Volume 27 | 2015

Pacific-Asian Education

A JOURNAL ABOUT EDUCATION IN PACIFIC CIRCLE COUNTRIES

Pacific-Asian Education

The Journal of the Pacific Circle Consortium for Education
Volume 27, 2015

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ISSN 10109-8725
Pacific Circle Consortium for Education

Publication design and layout: Halcyon Design Ltd, *www.halcyondesign.co.nz*

Published by
Pacific Circle Consortium for Education
http://pacificcircleconsortium.org/PAEJournal.html

Pacific-Asian Education

Volume 27, 2015

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Exploring the use of "slowmation" as a pedagogical alternative in science teaching and learning

Dennis Jablonski, Garry F. Hoban, Heather S. Ransom, Katie S. Ward

Abstract

To explore the efficacy of innovative teaching methods in science, investigators introduced a multimodal process called a "slowmation" (abbreviated from slow animation) that uses widely available digital technologies to determine if students can successfully represent their science knowledge when compared to the typical curriculum unit activity, in this case, making a wire hanger mobile. One hundred students in four intact eighth-grade science classes in the USA studied the same science content, engaged in their assigned project activity, and took a test at the end of the unit. Results indicated that all students in the slowmation group successfully demonstrated their understanding of a science concept with their narrated animations, and their average test score was nearly two points higher than the average test score of the mobile-making group ($p < .01$).

Keywords: Slowmation, animation, multimodal, science learning, science teaching, digital technologies

Introduction

In most parts of the world, science is viewed as an important part of developing cultures, contributing to humans' quality of life, the development of products, the sustainability of resources and, in many cases, fostering equality through the sharing of knowledge (Schreiner & Sjoberg, 2004; UNESCO, 2010). Indeed, science at its most inclusive can be a great equalizer and, at its most exclusive, is an instigator of disparities between rich and poor. The position of international organizations such as the United Nations Economic, Scientific and Cultural Organization (UNESCO), and the multinational research project called the Relevance of Science Education (ROSE), is that the benefits of science (e.g., its ways of thinking to support sound decision-making) emanate from a societal structure that emphasizes appropriate science education at every level of schooling. However, survey data from studies in Australia, and internationally, through the Trends in International Mathematics and Science Study (TIMSS) and the Programme for International Student Assessment (PISA) of 15-year-olds' attitudes indicate that science is seen as being transmissive, dogmatic, abstract, and not interactive (Fensham, 2008). Collectively, proposals around the globe have called for new ways to teach science, for both humanistic and economic reasons.

Science learning in America's schools is receiving intense scrutiny as the United

States government and its school districts are taking significant steps to attract students into science and technology careers (National Academy of Sciences, 2006). The fields of science, technology, engineering and mathematics (STEM) are being actively promoted at a pace not seen since the revitalization of science education following the launch of the Russian satellite, Sputnik in 1957. Although the demand for science careers is increasing, public school students' engagement in science has significantly decreased in the last 20 years (Davis, Petish, & Smithey, 2006). Despite some notable exceptions, there is a persistent view that science learning is more often about learners' memorizing content as discipline knowledge rather than the development of students' deep conceptual understanding (Goodrum, Hackling, & Rennie, 2001). According to a report by the National Academies of Science (2006), there is a deepening crisis in American schools because students are increasingly disengaging with learning science in school classes.

Lacklustre student engagement in science is evidenced by national and international comparative studies which show that the achievement in science by USA public school students gives cause for concern. Although slight improvement in science scores was noted on the latest National Assessment of Educational Progress (NAEP), also known as "the Nation's Report Card", less than one third of eighth-grade students in the nation are proficient in science, and only two percent are advanced (NCES, 2012; Sparks, 2012). Nor are international comparisons very heartening. Among the 65 countries that administered PISA in 2012, 26 countries outperformed the United States in science literacy when comparing the percentages of 15-year-olds in the top proficiency levels and 27 countries outperformed the United States when the average scores of all students were compared (NCES, PISA, 2012).

To turn around this worrisome situation, President Obama's fiscal year 2015 budget called for $170 million of new funding to improve the quality of STEM teaching and learning, which contributes to the current goal of training thousands of new science teachers and increasing the effectiveness of 100,000 science and mathematics teachers throughout the nation (USDOE, n.d). The administration's rationale is that science teachers who are well trained and excited about their subject are more likely to engage students in the types of science activities that will entice them into pursuing science beyond high school. This agenda is an undisguised effort to keep America economically competitive with other nations, along with raising test scores. Examining the latest scores on the NAEP's science assessment in the United States, it appears that students who engage in hands-on science activities nearly every day score higher than students who engage in hands-on science activities less frequently (NCES, 2012). The introduction of new pedagogies may help in this regard, using methods that not only engage students in learning science, but also encourage them to develop richer links between science concepts and their everyday experiences of the real world. Students can make these connections by engaging with content in a concrete manner to interpret information and transform the science knowledge into different representational forms (Loughran, 2010).

Using technology that students are familiar with can sometimes be a catalyst for improving engagement, especially if the tools help them to engage with science content

and transform it in multiple ways (Jonassen, Myers, & McKillip, 1996; Kim & Reeves, 2007; Lee, Linn, Varma, & Liu, 2010). As Kozma (2000) noted, "technology can augment the cognitive and social processes of scientific understanding and learning" (p. 13). There are several reasons why encouraging students to use technology is likely to increase student engagement. First, the students' access to personal digital technologies offers them new opportunities to use technology that they are familiar with to represent content (Kim & Reeves, 2007; Traxler, 2010). For example, nearly all students have the capacity to create their own digital media such as videos, podcasts and animations because of their increasing access to digital still cameras (either stand-alone or in mobile phones), iPods for recording and playing sound tracks, and computers with free movie-making software. This media-making capacity is the reason that websites such as Facebook, Wikipedia, MySpace, Twitter and YouTube are the most popular in the world, by design, they are populated by user-generated content. The exponential growth of these sites will continue to expand with the additional affordances of developing Web 2.0 technologies. Second, it has been argued that learners need to become immersed in ways of thinking and use of technology that are commonly used in professional and research science communities (Lemke, 1998, 2004). For example, scientists are continually using new forms of digital representations to present their ideas to others in the scientific community. Third, there is a growing body of research that suggests that getting students to use technology to create their own representations to explain a science concept is one way to engage them with science content (Hand, Gunel, & Ulu, 2009; Prain & Waldrip, 2006; Tytler & Prain, 2010). According to Jonassen et al. (1996), "The people who learn the most from instructional materials are the designers . . . . We have all stated at one time or another that the quickest way to learn about subject matter is to have to teach [design] it" (p. 95). As media-making technology is becoming more prevalent and present in mobile devices, simpler ways of making digital representations are evolving. One of the forms of media that is becoming simpler to create with advances in technology is animation.

"Slowmation": Promoting engagement with student-generated animations

Slowmation (abbreviated from "slow animation") is a simplified method for students to make a narrated stop-motion animation as an innovative way to represent and explain a science concept (Hoban, 2005, 2007, 2009). Creating a slowmation integrates features of clay animation, object animation and digital storytelling (Lambert, 2002) with the product being similar to a narrated flip-book. In summary, a slowmation displays the following features:

- **Purpose:** the intention of a making slowmation is for students to engage with science content by making a 1-2 minute, narrated animation to explain a science concept. According to Jonassen et al. (1996), when students design multimedia to explain content "they reflect on that knowledge in new and meaningful ways" (p. 95). Its design can include a range of enhancements such as narration, music, and static images.
- **Timing:** slowmations are usually played slowly (at 2 frames per second), not the usual animation speed of 20-24 frames per second, thus, ten times fewer

photos are needed than in clay or computer animation. This slow speed enables a narration to be added to explain the science content.

- **Orientation:** models are made in 2-D and/or 3-D and usually are manipulated in the horizontal plane (lying flat on a table or the floor) and photographed by a digital still camera mounted on a tripod looking down or across at the models or by a hand-held mobile phone (or iPad), which makes them easier to make, move and photograph.
- **Materials:** because models do not have to stand up, many different materials can be used such as soft play-dough, plasticine, 2-D pictures, drawings, written text, existing 3-D models, felt, cardboard cut-outs and natural materials such as leaves, rocks or fruit.
- **Technology:** students use their own digital still camera or a hand-held mobile phone camera (with photo quality set on low resolution) and free movie-making software available on their computers (e.g., iMovie or SAM Animation on a Mac, or Windows Movie Maker on a PC, and MyCreate or LEGO Movie Maker on an iPad or smartphone).

Fundamentally, slowmation involves students designing a sequence of five representations using a range of modalities (Hoban & Nielsen, 2010): (i) research notes; (ii) storyboard; (iii) models; (iv) digital photographs; and (v) the narrated animation. Key to the learning process fostered by slowmation is that each representation has particular affordances to encourage students to think about the concept in different ways (Hoban & Nielsen, 2011). For example, taking research notes encourages students to think about organizing information, designing a storyboard influences them to break the concept down into "chunks", making models encourages them to think about how a concept should look, taking digital photos makes students think about relative movement and the final narrated animation encourages students to think about how the modes of still images, moving images, narration and text integrate to explain the science concept.

Representations, which can be described as "signs" that stand for something else (Peirce, 1931), are essential in science learning. According to Lemke (1998):

> *When scientists think, talk, write, work and teach, they do not just use words; they gesture and move in imaginary visual spaces defined by graphical representations and simulations. They combine, interconnect, and integrate verbal text with mathematical expressions, quantitative graphs, information tables, abstract diagrams, maps, drawings, photographs and a host of unique specialised visual genres seen nowhere else.* (p. 88)

It should be noted that each representational stage (with the exception of the model making) is facilitated by technology devices and software of some kind. Computers and the Internet are used for research, word processing is used for script writing, digital cameras are used for taking photos, and movie editing software combines the visual with the auditory when the narration is added. Learners use these devices to transform information into dimensional representations in unlimited ways, as opposed to learners being passive observers of previously made content. The representational effect is

particularly powerful using learner-generated animation sequences because, after all, science environments are not static, and the movement changes in the photo sequences enable the concept to come alive and foster deeper understanding.

Although previous research on learner-generated animations (Chang, Quintana, & Krajcik, 2010; Hubscher-Younger & Hari Narayanan, 2008), has identified the value of students creating animations, in each of these studies software needed to be specially designed to enable students to create an animation. Clearly, the research area could benefit from the development of a simpler way for learners such as middle-school students to make stop-motion animations using generic movie-making software. Previous research on the slowmation process has involved case studies of preservice teachers creating slowmations (Hoban, Loughran, & Nielsen, 2011; Hoban & Nielsen, 2010), but there has not yet been a study involving middle-school students, nor have comparative studies been designed. The purpose of the present study, therefore, is to investigate if middle-school students can learn science by creating a slowmation to represent their science knowledge and in what ways does this learning compare to a similar group of students involved in the construction activity of making a mobile. To address this purpose, the following research questions were posed: (i) How does the learning in making a slowmation compare to the learning in a different type of activity such as making a mobile?; (ii) Can middle-school students design and make a slowmation to represent their understanding of a science concept in seven lessons and what were their perceptions of the process?

Methodology

Context

A quasi-experimental design was used to ascertain student learning by comparing learning from making a slowmation to learning by making a mobile (Creswell, 2003; Salkind, 2012). This study involved 100 eighth-grade students in two classrooms in a middle school located in southern Oregon. All students studied the same science content–a textbook unit on protists–engaged in a project activity, and took a quiz at the end of the unit. The intervention variable for each group was the type of project activity; the experimental group used the slowmation process to create an animation, and the control group followed the regular textbook curriculum by creating a wire hanger mobile. Two sections of students (n=51) in one classroom were designated as the experimental groups (slowmation groups) and taught by Teacher A and a graduate-level preservice teacher, and two sections of students (n=49) in a second classroom were designated as the control groups (mobile-making groups), and taught by Teacher B. In both cases, the unit objective was to learn the content, represent the characteristics of three types of protists, i.e., animal-like, plant-like, and fungus-like, in a culminating product (slowmation or mobile), and take a test on the unit content.

Participants

The science classes in both project conditions were judged to be comparable middle-school classes, comprised of students similar in age, generally equal in gender breakdown and academic ability. The students were taught by their regular teachers (Teachers A

and B) during the intervention, with the addition of a preservice teacher in Teacher A's classroom who alternated daily responsibilities. Two classes of Teacher A's six regular classes were purposively selected to be the experimental groups based on which two of the six classes' average grades best matched the two control groups' average grades of Teacher B. ANOVA was conducted to determine which two classes of Teacher A's were comparable academically to the two classes of Teacher B. Prior academic achievement, as represented by the students' science scores (in percentages) at the end of the first trimester, was used as the primary variable for comparison. There was no statistical difference between the mean scores of the groups, based on the grades of the first trimester.

The intervention

The intervention in this study involved the introduction of the slowmation process as a project activity for the experimental group over seven lessons compared to the usual curriculum project activity of making a mobile. As described earlier, in a slowmation students create five representations—research notes, storyboard, models, digital still photos—that culminate in the narrated animation. The teachers of the two classrooms met prior to introducing the unit and agreed on presenting similar content, but the order of the lessons was left to each teacher's discretion. The unit of study included a textbook chapter on protists, and an internet investigation, with the learning objectives being the identification of protist types and the differentiation of their characteristics and behaviors. Daily lessons took place within 50-minute class periods over an eight-day period (see Table 1).

Table 1: Daily Lessons

	Experimental Group	Control Group
Day 1	Read textbook material	Read textbook material
Day 2	Powerpoint on types of protists Protist worksheet	Protist video
Day 3	Introduction to animation project Begin storyboard Computer lab- research & protist videos	Introduction to mobile project Computer lab- research Protist worksheet
Day 4	Computer lab-protist videos Create storyboard on 11x17 paper, with 8 panels	Computer lab-research Begin work on mobile, using construction paper drawings, wire hangers and string.
Day 5	Create models using playdoh	Work on mobile
Day 6	Take digital pictures using inexpensive digital cameras	Work on mobile
Day 7	Narrate story/create movie using Windows Movie Maker	Presentation/hanging of mobiles in classroom
Day 8	Quiz	Quiz

One major difference in the structure of the culminating project activity was that the slowmation groups worked in groups of three students, and the students creating the mobiles worked on their projects individually. The quiz at the conclusion of the unit was a teacher-created test taken individually by all students during a 20-minute period.

Data-gathering measures

At the conclusion of the unit activities, learning was measured by means of a quiz, which consisted of 10 multiple-choice questions, and two constructed-response questions, which are open-ended questions designed to demonstrate knowledge of content. The multiple-choice quiz questions had been created by the teachers of the two classrooms and used in previous years, representing chapter content previously tested. The constructed-response questions were added to the quiz for the purposes of the study, with the intention of eliciting the students' deeper understanding of the similarities and differences of protists. Teacher A and Teacher B separately scored the constructed responses of the students from both the experimental group and the control group. In order for the teachers to blindly rate the constructed responses, code numbers were assigned to the students' papers, so that the names of the students were concealed. Prior to grading, the teachers held discussions to establish the grading criteria, and created a scoring guide with the following 4-point scale: 1= Emerging; 2=Developing; 3=Proficient; 4= Mastered. An inter-rater reliability analysis using the Kappa statistic was performed to determine consistency between raters. The inter-rater reliability for the raters was found to be Kappa = 0.96 ($p < .001$). Finally, a satisfaction survey consisting of 14 multiple-choice questions was administered to all the students who created a slowmation to allow students to express their opinions of how they felt about the project and science in general.

Results

To address the first research question, "How does the learning in making a slowmation compare to the learning in a similar activity such as making a mobile?", a one-way analysis of variance of the post-intervention test results was conducted to evaluate the actual effects of slowmation on students' learning. The independent variable was the type of project activity, i.e., assignment to a slowmation group or a mobile-making group. The dependent variable was the post-activity test score. In creating a total score for the test, the scoring of the constructed response portion of the test was added to the score of the multiple-choice portion of the test. The ANOVA was significant, $F(1,93) = 3.44$, $p < .01$ (see Table 2). On average, students in the slowmation condition ($M = 19.94$, $SD = 2.35$) scored higher than students in the mobile-making condition ($M = 18.18$, $SD = 3.06$). Calculation of an effect size, as assessed by eta square, was .097, which is considered a small effect size, indicating that the assignment to the slowmation group accounted for 10% of the variance in test scores. By the end of the unit there was some attrition, as five students from Classroom B were dropped from the data set because of missing test scores.

Table 2: Test Scores

	N	M	SD
Slowmation	51	19.94**	2.35
Mobile-making	44	18.18	3.06

*$p < .01$

To answer the second research question, "Can middle-school students design and make a slowmation in seven lessons and what were their perceptions of the process?", observations of the classes over the seven lessons showed that all of the students assigned to the slowmation groups were able to design and make a narrated animation in the time allocated. At the end of the unit, all six classes of Teacher A (N=151), which included four classes that created slowmations that were not used as experimental groups, were asked to complete a survey to measure student perceptions of the slowmation activity. We were particularly interested in the feasibility of creating a slowmation and the students' observations and attitudes, so we did not survey the control groups about their perceptions of making a mobile, an activity that had been in place for several previous years. Of all the students who created a slowmation, 61% enjoyed the activity (40% liked it; and 21% loved it). Students were asked to identify which part of creating a slowmation that they "liked most", and which part that they "liked least" (see Table 3).

Table 3: Students' Satisfaction of Slowmation

	Liked Most (n=151)		Liked Least (n=151)	
Part of Project	n	%	n	%
Photographing scenes	48	31.8	19	12.6
Creating models	36	23.8	7	4.6
Narrating the video	25	16.6	43	28.5
Videos on Moodle	21	13.9	14	9.3
Internet research	15	9.9	37	24.5
Storyboarding	6	4	31	20.5

The results in Table 3 show that of all the parts of the process, photographing the scenes was "liked most" by 31.8% of the students, and creating the models was "liked most" by 23.8% of the students. By contrast, narrating the video (28.5%) was the part "liked least" and doing internet research (24.5%) was the next "liked least" part of the process. It should be noted that the narration portion included using computer software that would sometimes freeze in the middle of the narration part, which required the students to restart the computer, and repeat any unsaved narrated portions.

Two of the survey questions addressed the students' perceptions of learning and remembering the content of the protist unit (see Table 4).

Table 4: Students' Perceptions of Learning and Remembering

	Learned Most (n=151)		Remembered Most (n=149)	
Type of Content	n	%	n	%
Internet research	90	59.6	50	33.6
Watching Videos	44	29.1	39	26.2
Making the animation	11	7.3	51	34.2
Reading Book	6	4	9	6

In response to the question ,"In which part of the protist unit did you learn the most about protists?", nearly 60% of the students who created a slowmation felt that they learned the most doing Internet research. This response is not surprising because Internet research was needed early in the unit to expose students to an entirely new and somewhat obscure science topic (protists). Although most students claimed to have learned the most doing Internet research, Table 3 shows that only 10% of the students "liked" doing Internet research the most of any part of the slowmation process.

In an attempt to differentiate between learning and remembering content, another survey question asked "In which part of the protist unit did you remember the most about protists?" (see Table 4). Compared to the previous question on learning, slightly more students (34.2%) felt that making the animation helped them remember what they learned about protists compared to 33.6% of the students who felt that Internet research helped them remember what they learned about this subject. This could be an indication that students felt that performing the multiple steps of creating a slowmation and experiencing multiple representations helped them retain the science content.

Discussion

The goal of this study was to examine in what ways does the learning in making a slowmation compare to the learning when making a mobile and also to explore whether middle-school students could design and make a slowmation over a time period of seven lessons. In regard to learning, the results of this study demonstrate that students who design and create a slowmation may benefit students academically. The average score in the slowmation group was nearly two points higher than the average score in the mobile-making group, with this difference being statistically significant. This apparent boost in learning might be attributed to the number and variety of ways in which the students engage with the content. When creating a slowmation, the students revisit the content many times because the process requires students to create a sequence of five representations in the form of research, storyboarding, model-making, taking digital pictures, and adding a narration to an animation (Hoban et al., 2011). In particular, each representation offers an affordance that encourages the students to think about the concept in certain ways. In contrast, it is possible that the students making mobiles used discrete information that is less "interactive" or is not "additive" and is not re-represented in as many modes. Creating a slowmation is a multimodal representation,

as the students re-represent the content through different modalities, starting from their first contact with the content in a book or on the Internet, and culminating in the narrated animation. At each stage, meaning-making occurs within a different modality, so students must transfer what they learn at one stage to each subsequent stage so that the final product makes sense for both the designer and the viewer of the finished animation.

As noted earlier, several studies have shown that in creating a slowmation, preservice teachers learned science concepts in a way that represented understanding, and we believe the middle-school students of this study were similarly successful at representing their understanding of protist organisms using the slowmation approach, as evidenced by their success at displaying a story of the distinct characteristics of protist organisms. In addition, the current study demonstrated that the slowmation process could also be used to improve student learning in middle schools.

The second finding from this study is that middle-school children could indeed learn science by designing and making a slowmation in seven lessons. Previous studies of the slowmation approach have occurred in the context of preservice teacher education courses demonstrating that teachers in training could learn science concepts by designing and making a slowmation in several hours (Hoban & Nielsen, 2011; Jablonski, 2016). This current study showed that the approach could be adapted for use in a middle-school science class, with its 50-minute class periods, as a new way for students to engage with science content knowledge. The stages of making a slowmation fit efficiently into discrete lessons that connected together and culminated in a narrated animation. In fact, all the students who attempted the slowmation activity were successful in creating a worthwhile final product. This is a significant finding from the study, as the literature suggests that new ways to engage middle-schools students in science are needed, especially in cases where technology is so accessible (National Academies of Sciences, 2006).

Although a positive effect of slowmation on science learning was evident, the results should be interpreted with caution. Due to constraints in the school schedule, a random assignment of students to each group was not possible, so participant selection was limited to the most comparable intact classes (based on the first trimester scores). We would expect our inferences would be strengthened if randomization could have occurred. In addition, students in the slowmation groups could have benefited from the collaborative nature of their task, which promoted sharing of information to make sense of the scientific content on the behaviors of the protist organisms. In contrast, the mobile-making task was accomplished as an individual project. The slowmation groups also had two teachers available, however, they traded off classroom responsibilities. Generally speaking, the regular classroom teacher handled the pacing of the activities (i.e., starting and ending each session, demonstrating, time keeping, etc.), and the student teacher was responsible for the application of the slowmation process (i.e., script, model making, using cameras and computers, narration, etc.). A critique could be made about the assessment in this study; the test given to measure content knowledge was a teacher-made test, which is a typical occurrence in K-12 classrooms, and its validity is not standardized. In this circumstance, no standardized test could have been used that

would have covered this particular unit of study.

An important point must also be made about the motivational effect of the technology component used in the slowmation group. Although both the experimental groups and the control groups used the computer lab to research background information, the slowmation group used digital cameras to take pictures of their models, and laptop computers with headset microphones to create a narrated movie. The slowmation activity with the infusion of technology was perhaps a more novel and engaging activity which, after all, is one of the points mentioned earlier regarding technology's additive effect to build interest in science (Kozma, 2000). It should obvious to everyone how enticing technology is to today's youth; using technology can make nearly any activity more interesting and relevant to students. It is the relevance factor (of science and technology) that is the primary concern of the ROSE project, a multiyear study involving over 35 countries conducted by researchers at the University of Oslo. The project's aim is to achieve "a better understanding of a series of aspects that are related to young people's relationship with the emotions toward S &T [science and technology]: their interests, perceptions, experiences, attitudes, plans and priorities" (Schreiner & Sjoberg, 2004, p. 20).

More research needs to be done with K-12 students to determine the benefits of including innovative approaches such as slowmation as a teaching approach in a typical school setting. Although this study had some design limitations (e.g., students were not randomly assigned into groups, standardized tests were not used and the slowmation was conducted as a group activity), tentative findings suggest that the slowmation process could be beneficial to promote student learning. In particular, the study did show that this new teaching and learning approach that had been developed in the context of adult preservice teacher education classes, could also be used in a middle-school setting. Recommendations for future studies would be to control the variables in order to isolate the slowmation effect, for example, have all students (control groups included) work in groups with different activities to be able to share and discuss their learning. Likewise, a future study could record and compare the richness of discussions (or lack of richness) amongst the students as they are creating their projects and constructing their understanding of science concepts and their application in a final product.

Implications for science teaching and learning

As a result of this study, and building on reports previously mentioned, we offer the following suggestions for the use of slowmation in science teaching and learning:

1. Slowmation is well suited to be a final task of a science unit. In a unit plan that involves standards, essential questions, objectives, knowledge and skills that students must master, a summative assessment in the form of a final task (in lieu of a test), could be a performance or product (Penuel & Gallagher, 2009; Wiggins & McTighe, 2011). As previously described, slowmation involves students in five stages: researching, writing a script, making models, taking digital photos, and a narrating an animation. Therefore, each stage could require a separate lesson plan and provide a de facto formative assessment, because a student cannot move on to the next stage if he/she had not accomplished what was necessary in the previous

stage. The final task incorporates all stages and is both performance (narration) and product (animated movie). The current study did not utilize a rubric for the final task, although one could easily have been created. Such a rubric might include criteria such as accuracy of content and references in the research phase, quality of script writing, authenticity of the models, clarity of the digital images, and appropriate delivery of narration.

2. Slowmation is an engaging activity that can supplement or replace the standard curriculum with a comparable amount of learning. Some of the initial concerns of the classroom teachers in this study were the potential of the slowmation activity to have too much gadgetry, to be too time consuming, or to be too distracting from the student learning expected in the usual curriculum. The results of this study demonstrate that, with proper preparation and classroom structure (e.g., tightly managed 50-minute sessions), curriculum disruptions can be minimized, or be nonexistent. Furthermore, the results demonstrated that the slowmation group outperformed the mobile-making group on a unit test, which alleviated the teachers' concerns over the amount and quality of learning that occurred in the unit.
3. Slowmation employs technology features that meet expectations of science standards. The recently developed Next Generation Science Standards elevate the expectations of science practices and acquisition of core ideas. For example, one of the targeted Science and Engineering Practices is Obtaining, Evaluating, and Communicating Information, in which "Reading, interpreting, and producing text are fundamental practices of science in particular", with the understanding that the term 'text' refers to all types of communication, from "printed text to video productions" (National Research Council, 2012, p. 74). Thus, science texts in the broadest sense are multimodal. In creating a slowmation, students would meet this standard to be literate in science by conducting initial research, creating a script, making models, taking digital photos and adding narration to an animation. Furthermore, in the United States, the recently adopted Common Core State Standards include over 90 references to using digital sources, multimedia, or the Internet for reading, writing, speaking and listening in Grades K-12, presenting opportunities for science teachers to link to other core curricular objectives (Jablonski, 2016).
4. Slowmation utilizes "everyday" digital technologies, such as digital cameras, and multimedia editing software that, generally speaking, are likely to be areas of strength for students, and even new teachers, who have grown up in a digital age. The introduction of this novel process in a science class by the teacher can promote confidence, build rapport and promote relevancy. Clearly, the concern that the complexity or time-consuming nature of slowmation may disrupt learning is legitimate, as a significant commitment must be made when using multiple digital tools. However, photo and movie-editing apps on laptops, tablets and smartphones are making this process much easier than ever before. We have discovered that, with proper training using technology within the coursework of a teacher education program or in stand-alone workshops, teachers can adequately prepare for the supervision of a slowmation project.
5. Student-created media demonstrate creativity and persist as instructional

tools for the future students of science teachers. Just as preservice teachers have demonstrated that creating a slowmation contributed to their own understanding of science concepts (Hoban & Nielsen, 2010; Hoban et al., 2011), middle-school students appear to benefit as well from the creation and narration of this type of science related product. In either case, once a narrated animation is created, the final product becomes an artifact—a teaching tool for future classroom lessons. Whether the final movie is archived in a school's digital library or posted to YouTube, these animations remain available for viewing in class or at the students' homes for years to come, with the best ones having high replay value. Lehrer, Erickson, and Connell (1994) demonstrated just such a benefit with students designing multimedia products on major events in American history, to be shared with classmates as learning aids and housed in the school's media center. Indeed, future studies might investigate the correlation between the number of replays after construction of an animation and the retention of science content.

The US government's call to action to prepare more science teachers to cultivate more science interest has never been more prominent (US DOE, 2009, US DOE, n.d.). Considering the increasing nationwide emphasis on science education, it is timely to suggest innovative ways to teach and learn science and take on the challenge to make science more relevant (Schreiner & Sjoberg, 2004), who insist that relevancy helps to develop a "scientific attitude" as an outcome of science education (p. 19). Furthermore, the foundational component of science literacy in school is a potential entrée to a profession in science that may be advanced by the unique features of the slowmation process. Finally, we suggest that the availability of inexpensive digital technologies, along with the evolution of personal digital mobile devices, will make the described animation process even more manageable and beneficial for the classroom teacher in the future.

Note: Examples of slowmations created by preservice teachers, along with numerous resources and instructions can be located at the following website: http://slowmation.com

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Pacific-Asian Education
Vol. 27, 2015, 21-36

The perceived status of engineers through the eyes of New Zealand students

Robert Craig

Introduction

This paper briefly reports on enrolment into engineering programs in New Zealand and selected industrialised nations from 2002 to 2012, and then reports on research conducted in Autumn 2010. The research was conducted among Year 12 students attending schools within the Greater Auckland region[1]. Responses regarding knowledge, attitudes, and perceived influences on attitudes are analysed. A statistically significant relationship between ethnicity and perceived status of engineers suggests Pākehā[2] and Māori show low inclination towards engineering programs, and disagreement with the notion of high status for engineers. The results are discussed, conclusions drawn, and recommendations made.

RESEARCH RATIONALE AND BACKGROUND INFORMATION

Enrolment at the turn of the new millennium

Over ten years ago, the author summarized the situation regarding declining enrolment into engineering programs and the under-supply of engineers, within the New Zealand context and within the context of selected Western industrialized nations (Craig, 2002). At that time the industrialized nations had been described by Kelly (2001), Baillie and Fitzgerald (2000), and by Rubin, Angelo, Powers, Rosenbaum, and Reina (2000), as experiencing difficulties attracting and retaining engineering students. The New Zealand situation in 2002 seemed similar in that *Profiles & Trends 2000* indicated enrolment into engineering degrees as a percentage of total first year degree program enrolment was low, even though the New Zealand Department of Immigration (DOI, 2001) showed an under supply of engineers on their skills shortage lists for the major New Zealand cities. Pākehā and Māori, who at that time formed about 82% of the annual higher education enrolment, appeared less interested in engineering than did students from Indian and other Asian backgrounds.

Engineers remain in demand

From the time of the author's paper on declining enrolment into engineering degrees (Craig, 2002) until commencing this paper, the available data suggested the requirement for graduate engineers had not diminished. Craig (2002) had commented that Bellinger (1997) and Kubel (2001) reported the demand for graduate engineers in the US was high, Marcus (2001) reported salaries for qualified engineers were high, and Coy and

Whalen (2001) indicated that to maintain long-term growth there was a strong demand to fill positions across a range of engineering fields. A decade later in Australia, the Victorian state government sponsored research into the attitudes and knowledge of school students because of a perceived declining interest towards ICT, and in New Zealand in 2012, engineering and ICT again appeared on the skills shortages lists of the DOI Web site. In addition the DOI had also created a list named the *Long Term Skill Shortage List* (LTSSL) which was pertinent to the context of this research. The purpose of the LTSSL was to identify "those occupations where there is an absolute (sustained and ongoing) shortage of highly skilled workers both globally and throughout New Zealand"[3]. Engineering featured on this list.

Engineering programs remain unpopular

Despite drives internationally to increase the number of students who enrol into engineering and technology programs, no sustained improvement had been seen by the end of 2010. In the UK, there were the promotional activities of societies such as EngineeringUK, whose aim was to improve the perception of engineering among the youth and their influencers, and in Australia, the state government of Victoria had launched, and continues to run as at September 2015 a careers awareness campaign entitled *ICT: Start Here. Go Anywhere* (National ICT Careers Week, July 27th, 2015). However, contrary to the aims of these institutions and associations, enrolment into first year engineering and technology degrees in the UK declined significantly in absolute numbers between the years 1995 and 2003, and as a percentage of total enrolment between 1995 and 2008. In Australia, first year enrolment into ICT programs decreased by 38% between the years 2002 to 2008.

In New Zealand The Institute of Professional Engineers (IPENZ) had initiated *Futureintech*; working with schools to promote student interest in science, and in October 2010, IPENZ released a paper on the National Engineering Education Plan (NEEP) project, the objective of which is to "develop a coherent national plan to produce the right number of the right types of engineering graduates to meet New Zealand's needs." (IPENZ, 2010). The NEEP paper reiterated the shortage of professional engineers in New Zealand, calling for greater awareness of the challenges faced by minority groups and females when entering and working in engineering, and making a number of recommendations including an increase in funding for engineering program providers. However, examination of New Zealand government reports published on the Ministry of Education (MOE) web site *Education Counts*[4], revealed similarities between student enrolment patterns in New Zealand and those of other Western industrialised nations. The series of MOE annual reports entitled *Profile & Trends,* and the MOE data on domestic enrolment into tertiary education programs, showed that New Zealand was likewise struggling to attract students into the fields of engineering and the more mathematical sciences. Statistics from the MOE web site clearly indicated that of the broad fields of study, engineering and IT continually attracted the lowest number of students. Snap-shots of enrolment data are reproduced in Table 1, p. 3. The data shown in Table 1 indicate that an increase in the number of students enroling into engineering and IT programs was seen from 2007 to 2012. However, the 2012 figures only show that enrolment in absolute numbers had returned to the level shown for 2003; but as a

percentage of total enrolment, with only 6.9% of the total cohort opting for engineering and IT programs, it is suggested that those programs had remained unpopular.

Enrolment into engineering programs across ethnic backgrounds

Data relating to student enrolment into bachelor degree programs by ethnicity were also available on the New Zealand MOE web site. Based on ethnicity, Table 2, p. 3, shows enrolment figures into selected fields of study as a percentage of the total tertiary enrolment during 2012. It can be seen from Table 2 that in 2012 Pākehā formed approximately 70% of the tertiary enrolment, yet engineering and IT appeared to be less popular to them than did programs in other fields. Approximately 6% (4.3% of 70%) of Pākehā chose to study courses related to IT and engineering. Māori, who formed around 13% of tertiary enrolment, showed even less interest with just 4% (0.5% of 13%) choosing engineering and IT, and similarly to Pākehā, engineering and IT were their least preferred programs. Asians, however, with 11% (1.8% of 17%) of their total tertiary enrolment, appeared to show approximately twice as much interest in engineering and IT than did their Pākehā and Māori counterparts.

Table 1: Domestic Enrolment into Engineering and IT Programs 2003- 2012

Year	2003	2005	2007	2009	2012
Student enrolment	7,330	5.960	5,490	6,070	7,400
% of total enrolment	8.0%	6.8%	6.0%	6.1%	6.9%

Data source: New Zealand Ministry of Education Tertiary Enrolment Statistics http://www.educationcounts.govt.nz/statistics/tertiary_education/participation, Provider-based Equivalent Full-time Students: Field of Study, [Index- bach trnds].

Table 2: Enrolment into Tertiary Fields of Study by Ethnicity as a Percentage of Total Enrolment in 2012

Ethnicity Field of Study	Pākehā %	Māori %	Asian %	Other groups %	Totals %
Society & Culture	21.2	4.3	3.8	3.7	33.0
Education	7.2	1.8	0.7	1.1	10.8
Commerce & Management	9.4	1.4	3.5	2.1	16.4
Health	10.1	2.1	2.8	2.0	17.0
Engineering and IT	4.3	0.5	1.8	1.0	7.6
Other fields	17.5	3.1	4.4	2.7	27.7
Totals	70%	13%	17%	13%	113%

Data source: http://www.educationcounts.govt.nz/statistics/tertiary_education/ partici-pation, Provider-based Equivalent Full-time Students: Field of Study (Index-bach eg)
Students may enroll in more than one field, hence the enrolment total exceeds 100%.

Factors affecting enrolment into Bachelor of Engineering degree programs

Reasons for the decline in engineering enrolment experienced by many nations have been of interest to researchers, governments, and institutions for many years. Comparatively recently in New Zealand, Schagen and Hogan (2009) prepared a report for IPENZ entitled *Why engineering, technology, or science?* They canvassed first-year students already enrolled in the fields of engineering, technology, and science, and data were collected online from six universities and eight polytechnics. They received responses from 1,148 students, and their sample consisted of approximately 60% Pākehā, 26% Asian, 8% Māori and Pasifika[5], and 6% Others. However, by canvassing only students who had already enrolled into engineering and related programs, Schagen and Hogen (2009) did not collect data related to the career choices from students who had elected to pursue studies in other academic fields. To briefly summarize the results of a number of reports, researchers found career choice to be associated with a variety of factors including internal influences such as gender and cultural background; external influences, which for example might come from family, friends or careers advisors; the anticipation of interesting work; and factors such as salary and status.

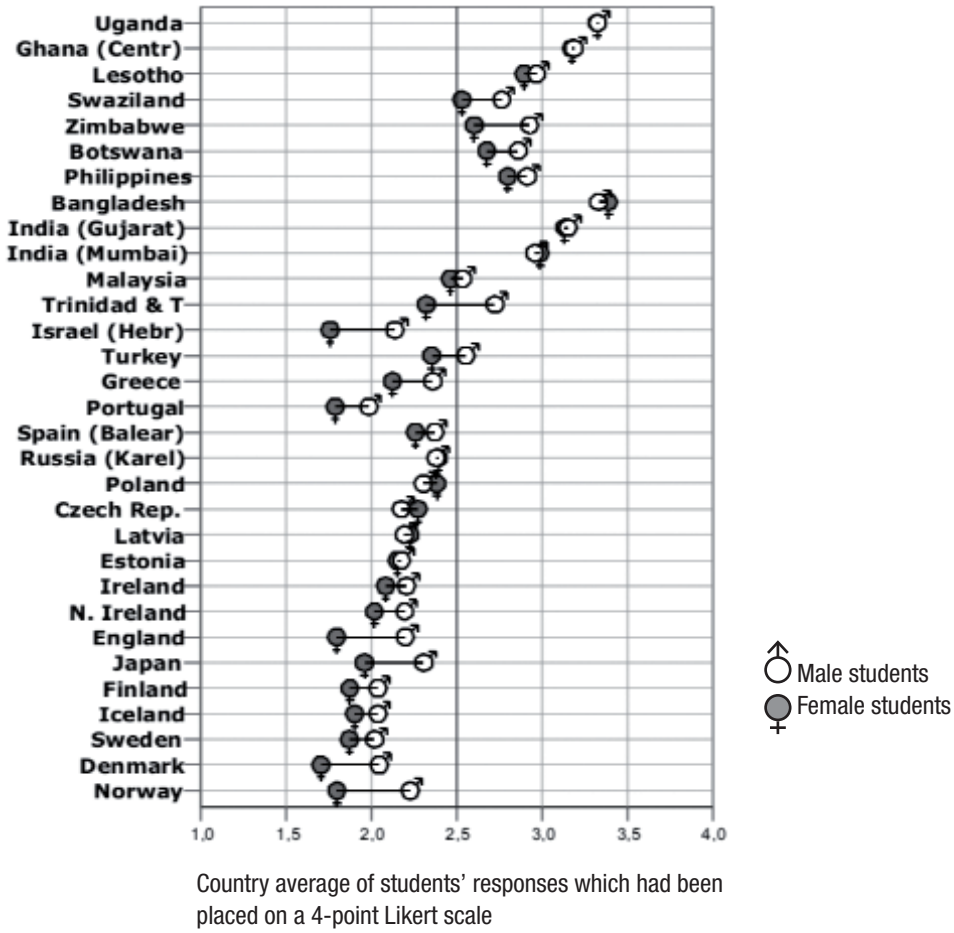
Cultural background

A report in 2008 to the Nuffield Foundation by Osborne and Dillon, entitled *Science education in Europe: Critical Reflections*, indicated a cultural factor which could be relevant to New Zealand's tertiary enrolment. Osborne and Dillon (2008) discussed the work by Sjøberg and Schreiner (2005) who investigated how learners from different cultures relate to science and technology; the ROSE project *(Relevance of Science Education)*. Sjøberg and Schreiner (2005) found a negative correlation at the level of 0.92 between a country's position on the UNHDI, and mean score responses from school students aged between 14 years and 16 years inclusive to the question *I like school science better than other subjects*; the diagram from the report by Sjøberg and Schreiner (2005) is shown as Figure 1, p. 5.

Commenting on the results from Sjøberg and Schreiner (2005), Osborne and Dillon (2008) suggested that "One interpretation of these data sets is that this is a phenomenon that is deeply cultural" (p. 14).

The results as shown on Figure 1, however, seem to treat a country's population as ethnically homogenous, whereas New Zealand has an ethnically heterogeneous population as indicated by the government Web site for the Department of Labour[6]. Immigration for 2009/10 came mainly from China, South Africa, and the UK, with India providing the largest proportion of international students. This last fact was relevant to this research in that India appears on Figure 1 and with two interesting characteristics: a high proportion of the Indian students indicated they were more interested in science than other subjects, and unlike the majority of the response patterns, Indian males and females responded in a very similar fashion. Given New Zealand's profile of immigration, it is possible the children of recent immigrants, of whom Indians form a considerable portion, are complicating the relationship between the studying of science in school and the subsequent enrolment into engineering programs.

Figure 1: Information from the ROSE study showing student's responses to the question "I like school science better than most other school subjects".



The status of engineers

The notion of status and its association with different careers such as engineering has been investigated by many researchers. Morgan et al. (2001) concluded that engineering was perceived as a high pay and high status career to students in the US. This same notion of high status was echoed more than a decade later by The Chartered Institution of Highways & Transportation (CIHT, 2015) in the UK, who claimed that high status is attached to the Chartered Engineer and Incorporated Engineer qualifications, and by Baranowska and Unt (2012), who concluded from their research into employment within Western Europe, graduates from e*ngineering* may enter high status jobs at the end of their education and training. However, such observations are not entirely consistent with the findings of all researchers. Rojter (2009) of Victoria University, Melbourne, when researching the reluctance of senior secondary students to choose engineering as

a course of study, suggested that the engineering profession was not well marketed to the public in general, and that engineers were not perceived as an occupational group as such, they were rather seen as a subset of science professionals.

The research problem and its significance

This research set out to answer the following questions:

1. What do students from the Greater Auckland region know of careers in engineering?
2. What are the attitudes of students from the Greater Auckland region towards engineering as a career or field of study?
3. What factors do students from the Greater Auckland region perceive have influenced their attitudes towards engineering as a career or field of study?
4. What recommendations can be made to assist school career advisors in guiding students in their consideration of engineering as a career?

The potential effect of ensuring students have positive attitudes regarding engineering careers is considerable. Increasing enrolment into engineering by Pākehā and Māori to proportions similar to those of Asian and Indian students would generate approximately 4,500 additional enrollees per annum. The subsequent increase in graduate engineers would contribute to the alleviation of the shortage of professional engineers in New Zealand, and potentially stimulate sustained industrial development.

Research design

The target population for this research was students attending Year 12 classes at schools in the Greater Auckland region in 2010. The Greater Auckland region was chosen for reasons of relevance and convenience. Greater Auckland contained approximately 35% of the New Zealand senior school students, and so was considered likely to give some indication of the responses which might have been returned from the senior school population as a whole; and in terms of convenience, the author's New Zealand home is within the Greater Auckland region. Given the resource and time restraints however, it was not feasible to gather data from the entire Year 12 population of Greater Auckland and so a random sampling technique was adopted to create the sample population.

The statistics department of The New Zealand MOE supplied information which indicated 18,107 Year 12 students attended schools of the Greater Auckland region in 2009. This number of students excluded students from special needs schools and homeschooling as it was felt the survey activity might be disruptive to their schedules. Sekaran (1992, p. 253) and the Institute of Electrical and Electronic Engineers (IEEE, Sample Sizes) provide a generalized scientific guideline for sample size and population size: both indicate that to achieve a 95% level of confidence for a population of around 20,000, the sample size should be at least 377. Estimating a 50% return rate meant approximately 800 students should be included in the survey. Although the Year 12 student population of Greater Auckland is nearly 35% of the New Zealand Year 12 population, the anticipated 95% level of confidence in the inferences from this type of research can only be attributed to the Year 12 students of the Greater Auckland region itself.

Sample selection

The sample was stratified by school type and governing authority, and the ratios of strata sizes to the whole Greater Auckland Year 12 population calculated. A stratified random sampling technique was adopted which maintained those same ratios for strata within the survey sample to the whole sample. Ideally students should be selected throughout the strata, this would however require the selection of just a few students from each of the Year 12 classes throughout the Greater Auckland region; an approach considered impractical and expensive. Cluster sampling by school class, considering an average class size of 30 students, was considered a practical approach to this sampling situation, which also minimized the potential disruption to students.

Survey instrument

The questionnaire consisted of 58 items. In order to focus the students' thinking, the items were grouped thematically, and the question stems which relate to this paper are shown in Figure 2, p. 8.

Figure 2: The question groups which support the main research questions.

Relationship to sample population Gender? School type? Ethnicity? Knowledge about engineering: Providers of engineering courses? Different types of engineering courses available? Gender ratio of engineers? How engineers contribute to society? Surplus/shortage of engineers in society? International recognition of a New Zealand engineering qualification? Considering engineering as a career or field of study?	Career expectations of careers in general: Interesting work Salary Status Computer-usage Job-mobility Continuous employment? Career expectations of a career in engineering: Interesting work? Salary? Status? Job-mobility? Continuous employment? Appropriate for women/men?

SELECTED SURVEY RESULTS

The demographics of the Greater Auckland sample

Data were returned by 292 Year 12 students who were attending nine schools within the Greater Auckland region. Almost all, 289 of the 292 students, came from publicly funded schools, of which 261 were from the state co-educational sector, 13 from the state girls sector. The ethnic distribution of the sample was 45% Pākehā, with Pasifika and Māori being the largest minority groups with 10% and 8% respectively. Most students, about 80%, had done most of their junior and senior schooling in New Zealand, with just 10%

experiencing some or most of their senior education in New Zealand though having all their junior education overseas. Students in both the arts and sciences streams were well represented.

Assessment of the students' knowledge of engineering

The questions were divided broadly as "academic" and "societal". The academic questions related to where and in what study modes engineering might be studied, the broad fields of study and at what academic level, what engineers do at work, and the international currency of the qualification. The societal questions focused on gender ratios within engineering, engineers' contributions towards society's development, and the demand for engineers in New Zealand.

The responses suggest the students had a reasonable level of general knowledge about engineering, the kind of work done by engineers, and some idea of their training. Most of the students, 91%, felt that at least 60% of engineers were male; around 80%, were aware that engineering was offered at universities and other institutions; but less than half were aware of online or part-time programs. Only 8% of students thought all engineering programs were the same, and about 70% understood a variety of engineering fields exist. Regarding the more societal questions, 86% of the sample held the opinion that engineers contribute at least quite a lot to society's development, yet although more than 50% thought New Zealand needed more engineers, 41% had no idea about demand. Some students were rather confused about the kind of work done by engineers with 20% thinking they made mechanical repairs, and only 71% recognizing the design role in engineering.

The attitudes of Year 12 students in Greater Auckland towards engineering as a career or field of study

The initial series of attitudinal questions probed the students' hopes and expectations for their future careers, whatever those careers might be, creating a context-free impression of the sample's attitudes towards careers in general. The students were then asked in a direct manner if they were considering engineering as a career or program of study, followed by a second series of questions, very similar in phraseology to the first series, but this time directing the students to consider their context as a possible career in engineering.

The students in the sample exhibited a generally positive regard for their potential careers in terms of salary, status, continuous employment, helping their country, and of obtaining interesting work. The least positive responses were to the notion of using computers frequently, but even for this question, twice as many students appeared to be looking forward to using computers than those who were not. The conclusion from these responses to these questions, which related to careers in general, is that this sample of students had fairly positive expectations for their future careers, and that the majority were comfortable with the use of computers and hoped for it to be a part of their future career.

When asked if considering engineering as a career or field of study, only 13% of the sample indicated they were actively considering engineering for their future career

or field of study, and nearly half (47%) had already decided against engineering as a possible career.

With regards to the students' attitudes towards a possible career in engineering, the responses suggested the students had a generally positive attitude towards engineering, in that the majority of the sample expected engineers to be well paid, with good job opportunities, and to be in demand across New Zealand. They also perceived engineers made things that were helpful in daily life and for the development of the nation, and over 70% agreed that engineering is potentially an interesting career.

Despite the students' apparently positive impressions of engineering careers and the similarity of the response distributions with the sample's general career expectations, the students registered considerable disagreement with some of the statements related to engineers and/or careers in engineering. The responses related to whether engineers were highly thought of, and their status in New Zealand society received the most disagreement to any of the questions related to engineering. Nearly 40% of the respondents felt that engineers were not highly thought of and did not hold high status, and less than 10% strongly agreed to the contrary. Engineering as an interesting career received the largest amount of strong disagreement (10%) of any of the questions on attitudes towards engineers and engineering.

Attitudes towards engineers as related to ethnic background

Enrolment into tertiary programs by students from selected ethnic backgrounds within the New Zealand context was discussed earlier, and the responses recorded in Table 2 indicated Pākehā and Māori were proportionately under-represented in the fields of engineering and IT. Consequently, the sample's responses to whether they were considering engineering as a career or field of study were analyzed by ethnic background, and the results shown in Table 3, p. 11.

The Ethnic composition of the sample is diverse and around 30% of the cells contain small numbers. However, a Chi-square analysis indicates that there is a statistically significant relationship between ethnicity and choice of career, χ^2 (df = 12, N = 289) = 28.15, p = .005, and the effect size is moderate (Cohen's w = 0.31). Cautiously interpreted, the response pattern suggests that Pākehā and Māori students showed the least interest in engineering with just 11% and 4% respectively responding "yes", whereas 40% of the Indians indicated that were considering a future in engineering. Of those who rejected engineering, Pākehā, Chinese, and Māori had proportions of 50% or greater, yet rejection of engineering by Indians was only 10%. It must be repeated that these findings are based on small numbers for the non-Pākehā groups, and so these varied responses must be interpreted as suggestive rather than firm indicators of intention.

Earlier analysis of the sample's responses suggested that they had a generally positive attitude towards engineers and engineering, except for the student's attitudes towards the suggested high status afforded to engineers. Nearly 40% of the respondents did not concur that engineers were highly thought of and hold high status, and less than 10% strongly agreed to the contrary. Consequently the perceived status of engineers was analysed with respect to ethnic background, and the results shown in Table 4, p. 11.

Table 3: The Relationship between Ethnic Background and Students' Responses to Considering Engineering as a Career

	Are you considering engineering as a career or field of study? Response choices (%)		
Ethnic background	Yes	Maybe	Not at all
Pākehā (n =131)	11	39	50
Chinese (n =15)	13	34	53
Indian (n =20)	40	50	10
Māori (n =24)	4	29	67
Other Asian (n =19)	16	47	37
Pasifika (n =29)	21	48	31
Other (n =53)	8	41	51

Table 4: Perceived Status of Engineers Distributed by Ethnic Background

	Engineers are highly thought of Response choices (%)			
Ethnic background	strongly disagree	disagree	agree	strongly agree
Pākehā (n =131)	6	37	52	5
Chinese (n =15)	0	27	60	13
Indian (n =20)	0	20	60	20
Māori (n =24)	13	52	35	0
Other Asian (n =19)	0	17	56	28
Pasifika (n =29)	7	21	55	17

The analysis of the cross tabulated data shown in Table 4 indicates that the attitude towards engineers is not consistent across the ethnic backgrounds, and that the relationships show statistically significant trends, χ^2 (df = 18, N = 288) = 34.34, p = .011 with a moderate effect size, Cohen's w = 0.35.

Māori students showed considerable disagreement with the notion that engineers are highly thought of, and none of them strongly agreed. The Pākehā contingent was also inclined to this perception, with 43% disagreeing that engineers are thought of highly. By contrast, the responses from the groups of Asian students were more favourably disposed to high status for engineers. Indians students responded most positively with 80% agreeing with the notion of high status for engineers, and the "Other Asian" sector

of the sample population recorded the highest mean at 3.11 out of a maximum of 4.00.

Of the data collected in the course of this research, the responses associated with the expected salaries of engineers, and the contribution of engineers to the development of New Zealand, are most likely to impact on the students perception of the status of engineers. Consequently the next two tables, Table 5, p. 13, and Table 6, p. 13, record the cross tabulated responses regarding engineers' salary and contribution to development, with respect to ethnic background.

The Chi-square analysis of the data shown in Table 5 and Table 6 both indicate inconsistencies across the ethnic backgrounds, and that the relationships show statistically significant trends with a moderate effect sizes.

Regarding perception of the salary paid to engineers (Table 5); Māori and Pākehā students showed the least strong agreement that engineers are well paid, with Māori indicating the greatest disagreement. Regarding engineering as a nation building profession, (Table 6) 25% of Māori and 17% of Pasifika disagreed with such a notion; in sharp contrast with Chinese and Indian students who registered less than 10% disagreement, and the Other Asian group which registered no disagreement at all. Again however, these findings are based on small numbers and so caution must be taken with the interpretations.

Table 5: Perceived Remuneration of Engineers Distributed by Ethnic Background

	Engineers are well paid Q36 Response choices (%)			
Q5 Ethnic background	strongly disagree	disagree	agree	strongly agree
Pākehā (n =132)	4	14	74	8
Chinese (n =15)	7	0	66	27
Indian (n =20)	5	10	75	10
Māori (n =24)	8	13	75	4
Other Asian (n =19)	0	21	47	32
Pasifika (n =29)	3	3	46	48

χ^2 (df = 18, N = 291) = 42.77, p = .001, Cohen's w = 0.38

Table 6: Perceived Contribution of Engineers to Nation Building Distributed by Ethnic Background

	Engineers will help the development New Zealand Q42 Response choices (%)			
Ethnic background	strongly disagree	disagree	agree	strongly agree
Pakeha (n =130)	3	6	59	32
Chinese (n =15)	7	0	47	46
Indian (n =20)	5	0	45	50
Maori (n =24)	12	13	63	12
Other Asian (n =19)	0	0	58	42
Pasifika (n =29)	3	14	59	24

χ^2 (df = 18, N = 289) = 25.76, p = .105, Cohen's w = 0.30

CONCLUSIONS AND RECOMMENDATIONS

Although Pākehā was the only specific ethnic group containing more than 30 respondents, and so the analyses of the responses are interpreted cautiously, a statistically significant relationship was found between ethnicity and the choice of engineering as a career, and a statistically significant relationship was also apparent between ethnic background and the responses regarding the high status of engineers in New Zealand society. Pākehā and Māori appeared less inclined to become engineers than those of the other ethnic groups within the sample, and registered the highest disagreement regarding the notion of engineering being a high status career. The responses of Pākehā and Māori regarding the status of engineers were contrary to the majority of the rest of the sample, and also to the findings of the literature. Further investigation into factors that might affect the students' perception of the status of engineers again revealed statistically significant relationships along ethnic lines. Māori indicated the strongest disagreement that engineers were well paid and help the development of New Zealand, and the responses of the Pākehā students suggested similar sentiments.

Implications for research

Given Pākehā and Māori form approximately 80% of tertiary enrolment in New Zealand, and that they showed the least inclination of all groups to follow careers in engineering, such findings, although suggestive rather than strongly indicative, require further investigation. For example if we consider the results indicating a significant proportion of Pākehā and Māori disagree with the notion that engineers are not well paid, this could be the students' perception of the absolute level of the salary itself, or comparison of engineers' salaries with those in other professions, or as insufficient reward for

completing a demanding degree and taking on a job with pressure and responsibility. The results showing a significant proportion of Māori and Pasifika disagreed that engineers help the development of New Zealand could likewise reflect a number of factors, including the development of New Zealand in general, or its development as perceived through cultural frameworks. In order to better understand the motivation behind the students' responses, research of a qualitative nature will be required.

Implications for careers advisors

Careers advisors should be aware that Pākehā and Māori are under-represented in engineering and so those particular groups should be encouraged to persist with senior school science, especially physics, and to attend opportunities to learn more about engineering careers. It is important to clarify the nature of an engineer's job, and to clearly separate between that and trade work such as done by mechanics, plumbers and electricians.

Implications for practitioners

Steps should be taken to redress the perception of engineering as a career with low status. Engineering bodies should embark on campaigns, clarifying differences between the typical work of a professional engineers and tradesmen; targeting Pākehā and Māori to improve the perception of these groups towards the status of engineering careers; and promoting the title *Engineer* similar to such as Doctor or Professor. The title *Engineer* is already practiced in some countries, implying elevated status. Futureintech recently introduced Engineering Education-to-Employment (E2E) as a new initiative aimed at increasing enrolment into engineering programs (n.d.). To make this initiative a success, related sectors and their personnel should acquaint themselves with the E2E web site[7], and get themselves and others involved.

Concluding comment

In an international newspaper published in the UK, Nick Martindale reported that Semta, which is the sector skills council for science, engineering, and manufacturing technologies, predicted that an additional 82,000 scientists, engineers, and technologist would be needed in the UK by 2016, "simply to keep pace with the retirement of an aging workforce" (The Telegraph, 19-25 September, 2012). For New Zealand to avoid a similar situation of impending deficit, it is critical that young minds are engaged with the fields of science, and particularly with the notion of careers in engineering. Although the sample surveyed for this research was not representative of the total student population in New Zealand schools, the findings related to the perceived status of engineers by Pākehā and Māori point to a possible issue involving 80% of the tertiary intake. Resolution of such an issue could have a significant impact on enrolment into engineering programs from students of those ethnic backgrounds, and a significant impact on the future development of New Zealand.

Notes:

1 The Greater Auckland region consists of Auckland City, Franklin District, North Shore City, Manukau City, Papakura District, Rodney District, and Waitakere City.
2 *Pākehā* – a person who is a New Zealander, non-Māori, of European Caucasian extraction (Ryan, 1995).
3 Retrieved from http://www.immigration.govt.nz/migrant/stream/work/skilledmigrant/Link Administration /ToolboxLinks/essentialskills.htm?level=1 (DoI, Essential skills in demand, accessed May 2012).
4 Retrieved from http://www.educationcounts.govt.nz/statistics/schooling/ july_school_roll_returns/6028
5 Pasifika refers to those peoples who have migrated from Pacific nations and territories to New Zealand, or who identify as Pasifika, via ancestry or descent (Airini, Mila-Schaaf, Coxon, Mara, & Sanga, 2010).
6 Retrieved from http://www.dol.govt.nz/publications/general/migration-trends-outlook/2009-2010/at-a-glance.asp
7 http://www.futureintech.org.nz/index.cfm

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Pacific-Asian Education
Vol. 27, 2015, 37-46

Conceptualization of Global Human Resource in Japan and its Development Initiatives – Focusing on the *Super Global High School Program*

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Abstract

This paper examines the concept of the *Global Human Resource* in Japan. It considers the program's development strategies, focusing particularly on the *Super Global High School (SGH) Program*. This program began in 2014 with the expectation that high schools would foster the development of global leaders by requiring students to undertake multidisciplinary, comprehensive and exploratory studies on global social and business issues. Students are expected to conduct fieldwork on a research theme both inside and outside the country as part of their learning endeavor. According to the documents and policies of each *SGH*, the *Global Human Resource* should produce: 1) proactive and innovative global business leaders; 2) active participants in multicultural co-existence; or 3) imaginative problem solvers and critical thinkers on global issues.

Introduction

This paper analyzes the *Super Global High School (SGH) Program* in order to conceptualize the *Global Human Resource* and its competencies in Japan. According to the national government, the *Global Human Resource* is understood to have an active international leadership with an awareness and deep knowledge of social issues, communication and problem-solving skills, and other globally competitive skills (Ministry of Education, Culture, Sports, Science and Technology (MEXT), 2014a).

To foster competencies for global leadership, the SGH Program started with 56 certified high schools in 2014, and another 56 high schools were added in 2015. These SGHs are expected, within five years, to conduct multidisciplinary, comprehensive and exploratory studies on global social and business issues. They are expected to collaborate with local and international universities that promote globalization as well as with international companies and organizations. This program also requires the students to conduct fieldwork on a research theme inside and outside the country as part of their learning activities. It is maintained that it will broaden the students' views and pursuit of goals. Parallel to these endeavors, every SGH should determine their ideal leadership profile, specific research themes and education contents along with their regional characteristics and unique school features (Ishii, 2014, pp. 43-44). In this context, our research analyzes the documents and policies of each SGH in consideration of the strategies for Global Human Resource development in Japan.

Our previous studies described and critically discussed the international

standardization of education in representative countries as evident in their strategies for global governance in education (Ninomiya & Urabe, 2011, p. 23). These situations can be classified as a 'dialogue' between localization and globalization. In this context, the SGH Program can be interpreted as a dialogue between traditional Japanese education and global education reform (Urabe & Ninomiya, 2014).

This paper first explains the roots of, and discussions about, the Global Human Resource in Japan. This has been discussed in the field of higher education in line with the business or industrial sectors. Discussion of the Global Human Resource is also expected in secondary education. This should serve as their link with higher education. Secondly, an outline of the SGH Program and the characteristics of the certified schools and their programs are presented prior to the analysis of the concept, Global Human Resource, and its competencies. Finally, the paper discusses the challenges and outlook for Global Human Resource development in Japan.

1. Discourses on *Global Human Resource* in Japan

Roots in Japan

The concept of Global Human Resource can be traced back to a proposal for 'Human Qualities' by the Strategic Research Team for Human Qualities (Japanese Cabinet Office, 2003) by the Government Cabinet Office. This occurred at a time when the Japanese economy was sluggish. This condition led to the formulation of a 'Strategic Research Team for Human Qualities' composed of experts in education and industry. They were tasked to identify competencies that would develop human resources to increase economic activity. This research team formulated Human Qualities as necessary competencies for human resources that would foster Japan's industrial competitiveness.

There are another two recent competency-based models in Japan in addition to the Human Qualities model. These are the Fundamental Competencies for Working Persons, and the Bachelor's Competencies. The Human Qualities competency-based model consists of three competencies: 1) intellectual abilities; 2) social and interpersonal competencies; and 3) self-control competencies. Firstly, intellectual abilities refers to basic skills, professional knowledge or know-how, logical thinking, and creativity. Secondly, social and interpersonal competencies includes communication skills, public and normative consciousness, and respect for others. Thirdly, self-control competencies contain motivation, perseverance, and a desire for their own lifestyle and success. In addition, there are Fundamental Competencies for Working Persons which include: (1) action; 2) thinking; and 3) teamwork and the Bachelor's Competencies which include: 1) knowledge and understanding; 2) generic skills; 3) personal qualities; and 4) comprehensive learning experience and creative thinking. The Fundamental Competencies for Working Persons was developed in 2006 by the Research Team about Fundamental Competencies for Working Persons (2006) in the Ministry of Economy, Trade and Industry (METI). The Bachelor's Competencies model was developed two years later by the Central Council for Education in the Ministry of Education, Culture, Sports, Science and Technology (MEXT, 2008).

Definition of Global Human Resource *and the* Super Global University Program

Earlier discussions on building competency-based models led to a definition of Global Human Resource by the Council for the Promotion of Global Human Resource Development (2012). The definition refers to those individuals who can actively contribute to economic and social development in the globalized world and consists of the following three elements: "language and communication skills"; "independence and activeness, spirit of challenge, coordination and flexibility and a sense of responsibility and mission"; and "understanding about different cultures and identity as Japanese". In addition, the following competencies are required for the Global Human Resource: a wide-ranging and in-depth expertise in the liberal arts, problem identification and problem-solving ability, teamwork and leadership (within group members with different backgrounds), public and ethical awareness, and media literacies.

It is expected that this Global Human Resource should be developed firstly in higher education in partnership with the business or industrial sectors. Thus, MEXT started the promotion initiatives for the Global Human Resource development by asking universities and colleges to foster the competencies of the students for globalization (MEXT, 2014b). In response to this, the Super Global University (SGU) Program was formed with 37 certified universities (out of 782 universities) in order to develop Global Human Resources. The SGUs are separated into two categories: 1) 13 'Top Global Universities'; and 2) 24 'Globalization Leading Universities'. The 13 Top Global Universities are expected to invite excellent foreign faculties to Japan in order to be recognized as one of the top 100 universities in the world. They are then eligible for a 10-year budget amounting to US$4,200,000 per year. The 24 Globalization Leading Universities in the second category are required to serve as models for an excellent international university. They also have a 10-year budget of about US$1,700,000 per year.

Problematic link between Higher Education, Secondary Education, and Super Global High School Program

Since 2002, the government has promoted English, mathematics and science education at the secondary school level. The selected Super English Language High Schools (SELHi) are expected to promote the use of English language as a model of best practice in education (MEXT, 2011). There are also selected Super Science High Schools (SSHs) which offer intensive programs in mathematics and science in order to foster competitive experts in the field of science and technology (Japan Science and Technology Agency (JSTA), 2014).

As part of fostering Global Human Resources, policy makers in Japan have discussed how to link higher education to secondary education. Specifically they are interested in how to connect university and senior high school curricula to develop the Global Human Resource. The difficulty in connecting the two levels of education lies in adjusting the traditional Japanese school curriculum model ('Zest for Life') to the new competency-based human development model in higher education. After 2003 when the key competency (DeSeCo) was proposed by the OECD, the competency-based

human development models spread to many countries. For example the '21st Century Skills' in the US, the 'Key Skills' in the UK, the 'General Capabilities' in Australia, and the 'Key Competencies' in New Zealand. But the traditional Japanese model, 'Zest for Life', can not be directly reconstructed because it is a content-based model. This difficulty led to the Japanese government's endorsement of the new program, the Super Global High School, in 2014. This is seen as a possible solution to the incompatibility between the content-based 'Zest for Life' curriculum, the content-based model used in Japanese secondary schools and the competency-based human development model curriculum being promoted in higher education. Although policy makers wish to link secondary education and higher education in order to foster the Global Human Resources development, there remains a concern for a possible derailment of the curriculum in the process.

2. *Super Global High School Program (SGH)*

Outline of SGH Program

The SGH program certificates and provides a budget to high schools which have defined an ideal global leader profile. This is done with the purpose of fostering global leaders and accepting the challenge of possibly linking with university education (MEXT, 2014a). These certified SGHs are expected to conduct multidisciplinary, comprehensive and exploratory studies on global social and business issues for five years. They are expected to collaborate with domestic and international universities as well as with companies and international organizations that promote globalization. They also require their students to conduct fieldwork on a research theme both inside and outside the country. The endeavor is part of students' learning activities and intended to broaden their views and encourage the pursuit of their goals. In addition, the certified SGHs are also expected to determine their ideal leader, specific research themes and education contents in consideration of their regional characteristics and schools' features.

Characteristics of Certified High Schools and their Study Themes

The data below show the distribution and proportion of certified SGHs by region. MEXT endeavored to achieve a balance of certified SGHs within the different regions in Japan (See Table 1). However, there are more certified high schools in the Kansai area (e.g., Osaka and Kyoto).

Table 1: Regional Distributions of Certified High Schools

All Japan (in 2014)	112 of 5,014 Schools	Chubu (1.7%)	15 of 849 Schools
Hokkaido (1.7%)	5 of 291 Schools	Kansai (3.8%)	31 of 813 Schools
Tohoku (1.2%)	6 of 493 Schools	Chu-Shikoku (2.5%)	15 of 579 Schools
Kanto (2.1%)	29 of 1,346 Schools	Kyushu (1.7%)	11 of 643 Schools

As for the proportions of schools by establishment, the certification rates of the national high schools prove to be overwhelmingly higher than the other prefectural, municipal, and private high schools (See Table 2).

Table 2: Certification Rates of Certified High Schools based on Establisher

National	Prefectural or Municipal	Private
11 of 19 Schools (57.8%)	65 of 3,660 Schools (1.8%)	36 of 1,335 Schools (2.7%)

Upon analyzing the initial working documents of 112 certified schools (see Table 3), the study themes tend to be related in particular to the issues on economics, business, industry, social entrepreneurship, and corporate social responsibility (selected by 60 schools), international relationship such as diplomacy, security, peace, poverty, international cooperation, and development (selected by 53 schools), and environmental issues (selected by 51 schools).

Table 3: Study Themes at *SGHs* (categorized by MEXT)

Economics, Business, Industry, Social Entrepreneurship, and Corporate Social Responsibility	60 Schools
International Relationship (Diplomacy, Security, Peace, Poverty, International Cooperation, and Development)	53 Schools
Environment	51 Schools
Community	39 Schools
Symbiosis (Culture, Ethnicity, and Foreigners)	31 Schools
Culture, History, Religion, and Language	28 Schools
Education for Sustainable Development, and recycling society	27 Schools
Education	21 Schools
Medical, Health, and Welfare	18 Schools
Agriculture and Food	18 Schools
Resources and Energy	15 Schools
Tourism	14 Schools
Urban and Living environment	14 Schools
Philosophy and Universal Values (Law and Human Rights)	10 Schools
Disaster Prevention and Reconstruction	9 Schools
Biological and Ecosystem	7 Schools
Successful Women	5 Schools

3. Concept of *Global Human Resource* through *SGHs*

Global Human Resources *in* SGHs *and their Competencies*

How do the SGHs construct students in terms of their own Global Human Resource model? What competencies do they expect the students to develop? According to the initial working documents, all the SGHs clarify the contents or themes of their study projects, while only some SGHs set their concrete images of the Global Human Resource and the required competencies. To date, each SGH is struggling to seek for an ideal, but concrete, model of Global Human Resource in transforming contents-based curricula to competency-based curricula. In fact, there are only 4 out of 112 certified schools which have proposed both concrete human resource and required competency models (see Table 4).

Table 4: Concretely Proposed *Global Human Resources* and Required Competencies (by 4 *SGHs*)

1. Ochanomizu University Senior High School (Tokyo/National)	
Global Human Resource	Person who can cooperatively live together with the people from different cultural backgrounds, have willingness and ability to contribute to peace and sustainable development in the international community.
Required Competencies	Communication Skills, Commonality, and Ethics
2. Haruhigaoka High School (Aichi/Private)	
Global Human Resource	Global citizen
Required Competencies	Global Competency, Consciousness for Cooperation and Symbiosis
3. Ritsumeikan Senior High School (Kyoto/Private)	
Global Human Resource	Person with willingness to solve difficult problems of human beings
Required Competencies	Rich Communication Skills for Seeking a Solution of Difficult Problems of Human Beings
4. Fukuyama Junior and Senior High School Attached to Hiroshima University (Hiroshima/National)	
Global Human Resource	Person who will create an innovation from a glocal perspective rooted in a region
Required Competencies	Consensus Building

Seven SGHs were found to include a human resources model without setting their concrete competencies (See Table 5).

Table 5: Definitions of *Global Human Resources*

Name of Schools	Definition of Global Human Resources
1. Shibuya Junior and Senior High School, Shibuya Kyoiku Gakuen (Tokyo/Private)	Person who can consider and act for a solution of a problem
2. Jishukan Senior High School (Aichi/Prefectural)	Person who can create an image of the future in Japan
3. Meijo University Senior High School (Aichi/Private)	Global citizen
4. Yokkaichi High School (Mie/Prefectural)	International person who can create a new value
5. Doshisha International Junior/Senior High School (Kyoto/Private)	Person who can learn to propose a sustainable society
6. Kitano High School (Osaka/Prefectural)	Person who can take advantage of the results learned in the global studies to build a better Japan
7. Toyonaka High School (Osaka/Prefectural)	Person who can become a business leader in the world

Twenty-one SGHs, on the other hand, proposed the required competencies without any concrete concepts of Global Human Resource (See Table 6).

Table 6: Required Competencies of 21 *SGHs*

Name of Schools	Required Competencies
1. Sapporo Nihon University Senior High School (Hokkaido/Private)	Ability to Collect Information, Skills for Analysis and Consideration, Imagination, Problem-solving Skills, Diversity, Practical skills, Ability of Expression and Negotiation, and Communication Skills using English
2. Aomori Senior High School (Aomori/Prefectural)	Ability to Set the Agenda on the Basis of Understanding of Diversity, Planning Capabilities based on Global Mind, and Ability to Combine Theory and Practice through Development of Business Models
3. Akita Minami Senior High School (Akita/Prefectural)	Communication Skills
4. Tsuchiura First High School (Ibaraki/Prefectural)	Interdisciplinary Knowledge and International Perspectives
5. Waseda University Honjo Senior High School (Saitama/Private)	Ability to Build Partnerships for International Coexistence

Name of Schools	Required Competencies
6. Tokyo Gakugei University International Secondary School (Tokyo/National)	Ability to Confront the "Risk Society" with Organizations, and Negotiation Skills for Consensus and Peace, and Ability of Implementation
7. Kosei Gakuen Girls' Junior & Senior High School (Tokyo/Private)	Problem-Solving Approach, International Knowledge, Social Behaviors, Communication Skills in English, and Career Planning
8. Shinagawa Joshi Gakuin (Tokyo/Private)	"Entrepreneurial Mind" to Discover Social Issues and Create New Social Business
9. Showa Women's University Showa High School (Tokyo/Private)	International Understanding and Ability to Design Career
10. Yokohama Municipal Yokohama Science Frontier High School (Kanagawa/ Municipal)	Communication Skills and Logical Thinking in English
11. Hosei University Girls' High School (Kanagawa/Private)	Capability to Discover and Solve the Problems, Social Awareness, Career Awareness, Learning Motivation, and Transmission Abilities
12. Niigata Prefectural Kokusai Joho High School (Niigata/Prefectural)	Logical and Analytical Thinking
13. Nagoya University School of Education Affiliated Upper and Lower Secondary School (Aichi/National)	Self-directed Learners
14. Kyoto Municipal Horikawa High School (Kyoto/Municipal)	Toughness and Resilience
15. Semboku Senior High School (Osaka/Prefectural)	Global Mind, Global Knowledge, and Global Human Skills
16. Kansai Soka Senior High School (Osaka/Private)	Sense of Mission as a Global Leader, Empathy, and Creativity for Problem-solving
17. Seifunankai High School (Osaka/Private)	Ability to Create the Future Proactively
18. Itami High School (Hyogo/Prefectural)	Expression in English and Transmission Skills in English
19. Keimaigakuin Junior & Senior High School (Hyogo/Private)	"Social Entrepreneurship", Independence, Diversity, Cooperativity, and Motivation on Contribution to the World
20. Hiroshima Junior/Senior High School (Hiroshima/Prefectural)	"High Aspirations" for Contribution to "Building a Sustainable Society"
21. Fukuoka Futaba Junior/Senior High School (Fukuoka/Private)	Women Shaping Their Dreams and Thinking for Design

Characteristics of Global Human Resources *and Competencies*

On the basis of the initial working documents of each SGH, we can identify three types of Global Human Resource model. In the first, a Global Human Resource is defined as a person who create a new value and innovation as a business leader. Second, a person who can live together cooperatively with others from different backgrounds. Third, a person who can propose and implement a solution for global issues. In other words, Global Human Resource individuals should be, firstly, proactive and innovative global business leaders. Secondly, they should be active participants in multicultural co-existence and thirdly, imaginative problem solvers and critical thinkers on global issues.

With respect to the required competencies, we found that the proposed competencies by SGHs can be classified into the following five categories: 1) International Understanding (Knowledge); 2) Logical/Critical Thinking; 3) Communication Skills; 4) Attitudes and Behaviors; and 5) Creativity. In addition, a specific competency related to Japanese peoples' identity, that of toughness and resilience is required (See Table 7).

Table 7: Categories of Required Competencies

Categories	Required Competencies
1. International Understanding	Interdisciplinary Knowledge, International Perspectives, International Knowledge etc.
2. Logical/critical Thinking	Skills for Analysis, Consideration and Problem-solving, Imagination, Logical Thinking etc.
3. Communication Skills	Consensus, Gathering and Transmission of Information, Negotiation, English etc.
4. Attitudes and Behaviors	Public Mind, Ethics, Cooperative Awareness, Diversity, Sense of Mission etc.
5. Creativity	Planning Skills, Career Planning, Entrepreneurial Mind, Motivation, Creativity etc.
6. Specific Competencies	Toughness and Resilience

4. Challenges and Outlook of *Global Human Resource* Development in Japan

Our document analysis of the SGH Program reveals the challenges and prospects faced by the Global Human Resource Initiatives in Japan. Primarily, there should be a clear basis for setting the core competencies pertinent to Global Human Resource. Core competencies should be common skills for global business leaders as well as for global citizens. However, it must be noted that global citizenship can differ from global business competencies. Secondly, the issue of appropriateness must be taken into consideration. The human resource models, along with the different competencies that work in English-speaking countries, might not be applicable to non-English-speaking countries like Japan. However it is also possible that the core competencies for Global Human Resource can be known and understood in the same way all over the world.

It goes without saying that culture and context play an important role in defining and implementing the different competencies. Hence, 'Cross-Cultural Competence' can be a key competence for Global Human Resource. Global leaders cannot be successful without an ability to co-exist with other individuals from different cultures. Along with cross-cultural competence, citizenship education may also be a valuable contributor to Global Human Resource development. This form of education is becoming more important in Japan because of recent political developments including the lowering of the voting age from 20 to 18. As global citizens as well as citizens of Japan students need to be aware of political issues. This could be an important competency for inclusion in the Global Human Resource program.

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Pacific-Asian Education
Vol. 27, 2015, 47-60

Perceptions of leadership in high achieving urban secondary schools in Bangladesh

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Abstract

School leadership in Bangladesh secondary schools largely draws on a hierarchical model. The principal is often seen as the person who makes a school successful and they also act as the gatekeepers to transform a school through change initiatives. While the rate of change in education can sometimes be overwhelming, school principals in Bangladesh struggle with the practical realities of management in a school system that is itself undergoing change. There is some recognition of the need to distribute power to teachers for successful school change. This paper provides contextual information and specific findings about how four principals lead their secondary schools in Bangladesh. We explore to what extent urban principals in Dhaka city are moving towards distributed leadership for effective change. Both qualitative and quantitative data provide insights into the extent to which four principals use distributed leadership. Their approaches to leadership depend on their knowledge and application of the ideology of distributed leadership. The findings have implications for the development of principals as leaders in the future.

Introduction

International studies on school leadership show that effective leadership is basic to successful school development and the enhancement of teaching and learning (Bush, 2008; Camburn, Rowan, & Taylor, 2003; Miller, 2013). The OECD (Schleicher, 2012, p. 14) report for the International Summit on Teaching described the role as:

> *School leaders can define the school's educational goals, ensure that instructional practice is directed towards achieving these goals, observe and evaluate teachers, suggest modifications to improve teaching practices, shape their professional development, help solve problems that may arise within the classroom or among teachers and liaise with the community and parents. They are also in a position to provide incentives and motivate teachers to improve the quality of instruction.*

How principals enable teachers to be effective, especially regarding curriculum implementation and development is an essential focus for inquiry. While school principals play a large role in co-coordinating, monitoring and evaluating teaching and promoting teachers' professional development (Robinson, Lloyd, & Rowe, 2008), less is

documented about how principals might challenge the assumptions their staff have and to actively work towards building a professional learning community through sharing their beliefs and building a school culture (Sergiovanni & Starratt, 2007).

In their meta-analysis of 27 studies of how leadership practices affect student outcomes, Robinson, Lloyd, & Rowe (2008) found that there were five key sets of leadership practices or dimensions: establishing goals and expectations; resourcing strategically; planning, coordinating, and evaluating teaching and the curriculum; promoting and participating in teacher learning and development; and ensuring an orderly and supportive environment. Further analysis revealed that there were significant effects for the leadership dimension involving promoting and participating in teacher learning and development and moderate effects for the dimensions concerned with goal setting and planning, coordinating, and evaluating teaching and the curriculum.

Distributed leadership has emerged as a leadership approach that produces successful school performance in challenging contexts (Harris, 2002). As Bangladesh faces the challenge of reformation of the secondary education sector, it is timely for leaders to consider distributed leadership as a means to achieve more effective leadership in secondary schools. Distributed leadership is where responsibility and leadership action are shared amongst a number of personnel (Darling-Hammond, La Pointe, Meyerson, Orr, & Cohen, 2007). This requires communication between leaders, followers and situations (Spillane, 2006) and focuses on the interrelations of people and their situations by taking account of individuals' expertise, knowledge and skills. The aim of distributed leadership in schools is to enhance teaching and learning by building teachers' capacity to lead learning. Duignan (2006) posits that distributed leadership has a clear purpose of whole school improvement through improving quality teaching and learning; where school leaders try to build a culture that engages every teacher and student in the school in learning and contributing to decision-making processes to make their school successful (Senge, 2006).

As in other societies, schools in Bangladesh are often blamed for not developing students for a global economic society. As a consequence, there is a strong public call to make changes to schooling to keep pace with modern global trends. Principals are looking for ways to implement effective changes efficiently through their leadership to make their schools successful. The formal leadership role of a school principal is complex: from monitoring teachers' presence to making sure classes run smoothly. Although there are Assistant Heads in Bangladesh schools, they support the Principals with managerial duties but have limited authority to make decisions. However, one of the most complex and pragmatic tasks that school principals carry out is the everyday management of the school while leading it to fulfil its commitment to society.

As well as being accountable to the government authority in a broader aspect, a principal is also answerable to parents and community members regarding students' learning and other school-related experiences. So, the work of a high achieving school principal in Bangladesh is very demanding and the scope of work almost impossible to detail. The principals' and teachers' perceptions about leadership in secondary schools in Bangladesh influence what they do. This research reports on how four principals in high achieving urban secondary schools understand "leadership" and the extent to which they use aspects of distributed leadership.

The Research Study

A case study approach (Bassey, 2007; Yin, 2009, Patton, 2015) was used to explore the principals' interpretation of school leadership, their practice of it and their thinking about how they can distribute leadership, especially decision-making and responsibilities within their schools. Both qualitative and quantitative methods were employed to provide in-depth accounts of perceptions and practice-in-action. These included interviews of principals and surveys to elicit 20 teachers' opinions and ideas about how four schools were operating. The four schools were selected from the 10 top-ranked schools in the Dhaka Education Board in the 2009–2010 Secondary School Certificate examinations. Five teachers were selected from each school randomly from those who were present at each school during the time that the interviews were conducted with the four principals. The interviews were analysed inductively whereas the survey data provided more objective information from the teachers' perspectives about how distributed leadership was practised in their schools. The survey utilised a 5-point (1 to 5) Likert scale and was developed from the *Distributed Leadership Readiness Scale* (*DLRS*) with permission from the authority (© 2004 held by the Connecticut State Board of Education in the name of the Secretary of the State of Connecticut, Connecticut State Department of Education, 2004). This instrument was selected because it was specifically designed to measure distributed leadership, an objective of this study. Considering the contextual differences in this study compared with the USA, only 35 items out of 40 from this survey were used as these were identified as being the most relevant to the Bangladesh education context (Salahuddin, 2011).

Findings

The principals from four high achieving urban secondary schools in Dhaka were interviewed about their leadership practices. We chose high achieving schools because it was likely that the leadership practices contributed to the success of these schools and we wanted to find out what they perceived as being important. Pseudonyms were used for all participants in reporting the findings and ethical clearance was obtained through the University of Canterbury Ethical clearance committee prior to commencing this study. Principals openly discussed the aims of their leadership, their general approaches and how they made decisions. The questionnaire responses from the teachers also contributed to an understanding of leadership practices, especially to what extent distributed leadership was practised in their schools.

Interview findings

Many of the principals did not have a theoretical model that they could use to describe their leadership. Overall, the principals thought that leadership was complex and difficult to define, as principals in Bangladesh tend to see themselves mostly as managers, rather than leaders. These principals were positional leaders appointed according to the rules, after acquiring sufficient teaching experience (rather than on merit or selection based on the best person for the job). However, they indicated an awareness of the purpose of leadership for transformational change. For example, Mobarak, principal of a leading public school, explained that the purpose of leadership was to inspire and build

relationship among principal, teachers and students for the betterment of school. He stated:

In effective leadership, the factors that should necessarily be kept in view are 'teacher versus teacher interaction', 'head teacher versus student interaction' and 'teacher-student-guardian triangle relationship'. The progress of a school significantly depends on how effectively it establishes a relationship among these three factors.

All of the principals indicated that decision-making was a key part of their role. They considered that their schools depended on the decisions they made and they preferred to discuss ideas first so that there was more chance of making the right decisions. For example, Zannat, principal of one of the most famous private schools, noted, "If any ideas come out from the ten people altogether, some good decisions may then be accomplished by combining those ideas." This principal advocated for a democratic system. Similarly, Mobarak believed in actively involving students and teachers in decision-making. He mentioned how he met with groups several times: "Persistent attempts are made until it becomes helpful for the learners or effective support for achieving the targets and goals of the school."

All four principals believed in using different leadership styles in relation to time, situation and context. They assumed that one specific leadership approach did not work effectively in all situations. Alam, a non-teaching principal who formerly had a career with the armed forces, indicated that when he made disciplinary decision, he mostly used organisational rules and regulations but involved others when he wanted to find out what other people wanted or what was a preferred solution. He said:

I try to follow here participatory leadership. That means, I try to listen to all concerns and get their [teachers'] opinions. But I consider what is the best for the collective group or for the betterment of the institution. Our leadership is also distributed. I cannot do everything myself. So, responsibility for various subjects is distributed among them.

It would appear that when the principal indicated that leadership in his school was distributed, he was really referring to task allocation, rather than a broader definition of distributed leadership that would include sharing decision-making and responsibility for specific areas of management or project management. As Mobarak mentioned:

We properly distribute the responsibilities among all the teachers. After properly distributing our works, different functional areas of activity have to be determined and distributed to the teachers suited to their talent and expertise. Rahima, principal of one of the most renowned girls' schools, also described her leadership as distributed amongst teachers because she assigned particular tasks to specific teachers.. Other principals advocated for democratic, distributive, co-operational and instructional leadership to reach their schools' goals. They viewed their schools as being like a classroom and distributed their work to particular teachers. The principals confirmed that they used a range of leadership approaches to make their schools successful and, while a number of principals referred to 'distributed leadership' we have interpreted this as referring to delegation of tasks and responsibilities. This is because all of the principals took their decision-making very seriously and ultimately saw themselves as being the responsible decision-makers for their schools.

Questionnaire findings

Twenty teachers answered the questionnaire about distributed leadership. While the number of teachers who participated in this study was a limitation, the findings were relatively consistent between these teachers for the majority of question items as shown in Tables 1-4. The items of the distributed leadership questionnaire were analysed by dividing them into four dimensions: i) Mission, vision and goals; ii) School culture; iii) Shared responsibility; and iv) Leadership practices. These items are presented in four different tables where the mean and standard deviation for the cluster of items calculated using SPSS. Therefore the findings represent descriptive analyses of distributed leadership according to items on the questionnaire rather than complex relations among the items and dimensions.

i. Mission, vision and goals

The first item identified whether the teachers were aware of the mission, vision and goals of the school. The results are presented in Table 1.

Table 1: Teachers' Perceptions of the Schools' Mission, Vision and Goals

Item	N	Min	Max	Mean	S.D
The school has clearly written vision and mission statements.	20	3	5	4.15	0.671
Teachers understand and support a common mission for the school and can describe it clearly.	20	3	5	4.40	0.598
If parents are asked to describe the school's mission, most will be able to describe the mission clearly.	20	1	5	3.90	1.252
If students are asked to describe the schools' mission, most will be able to describe it clearly.	20	2	5	4.05	0.945
School goals are aligned with the national educational statement.	20	2	5	4.60	0.940
The school uses a school improvement plan as a basis for progress.	20	2	5	4.40	0.821
Teachers and administrators (Head & Assistant Head) collectively establish school goals and revise goals annually.	20	4	5	4.85	0.366
Overall Mean and S.D				4.34	0.799

Table 1 shows that there was not much variation in the responses to these items, except for the teachers' perceptions of whether parents could describe the school's mission clearly, (values ranged from 1 to 5 with a standard deviation of 1.252). The mean for each of the items ranged from 3.90 to 4.85. Although the overall mean of 4.34

indicated the presence of a mission, vision and goals in schools, the range of standard deviations, apart from the item about parents' awareness of the mission, signified that there was not much variation in teachers' thinking regarding the use and application of a good mission, vision and goals in their schools.

ii. School culture

School culture was considered as the second dimension for distributed leadership because it can contribute to student achievement as well as school effectiveness (Elmore, 2000). The culture of a school in this survey, related to the norms, values, beliefs of the teachers, students, parents and community members of the school. Given that the teachers had similar understanding about culture, there was a degree of integrity and similarity within the research findings.

Table 2: Teachers' Perceptions of School Culture

Item	N	Min	Max	Mean	S.D
There is a high level of mutual respect and trust among the teachers.	20	3	5	4.30	0.657
There is mutual respect and trust between school head and the teachers.	20	3	5	4.65	0.587
The school administrators (Head & Assistant Head) welcome teachers' input on issues related to instruction and improving student performance.	20	3	5	4.45	0.759
The school supports using new instructional ideas and innovations.	20	3	5	4.55	0.686
The principal actively encourages teachers to participate.	20	3	5	4.75	0.550
The principal actively participates in his or her own professional development activities to improve leadership in the school.	20	3	5	4.65	0.587
My principal and I jointly develop my annual professional development plan.	20	2	5	4.45	0.826
My professional development plan includes activities that are based on my individual professional needs and school needs.	20	3	5	4.55	0.686
Teachers actively participate in instructional decision-making.	20	2	5	4.15	1.137
The principal is knowledgeable about current instructional issues.	20	4	5	4.80	0.410
My principal's practices are consistent with his or her words.	20	4	5	4.75	0.444
Overall Mean and S.D				4.55	0.666

Table 2 shows that most of the teachers either agreed or strongly agreed with each of the items. The overall mean of 4.55 indicated that the participants reported that activities related to a strong school culture were present in their schools. The low SDs showed that there was consistency amongst the teachers in their responses. Though they responded with 'neutral' to 'strongly agree' for most items, some chose 'disagree' on the items such as getting an opportunity to participate in the schools' annual development plan and instructional decision-making.

iii. Shared responsibility

The teachers' opinions about their involvement in important school decision and policy-making processes were sought as part of this survey. We also wanted to know the extent to which parents' cooperation was leveraged to make the schools successful. The study sought to determine whether teachers, students and parents had joint responsibility for decision-making and implementing aspects of schooling. The responses related to shared responsibility from the teachers' perspectives are provided in Table 3.

Table 3: Teachers' Perceptions of Shared Responsibility

Item	N	Min	Max	Mean	S.D
Teachers share accountability for students' academic performance.	20	4	5	4.80	0.410
Government resources are directed to those areas in which student learning needs to improve most.	20	2	5	4.00	0.725
The school is a learning community that continually improves its effectiveness, learning from both successes and failures.	20	2	5	4.30	0.923
The school's daily and weekly schedules provide time for teachers to collaborate on instructional issues.	20	2	5	4.00	0.858
The school clearly communicates the 'chain of contact' between home and school so parents know whom to contact when they have questions and concerns.	20	3	5	4.60	0.598
Schoolteachers and parents agree on the most effective roles parents can play as partners in their child's education.	20	4	5	4.65	0.489
The school makes available a variety of data (e.g., school performance) for teachers to use to improve student achievement.	20	4	5	4.45	0.510
Decisions to change instructional programmes are based on assessment data.	20	3	5	4.25	0.716
There is a formal structure in place in the school (academic council) to provide teachers opportunities to participate in school-level instructional decision-making.	20	3	5	4.35	0.587
Overall Mean and S.D				4.38	0.646

As shown in Table 3, the highest and lowest value for all items related to shared responsibility were 2 and 5 respectively. The mean values for the items ranged from 4.00 to 4.80 and the overall mean was 4.38. This suggested that, in general, teachers thought there was shared responsibility in their schools. However, there was more variation in their responses, as indicated by the higher SDs. The teachers indicated they shared accountability for students' academic performance. The schools provided data of student performance and teachers seemed to use this to inform how they might change their teaching. However, this survey did not capture ideas from the teachers about how assessment information was used to inform approaches to teaching, specific pedagogies or how teachers appropriate teaching practices for the type of learning desired. It may be that tests scores and end-of-year exams were used to inform how well students memorised content, rather than how well teachers taught.

Additionally, some teachers thought that resources were not allocated based on a needs analysis. They also thought that there was a lack of time in their daily routines for collaboration on instructional issues. This latter point is perhaps fundamental to supporting teachers' to reflect on their teaching and to work with others on sharing good practice.

iv. Leadership practices

The teachers' responses about principals' leadership practices were analysed and are presented in Table 4. They showed the extent to which they thought they were given leadership opportunities.

Table 4: Leadership practices

Item	N	Min	Max	Mean	S.D
The school provides teachers with professional development aligned with the school's mission and goals.	20	4	5	4.70	0.470
Informal school leaders play an important role in the school in improving the performance of professionals and the achievement of students.	20	3	5	4.70	0.657
The school has expanded its capacity by providing professional staff with formal opportunities to take on leadership roles.	20	4	5	4.40	0.503
Teachers who assume leadership roles in the school have sufficient school time to permit them to make meaningful contributions to school.	20	2	5	4.15	0.745
Teachers who assume leadership roles in the school have sufficient resources to be able to make meaningful contributions to the school.	20	2	5	3.75	0.716
Expert teachers fill most leadership roles in the school.	20	3	5	4.30	0.733
New teachers are provided opportunities to fill some school leadership roles.	20	3	5	4.35	0.587
Teachers are interested in participating in school leadership roles.	20	3	5	4.70	0.571
Overall Mean and S.D				4.38	0.623

In Table 4, the participants responded to the items related to leadership practices. The overall mean of 4.38, suggested that the teachers were interested in, and had opportunities to be involved in, leadership practices in their schools. The SDs indicated that there was relative consistency in their responses. While the teachers were interested in school leadership and that in general they had leadership opportunities, they often lacked sufficient time and resources to make meaningful contributions in these roles.

Discussion

The leadership that principals enacted in their schools contributed significantly and was often essential for school success. This has also been highlighted by Hallinger and Heck (1996; 2010), Leithwood, Harris, and Strauss (2010), and Leithwood and Jantzi (2000). In this study, the principals considered the purpose of leadership was to improve their schools. They clearly understood the importance of school leadership and they operated their schools effectively. The bureaucratic system in Bangladesh schooling, required them to do everything according to the rules, but also sometimes hindered them from making timely decisions or more radical decisions for improving their schools (Salahuddin, 2011). Though they utilised some democratic systems for making decisions, where teachers and community members were able to contribute ideas, they were ultimately responsible for their schools. These leaders took their responsibility as principals, very seriously.

For aspects of distributed leadership, the dimension of decision-making was considered with scrutiny as this has been shown to be an important aspect of effective leadership (Mulford et al., 2008). Due to their position, principals in Bangladesh schools implemented rules and regulations and made appropriate decisions based on these regulations (Bangladesh Bureau of Educational Information and Statistics, 2007). All the principals in this study agreed that to enable democratic decision-making in their schools, they sought teachers' opinions. They indicated that sometimes, decisions were not made until teachers had opportunities to voice their concerns. They considered this participation enhanced democratic decision-making within their schools. It also with what Katzenmeyer and Moller (2009) observed: that schools became more democratic when there was increased participation of teachers in decision-making.

Different leadership approaches were used in within these four secondary schools in Bangladesh. According to the principals the range of leadership approaches included participatory, democratic, distributed, situational co-operational and instructional leadership to help them achieve their school goals. However, their definition of the terms might differ from the descriptions used in the extant literature. For instance, one principal cited her leadership as 'distributed' because she delegated responsibility to particular teachers, indicating that she viewed distributed leadership as task distribution. In contrast, distributed leadership is described in the literature as engaging teachers and students in leadership activities for school development (Elmore, 2000; Spillane, 2006). Another principal described his leadership as 'distributed' because he delegated subject responsibility to his teachers. Indeed, Harris (2008) and Duignan (2006) described distributed leadership as engaging many people in leadership activities, but they emphasised leadership *practices* rather than functions. So, distributed leadership involved a range of leadership practices more generally, rather than confining it to

engaging in, or delegating, tasks. However, the principals interviewed in this study considered that distributed leadership meant delegating the responsibility for tasks rather than participating in decision-making at all levels in the system.

Teachers' responses to the questionnaire aligned with the principals' information from different perspectives. This especially applied to the responses related to the mission, vision and goals in these secondary schools were derived collaboratively. Neuman and Simmons (2000) have indicated that developing a shared mission and vision, with significant goals helped focus the staff on student learning. The perception of the teachers was that parents and students did not necessarily understand the school goals, mission and vision. This was therefore a point for development in secondary school improvement in Bangladesh. They indicated that parents and students were important stakeholders; without their awareness and participation in the spirit of the mission and vision, it would be difficult for the school community to reach its goals (Marks & Printy, 2003). Potentially there were many ways to raise awareness: one was publishing newsletters on the updated mission, vision and goals of schools and distributing them among the parents and students or the school could have held community-based meetings.

The dimensions of school culture and distributed leadership considered in this study have provided insights about how the principals, teachers, parents and community related to each other and worked together. This was important because it was the sharing of the development of beliefs, values and norms that supported the building of school culture (Sergiovanni & Starratt, 2007). Teachers reported that activities related to discussing the beliefs, values and norms were undertaken in their schools. Most of the teachers indicated that their principals were knowledgeable about current instructional strategies. According to the teachers, while the principals encouraged them to participate in leadership tasks and valued their input on instructional ideas, they did not actively involve them in instructional decision-making. This presented a contradiction. Since teachers were the leaders in classroom teaching, they knew the problems and possibilities in teaching and learning better than others. Perhaps this aspect of teacher decision-making is closely aligned with the national examination system in Bangladesh and that teachers are expected to use the same text books for particular subjects and levels within the school system. That is, it is a nationalised system. As the school culture is directed to influencing and impacting students' achievement, teachers' active involvement in instructional decision-making based on evidence of student learning (Timperley & Parr, 2004) could enhance success in student learning and in developing a more productive school culture in Bangladesh secondary schools.

In the future, principals could take more active roles in discussing more effective ways of teaching and learning and actively instigate and encourage teachers to share what works well in their teaching with each other. Schools could progress more rapidly when teachers, students and parents carry through their responsibilities collaboratively. Phillips (2003) noted that students' achievement improved when responsibilities were shared. In this study, most of the teachers responded that they shared responsibilities for students' academic performance and their schools provided data that could be used to effect changes for improvement in students' learning. They indicated that schools

valued the parents' roles and their input into the children's learning.

A few teachers added comments indicating they lacked time to reflect on better ways to teach, to collaborate with each other on instructional issues and that changes in teaching strategies were not based on feedback from assessment data. Some teachers also thought that government resources were not properly directed to the most-needed areas of student learning and this created a barrier to developing shared responsibility in secondary schools. Given that the schools in this study were selected because they had the highest-achieving students, this data set potentially represents the best of what was happening. Therefore, if there were significant concerns in the best schools, there were likely to be greater concerns for other schools as well. This highlights the need to identify what aspects of strategic resourcing would make a difference.

In terms of leadership practices, the teachers reported that schools did provide formal opportunities for taking on leadership roles and professional development programmes which were aligned with the mission, vision and goals of these schools. Copland (2003) has indicated that such participation in professional development can support the development of effective leadership to help make the schools more successful. According to the survey, most of the teachers were interested in participating in leadership roles even though they lacked the necessary time and resources for doing so. In Bangladesh, the length of time of service in teaching was equated with "experience" and "expert" status. Therefore older teachers were more likely to gain leadership positions.

It was pleasing to note that in the survey, the role of informal school leaders was reported as important for improving the professional learning of teachers and student achievement. Sheppard (2003) implied that distributed leadership among formal and informal leaders contributed to school success. But without sufficient time and resources, it was difficult for the teachers in these schools to contribute meaningfully to leadership roles. Principals needed to be more aware of such time constraints and to reconsider what needed to change to enable time and resources for teachers to contribute to leadership roles. There were staffing and resourcing constraints that worked against this, so some creative thinking was needed to solve this issue.

The teachers' survey responses indicated that each of the dimensions of distributed leadership existed, to some extent, in these schools. This is positive although the teachers also may not have had a deep understanding about what distributed leadership involved. Although the principals were not very aware of the different approaches to leadership, they delegated some tasks that helped their schools to operate effectively. This finding added to an understanding of how experienced principals in Bangladesh managed their schools effectively. However, advancing their theoretical knowledge about leadership approaches might help principals to understand how they could lead their schools more effectively (Darling-Hammond et al., 2007) and challenge their assumptions about what is working, or what would enable them and their work to be more effective.

There were only four schools in this survey due to the limitations of time and the possibilities for collecting data. Further, the schools were purposively chosen because of their high reputations. Therefore it was likely that these schools represented current good practice in leadership, rather than being representative of Bangladesh leadership practices more generally.

Conclusion

In comparison with leadership practices in schools in different countries (e.g., Darling-Hammond et al., 2007; Miller, 2013; Schleicher, 2012) this study was significant because there has been a relative lack of research on school leadership in Bangladesh. In the urban schools included in this study, leadership was understood as the administrative or management tasks that principals undertook. We have identified that these school leaders could be more active in seeking the assistance of others in the way they implemented school reform. The principals had a limited understanding of the wider theory and applications of distributed leadership. They did not consider in much depth how they could use the ideas and energy of the people around them, and especially their lead teachers' expertise. It would take some creative thinking to redistribute resources (time and the tasks that lead teachers were expected to do) to free teachers up more to have time to think and discuss how they can work together to improve the learning outcomes for students. In this way, if principals focussed on resourcing strategically, they may be able to help their teachers to contribute as leaders. As well, if the principals provided professional learning opportunities for teachers and made this possible through allocating time (shifting resourcing) the leadership capabilities and capacity within the Bangladesh education system would be enhanced. This has been shown to be effective in other education systems (Darling-Hammond et al., 2007). In the meta-analysis of effective school leadership, Robinson et al. (2008) found that strategic resourcing had small, but still significant, effects on student outcomes. This study suggests that strategic resourcing may be more important in the Bangladeshi context.

The future development of principals in Bangladesh could include application of evidence from international studies about how leadership practices could lead to system-wide school improvement, since the issues were too big for principals to resolve by themselves. Connecting networks of principals (potentially through electronic and face-to-face meetings) may also assist them to share their learning as leaders. More sharing of responsibility by principals with emerging leaders in their schools, could shift and improve leadership and learning in secondary education of Bangladesh. This would require principals and teachers to change their perceptions of leadership of their schools and to redistribute how resources (time) were allocated.

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Pacific-Asian Education
Vol. 27, 2015, 61-74

Filipino mothers' involvement in the education of their Japanese–Filipino children

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Abstract

This paper discusses the nature of Filipino mothers' involvement in the education of their Japanese-Filipino children in Japan. It depicts their strategies for integration and shows the role of education in improving the status of women migrants. It also provides an understanding of how education can facilitate multicultural understanding and recognition of the presence of bicultural children in Japanese society. The questions in this study include: What is the nature of Filipino mothers' involvement in the education of their Japanese–Filipino Children in Japan? What are their challenges and experiences as mothers? What are the factors in their lives that call for an enhanced parental involvement? Twenty Filipino women living in Japan's five prefectures were interviewed. Three themes on parental involvement were derived: *Ii Oyomesan*: from nourishment to assignment; Widening network: a protective measure; and Limiting choices: making participation possible.

Keywords: Education, Parental involvement, Filipino women, Japanese–Filipino children, bicultural children

Introduction

The migration of people from various socio-economic backgrounds is a global phenomenon. More often than not, people from developing countries migrate to developed countries in search of greener pastures. Japan, despite being a developed country, retains strong reservations towards foreigners. This is marked by the absence of a national policy for foreigners' integration as well as a Japanese ingrained notion of foreigners as *gaijin* (outsiders). Hence, integration into mainstream society is difficult, if not impossible.

Japanese society still holds to the idea of homogeneity which, arguably, makes the Japanese wary of the social realities of diversity. However, there are increasing numbers of diverse foreigners, immigrants, and minority groups of non-Japanese lineage who live in Japanese society. Their presence attests to the fact of the diversity of individuals from different cultures in Japan. These groups may influence and play an integral part in developing the host society's consciousness of its changing population.

Although Japan presents itself as open to internationalization and promotes its levels of international understanding, in reality, it remains a closed society where multicultural

coexistence tends to be merely rhetorical. For this reason, it is difficult at the national level to develop an integration policy for foreigners. The absence of clear policy may weaken the support systems which currently exist at the local level. According to Tsuda (2002), in the future there will be no drastic changes in the form of integration policy initiated at the national level in Japan as this would entail the introduction of structural changes. These would test that society's willingness to fully accept that homogeneity is longer the social reality. Anxiety on the part of the Japanese is apparent in different forms: in expectations and in discrimination towards foreigners. These have led to feelings of segregation and subordination of the latter despite their efforts to be integrated.

Among these foreigners are Filipino women (Filipinas) who have earned a negative reputation due to the categorized entry point of the majority of them (i.e., the entertainment and mail-order bride industries). Although not all of the Filipinas in Japan have the same migration backgrounds, they are all inevitably affected by the predominantly negative image of Filipinas. Filipina as a category is narrowly defined as 'entertainer' and also equated with prostitution. They are known as *Japayuki*, a term that simply means 'Japan bound', but which carries the stigma of prostitution. Although Filipino women in Japan have varied levels of educational attainment and have been trying to be integrated, they still encounter forms of discrimination. As they become social participants in Japanese society by virtue of their being wives and mothers of Japanese, challenges in various contexts become inevitable.

The Filipino women's varied exposure to Japanese culture and language, their position in Japanese society as migrants, and their educational backgrounds posit challenges in their involvement with their children's education. By looking at the socio-cultural dynamics of Filipino women in Japan, their educational involvement as mothers of bicultural children is ascertained. In this vein, it is hoped in this paper that some important issues that call for integration strategies through education in support of women migrants and their bicultural children in Japanese society will be revealed.

Brief History of Filipino Women's Migration to Japan

In the 1970s many Filipinos responded to Japan's call for labor migrants. The majority of these were women who were absorbed into the entertainment and mail-order bride industries. Their migration, being work- and gender-specific, is usually viewed as a consequence of being trapped in a political and economic quagmire in their homeland. Given these conditions, Filipino migrants took advantage of a fast-growing Japanese economy that had led to a labor shortage in Japan. In the 1980s and 1990s, foreigners occupied the 3K (*kiken, kitsui, kitanai* – dangerous, difficult, dirty) occupations. These included construction and factory jobs which were filled by foreigners. However, the migration flow from the Philippines to Japan was unique in that it became increasingly feminized and concentrated in the entertainment industry (de Dios, 2014).

Due to the dominant migration pattern of Filipino women in Japan, two prevalent images have shaped public perceptions. The first, *Hanayome*, describes brides in remote areas who are portrayed as both victims of village oppression and as heroines of a declining rural population. The match-making industries, government-mediated meetings, and referrals from friends facilitated and perpetuate this phenomenon. This

is also known as the 'mail order bride' (MOB) phenomenon and the second image, as mentioned, *Japayuki* (Japan bound), refers to Filipinas working in bars as hostesses and performers, or those marrying Japanese men for convenience (Suzuki, 2000). The latter has become the generalized image of Filipinas since it has been highly sensationalized in the mass media. Contributing to the persistence of such images is the fact that although the foreign *Hanayome* have now vanished in rural areas some Filipino women do remain in the entertainment industry (Celero, 2014). Some are forced to work there by circumstances: sustaining the needs of their families in the Philippines, while others are single mothers and/or divorced from their Japanese husbands and see the entertainment world as a refuge.

The work of entertainers in the context of Japan simply means enabling the male customers to unwind and relax by engaging them in lively conversations, serving food and drinks, and to a certain extent, providing an intimate atmosphere (Faier, 2011; Parrenas, 2003). Aside from the Filipino women there are great numbers of foreign nationals such as Koreans, Chinese, Brazilians, and Thais, who also make use of the entertainment industry and the MOB phenomenon. Entertainers and *Hanayome* are not the sole preserve of Filipino women, however, their entry into those categories has attracted attention. Their presence has been noticed probably due to the way they represent, and make their plight known, to the host society. This could also be attributed to the way Filipinas maintain their self-worth and self-respect against all the odds and negative experiences. Their appearance, values, attitudes and ways of life also make them noticeable and 'separable' from the mainstream of Japanese society. Their conspicuous linguistic difficulties, both in speaking and significantly in reading and writing Japanese, which serve to aggravate their conditions and to hamper their understanding of Japanese society, can also highlight their obvious presence as foreigners. This sets them apart from their Chinese counterparts, who have knowledge of *kanji* (ideographic symbols that serve as a form of communication) which facilitates faster acquisition of Japanese language and thus adaptation to Japanese society. Moreover, while the Philippines have a shared history with Japan this is less than that of China, Korea, and Brazil. The abovementioned entry point for the majority of Filipino women into Japan, the way they exercise their human agency in hurdling the challenges attached to being immigrant Filipinas, and as mothers and socializers of Japanese–Filipino children is worth unravelling.

Parental Involvement as Social Capital

Parents, whether immigrant or native, are influential in the lives of their children. They can inspire and persuade their children to become focused and interested in the learning process. However parents can also be an instrument for disinterestedness and indifference by their children with regards to their studies. Both positive and negative influences are rooted in various factors which may include social, cultural, economic, and human capital (e.g., Cruz, 2009; Lareau & Horvat, 1999; Zedan, 2011). 'Capital' refers to the resources which parents have to draw upon when they navigate through various settings. Cultural capital refers to the predispositions, attitudes, and knowledge gained from experience. People capitalize on culture to strengthen their position in

society. Social capital refers to the relationships which provide access to information and resources and, which can, potentially, build collective political power. This is made possible as individuals establish relationships which may extend from mere acquaintance to more established networks involving the people with whom interaction is inevitable. All of these forms of capital provide parents with resources upon which they can draw when they enter their children's schools and seek to support their children's learning (Mitchell, 2008).

As in Japan, children with migrant parents are one of the most academically vulnerable group in the United States. They are constantly faced with economic, health, and work-related problems that translate into lower academic achievement and high dropout rates (Lopez, Scribner, & Mahitivanichcha, 2001). Some of the reasons for migrants' non-participation include lack of efficacy, time and skill, language incompetence, a school's uncertainty over whether to include parents in educational processes include socioeconomic status, cultural differences, and biases of school officials towards including parents in professional matters (Lopez et al., 2001; Crosnoe, 2010; Lareau & Horvat, 1999). In Japan, the persistence of foreigner status for migrants and their position as *gaijin* or outsiders, who oftentimes feel that they are not welcome and therefore, exasperates the difficulties with integrating into society. The involvement of migrant parents, like the Filipino women, in the education of their children may offers perspectives that show ways of integrating which are of value to education.

Pierre Bourdieu, James Coleman, and Robert Putnam are noted intellectuals who propel the discussion of social capital. The social capital theory serves as a useful framework in the discussion of parents' involvement to the education of their children. According to Bourdieu (1986), "social capital is the aggregate of the actual or potential resources which are linked to a possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition – or in other words, to membership of a group – which provides each of its members with the backing of collectively owned capital, a 'credential' which entitles them to credit in the various senses of the word" (p. 51). What is evident in this definition is the importance of group membership and social networks. Membership or involvement in social networks can give rise to actual and potential benefits to the individual. In this sense the individual can make a decision to be involved in a group, wherein he/she can be influenced (or can allow himself/herself to be influenced) by the group in cognizance of the different degrees of 'profit' and the power of influence from different actors in the group. Each social field that the actor gets involved with has its own dynamics and context. The actor determines his or her manner of engagement along with the underlying motives in certain engagements. Central to the concept of social capital is the *'habitus'* which incorporates the objective structures of society and the subjective role of agents within it. "The *habitus* is a set of dispositions, reflexes, and forms of behavior that people acquire through acting in society. It reflects the different positions people have in society, for example, whether they are brought up in a middle-class environment or in a working class suburb… Then the question of social agency and political intervention becomes very important" (Bourdieu, 2000, as cited in Siisiainen, 2000, p. 10). The individual's subjective experience in playing the game is at the core of *habitus*. Bourdieu's concept of

social capital recognizes its exclusionary power. Those on the top of social hierarchies can hold onto their positions through a range of subtle techniques which, cumulatively, form an iron grip. Social context possesses power and what ultimately remains important is what happens to people rather than the world in which they can intervene in their individual and collective destinies (Jenkins, 2002, as cited in Gauntlett, 2011). In other words, what matters is how the individual exercises his/her social agency within that social context and how they make sense of their presence vis-à-vis social hierarchies.

Coleman stresses the role of social capital in communicating the norms, trust, authority and social controls that an individual must understand and adopt in order to succeed. In identifying the ways in which parental involvement can build social capital, he suggests that this form of capital is derived from two types of relationships: the relationship between a student and his/her parents and relationships between a student's parents and other adults, particularly adults who are connected to the school that the student attends (Dika & Singh, 2002, as cited in Perna & Titus, 2005). Coleman, like Bourdieu, also recognizes that social capital is embedded in social relations and social structure. It consists of activities within certain structures that occur within a given system. Coleman's theory highlights the idea that the actors are 'socialized' and that their actions are governed by social norms, rules, and obligations. He considers the actor to be a social being and an 'economist'; people who have goals independently arrived at, who act independently and who are wholly self-interested (Coleman, 1988, as cited in Bexley, Marginson, & Wheelahan, 2007).

Putnam (2000) defines social capital as the connections among individuals' social networks and the norms of reciprocity and trustworthiness that arise from them. For Putman, social capital is closely related to 'civic virtue'. He calls attention to the fact that civic virtue is most powerful when embedded in a dense network or in reciprocal social relations. A society of many virtuous, but isolated, individuals is not necessarily rich in social capital (Bexley et al., 2007). Social capital operates within norms and obligations, and trust and social networks. Individuals within a certain social system are expected to have some ties or connections with other individuals. The ties that they develop entail actions within certain norms wherein a sense of trustworthiness arises from them. Hence social capital is related to civic virtue that must be actualized in the network of social relations (Putnam, 2000, as cited in Bexley et al., 2007). Individuals who cooperate in a social network tend to exude trust in order to achieve their common goals.

An educational system is a social field containing rules and regulations. Parents, students, and educators interact within certain norms. Parents participate in the educational social fields with their own strategies, motives, according to their own capacities. Using the framework of social capital, the relationship of parents to their children, school, teachers, and co-parents/community was investigated in the study described below. Parents' involvement that can be seen in the school is referred to as school-based involvement. School-based interaction can be manifested in attending school activities and meetings. Parent and child interaction is reflected in how parents help in accomplishing homework or children's projects at home.

Methodology

The study of the involvement of the Filipina in their children's education was undertaken using a case-study method. Data were gathered both from observation and in-depth structured interviews, lasting for two hours, with twenty (20) Filipino women residing in Hiroshima, Aichi, Saitama, Kagawa Ken (prefectures) and Osaka Fu (urban prefecture). The interviewed Filipinas vary in age and educational attainment. They had, on average, two children. Thirteen (13) or the majority of the respondents met their husbands in the entertainment industry while one (1) met her partner through the introduction of someone she knows and two (2) through match-making companies. Four (4) were professionals who met their husbands in their respective professional fields. All of them made considerable efforts towards positioning themselves in the host society.

Patterns of Parental Involvement

There are a number of issues that affect parental involvement in the education of Japanese–Filipino children. The dynamics of the involvement of Filipino women to the education of their children are limited by their capacity in relation to knowledge and understanding of Japanese language and culture. In addition, their involvement is limited and challenged by the general image of Filipinas in Japanese society. Below are themes that capture the nature of involvement of Filipino women in Japan.

Ii oyomesan: From nourishment to assignment

Oyomesan is an honorific or polite form of the word for "bride" or "daughter-in-law": *yome*, made by adding the honorific prefix "o" and the polite suffix "-san". An *ii oyomesan* is literally a "good bride and daughter-in-law". The *yome/oyomesan* has widely been regarded as a position for a woman within the *ie*, or household, a kinship formation that is generally associated in Japan with traditional, rural, and an essentially Japanese way of life. Correspondingly, the *yome/oyomesan* is frequently understood as a traditional and distinctively Japanese kinship role for women (Faier, 2011).

Part of becoming an *ii oyomesan* is executing activities that are done by women. These include doing all the household chores, working on the farm of the family, and taking care of the children. As mothers, caring for their children and their education is important. As they care for the education of their children, Filipina mothers believe that this has to start with nourishment. Preparing food for them, taking care of the child's needs in the house and at school, and bringing the child to school are considered basic involvement. This involvement is actually rooted in their understanding of how an *ii oyomesan* should be. At the onset, when they married Japanese men, they were open to the possibility of having Japanese–Filipino children. Their experience shows their adjustment in order to be considered as *ii oyomesan* who can nurture their children in the host society.

According to Participant 6:

> *At first, my mother-in-law did not accept me because I am a foreigner and an entertainer. She hardly talked to me and was very skeptical of all my actions. I tried my very best to concede to her command and show*

> *my good nature, learn their ways, culture, and language eventually she accepted me. I persevered in learning the Japanese language since it is the way to connect with the people around me. My mother-in-law witnessed that I am a good homemaker. I prepare food for the family, I take care of my children well, I help them with their homework to certain extent, and bring them to school.*

Participant 15 said:

> *I exerted efforts to adjust and assimilate because I wanted them to know that although I am a foreigner – a Filipina, I can also do what a Japanese wife can do. As a mother, I take care of my children, I prepare their food, I bring them to school, I guide them in their homework the most that I can, and I encourage them to study hard. I always tell them the importance of being educated. Since I did not finish a degree, I always instill the importance of education to my children.*

These Filipino women considered the importance of learning Japanese culture to be high (reflected in values and way of life) because they see the need to adjust, to be integrated and accepted as part of the host society. Their efforts to learn and adjust are deemed the means by which they can recast their negative images as Filipinas and foreigners. By performing their duty as wives and mothers they provide an alternative image of themselves. Moreover, being involved in the education of their children is seen as a manifestation of a good mother.

Their efforts in learning the Japanese language and culture are rooted in desires to show the host society that they are *ii oyomesan*. They believe that learning the Japanese language and culture is of value in nurturing their Japanese–Filipino children. Their involvement in the education of their children is made possible by their knowledge of the Japanese language and ways. However, involvement diminishes as their children reach higher grade levels, the period when their inadequacies as parents dawn on them.

Widening network: Proactive measures

Learning the Japanese language and culture in the Japanese way did not come easily to them. Their efforts indicate a recognition of the power structure that they must succumb to in order to gain social advantage. Being accepted as part of the host society is deemed to create a social advantage for both them and for their children.

Being bullied in school becomes the concern of Filipina mothers because their children are often identified as different from the majority. Having *gaijin* (foreigner) mothers, different features and skin color make their children susceptible to bullying. Because of this, they make considerable efforts to lessen, if not completely eliminate, it. In some prefectures there are Filipino organizations which are greatly concerned with inter-cultural exchange and friendship activities. These organizations serve as a venue for meeting other Filipinas where they can exchange information on their situation, knowledge, and experience of Japanese society as well as the means by which they can represent themselves socially. Participant 14 shared the concerns of their organization:

> *We organize community programs, join festivals, and charity projects. One time, we organized a program that involved children of Filipino women, Japanese schools teachers, and Japanese children. Our aim was to introduce the Philippines. We presented about children and family life of Filipinos. We want our children to understand their roots and be known to their teachers and classmates too. In this way instances of discrimination and bullying can be lessened if not eliminated.*

The negative image of Filipinas is recognized, but this does not lead them to develop low self-esteem, feelings of incompetence, or a sense of helplessness. It has, in fact, led them to find ways to counteract negativity – not only to be able to stay, but to stay as foreigners who can effectively participate in the host society. Their experience depicts accommodation and resistance that are parallel to structural and cultural settings where Filipinas learn to function and behave appropriately. Filipinas made adjustments in line with their purpose of remaining in Japan, their aims of recasting their stereotyped image, their desire to protect their children from bullying, and their speculation on what is expected of them as foreigners based on their perceived demands of Japanese society. Participant 5 narrated her experience:

> *I finished a college degree in the Philippines but due to circumstances in life I ventured in the entertainment industries. Despite … this, I have been trying my very best to make my children proud of me. They can see me getting along with Japanese, I teach English and am often invited to talk in schools. I strictly follow Japanese rule (e.g., driving) and do simple things like* aisatsu *(greetings) in their manner, with bow, I practice my faith, remain friendly and express my fun loving approach to life. I want the Japanese to realize that we are not entirely bad and not nuisance[s] to their society.*

Participant 15 stated a similar view:

> *I tried to maintain good behavior with the Japanese, especially in the close-knit community where I stay. I want them to see the Filipino value* pakikisama *[getting along with] and pakikitungo [to adjust, act humbly and relate with others properly]. I know that Filipinas are considered inferior and [have a] negative image. I don't want to aggravate it, at least through my ways and action. Also, I don't want my children to suffer it.*

Participant 8 also manifested these Filipino values so that the host society can recognize that Filipino women are willing to be assimilated and that they are making efforts to be accepted. She stated:

> *I practice the* aisatsu *[greetings] of Japanese. I'm doing it so that I will not be a stranger to them. I notice that, they look at the outside appearance and the manners of foreigners. I am just fortunate that I have a fair complexion and they see my effort in trying to mingle. I gained the friendship of Japanese mothers that I used to meet since my son started*

> *school. Since I worked as esthetician, they have been supporting me. They become my customer. They go to my place of work despite the distance from their residence. Perhaps they appreciate that despite being a gaijin [foreigner], I exert effort to do their ways and embrace their culture.*

Participant 8 may not have set out to show her good nature in order to have some form of economic return. However, her experience simply shows that social networks facilitate returns on investment. Making efforts to adjust was seen as a key to recognition, if not full acceptance, of *gaijin* by the Japanese. Her good behavior, willingness to adjust and embrace Japanese culture resulted in both social and economic returns.

Filipinas' manifestations of Filipino culture and values enable them to position themselves firmly in their immediate community. These then serve as their cultural capital and include their predispositions, attitudes, and the knowledge gained from their experience (Lin, 1999). Exuding positive Filipino values enables then to mingle with, and get along with, the Japanese. Apparently, they not only find ways to adjust but at the same time find meanings in how their own culture and values could serve their purpose. Manifesting actions that are deemed appropriate and acceptable to the Japanese community is done by Filipino women in order to strengthen social acceptance and social ties. These conscious efforts are made to recast their negative image so that their children will not suffer from the stigma attached to Filipino women. As they begin to feel that they are accepted and considered as part of the school and as within the community, school involvement or participation is enhanced.

Showing their good nature by adjusting to and embracing the Japanese language, culture, and traditions is attributed to Filipino values such as *pakikisama*, *matiisin*, etc. Providing good impressions by taking on the ways and gestures of Japanese are significant in recasting their image so that their children can be proud of them and of their roots. They learn the forms of acceptable behavior through direct mandates from their in-laws and their own observations within the close-knit community. The people around them are the social capital or networks that communicate norms, trust, authority, and social control. They are led to realize that embracing the Japanese ways is the key to successfully interact with the Japanese. As Coleman identified, there are ways by which parental involvement can build social capital. He suggested that social capital is derived from two types of relationships; relationships between the student and his/her parents; and relationships between students' parents, and other adults, particularly adults who are connected to the school that the students attend (Perna & Titus, 2005). The former is evident in the utterances of Filipino mothers, however, what is more compelling are the reasons why they choose to be involved in the education of their children. They want their children to be treated like any other Japanese, not merely as sons and daughters of *gaijin* or as *gaijin*. They are doing their part so that their children will not be bullied in school. They have been endeavoring to adjust and assimilate so that a positive image can replace the negative image of Filipina in Japan. In doing so, they build relationships with their co-parents, and other adults, like the teachers in school so that they can be accepted as part of the group and community.

Filipino women build social capital as they relate well with the different stakeholders

in school and even within the close-knit community. The premise behind social capital is investment in social relations with expected returns (Lin, 1999). Filipino mothers engage in social interactions that create benefit for themselves and for their children. They invest in embracing Japanese language, culture, and values in order to create better impressions and greater acceptance of their presence as foreigners. Social interaction is deemed as important to create social networks that would help them to be recognized in the Japanese society as good mothers and eventually erase the negative images of the past. This suggests that all of their conscious efforts within their households, community and school contribute to a kind of involvement in the education of their children. Widening their social network through various means is a proactive measure to protect themselves and their children.

Limiting Choices: Making Participation Possible

Filipino women in Japanese society are social agents who have the capacity to act and decide on the nature of their involvement within a social structure. However their involvement in the education of their children has limits given their own context and capacity as individual agents. Participant 8 recalled:

> *I make it a point that I attend meetings in school so that I get to meet parents and teachers. Honestly, I always have hesitation because of fear that I might not understand what is being discussed. What I usually do, I ask questions to the one besides me or to someone I know already in the meeting. Also, I take note of the word, then I search for the meaning, either through the digital dictionary, google it, or through my husband to better understand the word and its usage within certain context. Usually, there are committee works. Parents are asked to choose the group or committee that they want to be included with. I usually choose, the easy one with no paper works. Like those that entail, preparation for the event, cutting of stuff for the games…more on something that can be done by following what others are doing.*

Recognizing one's abilities and capacities facilitates appropriate choices for better involvement. Also, one can strategize on how involvement can be made possible. This manifests as a willingness and as positive efforts to participate in school activities. Adjustment on the part of the foreigner is seen as necessary. However, there are some familial contexts that influence the extent of involvement on the part of Filipino mothers. Participant 2 stated:

> *I am a single parent. I must work for my children to sustain their needs. This is the reason why I cannot attend the meetings of the parents and teachers. I cannot participate in many of the activities. But in an instance wherein I do not have work and there is a scheduled meeting then, I make it a point that I attend. Sad to say, I cannot prioritize it over work. If I cannot attend the meeting, I ask other Filipino mothers who have kid(s) in the class. I also feel comfortable to attend meetings with fellow Filipino mothers. In terms of helping my kids with their homework, I ask them to*

> *study on their own or tell them to ask their classmates. Aside from being busy with work….I go home late…I do not have the energy and capacity to teach them, I hardly read and understand written Japanese….I rely on the teachers…they can best teach my children.*

Aside from the inability of the Filipino women to help their children with schoolwork, the socioeconomic context also contributes to their decision making. The pressing need to work takes priority over the extent to which they can help their children with study. This context calls for a complete reliance on school for their children's education. Participant 8 also emphasized this:

> *My husband knows that I am not highly educated in the Philippines. He knows that it will be difficult for me to guide the studies of our son. Since my son was three year[s] old, my husband enabled him to develop independent learning. We enrolled him in KUMON. There he learned on his own with minimal supervision. In the house if he has questions about homework, I usually tell him to keep on reading and try to understand by himself. In an instance that I can understand and I am confident that I can give the correct answer then I help. But most of the time, I cannot. I'm afraid that I might commit mistakes that would create conflict between what is being taught in school and my own understanding.*

Being prudent with one's involvement in the education of their children is deemed important by Filipino mothers. Knowing their ability, they fully entrust the education of their children to school and to educational providers (e.g. the school and KUMON). The act of being prudent and of choosing the kind of involvement based on their ability are seen as important in their children's education.

On the other hand, being *gaijin*, hesitation plays a part in their school involvement. There are those who consciously limit their involvement in school activities; like Participant 6:

> *I feel better if there are Filipino mothers in the school meetings or activities so that I can clarify what is being discussed through them. I am not comfortable attending meeting[s] alone, I mean being the only* gaijin. *I am not comfortable [with] how the Japanese look at me. Due to my big eyes and dark colored skin, I can never be mistaken for a Japanese. So what I usually do, I ask around if there is a Filipino mothers who will be attending the school meeting or activity.*

Social networks in an organized activity are deemed important. Meeting fellow Filipinas in a school activity helps make them feel secure. A tendency to relate to individuals with similar perspectives and backgrounds is evident. While some seek relationship with those of better status than them, there are Filipinas who feel secure in the presence of other Filipino mothers. Insecurities prevail and these foster a dichotomy between the dominant members of society and minority groups. If this kind of relationship prevails, access to resources or information for the education of their

bicultural children might be delayed if not completely restricted.

The above utterances show that parental involvement is influenced by social class, single-parent status, levels of confidence, ethnicity, maternal level of education and the extent of the women's understanding of the language, culture, and traditions of the dominant class. The disposition of Filipino women here reflects the *habitus* as defined by Bourdieu. *Habitus* includes the internalized set of dispositions and preferences that subconsciously define an individual's reasonable actions. *Habitus* also reflects the internalization of structural boundaries and constraints and determines what is possible for an individual (Horvat, 2001, as cited in Perna & Titus, 2005). These women's dispositions towards their involvement in the education of their children are influenced by their perceptions of themselves and their perception of the host society. Their actions are linked with how they see themselves within a wider societal structure.

Conclusion

Parental involvement in the context of Filipino mothers in Japan constitutes a continuous effort to prove themselves as both migrants and mothers raising Japanese–Filipino children. The road to being involved in the education of their children is not without challenges and it falls into the three broad categories: (1) *ii oyomesan* (good homemaker/mother) wherein they maximize the social capital which includes showing their good nature to the Japanese whom they encounter, including community members, co-parents, and teachers. They conform to the expectation of what it takes to be an *ii oyomesan*, both inside and outside their homes. They exhibit good behavior to rectify the prevailing negative image of Filipinas, and to enable their children not to suffer the stigma attached to having a *gaijin* – a foreigner mother who is a Filipina; (2) this leads to widening their network and identifying the possible ways of enhancing their involvement in the education of their children. In the process they exercise their *habitus* and that leads to an understanding of the need for strong social relations and a realization as to where improvement must be made; (3) Recognizing their ability and capacity leads them to restrict their choices in participating. They may feel a sense of insecurity in dealing with the people they encounter, given the attached stigma of their presence in Japanese society. They also feel a sense of inadequacy in helping their children due to their limited knowledge of Japanese language, culture, and traditions. These challenges lead them to limit their involvement and to entrust the education of their children to the education providers.

Social and cultural capital are factors in determining parental involvement in education made possible through social interaction. Given the nature and context of Filipino women's involvement in the education of their bicultural children, their trust in, and dependency on, schools are evident. Creating a venue for interaction where expectations and obligations can be clarified and strengthened is deemed necessary. Clear and frequent communication between teachers and migrant parents can strengthen the goal of improving the educational performance of all the students regardless of their Japanese status. Such communication can build confidence among migrant parents in creating a home environment conducive to learning. Intercultural activities may increase the frequency of contacts between co-parents, teachers, and students which

could possibly lessen the perceived subordination and hierarchical nature of structures that interfere in social interaction. Migrant parents can be resources for intercultural understanding and multicultural co-existence. However the school is the venue where linkages, connections, and authentic interactions must be provided for the benefit of the students.

This study was limited to investigating the perspectives of Filipino women's involvement in the education of their bicultural children. To further enhance understanding of parental involvement of migrant parents in Japan, perspectives of other migrant parents and Japanese teachers could be the focus of future research.

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Pacific-Asian Education
Vol. 27, 2015, 75-76

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