self- evaluation and peer evaluation contribute to higher scores;
- there is a need for peer assessment training, guidance and quality control;
- students still view teacher as the sole provider of feedback and are less confident of their peers' assessment;
- students with better language competency tend to benefit more with self-evaluation and peer-evaluation;
- teachers should take note of the time needed for students to be familiar with the programme's interface.

Even if peer feedback is not be as accurate as an expert's feedback, there is merit in harnessing peer feedback to promote self-directed learning. As students articulate their knowledge, standards and criteria during peer feedback, their clarity of the assessment standards and criteria is sharpened. This, in turn, enhances evaluation of their own work. When guiding students to be independent learners, the role of teacher is very important. In this study, the teacher provided essay writing rubrics and a feedback template. The evidence shows that such scaffolding structures are useful in facilitating peer-evaluation and self-evaluation. It was also noted that the degree of performance improvement depends on the students' language competency and ICT skills.

Recommendations

What actions, if any, do your findings suggest should be taken or have already been taken?

- Quality of peer feedback can be enhanced by guiding prompts and specific training of assessors.
- Teachers should include instructional interventions to encourage students to be more receptive to their peers' feedback.
- Progress of the students must be monitored regularly.

Students need to learn the skills of peer-evaluation and self-evaluation. Thus, teachers should provide scaffolding and guidance at the initial stage through guiding prompts and role-modeling the appropriate way to give evaluation. With sufficient practice, the quality of peer feedback can be enhanced and students in turn, will find it easier to accept and learn to trust the feedback given by their peers. Teachers as facilitators should also provide timely feedback and feed-forward as students should not only be using peer and self-evaluation to improve. Feedback left unattended or not acted upon cannot be effective.

Further studies can be expanded to all classes in one level to help provide a fuller picture. A more comprehensive study can be done in the future by recording the actual lessons and taking down field notes in order to get more insights into how the teachers modify the lesson plans in the actual daily classroom context. Classroom discourse can also be recorded so that the interaction between the students and the teachers can be investigated.

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Using Assessment of Macroconcepts to Increase Metacognition and Disciplinarian Thinking

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This paper was presented at the Teacher's Network Conference, Singapore, 2010.

Abstract

'Systems' and 'Change' are overarching concepts in curriculum design and should be assessed in both formative and summative assessments (Van-Tassel Baska, 1986). In doing so, students will have the essential knowledge of the discipline which increases their disposition to interpret the world, (Mansilla& Gardner, 2008).

The scaffolding and the crafting of the assessment of macro-concepts through formative and summative assessments facilitate students' understanding and appreciation of the complex world, their metacognition and their ability to think as a Geographer.

What was the question you wanted to answer?

Does the concept-based learning in classroom activities and assessments develop students' disciplinary thinking; ie, the ability to use the meta-language and thinking dispositions of a Geographer? (Mansilla& Gardner, 2008).

What was your initial hunch about the answer to the question?

Generalisations and/ or answers given by the Lower Secondary Students (LSS) explicitly state the content relationships and patterns, e.g. linking the level of development to the extent of physical damage. As for Upper Secondary Students (USS), their points or arguments and interpretations are substantiated using specific evidences from chosen sources and disciplinarian concepts pertinent to the issue that is analysed. They link the issue with generalizations of overarching concepts to show transference and metacognitive abilities. Their reflective essay reflects metacognition of organization, transition and flow of ideas and arguments.

What did the literature suggest?

For high ability learners, many of whom are abstract thinkers and have a metacognitive disposition (Davis &Rimms, 2004), concept-based learning is integral to hone their thinking, assessment and understanding of the world, as reflected in the Integrated Curriculum Model, (Van-Tassel Baska, 1986). However, the lack of use of the meta-language of the overarching concepts like 'system' and 'change' in the teaching process, can hamper the level of abstraction in dealing with real world issues.

According to Mansilla and Gardner (2008), the ability to identify patterns across different topics and make generalisations that show the inter-relationships, help students to retain knowledge and understanding. A proficiency in disciplinarian thinking will assist them to appreciate the complexities of the world, as they integrate their disciplinary perspectives into new phenomenon. This will enable them to be more effective problem solvers (Mansilla and Gardner, 2008).

Educators need to consciously guide students in their formulation of generalisations as they analyse the data presented to them and not depend on incidental higher order thinking that only some students may have (Nickerson, 1987). Thus, a concept–based approach should be undertaken, where learning experiences focus on uncovering the distinctive disciplinarian disposition. This facilitates students' ability to contextualise their interpretation of the world. (Van-Tassel Baska, &Stambaugh, 2006).

What evidence did you think you would need to answer the question?

The students' ability to formulate appropriate generalisations on topics -namely, Plate Tectonics for LSS and an issue of their own choice for USS – would reveal the desired disciplinarian thinking. In this case, the emphasis was on the Human-Land relationship which is the essence of the Geography discipline. Furthermore, for the USS, their explanation of how the chosen source exemplifies the overarching concepts of 'System' and 'Change' would serve as evidence of their metacognitive abilities.

How did you go about collecting evidence?

Evidence was collected through purposive sampling of subjects from the classes taught by the researchers from the Upper and Lower Secondary Geography classes. To inculcate students' metacognitive abilities and develop their disciplinarian thinking, concept-based learning was implemented. This involved the explicit reference to overarching concepts like 'System' and 'Change' in teaching and learning. They were integrated in both the formative and summative assessments across the levels.

For the LSS, the overarching concepts of 'System' and 'Change' were explicitly integrated in the assessments and classroom instruction for the topic 'Plate Tectonics'. Students formulated generalisations for two sub-topics : Volcanoes and Earthquakes. They then compared the impact of the eruptions and wrote generalisations based on their study on two volcanic eruptions - Mount Soufriere in Montserrat, a less economically developed country, and Mount St Helens, USA, a more economically developed country. They also formulated generalisations on the impact of earthquakes after watching a short video on the Kobe and California earthquakes. During the activity, the teacher prompted students' thinking by posing questions that required them to compare the two case studies and elicit pertinent points that would facilitate the crafting of the generalisations.

At the Upper secondary level, a group of students in an advanced Geography class was selected for this research. They were required to choose a source in the form of an article, a photograph or a diagram, on any of the topics covered within the year, and write a three page reflective essay that explained and justified how the chosen source exemplified the generalisations of the overarching concepts of 'System' and 'Change' as applied in Geography. This would allow students to illustrate the essence of the Geography discipline, which is seeing the earth as a system from a spatial perspective with elements that interact with one another over time. Students were guided in their choice of issue, source and development of argument for the reflective essay. Teacher-student consultation time was provided over three weeks, giving them time to reflect and build on their initial ideas and arguments, and to ensure alignment and fulfilment of the assessment criteria. Students were required to show their annotations on the source of choice and explain how the source exemplified the generalisations of the overarching concepts during these individualised consultation sessions.

The formulation of the generalisations in their discussion on issues - Plate Tectonics for the LSS, and an issue of their own choice for the USS – should emphasize the man-land relationship, which is the essence of the Geography discipline, hence illustrating the desired disciplinarian thinking. Furthermore, for the USS, the explanation of how the chosen source exemplified the overarching concepts of 'System' and 'Change' would serve as evidence of their metacognitive abilities.

What challenges, if any, did you face?

For LSS, the point at which they were required to formulate their generalisation affected their level of abstraction: when it was immediately after watching a video, they were locked in by the details. Thus, more guidance was needed to help them to think more conceptually. As for USS, it was not easy to find appropriate sources in terms of the depth and breadth to enable them to exemplify the 2 macroconcepts.

What did the evidence suggest?

Generalisations – Topical and Overarching concepts of System and Change

The LSS had difficulty in coming up with generalisations on the impact of volcanic eruptions based on the comparative study of Mt Soufriere, Montserrat, and Mt St Helens. Thus, they needed some guidance. For the second attempt, the answers ranged from simple to more complex ones.

The incidence of simple statements containing precise details on Earthquakes was higher than those for Volcanic eruptions even though it was the second time that the students were formulating generalisations. A possible reason was that the worksheet which compared the effects of the Volcanic eruptions helped them to see patterns slightly more easily whereas the crafting of the generalisations for Earthquakes was done immediately after watching the video. The rich visual presentation could have caused them to be more locked into details rather than seeing and evaluating the content from a more abstract level.

As the USS had greater exposure to concept-based learning and the use of generalisations in the Geography curriculum than the LSS, they were naturally more adept. In their reflective essays, they were able to annotate and extract sources that substantiated their interpretations and arguments. Although the essays showed different levels of proficiency, the clear and astute exemplification of the overarching concepts of 'System' and 'Change' showed a depth of understanding.

Metacognitive Abilities and Disciplinarian Thinking

Students found it easier to formulate generalisations the second time (83%) compared to at the beginning of the year. The high percentage of students agreeing that they were more proficient in understanding and formulating generalisations testifies to the importance of tackling the content at a conceptual level and the provision of opportunities to hone their disciplinarian thinking.

The ideas and arguments in the USS's reflective essays showed maturity and complexity of thought. They were able to use the meta-language of the Geography discipline in their explanation of the interaction of the elements resulting from the Human- Land relationship.

What actions, if any, do your findings suggest should be taken/ or have already been taken?

Actions taken:

The concept-based approach was sound and definitely appropriate for the high ability learners. To enhance their disciplinarian thinking, students' critical thinking abilities were capitalised on and markers were identified in the teaching process to guide them through their thinking and eventually the formulation (LSS) and exemplification (USS) of topical and/or overarching generalisations. For the LSS, by requiring them to craft generalisations, they had to be

more conscious of their analysis and synthesis of information as well as of their conceptual understanding of the topic. For the USS, the reflective essay was an apt assessment in illustrating their metacognition of organisation, transition and flow of ideas and arguments.

Action that could have been taken :

Although scaffolding was put in place for the LSS, the integration of the generalisations of the overarching concepts of "System" and "Change" in teaching and learning could have been more explicit and frequent. Also, the deconstruction of their answers and the crafting of an improved version could have been done immediately instead of after the second attempt.

The USS faced some challenge in choosing the right source that provided them with the depth and breadth to complete the task. Thus, they required more scaffolding and constant facilitation to meet the expectations. The success in the implementation of such an assessment that required the illustration of a relatively high level of metacognition and disciplinarian thinking could be attributed to the inherent caliber of the students. It remains to be seen whether this approach can be applied to students with a wider range of ability.

What scope is there, if any, for further investigation?

We could replicate this study to include the entire lower secondary level in RGS and similarly include the other students who take Geography in the Upper Secondary classes instead of just those from the Geography Advanced classes. A wider sample may increase the level of impact and validity of the findings. Other Humanities disciplines could also explore the use of this strategy and similarly integrate the macro-concept in the summative assessment element. The widening of this practice across subjects contributes to the use of macro-concepts as curriculum organisers.

Correlations between Article Review and Watson-Glaser Critical Thinking Appraisal

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This paper was submitted to National Institute of Education, Nanyang Technological University, in partial fulfilment of the requirement for the degree of M.Ed.

Abstract

Article Review (AR) was designed in 2008 as an assessment for Year 4 Social Studies in the Raffles Programme (RP) in Raffles Girls' School (RGS). The objective of the AR is to enhance critical thinking (CT) in high ability learners. Students are provided two articles with contrasting viewpoints on an issue. They are required to review ONE of the two articles. The review requires students to infer, analyse and evaluate assertions, as well as question assumptions. Students are also required to make a judgment on whether they consider the article, including its arguments, to be a convincing one. In making the judgment, students have to consider the viewpoint offered by the second article.

Purpose

The research aims to evaluate AR as an instrument to develop and assess the CT skills of high ability learners (HAL) in the school's Social Studies curriculum. The first part of the study compares CT skills developed by AR with the five domains tested in the Watson-Glaser Critical Thinking Appraisal (WGCTA). The WGCTA was chosen as it was already used as an instrument in RGS to assess students' CT skills. In the second part, the study seeks to establish the correlations between students' performance in the AR and in the WGCTA. This study was designed to answer these questions:

1. What is critical thinking?
2. How does AR compare with WGCTA in terms of the CT domains being tested?
3. Is there a correlation between students' performance in the WGCTA and their performance in the AR?

As the AR is aimed at developing students' CT skills, it can be assumed that that there is significant correlations between students' AR scores and their performance in WGCTA across the various domains.

Defining Critical Thinking

The literature on CT offers many definitions which reflect the complexity of CT as a construct. This complexity is reflected by the multitude of skills proposed in various studies examining CT. Paul, R (1990) for example, identified 9 micro skills and 16 macro abilities related to CT. These numerous skills may confound teachers. Unless there is clarity on the core elements of CT, teachers will continue to grapple with its complexity, which may then impede the ability of teachers to effectively develop and nurture CT in students. The research therefore offers to define CT by identifying its core elements. From the definitions given by various studies, three core elements of critical thinking were mapped out as follows:

Element 1:
CT involves evaluating the validity and falsity of an assertion. Some definitions use the term "argument" instead of "assertion".

Element 2:
CT involves making a judgment that relies on criteria. Some definitions may emphasise "making generalizations" instead of "making a judgment".

Element 3:
CT involves metacognitive self-evaluation. Some definitions use the term "self-correcting".

Each of these three core elements may involve multiple thinking skills. This study speculates that the skills involved are determined by the nature of the actual task.

The Four Domains tested in AR:

1. **Identify Assertions:** Students are required to identify key or salient arguments, make inferences from a statement, as well as to distinguish arguments that are relevant and those that are not.
2. **Recognition of Assumption:** Students are required to identify and question assumptions made by an author.
3. **Evaluation:** Students are required to evaluate the soundness of arguments, compare different points of view, evaluate credibility of a point of view, evaluate validity and falsity of an assertion, as well asevaluate accuracy of evidence provided.
4. **Making a Judgment:** Students are required to develop a criterion in making judgment, consider the influence of context in making a judgment, as well as to present her own position or viewpoint on an issue.

Note:The AR rubrics contain 3 criteria. "Assertion" and "Assumption" are merged into 1 criterion.

The Five Domains tested in WGCTA:

1. **Inference:** Students are required to draw conclusions from certain observed or supposed facts.
2. **Recognition of Assumption:** In this test, students are required to decide for each given statement, whether an assumption is made, or not made, by the person.
3. **Deduction:** Students are required to judge whether a conclusion necessarily follows from a statement.
4. **Interpretation:** Students are required to read a short paragraph and decide, for each of the given conclusion, whether the conclusion logically follows, or does not follow.
5. **Evaluation of Argument:** Students are given a series of questions. Each question is followed by several arguments. Students are required to decide if an argument is strong or weak. For an argument to be strong, it must be both important and directly related to the question.

Figure 1: The specific CT domains tested in AR and WGCTA

Mapping out CT Domains in the AR and WGCTA

The specific CT domains tested in AR and WGCTA are compared in Figure 1.

For the two domains of "Inference" and "Evaluation of Argument", there appears to be a strong overlap between the AR and WGCTA tests. Both instruments have also included "Assumption". However, the degree of complexity is much higher in AR as students are required to identify and question assumptions, while in WGCTA, students just indicate a "yes" or a "no". In general, AR is also more challenging as students are required to review two contrasting articles and identify convergent and divergent views. In the AR, students are also required to make a judgment on an issue, based on the contrasting views presented in the two articles given.

Methodology

This study used quantitative data from Year Four students' year-end scores for AR and their corresponding scores in the WGCTA test. In total, 96 sets of scores were collected from each student using stratified sampling. Pearson's correlation test was then implemented and the correlation coefficients analysed.

Results and Discussion of Correlations Test

The data showed that the correlation between the total WGCTA scores and AR scores was not significant. In terms of the correlation between each domain in WGCTA and the AR scores, "Recognition of Assumptions", "Deduction", "Interpretation" and "Evaluation of Arguments" were also not significant. Only "Inference" scores were statistically significant, but the strength of the correlation with the AR scores was weak. The correlation test results were definitely not expected. Three reasons could be posited for the unexpected results.

1. There is a major difference in format between the two tests. WGCTA uses multiple-choice format while the AR uses essay writing format. This means that language factor could be a major influence in AR scores. While students may have high CT skills, their performance in AR could be affected if they were not able to express their ideas clearly in an essay.
2. There are other skills tested in the AR but not in WGCTA. For example, compare and contrast skills are required in the AR where students have to analyse two articles with contrasting viewpoints.
3. The insignificant correlation may be due to the AR rubric itself. AR uses only 3 criteria which may not be sufficient to assess CT skills fully.

Conclusion

This research has opened up interesting implications for the AR. It is recommended that the rubric be reviewed by expanding it to four criteria instead of three. This will make the rubric more effective and reflective of the CT skills that the AR seeks to develop and assess. The WGCTA scores also showed that students have a high level of CT skills. The challenge is for the Social Studies teachers to translate this high level of skills to high performance in the AR. One way is for teachers to infuse CT in a more salient and explicit manner in class.

Developing and Enhancing Essay Writing Skills for Higher Tamil Pupils

By K. Uthaman, Teacher, Tamil Language, Mother Tongue Department.

This research paper was jointly written with Mr Sambandam Mohan, a Tamil Language teacher in Crescent School. It was published in a booklet by the Ministry of Education, Singapore, on 'Action Research symposium: Discourse Perspectives on School - Based Researches by Tamil Language Teachers (2012).'

Abstract

This research aimed to improve students' writing skills involving points of view. Such skills are important as students need to know how a problem can be analysed from various perspectives. The findings indicate that the use of appropriate intervention methods can improve students' essay skills that involve points of view. Educators who teach Higher Tamil can apply or adapt the research findings and the intervention methods to their own classrooms.

Introduction

The objectives of this research are (a) to improve students' ability to look at a problem from various perspectives and (b) to improve their skills by clearly expressing their thoughts through their written work. The 21st century workplace emphasizes critical thinking. One way of developing and assessing critical thinking is by teaching students the skills of writing essays that involve points of view.

The **guiding question** to the study is:

What are the methods that can be used to enhance the way students express their points of view?

The practice of analytical thinking and reasoning contributes to the development of a critical thinker. An exposure to problem-solving and reasoning skills since an early age is an excellent way of developing critical thinking skills. Exposing yourself to questions that encourage thinking can also help.

In this research, students were given opportunities to express their views on a range of issues. The intervention methods were as follows:

Activity 1: Newspaper articles

Students were required to express their opinions about the selected clippings and write them out as passages at the end of the lesson. These clippings were taken from the local Tamil newspaper, Tamil Murasu. Issues included the following:

- The distance between local Indians and Indians from India needs to be reduced (01/01/2012)
- Encouragement of a bilingual education system.
- Polytechnic students should be given concession for their transportation fares too (18/01/2012)

Activity 2: Selected pictures

Students were required to express their opinions about selected pictures shown on a power-point slide and write them out as passages at the end of the lesson.

The pictures were of less fortunate children in Asia as well as those of children in Singapore. The accompanying questions sought the students' views of the different educational experiences of these children.

The students were required to respond to this question: "Do you think Singaporean children are fortunate?" Discuss.

Activity 3: Reflect on a particular scene in the movie

Students were asked to comment on a scene from a Tamil movie in which a person who was initially reluctant to donate blood, agreed to do so at the end of the scene:

Questions posed:

- What social dimension, do you think, is the director trying to highlight by weaving this scene into the movie?
- What, do you think, caused the main character to have a change of heart?

Activity 4: State opinions in a prose

Students were given an excerpt on how Man is fighting over religious and racial differences despite scientific advancements. They then expressed their own opinions on it.

Activity 5: Give opinions on movie reviews

Students were given selected movie reviews and were asked to express their opinions, both orally and in written forms. The following questions were posed:

- Did the reviewer write it from a fan's point of view or a critic's point of view?
- Did the reviewer critique all aspects?
- Was the review objectively undertaken?

Activity 6: Give opinions on viewpoints raised in debate

Students were shown a TV debate on the topic, "Are parents and teachers heroes? villians? or comedians? Students were asked to write out their views in an essay format and submit it at the end of the lesson.

A pre-test and two post tests were administered to students. The tests

required them to write essays on perspectives, that is, point of view. An adaptation of the thematic analysis method was then used. Students' essays were analysed for similarities and differences in their style of argumentation as well as for their strengths and areas of improvement.

Results and/or Discussion

The first post-test did not show any significant improvement in their grades. This was probably because the students did not take the first post-test seriously as it was not graded. Thus, the second post test was conducted in the form of a summative assessment. The second post-test produced better results for analysis.

The findings suggest that appropriate intervention methods improve students' writing skills. Since the students were constantly encouraged to analyse and evaluate critically, they understood the expectations of essays involving points of view. The students were able to look at both sides of an argument and understand the importance of discourse markers in argumentative essays. They also learnt the right usage of such words.

Teaching critical thinking is an ongoing process. It cannot be limited to just a few classroom sessions. It should be strictly carried out by some well-trained instructors.

Recommendation

This research can be improved through:

- Increasing the sampling size to improve the validity of this research
- Applying the intervention methods to students in mainstream schools to analyse their effectiveness for different types of learners. As this research was conducted in a school for high ability learners, the intervention methods may need to be modified to cater to the needs of students in mainstream schools.

Future research can look at argumentative essays (Are teenagers today courteous?) which is similar to point of view essays (Teenagers today are courteous. Discuss.)

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The Reflective Practitioner

By Mary George Cheriyan, Director, RGS PeRL

A part of this paper was presented at the Educational Research Association of Singapore Conference in September, 2011.

A teacher intuitively knows when his/her students are engaged in the lessons. The quality of their classroom responses, their written work as well as their level of attentiveness are some indicators of their learning. When I was a practicing teacher, I used to take great pride in my unit planning and delivery. I was, therefore, extremely perturbed when some students in my class, showed less than their usual enthusiasm towards a particular unit of study. I invited 2 of them to meet me so as to understand why. One of them told me that in the earlier units, she had been enthralled by the human dimension that I brought into History lessons. But in the recent units of study, this dimension was missing.

That feedback was so powerful. Using that student's suggestions, I completely redesigned the next unit on Industrial Revolution to include multiple representations of the event-Art forms, poems, parts of novels etc- and incorporated once again, the human dimension that appealed to these learners in the classroom. In the ensuing group presentations, the whole class astounded me with the quality of their work which reflected divergent thinking, creativity and whole-hearted engagement.

This experience was a defining one for me: an informal effort to inquire into my practice resulted in adjustments to a unit plan that reaped immense learning….for me. A seasoned practitioner.

Does this experience constitute reflect reflective practice?

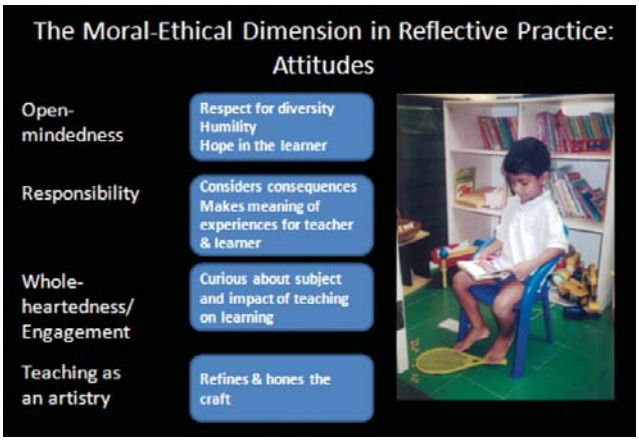
Donald Schon describes reflective practice as the habit of inquiring and investigating a problem situation in order to understand how to frame a solution (1983, 87). A reflective practitioner proactively seeks to understand why the students respond to the lessons the way they do. The teacher takes responsibility for the choices made in pedagogy, assessments and learningoutcomes. Rather than drilling the students with more and more worksheets and proclaiming students' ineptitude when they fail to do well, the reflective practitioner inquires into the various conditions that may impact students' learning.

As the Director of RGS PeRL, I took some time to derive a sense of purpose and mission in the notion of pedagogical research. As I delved into this issue, I realized gradually that there is a moral-ethical dimension in reflective practice: If we truly want to be a professional educator who empowers the students to be adept learners who have fun as they learn,while cajoling their minds to think deeper and more divergently, we need to have the humility to find out whether we have done that.

As Dewey notes, reflective practice requires traits of open-mindedness towards the learners, asense of responsibility for the curriculum choices that are made and a whole-hearted engagement with the teaching and learning process (Dewey, 1933). Other researchers also point out that teaching is a form of artistry that requires honing and reviewing to ensure its validity.

Thus, a reflective practitioner does not just have a repertoire of strategies and content mastery. This person is also mindful of the learners as complex, nuanced and multi-faceted beings who bring their diverse realities and learning styles to the classroom. As a parent, would you not wish that your children's teachers reflect this mindfulness?

The figure below depicts the attitudes that demonstrate the moral-ethical dimension to reflective practice.



Is systematic inquiry essential to reflective practice?

This is an important question to consider. I would like to put forward 2 perspectives to the question.

1. **Yes, reflective practice requires a systematic inquiry.**

   Dewey argues that reflective practice 'includes a conscious and voluntary effort to establish belief upon a firm basis of evidence and rationality'. The following reasons can be postulated:

   Firstly, data enables a shift from a reactive response to a reflective one. The integrity of a valid research process enables the practitioner to carefully assess the situation through the lens of objective, rational inquiry as opposed to mere gut feel.

   Secondly, research enables systematic enquiry (to be) made

public (Stenhouse, 1975). The legitimization of the research process adds credibility to the findings which can then be presented at external platforms; thereby, adding further knowledge to the field.

Thirdly, without a systematic inquiry, there is 'hegemony of habit' (Rudduck). In the absence of a rational inquiry, there is the likelihood of blind spots in our assessment of the problem situation as we are influenced by our inherent preferences and biases.

2. **Maybe not, reflective practice may not require systematic inquiry.**
   Seasoned practitioners can argue that the systematic collection of data in itself does not necessarily constitute reflective practice. What matters is the teacher's willingness to step aside from inherent preferences and prejudices and evaluate the situation with the sincere desire to improve the teaching and learning experience.

Kegan (1994) sums this up eloquently:

…..being able to think (reflectively) is not just a discrete skill, it is an active demonstration of a mind that can stand enough apart from its own opinions, values, rules and definitions to avoid being completely identified with them. It is able to keep from feeling that the whole self has been violated when its opinions, values, rules or definitions are challenged.

So, does my earlier anecdote of my History lesson constitute reflective practice?

I believe as far as my willingness to 'stand enough apart' so as understand the students' perspective and change the unit plan accordingly are concerned, I demonstrated reflective practice. However, as I do not have tangible data and a research methodology that can be articulated, I am unable to share these findings with the educational fraternity with credibility. Thus, this experience remains anecdotal at best.

The goal of RGS PeRL is to encourage both forms of reflective practice.

We need the habit of open-minded, responsible, whole-hearted inquiry that hones the artistry of our craft. However, if our aim is to share that knowledge at external platforms, we need the systematic inquiry.

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History is a Foreign Language? Historical Thinking and Writing as Exemplified in British Policy and the Chinese in Singapore, 1939 to 1955

By Lee Su Yin, Head of Department, Humanities Department.

Abstract

Why do students find it hard to write like historians? History is indeed hard as it is almost like a foreign language to the uninitiated and it can be quite daunting because history requires the student to "be expressive and critical". Students like to think that we, teachers, want to know 'HOW MUCH THEY KNOW'. The truth is what we really want to know is 'WHAT THE STUDENTS CAN DO' with what they know. Well, one thing that they ought to do with what they know is to write like a historian. This will allow them to ask difficult questions about events, personalities, values and the assumptions that arise from them. On top of that, students have to construct a story based on what they think constitutes the truth of that past by reasoning with evidence. New research on history learning suggests that historical thinking lies at the heart of historical instruction. Hence, to write like a historian, students must think like a historian. Once they think like a historian, writing is not hard any more. In fact, it is the thinking that is hard, not the writing. (1) Allow me to share with you my application of historical thinking - the capacity to reason, analyse, criticise and evaluate - into a study of British Policy and the Chinese in Singapore, 1939 to 1955.

The Question

Historians see themselves as detectives of the past, often curious and unsure about what had transpired and almost always never agreeing amongst themselves on what is the significance of those events. For me, a question I wanted to address in the book is this: "How did the colonial authorities try to maintain law and order in a colony dominated by a migrant population during the twilight years of British colonial rule in Singapore?" The Chinese community constituted the largest ethnic group in the colony, and they were not homogenous. They were made up of people who were distinguished by their speech group, economic background, nationality and ideology. Aware of the divisive nature of the Chinese community, how then did the British exploit that fragmentary structure to suit their designs?

The solution was to find a mediator, such as Tan Chin Tuan, who was an important intermediary between the Chinese business sector and the colonial government at that time. He was, in fact, the highest-ranking non-European government official and spokesman for Chinese economic interests in the Legislative Council. Hence, my second objective was to document and examine the dimensions of Tan's public service career so that a deeper understanding can be developed on how British colonial power made use of these leaders to liaise with and also, promote its rule over the community.

What were my sources of evidence?

My study was made possible because of the availability of new sources: firstly, the papers contributed by Tan Chin Tuan, and theinterviews I had with him over the years and with those who knew him. Secondly, the availability of official government records disclosed by the Public Records Office, United Kingdom, over the past decade under the thirty-year rule that governs the release of official documents. In Malaysia, the files of the British Military Administration (Malaya) and in Singapore, non-classified files of the Secretariat for Chinese Affairs are also now open to researchers. These were the main historical sources I hadinterrogated to form reasoned conclusions on Singapore's formative period.

One challenge I faced was that the pieces of historical evidence were often fragmented and contradictory. But since this was all I had to go on, I had to readthe sources closely, contextualising them and corroborating them.

What were my findings?

A number of key conclusions were uncovered: the decade after the end of World War Twowas a formative phase in Singapore's socio-political history because the period spelt the beginning of the end of a European-dominated public administration, laid the foundation for the transfer of political initiative to the local population, and nurtured a radical anti-colonial movement intent on getting rid of the British as quickly as possible. Even though the British had wanted to dictate the island's constitutional and political developments, the left-wing nationalist leaders were able to mobilise the masses and became a key element in determining Singapore's political future.

Tan Chin Tuan rose to positions of high office in the colony because he was an extremely talented and capable man who had deep-seated connections with both the British and the Chinese. Although Tan's withdrawal from public service was a career decision, the socio-political conditions which developed in Singapore after the end of World War Two also made it exceedingly

difficult for anyone to assume effectively the role of a political broker between the government and the Chinese community. With the availability of materials by Tan Chin Tuan and access to recently released government records, it is now possible to examine the subject in depth.

Writing the book affirms my belief that history is a discipline with its own unique questioning framework and set of concepts. As a discipline, history adopts a particular approach to investigating the past. The investigation is conducted by looking at history through the conceptual lens of evidence, chronology, cause and effect, significance, change and continuity, perspective, and not to be treated lightly, the ethical dimension of historical interpretation. The ethical dimension cannot be neglected because historians often have to make value judgements of what to include – or exclude – from the questions they formulated. Historians also have to make hard choices about what is worth remembering. The past is simply too much – and sometimes too controversial - for anyone to recall, memorialise or paint as significant.

Deputy President of the Singapore Legislative Council, Tan Chin Tuan, signs documents in the presence of Governor Sir Franklin Gimson (Source: David Ng Collection Courtesy of National Archives, Singapore)

Who can benefit from the findings?

The findings of my study have been published as an academic book in 2011, and according to the historian-reviewer, this study "fills an important gap in the studies of Singapore's history, as hardly any account has narrated these developments including Tan [Chin Tuan]'s role to show how Singapore's China-born Chinese became Singapore citizens in such large numbers, and how they then went on to exercise their franchise rights by voting in the left-wing PAP, a communist united front organization comprising many Chinese-educated candidates, into power in 1959…. It is a pioneering work that makes a significant contribution to Singapore's history. I would highly recommend it not only to students and teachers, but also to the general reader."

As you can see from the above, historical writing resembles nothing close to mindless memorisation of facts, dates and names. History is what historians do. So, let's start regarding history as a verb - a process/an activity/a story that historians tell/questions that historians ask – rather than as a noun.

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The Teaching and Learning of Mathematical Modelling for a Secondary School

By Kwek Meek Lin, Senior Teacher, Mathematics Department and Ko Hak Chin, Subject Head, Mathematics Department.

Abstract

The mathematics curriculum in Singapore is designed around a framework with "Mathematical Problem Solving" as the central focus (Ministry of Education, 2001). With increased emphasis on 21st century skills, the framework was revised to include Applications and Modelling as one of the mathematical processes for fostering problem-solving skills. In Raffles Girls' School, the Mathematics teachers took on an exploratory approach to incorporate the basic elements of mathematization, solution, interpretation and reflection into the mathematics curriculum.

This paper presents snapshots of teachers' experiences with designing and implementing mathematical modeling tasks, classroom facilitation and their impact on using mathematical modelling as a pedagogical approach and as a learning tool for students to apply their mathematical knowledge. The case study reported is part of a bigger study that aims to integrate elements of mathematical modeling into the current RGS Mathematics curriculum.

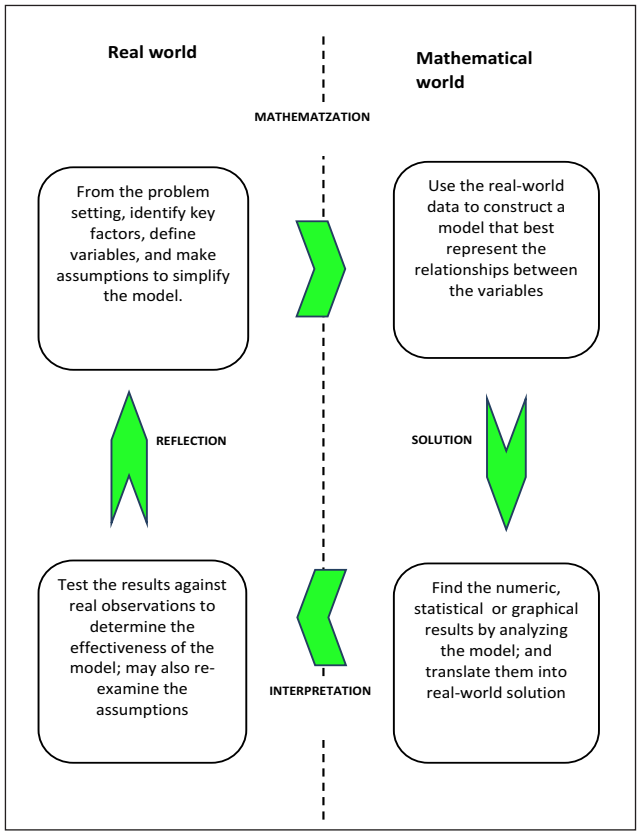
What is mathematical modelling?

Mathematical modelling is a process of describing a phenomenon and representing the behaviours or properties of a real-world system. These representations, often also known as mathematical models, can take the form of a system of equations, a stochastic process, a geometric or algebraic structure or even just a set of numbers. In this description, the term real world system could refer to a physical system, a financial system, a social system or any other systems whose behaviours can be

observed (Dobson, 2003). By analyzing these models, they are useful in helping us (1) gain an improved understanding of a system, the factors affecting it and the relation between its parts; (2) simulate and make predictions about a system's behaviour in the future, which could otherwise be expensive, hazardous, impractical or impossible to experiment.

What is the process of mathematical modelling?

A mathematical model can provide insights into a real-world system; and so, it is a useful tool for solving real-world problems or obtaining an approximation of real-world solutions. The process of mathematical modelling can be defined generally in the following schema adapted from Kaiser (1995).



The modelling process is similar to the scientific inquiry process, which includes (1) making a general observation of phenomenon, (2) formulating a hypothesis; (3) developing a method to test the hypothesis; (4) obtaining data; (5) testing hypothesis against data; and (6) attempting to confirm or deny hypothesis. In the case of mathematical modelling, the hypothesis is a mathematical model.

What are the constraints and affordances for the teacher in bridging the gap between theory and fieldwork?

Essentially, this research question seeks to address the relevance of mathematical modelling within the RGS Mathematics curriculum.The Raffles Approaches to Foster Learning (RAFL) framework undergirds the design of the learning experiences in all disciplines in RGS, including Mathematics. Under this framework, students undertake performance tasks with a focus on the application of mathematical concepts in real-world contexts. These activities often identify the mathematics or students to demonstrate their understanding within an authentic context; such as exponential functions in population growth models, trigonometric functions in

wave models, quadratic functions in supply-demand models, and logarithmic functions in Richter scale. In contrast, mathematical modeling tasks demand that students identify and gather knowledge about a real-world problem, and creatively apply their mathematical knowledge to productively solve the problem. By incorporating mathematical modelling into the school's Mathematics curriculum, it provides an added dimension to the students' problem-solving experience.

The critical comparison between performance tasks and modelling tasks shows that RGS students are already exposed and equipped with skills necessary for solving problems in the "mathematical world", but lacking in those needed in the "real world". More specifically, the RGS Mathematics department identifies the problem-solving skills of mathematization and reflection as essential competencies to be taught in the classroom, in order for students to engage themselves in mathematical modelling effectively.

What is the scope and sequence in teaching about mathematical modelling?

When teaching about mathematization, students learn to pose mathematical questions about a real world situation, explore a range of possibilities, answers and develop a critical perspective of things within a given context. The teaching of modelling was conducted in phases and varied in accordance to students' level of readiness:

(a) Present visual stimuli such as newspaper articles, photographs and videos to arouse students' curiosity about a real life situation
(b) Pose questions to facilitate students' divergent thinking about a problem area and then converge by identifying a problem statement related to the given situation
(c) Probe into the mathematical relationships between the factors involved in the real life situation and guide students in developing a hypothesis or model
(d) Equip students with skills related to ICT tools and probes such as motion sensors to collect real life data and analyze them for answering the problem posed.
(e) Expose students to the effects of assumptions made in constructing a model and its possible limitations.

How does a mathematical modelling task look like?

The design and demand of a modelling task are dependent on the mathematical maturity of students. The following are some examples that the teachers have used with the students from Year 1 to 3.

What are the findings from the exploratory study?

Many students responded positively to the mathematical modeling tasks. Some of the positive outcomes include their appreciation for the opportunities to see the real world situation through a mathematical lens, and the emphasis in using mathematics as a tool for reasoning and justification. The survey data also revealed that there are some students who tend to perceive mathematical modelling as a form of content knowledge. As a result of such perceptions, this group of students generally commented that they did not think their mathematical skills have improved as a result of their exposure to modeling tasks. Lastly, it was also found that there was a distinction between task engagement and task relevance to the students.

Reflection

From the students' perceptions of mathematical modelling and teachers' feedback in conducting the lessons, it is recommended that the modelling tasks be refined for greater student engagement, and increase the use of bite-sized modelling tasks for increasing teachers' confidence in facilitation and students' competency in modelling.

Levels	Modelling tasks
Year 1 focus on identifying factors and variables	Your parents have decided to convert to smartphones for the whole family, including yourself and your elder sibling. They have given you the responsibility to find the mobile phone plan that best meets your family member's individual needs.
Year 2 focus on collecting and analyzing data	Your sports shop wish to investigate to publish the bounce ability of different types of sports ball – Basketball, Volleyball, Soccer ball, Table tennis ball. Discuss why the balls are suited for its associated sports.
Year 3 focus on posing problem and interpreting results	 Source: China's Great Wall of Traffic Jam: 11 Days, 74.5 Miles The traffic jam occurred on the outskirts of the Chinese capital, Beijing. "By the end of 2009, Beijing had four million cars, a growth of 17 per cent over 2008. Experts say the urban layout forces people to buy cars and the city planning leaves people no choice but to travel."- Text Source: AP, PTI

Ruminating on Rubric

By Tan-Tham Kum Chee, Head of Department, English Language & Literature Department.

Introduction

We have been thinking…

Traditionally, we use a Levels of Response (LoR) approach in assigning a score to students' Use of English in written work for English Language. Five bands are used, and each band has a range of 3 or 4 scores [A ('Excellent' band) = 16-18; B = 13-15; C= 9-12; D = 5-8; E ('Limited' band) = 1-4] making a possible total of 18 marks. Descriptorsfor each band spell out what a student must demonstrate if she were judged to have scored a mark in that band.

At a benchmarking exercise, teachers typically would discuss (i) the band that a script would fall into, (ii) the specific mark in the 3- or 4-marks-range in that band that the script should earn. The first decision is arrived at by paying attention to how well a script fits the description in a band. The second decision involves a comparison between scripts. Say scripts X and Y are both judged to fall in band C; further, X is judged to have scored 10. We then ask, "While X and Y are both band C work, is Y stronger or weaker than X? How so?" Based on the evidence of work, a team at a benchmarking exercise can come to a consensus on whether Y scores 9, 11 or 12.

The challenges of scoring using this LoR approach are:

For teacher/assessor

1. If seven bullet points make the description of a band, how do we score a script that fits 4 of 7 bullet points in one band and 3 of the 7 bullet points in a higher (or lower) band? How does the 'best-fit' principle apply when there is evidence that a work best fits part of the description in one band and also best fits part of the description in a neighbouring band?
2. Within a band, we are expected to discriminate further by awarding a mark out of a range of 3 or 4 marks. How do we ensure consistency in exercising such discrimination within a band?

For students

1. What information can a student reliably draw from a score? Say a student scores 10, i.e. C-band Use of English. Does it tell her that she has demonstrated a grasp of grammar that is adequate for communication expected of a 13-year-old? Or does it tell her that she has slipped up sometimes on spelling,punctuation or register,and that those slips can be forgiven and therefore she did not fail? Or does it tell her that she is sound in punctuation but her vocabulary range is not sufficiently nuanced to convey shades of meaning?
2. Given her current score in Use of English, does a student know what she should work on if she wishes to score higher the next time she produces written work for English Language?

Discussion

A Change

Instead of LoR, we designed a rubric with five criteria and four standards to score the Use of English. The criteria are grammar, spelling, punctuation, vocabulary and expression – or what is commonly understood as mechanics in writing. The standards are (in ascending order of achievement): Limited, Adequate, Proficient, Excellent. The assessment on which we apply this rubric requires Year 2 students to submit a 800-1000 word biographical excerpt.

We learnt…

Of the five criteria, the most 'useless' is 'spelling'. When some 98% of the students scored '4' (excellent) (the remainder 2% scored '3'), it simplytells us that our students can spell. This is not surprising as students were allowed to submit a word-processed work. In fact it may be perceived by some that the 4 marks for spelling is a give-away. At review, when the question was posed – should we remove this criterion – one teacher responded, 'if we did not have spelling as a criterion, would students make the effort to spell as best as they can?' Viewed in this light, the assessment criteria are extrinsic motivation for students to submit their best work.

Of greater interest to the teachersare the three criteria, 'grammar', 'vocabulary' and 'expression', as these saw variation in student performance.

'Grammar' refers to a student's ability to manage units of meaning in standard use of English. This includes the ability to manage subject-verb-agreement, use of a noun as a countable or uncountable unit, use of tense to mark time and/or mood, use of preposition for the meaning intended, use of the article and use of modifiers. In effect, control of grammar shows a user's understanding of the structure of the language, and is the primary indicator used to tell confident users of the English language apart from the insecure. Given that 'grammar' takes into consideration more and more different aspects than 'spelling' or 'punctuation', it is not surprising that students' performance at 'grammar' saw variation.

Vocabulary refers to a student's ability to use a range of words and phrases appropriate for the purpose of writing. The students who scored

'2' are 'Adequate' at using vocabulary that succeeds at communication. The students who scored '4' show a vocabulary range beyond that expected of their age group, while being faithful to the purpose of writing.

Expression refers to a student's ability to use natural, idiomatic English free from transliteration from the mother tongues, and to vary her sentences for effect. A quick pace in the story-telling may be promoted by the use of a series of short sentences; or characterization can be achieved by the adoption of certain habits in sentence variation; or adopting the passive voice instead of the active voice may change how information is presented; or opening a sentence with an adverbial phrase may break the monotony of a succession of simple sentences.

At age 13-14, this is a challenge. Students who scored '2' (Adequate) are by and large in command of the language, but are not using English better than the average Primary 6 student can. Students who scored '4' tend to write with what one teacher refers to as 'rhythm'.

In effect, these three criteria give information on how we expect our students to have grown since their arrival at RGS. Almost without exception, every Year 1 student arrives with an A* in English Language at PSLE. Some students may feel very confident about their command of English; some may feel confident but also wish for something more challenging; some, we teachers note, seem to have been trained for the demands of PSLE English and no more. What they all need is information about the next level of achievement for them where the English Language is concerned.

We asked

We were interested in two questions:

1. For students, we wondered, "Does a rubric give them reliable information about their specific strengths and weaknesses in Use of English?"

   By design, a rubric would give more information about a student's specific strengths and weaknesses in Use of English, than a LoR would. When each component part that contributes to a student's Use of English is broken down and spelt out as such, a student is compelled to attend to each component part. The assumption is that the description of each standard for each criterion is sufficiently differentiated to show the progression in achievement. Then a student who scores '2' (adequate) in March for 'punctuation', picks up the information that she should attend to how punctuation is used, makes the effort, and then scores '3' (proficient) for 'punctuation' in September, would know that she has made an improvement that counts.

   In as far as the rubric breaks down our understanding of a performance by (i) the criteria to evaluate the performance, and (ii) the standards that attend each criterion, the rubric is a powerful instrument. It assures the student that she is doing well in the areas she is scoring 'Proficient' or 'Excellent', and directs her to work towards a higher standard in the areas she is not yet scoring full marks.

2. For teacher/assessor, we wondered, "How does the rubric discriminate between performances?"

   We saw the range of scores, from the borderline passes to scripts that earned the full 20 marks for Use of English. So for a cohort, the rubric does discriminate between students.

   We were also interested in whether the scripts that score 20 are all of the same quality. We realize that we tended to score 'spelling' by counting the number of spelling errors. With 'grammar', 'vocabulary' and 'expression' however, we looked at the kind of mistakes made: we made a distinction between basic errors and errors that arise because a student is attempting a more sophisticated sentence structure; we made reference to what we understand Primary 6 students to be generally capable of; and we also considered frequency of error-occurrence – since this was word-processed work done over four weeks which gave students ample opportunity to check their work.

Working with the "Second Family"

By Michelle Koay, School Counsellor

Abstract

During the adolescence period, friendships are important as they provide social support and emotional connection for the girls (Brizendine, 2006). As such, its inclusion by school counsellors greatly increases the effectiveness of counselling. Till today, seeing a counsellor is still perceived as stigmatising; students may not always be open to seeking professional help and it is usually regarded as the last resort. When a student has a problem, she is referred to the teacher and/or the school counsellor. At the moment, the school works closely with the parents to help the student but the scope can be expanded to include working with the "second family" (Taffel, 2010), which is the peer group. This article explores the benefits of doing so and how to work with the "second family".

Introduction

On one of my typical work days in RGS, three girls came to see me. They were neither interviewing me for their Research Studies project nor consulting me for their Community problem Solving project. They were concerned about their friend and hoped for advice on how to help her. I listened to their concerns and found out more about their friend but I realised that I was unable to offer much advice to them except to ask them to persuade their friend to see me. Although it would be ideal for me to work directly with their friend, she was not ready to see a counsellor.

Over time, I had more and more of such encounters where girls would come in pairs or trios to talk to me about their friend. Every now and then, some clients would come with their friend who will patiently wait in the reception area while reading a book or doing her homework. I often worked with the students and their parents and the idea of working with their friends never crossed my mind until I came across the concept of the "second family" (Taffel, 2010), a term coined by Ron Taffel, a psychotherapist. We are all familiar with the first family who consists primarily the parents and siblings (if any) of the student, and this is the family who significantly influences and affects the psychosocial well-being of a student. However, during the adolescence stage, the second family, which is the peer group, also plays an important role in a student's life, sometimes even more important than the family of origin. Hence, I learnt to be more open and flexible in my approach when working with the girls.

Working with the "second family"

Since RGS is a premium school, the girls are expected to not only excel in their academic pursuits, but also be equally outstanding in their co-curricular activities. Since these high-achieving girls are perceived to be capable and able to manage whatever difficulties they face, they tend to be more resistant to counselling, which implies that they need help to deal with their issues. Whether the problems stem from challenges at home or other issues, the girls tend to turn to their friends for support and comfort (Brizendine, 2006).

As the bonds of friendship are particularly strong during adolescence, the peer groups are usually very loyal and will try to do everything they can to help each other. In some cases, the friends may feel overwhelmed and helpless if the problems are beyond what they can deal with or they may recognise that professional help is required. This is when they may approach their teacher or me for help.

a) Helping the girls help their friend

When the girls talk to me about their friend, I find out more in order to assess how their friend is coping. Although the assessment is based on the girls' knowledge, observations and experience of interacting with their friend, it usually provides a very good indicator of the amount of distress their friend is facing. Depending on the issues, I may coach the girls on how to communicate with their friend, what to listen out for during their conversations and how to show empathy towards their friend. We discuss the signs to look out for and how to deal with them accordingly. The teacher may mandate a student to be seen by me but the girls are usually much more effective in getting their friend to seek help. Most of the time, the girls will offer to accompany their friend to see me, as a form of emotional support and a reflection of how much they care about their friend. I also take the opportunity to assess how the girls are coping psychologically and emotionally, while trying to help their friend.

b) Reaching out to the girls

My clients often talk about their friends and when enough rapport is built, they may share about their concerns for their friends who may be experiencing difficulties or have similar issues as them. We tend to assume that a girl will exhibit observable signs of distress but many of them are able to mask their distress by putting up a cheerful and light-hearted front. These girls may be more introverted in nature so they will choose to confide in a few close friends and a number of them are the ones I see. When I become aware of more of such girls, I explore ways to reach out to them through my clients or their teachers.

c) Use of social media

Many girls make use of various social media to stay connected with their friends and express their views and emotions. As a way to maintain professional boundaries, I do not add the girls as Facebook friends so I do not have access to their Facebook accounts. However, the girls share with me what their friends post on the wall if there is anything of concern. Another way to find out the thoughts and feelings of the girls, is by reading their blogs if they maintain one.

d) Peer group as a resource

Sometimes, the session can be more effective and productive when a client comes with her friends. The friends can be a resource when they share what they know about the client. The bonds of friendship can be strengthened in such sessions as well. For clients with interpersonal issues, I get them to invite their friends into the sessions to explore how their problematic interactions can be improved.

Influence of the "second family"

Finally, it is important to note that the "second family" has a huge impact on the girls in terms of how their friendships evolve. Fall-outs, misunderstandings and arguments can result in considerable amount of distress, which will inevitably affect various aspects of their lives. The type of friends they spend time with gives a glimpse of the type of issues they face and nature of influence they have on them, in a positive or negative way.

Recommended Readings

Brizendine, L. (2006). *The female brain*. Three Rivers Press.

Taffel, R. (2010). *Breaking through to teens: psychotherapy for the new adolescence*. The Guilford Press.

Research Studies in RGS : Perspectives

Editor's note

Research is fundamentally, a quest for understanding. As educators, we review and reflect on our pedagogical practices so that we know what works. The goal is to create new knowledge that enables us to be empowered participants in the community. In the same way, RGS students are involved in research projects as well. In Research Studies (RS), students are taught basic research skills, which they can apply to design their own projects. The aim is that they appreciate not just the technical aspects of research but also more importantly, the spirit of quest and the instinct to problem-solve.

The following two articles provide 2 perspectives on the RS experience:

1. **Is the Internet making us stupid?** This article was contributed by a Year 4 RS group in which they share their findings on the effects of the ubiquity of the Internet on the quality of thinking. The teacher-mentor was Mrs Mary George Cheriyan.

2. **An Evaluation of the Regional Studies Programme (RSP) in Raffles Girls' School:** This article was written from the perspective of a RS teacher-mentor, Ms Lee Su Yin, as she reflected on her facilitation of the project and her students' thinking process as they analysed the policy issues pertaining to the RSP in RGS.

Is The Internet Making Us Stupid?

By Koh Huey, Lim Jia Yi Edina and Yeo Le Qi Rachel, Year 4 students, 2012

Nowadays, the Internet is a necessity for students. With the click of the mouse, much information is displayed to us in an instant. However, the ubiquity of the Internet contributes to multiple distractions when using it. These distractions, such as YouTube or Facebook, cause a lack of focus on the task at hand. Our quality of thinking decreases; hence, compromising the quality of the task. It is important to understand one's capacity to complete a task with the presence of the Internet so that one can control the use of Internet when doing tasks and optimize their ability.

Literature review

The literature review states that the Internet's capacity for limitless amounts of information is a source of distraction. We put efficiency and immediacy above all else and skim the information, shrinking our attention spans and reducing our productivity. As attention switches to a secondary task and away from the first task, memory performance on the first task declines and secondary task performance improves; but this takes more time and involves more errors than focusing on a single task. Multi-tasking performance varies from person to person, and it is still a division of attention. Thus, those who multi-task, are unable to associate information "meaningfully and systematically with knowledge already well established in the memory"[1]. Thus, we are unable to master complex concepts and think critically. When constantly distracted, our brains cannot forge the strong and expansive neural connections that give distinctness and depth to our thinking. When learning with distractions due to multitasking, the striatum, that is not suited for long-term memory and understanding, is used. Our thoughts, therefore, become disjointed and our memory weakens.

Research design

We conducted a preliminary experiment with 30 Year three RGS students in 2011. Only one variable was changed: the presence of the Internet. Then, the top two elements-Analysis and Evaluation from Bloom's taxonomy of Higher Order Thinking were identified, in order to assess their quality of thinking. We decided on a suitable test to write a paragraph based on a Year 3 Social Studies topic question: "Does meritocracy and affirmative action bring about the same outcome?" All volunteers were required to type out one paragraph presenting one point to answer the question. During the first round of the experiment, all the volunteers did not have Internet access; while during the second round, all the volunteers had Internet access. After collating all the scripts, we marked them according to our criteria to determine what is considered an instance of Analysis and/or Evaluation.

[1]: *Quoting Nobel Prize winner Eric Kandel*

Challenges

We faced several challenges in implementing our methodology. Keeping the environment of the experiment constant between the duration of the two tests was a challenge as we needed to ensure that the attention span of the volunteers was the same for both of the tests which were administered one after another. By making them do both tests this way, we assumed that time would not have affected their attention span and their attention span for the second test would be the same as the first. Our biggest challenge was the marking of the scripts and identification of the instances of analysis and evaluation. For this, we tried to follow the levels of thinking stated in Bloom's taxonomy as much as possible. The results of our experiment pointed to the effect of the presence of the Internet on our quality of thinking and we obtained highly accurate results.

Results

Our results showed that 17 out of 30 displayed a higher quality of thinking in their answers without the Internet while 7 displayed the same quality of thinking with or without the Internet. 6 students displayed a higher quality of thinking when the Internet was present. This suggested that on the whole, the presence of the Internet has detrimental effects on our quality of thinking. Yet, there were some individuals who were less susceptible to the distractions posed by the Internet and thus, their quality of thinking was unaffected by the Internet. There were also students who performed better with the presence of the Internet. Their quality of thinking was unaffected by the distractions posed by the Internet, In fact, it appeared to be enhanced with its presence.

Discussion

These results implied that our brain can be constantly rewired so that we adapt to the situation and let the Internet enhance our quality of thinking rather than lower it. Interestingly, from our post experiment survey, we found that out of all our experimental subjects, those who performed better on the test without the presence of the Internet had scored the highest Grade Point Average in the group. This suggests that those who perform better without the Internet generally may have a higher quality of thinking than those who perform better with it. Furthermore, though many of the students knew that using the Internet while doing their work was distracting, they still did their work with the Internet present. This implied a lack of awareness and concern about the negative impact of the Internet.

Implications

Multi-tasking performance varies for each individual. With the school implementing the new 1-to-1 learning, some students will benefit from the new learning environment while others will not. We should differentiate the classroom to cater to the varying learning styles. A diagnostic test can be taken at the start of the year, perhaps one similar to our experiment. Based on the results, students can be then be sorted into different classes. That way, students who do better with the internet and a computer at hand can be assigned classes that can move straightaway into1-to-1 learning while students who do not do so well with multi-tasking with theinternet, should be given a more appropriate environment. Hence, we can maximize each student's potential based on his or her multi-tasking performance.

Further research

We can further expand our experiment by exploring how our brains work and respond to distractions posed by technology. This experiment can also be used to explore the impact of other technology on the way we think or do things in our daily life. For instance, we can also explore the effect of our phones and gaming devices like X-box or Kinect on our quality of thinking. There is a limitless scope, for every investigation brings new questions and new knowledge. Our experiment is merely part of the quest for more knowledge and investigation.

Looking back on a Research Studies Project "An Evaluation of the Regional Studies Programme (RSP) in Raffles Girls' School"

By Lee Su Yin, Head of Department, Humanities Department (Teacher-Mentor)

1) Why did the students embark on the project?

The Regional Studies Programme (RSP), introduced in Raffles Girls' School (RGS) in 2008, aims to nurture a group of students who have an interest in the Southeast Asian region. The programmes lined up for these students not only ensure that they will have a better appreciation and understanding of the diversity of the Southeast Asian region, but would also enable them to converse comfortably in the Malay language, the lingua franca of the territory. This will ensure that there are segments of Singaporeans in each generation who can effectively engage the region in the future.

However, this Research Studies (RS) team noticed that there has been a decline in the enrolment for RSP in RGS over the years – from 40 students in 2008 to about 30 or fewer the years thereafter. Therefore, the team[1] undertook this project to probe into the reasons behind these declining numbers. One reason they hypothesised was the perceived effectiveness – or the lack thereof - of the programme. Hence they wanted to find out whether the RSP actually met the objectives it had set out to achieve. From the surveys that were carried out, they also aimed to uncover other reasons influencing the decisions of students who chose not to continue with the RSP after Year 2, or not to take it up in Year 5 at Raffles Institution. Unravelling these questions would allow them to suggest more targeted improvements to the programme. They also wanted to unearth the reason underlying the decisions of students, who despite being eligible for the programme, chose not to join it. This could help arrest the declining numbers. In short, their research project aims to evaluate the effectiveness of the RSP, and the extent to which RSP students had benefitted from the programme. They also hoped to use their findings to promote the RSP to succeeding batches of students to boost the enrolment and enhance the programme. Students' responses from the survey they conducted on aspects of the RSP curriculum that they enjoyed and found beneficial would enable the team to quote these students to further convince parents and succeeding batches of Year 1 students to apply for the RSP in the coming years.

From the start, as their supervisor, I had impressed on the team that they needed to take great care in designing and conceptualising the project to ensure that it is viable. Otherwise, the quality of the research – despite their months of hard work – would be undermined. They were exhorted to adhere not only to research standards and protocols, but also to timelines, all of which are key components of research management. Each student also learnt to identify her area of strength – through timely, constructive feedback I provided – and to nurture these traits so that the team could build up their research capacity and personal effectiveness.

2) What did they find out?

RSP students, according to the data gathered, found that the programme helps to develop feelings of empathy, respect and sensitivities in the students towards other cultures, and thus achieving the goal of grooming culturally-sensitive students. Through the survey analysis, the team (2) also found out that the students enjoyed activities that were interactive in nature, allowing them to be fully immersed in the learning experience, and to be able to learn many things first-hand. By performing activities that were meaningful, instructive and enjoyable, the students were able to absorb and retain information more easily, and therefore, the RSP should consider having more of these engaging activities to enhance students' learning. Furthermore, when the students were asked whether they will be continuing with the RSP in Year 5 and 6, for those who answered "no", the most common reason cited was their subject combination which forced them to withdraw from the RSP rather than because the objectives of the RSP were not met. The team inferred that many had withdrawn from the RSP after

[1] *Student Investigators: Charlotte Ho Shue Ler (404), Nur Adilah bte Mohammed Idris (404) and Siti Nazihah bte Mohamed Khir (403)*

Year 4 due to various other reasons, and not specifically because its objectives were not met. Overall, the feedback the team received from RSP students at all four levels was generally positive. The students were convinced that the programme was beneficial to their learning and understanding of the Southeast Asian region.

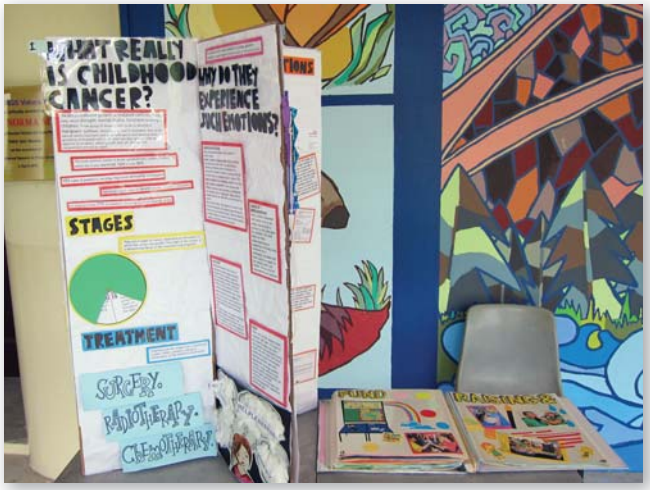
One thing the team learnt from the project is that they had to make informed judgements of complex issues, often with incomplete data. They, therefore, had to rely very much on their personal responsibility and communication skills (both written and oral) as well as develop sound judgement to see the project through, without compromising on the standard of work produced. To be sure, these skills would be very useful in life because the situations and issues that all of us face are complex and unpredictable.

3) What recommendations did they make from their findings?

Regarding the programme itself, the team gathered several suggestions for improvement, some of which were provided by the survey respondents. This includes offering more lessons on Understanding Southeast Asia (USEA) than the hours prescribed by the Ministry for Education, organising more fieldtrips and immersion programmes, grounding Malay lessons in Southeast Asian context and teaching Malay through non-conventional methods.

There are students and parents who are still unaware of the benefits that RSP brings. This is proven by the survey findings whereby a sizeable number of the non-RSP students were unaware that the programme even existed. Hence, the team recommended that the RSP teachers should try to generate greater awareness of the programme by holding more publicity blitzes, or by maintaining the publicity efforts they had put in the previous year whereby the RSP Coordinator and his team gave a talk, set up a RSP publicity booth and sent letters to parents to raise awareness of the programme during the Year 1 Orientation in December 2011. This would ensure that parents and students alike can make an informed decision on whether to enrol in the programme. Additionally, the findings and data from the research project could be used to convince even more students to take part in the programme and increase the enrolment. Hence, if the enrolment is higher, more students will be able to reap the benefits of the RSP.

The team had to communicate all these findings and conclusions clearly and convincingly not only to those who were familiar with the RSP, but also to those who were not, such as their evaluators at the RS Oral Presentation. For that to happen, they had to strike up rapport amongst themselves; learn to collaborate, often amidst very tight deadlines; come prepared for the consultation sessions with me to maximise the time spent on the meetings; and above all, to appreciate the whole process of developing disciplinary knowledge. It helped, too, that the students had a personal involvement in the project – they could relate to the respondents and they were familiar with the subject.



4) What does the "inquiry process" mean to the team? What is their understanding of what "inquiry" or "research" is all about?

Through this research project, the team believed they have deepened their understanding of the inquiry process and refined their research skills. To them, it meant asking questions to quench their curiosity on an issue of interest to them. Reading comprehensively on the issue helped them formulate their methodology and refine their thinking process. They then decided on a multi-prong approach to get their research question answered so that it would be as comprehensive an answer as they could obtain. Among the methods used were unstructured and informal interviews, on-site observations, questionnaires (pilot and actual), and extensive key-informant interviews.

What is their greatest takeaway from the project?

It must be the academic self-confidence they gained through the intense learning experience. Indeed, the learning was intense because the students were dealing with a complex academic task. The task not only required them to bring to bear their individual creativity and collective knowledge, but also to mould these into an original research that would create new knowledge, in keeping with the intellectual rigour of the discipline of Research Studies. By and large, they have succeeded.

Developing a Validity Framework to Assess the Quality of School-based Performance Task

By Dr Lee Yim Ping, Centre for Research in Pedagogy & Practice, National Institute of Education, Nanyang Technological University

Collaborators: Kwek Meek Lin, ex-Teacher-Specialist, and Mary George Cheriyan, Director, RGS PeRL

This paper was jointly presented by Yim Ping and Meek Lin at the International Association for Educational Assessment Conference at Philippines, October 2012

Abstract

In 1997, Singapore embarked on the Thinking Schools, Learning Nation movement aimed at equipping students with 21st century skills. In line with this effort, student-centric pedagogy and alternative modes of assessment were encouraged. Some schools have opted to design performance tasks to supplement traditional assessment (e.g. end-of-year examination and class tests) To ensure quality assurance to stakeholders, schools need to assess the technical quality of the performance tasks. Drawing on the practices used in test items development and construction, this paper proposes a pragmatic approach that teachers can use to validate school-constructed performance tasks as summative assessment.

Introduction

Performance assessment requires students to demonstrate that they have mastered specific skills and competencies by performing or producing something based on the learning outcomes in the intended curriculum. Does performance assessment deliver what it claims? What evidence is there to show that the performance task is a valid assessment of learning? These questions have recently raised considerable discussion in the use of performance tasks for assessment in schools.

Literature Review

Issues of Validation and Performance Assessment practices

While there is significant literature on the value of the performance assessment in developing and demonstrating higher order thinking skills and understanding, the extent to which they achieve these aims is only somewhat backed by research. The actual implementation of performance assessment is fraught with concerns like technical quality, sustainability and stakeholder confidence (Tung & Stazesky, 2010). Specifically, the lack of professional development support models may led to unevenness in inter-rater reliability and quality of the rubric in establishing standards (Howell, et al., 1999). Many researchers also highlight the sheer amount of effort and time required of teachers to design and evaluate performance assessments.

Therefore the manner in which the quality of performance assessment is judged is an important area for consideration and investigation. The empirical work involved in validating assessment use tools that are developed for standardised tests. Attempts have been made to extend the application of these tools to alternative assessment. In particular, the next section will focus on the experiences of researchers in their validation work involving performance tasks. Most of the validation studies on performance assessment usage indicate acceptable levels of technical quality. Others have urged for the need to expand single-concept understanding of validity (Miller & Linn, 2000). Various researchers have urged for an expanded framework of validity to allow a more meaningful interpretation of scores obtained as well as their impact as a result of the implementation of the assessment.

Validity and Validation

Validity is a judgement of the level of suitability and adequacy in how scores from the assessment are being interpreted and used in reference to the theoretical basis upon the assessment is designed for (Messick, 1989). The process of gathering the empirical evidence to provide that judgement is known as validation. The broad theoretical concept behind validity and the participant profiles contributes to a diverse range of interpretation and application in the validation efforts of various studies. From a set of some 20 research works relating to validation and performance assessment practices from 1998 – 2010, there emerged various approaches to establishing the validity of performance assessment.

School-based Validation

Assessment is about using evidence to reason towards a stand. As such, assessment is at best a projection of a candidate's knowledge and skills to do something. Assessment types vary according to their purpose. Assessment can be guided by three fundamentals as suggested by three corners of the assessment triangle (Pellegrino, Chudowsky, & Glaser, 2001). The first idea is about how students' convey their store of know and demonstrate their skills in a given area. The second idea is about providing a platform through a task or situation to observe the learner's level of knowledge or performance of skills. Thirdly, is the idea of interpretation of the observations collected. A pragmatic approach is

to devise a validity framework which overlays the assessment triangle with standard topics from the set of technical documents (Marion & Pellegrino, 2006). Using it as a framework, the three aspects of evaluating the technical validation can inform school-based validation efforts.

The Study

The performance assessment a) is itself an instruction of some concepts to be learned; b) requires the students to construct instead of picking from a list of multiple responses; c) provides opportunities for students to demonstrate skills beyond the pencil-and-paper medium; d) is open-ended and provide for knowledge application and understanding; and e) relates to some real world context.

RGS has been using performance assessment as part of a school-wide initiative since 2004, to present content more meaningfully to learners, encouraging them to think more divergently. Other schools in Singapore are similarly exploring the use of assessment as part of their holistic education curriculum.

This study seeks to outline a framework to establish the technical quality of teacher-constructed classroom assessments designed as part of the school-based curriculum innovation. It is part of a larger project which uses a single-school case study approach to inform the quality of the school-based assessment tasks. The findings can contribute to the acceptability of the use of school-based performance assessment for summative assessment purposes. The value of this proposed project is that it affirms the importance of individual school's discernment of the capabilities of their students when setting their targets or designing their assessment plans.

The study focuses on Mathematics as it is taken by all students in schools across the four grade levels (Grade 7, 8, 9 and 10). The choice will inform item refinement and the establishment of a defensible and credible item bank of performance tasks that other schools could draw from, contribute to as well as to bring together research findings on the use of performance assessment. The research method can also be replicated in validating the performance assessments in other subjects to gather more specific evidence of their validity.

The Performance Assessment in RGS

RGS has developed a collection of performance tasks in the mathematics department. Several teams of teachers (from Grade 7, 8, 9 and 10) assist in the development of the assessment instruments, the scoring rubrics and criteria. Each development team ensures that the tasks crafted represent the learning outcomes listed in the national mathematics curriculum documents.

Performance Assessment Components.

RGS performance assessment programme in mathematics seeks to 'develop good mathematical thinkers who are effective problem solvers and are able to use the language of mathematics for precise communication' (RGS, 2011).

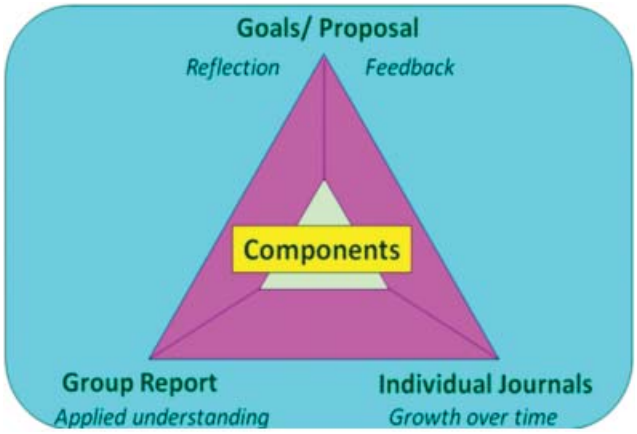


Figure 1: Core component of Performance Assessment

Figure 1 shows the three main components present in any of RGS performance assessment. Firstly, learning goals are explicitly articulated to guide the students' development of a proposal/plan. The second component is that of a product accompanied by a group report which details the application of knowledge, analysis and solution . The third component consists of the students' journals which describe their learning and challenges. At each juncture, assessment tools in the forms of checklists and rubrics provide the basis for feedback and criteria for reviewing/ evaluation their attainment.

An example of a performance assessment contributed by RGS in the teaching and learning of the topic of Probability is shown in Figure 2. The assessment contains a task where the students take on the role of a game designer to meet certain objectives in the context of a real world scenario such as that of a casino. The students are provided with details of the context to make it as real world as possible.

Figure 2: Performance Task Exemplar

Performance assessment is valued in mathematics learning and teaching as the assessment a) reflects how mathematics is used in real world situation; b) sharpen learning as it involves active interaction with the concepts and materials; c) prompts equity so that students who have other learning modalities or preferences can also show what they know; d) is an on-going process where teacher and students can receive specific feedback to improve; and e) has strong reliability and validity as the task is a composite of many aspects of performance for the students to demonstrate his/ her knowledge and/ or skills/ capability.

These features are also present in the design of the performance tasks in the other subjects as well because a consistent format is applied school-wide.

Psychometric Evaluation and Calibration Plan

The implementation of performance assessment is part and parcel of the whole teaching and learning continuum. There are multiple points for data collection. These include scores awarded to the in-class journal writing, oral presentation, the final product as well as conventional sources of evidence of students' learning (such as worksheets, observations). These data points are multiplied by the number of performance assessment conducted within a single grade level and across the four grade levels.

Using scores collected from the described instances, the psychometric properties of the performance assessment is examined using techniques from the classical test theory complemented by the Rasch model. The difference between the classical test theory and Rasch modeling is that the former is "test based" while the latter is "item based" (Jackson, Draugalis, Slack, Zachry, & D'Agostino, 2002). The conventional statistics such as item difficulty and item discrimination found in classical testing are sample dependent. To make school-specific assessment materials accessible to other schools who have similar curriculum focus, the information on the psychometric properties of the performance tasks should guide other schools in selecting items fit for their purpose. Item analysis statistics that are sample-free will be useful in future work to encourage the set-up of a credible item bank of performance tasks (Reeve, et al., 2007). By applying Rasch analysis alongside the classical test theory, this project hopes to provide information to evaluate the individual performance tasks' contribution to the respective learning outcomes, not affected by the standard methods which use KR20 or point-biserial correlations.

The validation is portioned into two stages. Stage 1 examines the form and nature of a collection of teacher-constructed tasks that the RGS has used as part of performance assessment. Stage 2 examines the construct validity of the performance assessment. In particularly, the criteria-related validation will be carried out to examine concurrent and predictive validity. Stage 2 has two parallel segments, one using techniques based on the classical test theory and the other using the Rasch model.

Stage 1

Face /content validity. The project will leverage on ground insights and involve the school-partner to establish the face and content validity of the performance tasks. The school team will document for each performance assessment, how (a) competencies are identified for performance assessment; (b) which authentic assessment method is to be used (e.g. what criterion descriptors to be used in the rubrics); and (c) the task is developed. At the task level, language and clarity of the tasks will be examined. The protocol of how performance tasks are being administered or used in the teaching and learning process will be documented as part of a technical manual.

Reliability. In the conventional fixed-response items, reliability of an assessment is strengthened by increasing the duration of the test or the number of items found in the test. As the nature of performance assessment requires it to be carried out over a series of lesson units where students are expected to demonstrate various skill-sets e.g. planning outline, group work dynamics, oral presentation, product, etc. The checklists and rubrics accompanying these tasks contain both generic criteria and task-specific criteria. The scores that are generated from these rubrics when grouped according to their criteria or subscales will be used as a means of establishing the reliability of the performance tasks for measuring particular learner outcomes. This can be done at two levels: firstly at the unit task level and also across different performance tasks. The level of inter-rater reliability will be assessed from the scores awarded by the different teachers on common students' products.

Performance tasks are open-ended in nature and are different from the conventional fixed-response items. The performance from the task is scored by a series of rubrics which are used to generate scores on the students' work. Each rubric is made up of a series of criteria which can be referred to as a subscale. Separate scores within a single performance task are generated within each of the criterion/ subscale listed in the rubric. In the following paragraphs, scores will be referred to as those from the respective criteria/ subscales. Table 1 depicts how each performance task is considered as comprising a series of subscale-items measuring the respective criterion. The data set will comprise scores from subscale-items across a set of performance tasks. Analysis by criteria forms the second level of analysis.

Performance	Criteria				
Task	Subscale 1	Subscale 2	Subscale 3	Subscale 4	Subscale 5
No. 1					
No. 2					
...					

Table 1. Tabulation of possible scores generated from performance tasks

Basic classical test theory statistics which provide descriptive information about the performance tasks will be estimated. Descriptive statistics on the scores from the performance subscale-items, such as measures of central tendency, spread, skewness and kurtosis and response category frequencies will be estimated for each of the subscale across a set of performance tasks. Other statistics will include inter-item correlations, item-scale correlations and internal consistency reliability will be computed.

Stage 2

Confirmatory factor analysis will be carried out on the scores from across a number of performance tasks to evaluate the extent these tasks measure the learner outcomes consistent with the content experts' definition of that construct.

Concurrent validity. Other on-going forms of assessment are used alongside the performance assessment within each maths topic. These include class quizzes, written assignment, oral presentation and summative assessment in the form of worksheets. Concurrent validation will be carried using scores from these other forms of assessment. Also available are school semestral examination maths scores which will also be used to evaluate the concurrent validity of performance assessment.

Predictive validity. The predictive validity of the performance task scores will be examined by means of correlation and regression, relating these scores to scores from other assessment evidence such as GCE A level project work grades and PISA maths items. Performance assessment has been part of their school-wide assessment practice in RGS since 2004. Some cohorts of their students have already sat for the GCE 'A' level examination project work. RGS has copies of their students' GCE A level project results. Singapore participated in her first OECD/ PISA assessment study in 2009. There is high interest in the extent the newer aspects of Singapore mathematics curriculum are preparing the students with the capacity to reason, analysis and communicate ideas. The PISA math framework is consistent with the objectives[1] of performance assessment. PISA math items measure mathematics literacy which focuses on real-world problems, beyond situations and problems typically found in school classrooms. Released PISA maths items can be readily administered to RGS's students and their scores can be used in predictive validation work.

The Rasch model will be used to evaluate the extent the performance task is targeted for the ability level of students they are designed for, item and person fit statistics will be computed. Corresponding separation reliability indexes will also be calculated. Before applying the Rasch model, it is important to check if the data satisfy the key assumptions of the Rasch model. Most importantly are the requirement of unidimensionality and local independence. To examine whether the tasks used in the performance assessment are unidimensional, separate confirmatory factor analysis will be carried out on each of the criterion-subscales. Local independence is assessed by item FIT statistics. The requirement of unidimensionality and local independence are met when the data fit the model and reliability of item placement is established. WINSTEPS will be used to generate the following statistics to inform the quality of the items – point-serial correlation, separation reliability (separation index and item relaibaility), item infit and outfit statistics and item difficulty map. Comparisons will also be made with the information generated by the conventional techniques of the classical test theory.

Item FIT and Person FIT statistics will be computed. INFIT statistic will surface any unexpected behaviour that affects the responses to some of the items near the person's ability. The INFIT statistic would inform the degree to which the observations for a particular item meets the model expectation. At the same time, OUTFIT statistic will indicate if outliers are present based on the person's ability. The information will guide item refinement or construction of new items. Item separation reliability index will be computed to estimate the replicability of item placement within the hierarchy of difficulty across students of differing abilities. Item distribution map will be constructed to show the distribution of the persons and items on the same measurement scale. From the map, gaps will be detected, suggesting regions of assessment where the creation of more items within that difficulty can improve the measure of the particular criterion or learning outcome.'

Conclusion

This report demonstates how the three core components of performance assessment provide the structure of the validation framework. Each of three core components is a data point where scores awarded on students' progress, work, attitudes and twenty-first century competencies. From the proposal submitted by the students to the final solution, the performance assessment provides many opportunities for assessment. Parallel sources of scores provide data for carrying out construct validation. The Rasch model is adopted into the project as it provides future opportunities which can facilitate the creation and maintenance of a item bank. By building an adequate range of items in terms of difficulty and discrimination, the teacher is able to make informed- selection of items from an established pool of known difficulty items.

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[1] *To develop good mathematical thinkers who are effective problem solvers and able to use the language of mathematics for precise communication.*

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Professional Development in RGS: Nurturing the Adept Teacher of the Highly Able Girl

By Mary George Cheriyan, Director, RGS PeRL

The quality teacher

As a Centre for Excellence in RGS, RGS PeRL is driven by the school's stretch goal of being a world class educational institution for young women. Such an aspiration compels evidence-backed professional standards that give credibility and enhance the school's clout as a reputable institution.

Research has consistently shown that quality teaching contributes to positive learning outcomes.[1]

Therefore, RGS PeRL seeks to nurture the staff's capacity to cultivate a learning environment that reflects a standards-based approach to teaching and learning.

The RGS Curriculum

The RGS curriculum is based on Gifted Education (GE) principles, incorporating elements of the Integrated Curriculum Model (ICM) (Joyce Van Tassel-Baska,1986) developed for high-ability learners.

These elements are:

1. Advanced content knowledge
2. Interdisciplinary concepts, issues, and themes with relevance to the real world.
3. High-level process and product work Socio-emotional learning is also a key thrust.

Professional Development in RGS: The Core Curriculum Competencies.

The RGS Professional Development Plan focuses on nurturing the RGS teachers' competencies in our core curriculum areas. These competencies are research-backed and aligned to the ICM.

Professional Development in RGS: A whole school approach

We adopt a whole-school approach to the development and review of the RGS core curriculum competencies so as to facilitate the consistency of processes and importantly, a common metalanguage within the fraternity. A recent research project conducted by the Centre for research on Pedagogy and Practice noted that a success factor in the implementation of the Raffles Programme in RGS was the following:

'A highly strategic and systematic approach to the reform effort, which maintained a consistency of direction…' (Taylor, Kwek, Foo, 2009)

There are various platforms available in RGS to enhance professional discourse and reflection. The thoughtful harnessing of these platforms can contribute to meaningful curriculum conversations and generation of pedagogical ideas.

Professional Development: Research and Consultancy

Pedagogical innovations and evaluation are backed by research and inquiry that provide vital evidence of our standards; eg, PeRL has just completed a school wide research project on the Performance Task (2010-12) which has given essential input that informs our curriculum review. Several teachers have also been involved in Practitioner Inquiry projects.

PeRL also offers Consultancy in pedagogical innovations so as to promote dialogue and collaboration with the larger educational fraternity. RGS teachers are invited to be co-trainers and to be involved in PeRL's platforms for engagement with the educational fraternity.

Our overarching objective is to contribute to a vibrant Asian discourse on educational trends and practices.

[1] *A 2007 report (Barber and Mourshed, 2007) by international consulting group McKinsey and Company proclaimed that the 'quality of an education system cannot exceed the quality of its teachers.'*

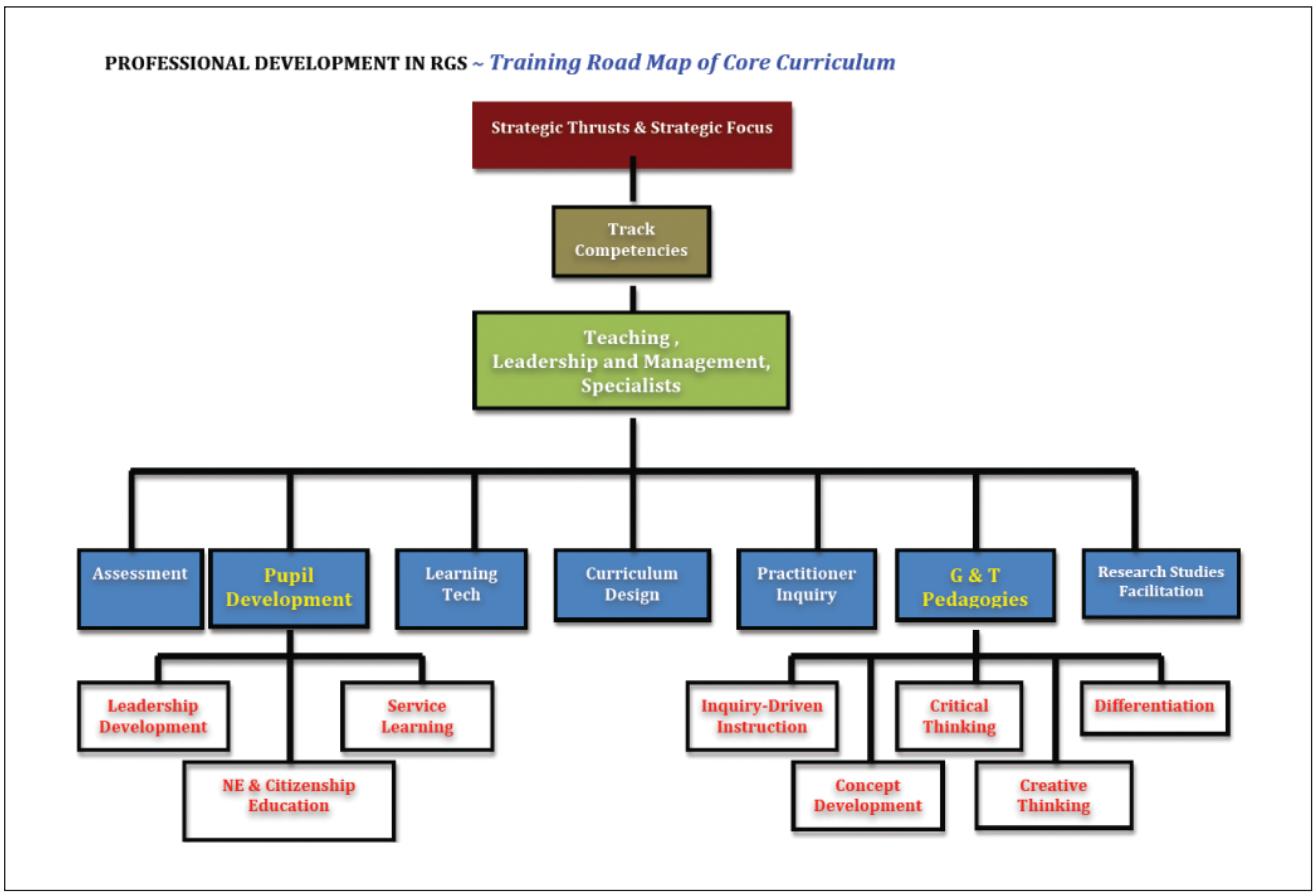

Figure 1: RGS core curriculum competencies

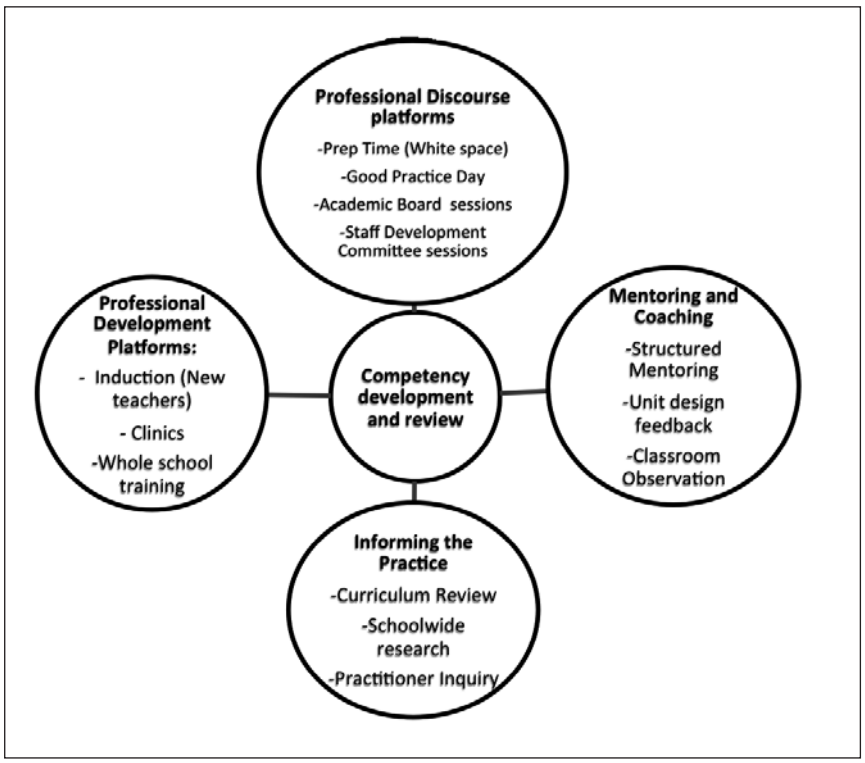

Figure 2: Platforms for competency development and review in RGS

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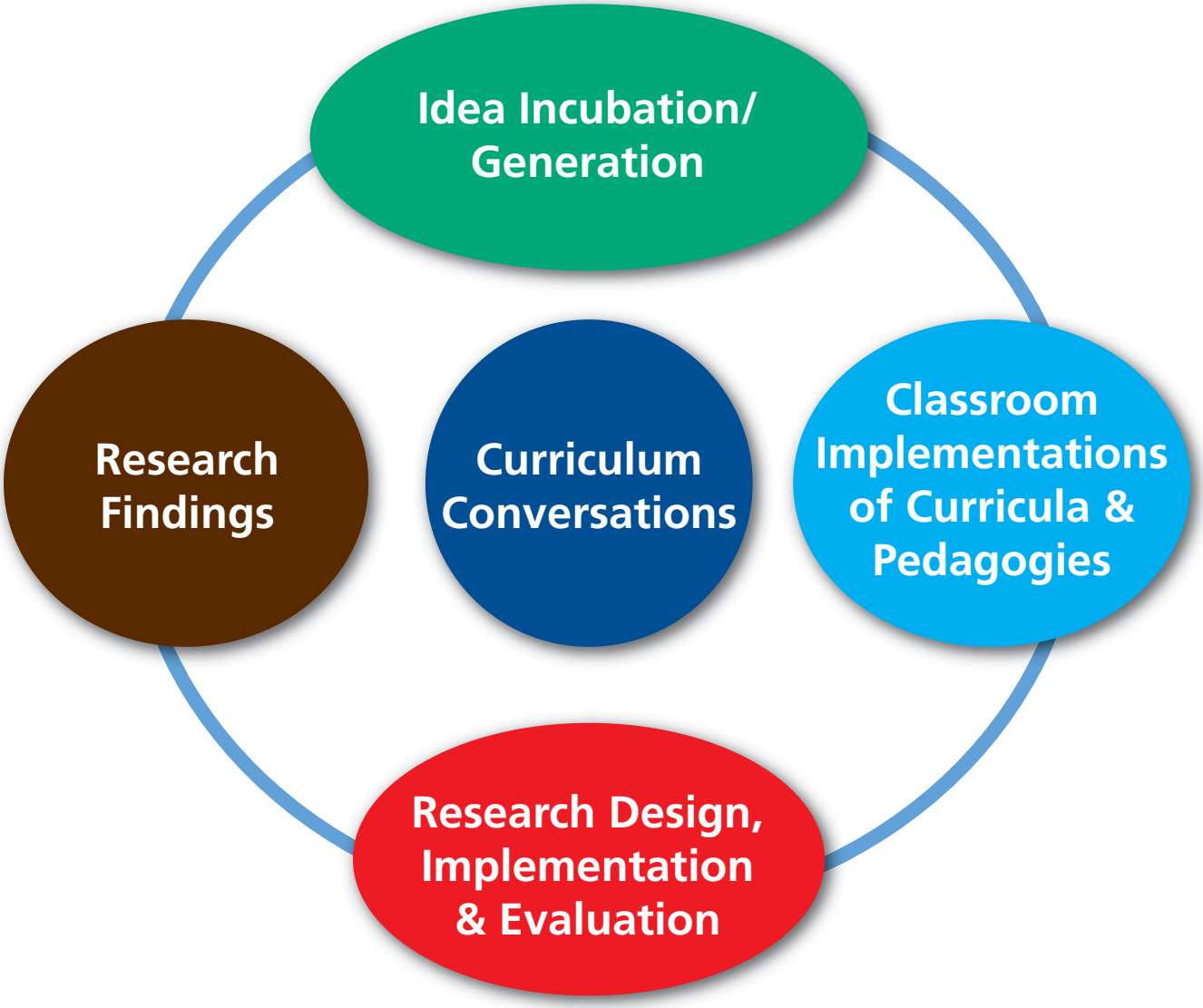
The Research Life-Cycle



"Schools of the future will need both teachers and researchers, and people who combine both roles, as happens at Raffles Girls' School, led by principal Julie Hoo."

Sir Michael Barber
Oceans of Innovation: The Atlantic, the Pacific, Global Leadership and the Future Of Education, 2012.

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