Teachers’ Attitude Towards Teaching Mathematics at Upper Primary Levels in Fiji’s Primary Schools: A Case Study of the Western Primary Schools

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Abstract

Teachers’ perceptions of teaching mathematics at upper are important as they do have a strong influence on the pedagogies utilized in daily classrooms. The purpose of this study was to gauge the perceptions of teaching mathematics in Upper primary schools in Fiji. Primary school teachers in Fiji are general teachers where they are expected to teach all the subject areas under the curriculum including mathematics. Literatures have indicated that teachers’ pedagogy is being influenced by experience, self-confidence and motivation for teaching the subject.

A survey using five point Likert type scale and open-ended questions was administered to upper primary school teachers in the Western division of the Fiji islands. Purposive sampling was utilised to select the school and a total of fifty four teachers participated in the survey. Quantitative data was analysed using the Statistical Package for Social Scientists (SPSS) whilst qualitative data gathered during the ‘talanoa’ sessions was analysed using thematic approach. All data collected was synthesised according to the mixed methods conventions and findings are discussed according to the research questions and pertinent emerging themes.

Results indicate that in general upper primary school teachers are predominantly males (75%) and are relatively equipped with the necessary pedagogies to impart the upper primary curriculum in Fiji. However there could always be room for improvement in certain areas in order to improve educational delivery especially in teaching mathematics in upper primary.

Keywords: Mathematics, primary numeracy, teacher preparedness, upper primary & teachers attitudes.
Introduction and Rationale

The reform on National Curriculum Framework has recognized that teachers’ values and attitude are often hidden. This values or perceptions may also manifest in teachers daily practice. Whilst the study managed to capture perceptions from selected primary schools in the western division, the findings from this paper could generate widespread discussions on connotations for primary school teachers in Fiji.

Primary school mathematics forms the basis of more complex forms of algebra, calculus, geometry and trigonometry at secondary schools. It has been assumed that mathematics is one of the challenging subjects that teachers have to teach in primary schools. This is then compounded by the fact that mathematics is not everyone’s strong suit. The study will try to explore how teachers at primary schools in the western division find mathematics teaching in their various respective schools and how do they teach mathematics in their classes.

The nexus of the research was to find out the perceptions of teachers in teaching mathematics in upper primary schools.

Significance of the Study

The project was significant for several reasons. There is an absence of literatures on the issue especially in Fiji. With the National Curriculum Framework (NCF) in place and having Numeracy Education as one of the curriculum perspectives (Ministry of Education, 2013), the current research enables stakeholders such as Ministry of Education (MoE) and teacher training institutions like the University of Fiji to have an insight perception of how teachers view mathematics and how are prepared are they to teach the subject. Hence, from the recommendations, stakeholders can consider some of the issues discussed in this study to improve the preparation of teachers to teach mathematics in the University’s pre-service and in-service programs.

Research Questions

The project encompasses the following research questions:

i. What are the teachers’ perceptions of teaching mathematics at upper primary school?

ii. Are teachers comfortable with the teaching of mathematics at upper primary school level?

iii. What are some strategies of trying to address challenges of teaching mathematics at upper primary school?

Definitions of Key Concepts and Terms

i. Upper primary – refers to Years 6 - 8 of primary school.

ii. Composite class – a teacher being in charge of two classes e.g. Year 5 & 6 or Year 7 & 8. It is common in rural schools.

iii. Multi-class teaching – a teacher taking more than two classes. Common in island or very remote schools.

iv. Stream – common in large urban schools where a Year level is being divided up into manageable class roll.
Literature Review

The learning of mathematics is being influenced by numerous factors. McLeod (1992) identified three factors that influence teachers in on their perceptions of teaching mathematics. Firstly, students have certain beliefs of mathematics; secondly they form perceptions when they constantly encounter mathematics problems and thirdly, they do encounter interruptions and blockages when they learn mathematics and this may lead to negative and positive responses to the learners.

Attitudes toward mathematics have not been studied as extensively as beliefs. Studies such as (Sherman & Christian, 1999 and Quinn, 1997) have shown that students’ attitudes toward mathematics tend to become more negative as they get older and the relationship between their attitudes and achievement tends to get stronger. Studies have also shown that many pre-service elementary school teachers have negative attitudes toward mathematics (see Cornell, 1999; Philippou & Christou, 1998 and Rech, Hartzell & Stephens, 1993). This should be a concern for teacher educators because teachers with negative attitudes toward mathematics are unlikely to cultivate positive attitudes in their own students (Hungerford, 1994). Once teachers have a negative attitude towards mathematics, it is a challenge to reverse this attitude. Improving the attitudes of pre-service primary school teachers is a crucial step in breaking the cycle of teachers with negative attitudes fostering negative attitudes in their own students (Philippou & Christou, 1998).

Several studies involving teacher training programs that utilized constructivist instructional methods have shown positive results in improving the attitudes and teacher self-efficacy of pre-service elementary teachers (Gibson & Van Strat, 2001; Philippou & Christou, 1998; Huinker & Madison, 1997 and Anderson & Piazza, 1996). Although these results are encouraging, future studies that follow these teachers past their teacher training programs and into their first few years of teaching to see if the attitude changes remain stable over time would be beneficial. The need for change in the area of attitudes toward mathematics has been long standing by the field of mathematics education.

The importance of developing self-confident, motivated students who value and enjoy mathematics has been well established, but the means for doing so are not as clear. Although results are not always consistent, McLeod (1992) highlighted that children typically begin school with positive attitudes toward mathematics, but these attitudes tend to become less positive as they get older. By the time students reach high school, their attitudes toward mathematics have frequently become negative.

Many believe that in order to teach mathematics well, one need to have a positive attitude toward the subject, and that the task of improving the attitudes toward mathematics of future elementary teachers begins at the university. Sherman and Christian (1999, 96) stated that improving the attitudes toward mathematics of pre-service primary school teachers is “an important concern for university education courses in order to facilitate positive mathematics attitudes in future elementary pupils”. Hungerford (1994) cited the need to improve the mathematics education of future elementary teachers by altering curriculum and attitudes. He suggested that elementary school teachers who do not know much mathematics, who care little about what it means to do mathematics, and who are afraid of mathematics will be unlikely to foster positive attitudes toward mathematics in their own students. Thus the system continues to move in a vicious cycle that must be broken, and teacher educators must
carefully consider the impact of their training programs on the attitudes of prospective teachers (Philippou & Christou, 1998).

Teachers’ beliefs about teaching and learning can influence their teaching practices. Stipek, Givvin, Salmon, and MacGyvers (2001) found substantial coherence between the teachers’ beliefs and their classroom practices. Teachers who held traditional beliefs about mathematics emphasized performance and speed in their classrooms rather than emphasizing learning and understanding. These teachers also gave students less autonomy and created a classroom environment where mistakes were viewed as something to be avoided rather than creating an environment where there was no risk of being embarrassed if a mistake was made.

The beliefs that teachers hold can also affect their students’ beliefs. Carter (1997) highlighted the similarities of the belief of student teachers which is in congruence with that of their teacher educators. However after pedagogical reforms he found out that there was a significant difference and led to success of these students teachers in comparison to other student teachers who did not go through a reform. These student teachers believed that working hard and striving for understanding were essential for success. Often teachers’ existing belief systems conflict with the pedagogical techniques and practices that they are being encouraged by the profession to adopt.

Mathematics teachers of today are being asked to shift their mathematics instruction away from the traditional teaching that they most likely received as students to a constructivist perspective of mathematics instruction. Discussing traditional mathematics instruction, Van de Walle (2004, 12-13) stated:

> Traditional teaching, still the predominant instructional pattern, typically begins with an explanation of whatever idea is on the current page of the text followed by showing children how to do the assigned exercises. Even with a hands-on activity, the traditional teacher is guiding students, telling them exactly how to use the materials in a prescribed manner. The focus of the lesson is primarily on getting answers. Students rely on the teacher to determine if their answers are correct. Children emerge from these experiences with a view that mathematics is a series of arbitrary rules, handed down by the teacher, who in turn got them from some very smart source.

Anderson and Piazza (1996, 54) cited several barriers to reform in mathematics education that inhibit the change process in teachers. They pointed out that many of the beliefs and attitudes of some teachers are “in direct conflict with those inherent to constructivism”.

Ambrose (2001) suggested several avenues for changing belief systems. The first involves the process of reflection and examination of personal beliefs. In this way, inconsistencies can be identified. The second involves making connections among beliefs. This allows one to activate new beliefs in situations where they might not previously have been activated. Another way that belief systems can be changed is by developing a new belief that is connected to existing beliefs. The last belief change is the reversal of an existing belief. However, they did note some successful programs. These programs typically build upon the existing beliefs of beginning teachers rather than trying to cultivate a reversal of beliefs (Wideen, Mayer-Smith, & Moon, 1998). The authors explained that learning to teach was a “deeply personal activity” (ibid, 161), and the first step involved having beginning teachers examine their existing beliefs. These prospective teachers should then be encouraged to consider how their existing belief system correlates with the expectations of the university and the teaching profession.
Setting and Context

Fiji is an archipelago located on 176° 53′ east and 178° 12′ west. Her population is just about 900,000 inhabitants being spread over the 18,270 sq/km land size. However, almost fifty percent of the populace resides on Viti Levu – one of Fiji’s two main islands (Asian Development Bank Report, 2014). The larger islands were formed due to volcanic activity. The comparatively smaller ones are made of coral reefs and thus unsuitable and fragile for habitation. The Western division (highlighted in map) is one of the four divisions in Fiji’s over than three hundred islands. It is on the main island of Viti Levu and also consists of some smaller group off shore islands. However, for the project for logistical and convenience reasons to the researchers, it mainly focused on mainland Western schools as highlighted below.

Figure 1: Map of Fiji Islands.

Source: www.google.com

Teachers in Fiji primary schools are general teachers, where they are expected to teach across a broad-based curriculum including co-curricular subjects like music, art & craft and physical education. They are usually engaged in teaching from 8:30am to 3:00pm and have two breaks at 10:30 am (15 minutes) and lunch break at 12:00pm (30 - 45 minutes). During the course of the day they are engaged in teaching or supervising students’ activities. The Upper primary levels in this study involved Years 6, 7 and 8 which normally consists of 11, 12 and 3 year olds. At the end of the year, teachers can either ‘progress’ with the class to their next level or remain at the same level and teach a ‘new’ set of students in the following year. Some rural schools do engage in composite class teaching or multiclass teaching where they take charge of two or more classes. These schools engage in such arrangement as they have fewer students hence they cannot meet a 1:30 standard teacher-student ratio.
At the time of the research the Fiji government Ministry of Education had implemented a seven-year policy where teachers have to be transferred to another school if they have spend more than seven years in that a particular school.

Research Methodology
The research methodology utilised for this research was mixed methodology. Several studies (such as Truman & Raggl, 2008; Ernest, 2000 and Romberg, 1988) had utilised similar method. Mixed methods have been found to have numerous benefits in a study of a phenomenon such as teachers’ perceptions. Creswell (2012; 536) had highlighted that;

“An investigator could determine if the trait was valid by examining and assessing whether the measure of the traits correlated is higher with each other. Evidence from these correlations provided useful information about the different form of validity”.

These multiples sources were used to verify and confirm information registered from other sources. Creswell (1995) and Greene (1994) offered some reasons for this mixed-design; triangulation, complementary, initiation, sequential development and experience. However, for this study, mixed method was embraced for Gall, Gall and Borg’s (2007; 32) justification; “to provide richer insight and raise more interesting questions for future research than if only one set of studies is considered”.

The participant group consisted of fifty-four teachers. The research took place in the Western Division with a mixture of rural and urban schools. The schools have been chosen due to accessibility to the researchers. The participants completed a questionnaire similar to the Attitude Towards Mathematics Inventory (ATMI) utilised by Schackow, (2005). The forty-five item revised instrument measures attitudes across the five dimensions of attitude, namely prior experience, value, enjoyment, self-confidence and motivation. It took about fifteen minutes to administer the survey. Subsequent to the surveys, four to five teachers from each of the education district were selected to participate in open-ended interviews to investigate the formation of their perceptions.

The selected teachers for the interview reflected the breadth of the responses from the survey and were selected from the original cohort. The interview sessions lasted about thirty minutes and mimicked the talanoa sessions that are being widely used in the Pacific communities. Local studies such as Naisilisili (2012), Nabobo-Baba (2006), Otsuka (2006) and Vaioleti (2006) have established talanoa sessions as a valid way of gathering information from culturally rooted communities such as Fiji. They are more contextualised and participants are more ‘free’ to give information in this particular setting. For this study, talanoa sessions espoused Nabobo-Baba (2006; 27) where it is; “...a process in which two or more people talk together, or in which one tells a story to an audience of people who are largely listeners”. The listeners in this case were the researchers. Some of these sessions were mostly held around the traditional drink of kava as to facilitate the discussion. The purpose of these talanoa sessions was to capture the realities that teachers do face in teaching mathematics in primary schools. This also ensured that data gathered was being triangulated and verified for its validity and reliability.
Table 1: Study Construct and Variables (Likert Type)

<table>
<thead>
<tr>
<th>Part I: Prior Experience of Mathematics</th>
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<tbody>
<tr>
<td>Mathematics was my favorite subject during my school days.</td>
</tr>
<tr>
<td>I have won mathematics awards during my school days.</td>
</tr>
<tr>
<td>The mathematics lessons were very interesting.</td>
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<tr>
<td>Wide ranges of strategies were being used by my teachers.</td>
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<tr>
<td>The mathematics/numeracy course at teacher training college really assists me in teaching mathematics.</td>
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<table>
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<tr>
<th>Part II: Value of Mathematics</th>
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<tbody>
<tr>
<td>Mathematics is a worthwhile subject.</td>
</tr>
<tr>
<td>I develop my mathematical skills through problem solving.</td>
</tr>
<tr>
<td>I use mathematics knowledge in my everyday life.</td>
</tr>
<tr>
<td>Mathematics requires memorization of rules and procedures.</td>
</tr>
<tr>
<td>I am willing to further my knowledge in mathematics.</td>
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<tr>
<th>Part III: Enjoyment of Mathematics</th>
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</thead>
<tbody>
<tr>
<td>I enjoy solving a mathematics problem.</td>
</tr>
<tr>
<td>When I hear the word mathematics, I have a feeling of dislike</td>
</tr>
<tr>
<td>I would prefer for someone to come and take my mathematics class for me.</td>
</tr>
<tr>
<td>I am comfortable in solving difficult problems in mathematics.</td>
</tr>
<tr>
<td>I invest my personal time outside school contact hours towards mathematics.</td>
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</table>

<table>
<thead>
<tr>
<th>Part IV: Self Confidence with Mathematics</th>
</tr>
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<tbody>
<tr>
<td>Mathematics is one of my most dreaded subjects.</td>
</tr>
<tr>
<td>I am confident when working with mathematics problems.</td>
</tr>
<tr>
<td>I love teaching mathematics.</td>
</tr>
<tr>
<td>I do fairly well in any mathematics class that I teach.</td>
</tr>
<tr>
<td>I always use the prescribed textbooks to teach mathematics.</td>
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</table>

<table>
<thead>
<tr>
<th>Part V: Motivation with Mathematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am willing to learn advanced mathematics.</td>
</tr>
<tr>
<td>The challenge of mathematics appeals to me.</td>
</tr>
<tr>
<td>I am committed towards the teaching of mathematics.</td>
</tr>
<tr>
<td>I create an effective climate for teaching mathematics.</td>
</tr>
<tr>
<td>I encourage practical teaching in mathematics.</td>
</tr>
</tbody>
</table>

The reliability tests the extent to which different questions of the same concept produce consistent results. Hence an affirmative response to I enjoy solving a mathematics problem should also yield a similar response when I am confident when working with mathematics problems, question was posed.
Table 2: Reliability - Cronbach Coefficient Alpha (α)

<table>
<thead>
<tr>
<th>Cronbach's Alpha</th>
<th>Cronbach's Alpha Based on Standardized Items</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>.554</td>
<td>.835</td>
<td>32</td>
</tr>
</tbody>
</table>

Similar constructs were devised in the survey and the Cronbach coefficient alpha (α) was used to assess the reliability of measurement of scales with the multi-point items. The overall reliability was 0.835 and reveals the construct variables were reliable.

Participants
The 54 participants in the study were practicing teachers from the Western division. At the outset, the demographic data gathered indicated that male teachers dominated upper primary teaching in the case study schools. More than 75% of the participants were male and had less than fifteen (15) years of teaching experience. It is understandable that when new graduates are being posted to schools, males are usually given upper classes to teach whilst female graduates are given the lower classes on the assumption that feminine and motherly characteristics are necessary for infant classes (i.e. Year 1-3).

Table 3: Gender of Teachers in Upper Primary

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>41</td>
<td>75.9</td>
<td>75.9</td>
<td>75.9</td>
</tr>
<tr>
<td>Female</td>
<td>13</td>
<td>24.1</td>
<td>24.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>54</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

For males being assigned to much older year groups is the norm as it involves lesser mother-like instincts in comparison to the lower classes. The transition of experienced teachers is being succinctly put by a Head Teacher in one of the talanoa sessions;

When teachers graduate, males are usually given upper classes and females the lower classes. However, for experienced ones and who have post of responsibility, they tend to shift to middle levels like (Year 4 – 6). This is to allow them to attend to administrative duties without any hassle or pressure of exam classes or infant classes as they need constant attention.

The above statement was linked to another data that was evident was that schools were selective in putting teachers in upper primary level. Majority of teachers in upper primary in the selected schools had 6 – 10 years (20%) or 11- 15 years (31%) of experience.
Novice teachers (less than 5 years of experience) attributed to only 14% of the teachers in upper primary schools. Hence, they were placed at lower levels to understudy the experienced teachers at upper levels before they slowly make the transition to infant levels for females and upper levels for females.

Most of the teachers participated in the research just have a Certificate (42%) or Diploma/Higher Diploma (31%) and are yet to attain a Bachelors qualification. This is understandable, considering Bachelors degree focusing on primary teaching just recently started for the two universities which had their main campuses for education programs in the Western division: Fiji National University and University of Fiji both roll out their Bachelors degree focussing in primary teaching in 2013. The region’s University of the South Pacific had much earlier incorporated this program into their fold in 1999.
This is a valuable data, for tertiary institutions to target their in-service programs towards this sector. However, as all the selected schools were Western based and some were situated in rural areas where access to education for teachers is limited, this data may vary in other areas of the country especially in the Central division, where there is a strong presence of tertiary institutions.

**Ethical Considerations**

Ethical issues took top precedence and this was kept in mind throughout the course of this study. According to Blaxter, Hughes and Tight (1996) ethics form an integral part of any research work. Every participant in the study had understood the intention of the project as it was explained clearly to them. All responses from the surveys and interviews reported were being bounded by strict ethical protocols. The confidentiality and anonymity of the participants were maintained and their views were respected at all times. According to Creswell (2003) researchers need to maintain confidentiality and anonymity of the respondents. The participants were given a coded identification to ensure confidentiality. The coded identity was only known to the researchers and their supervisor. The document that contains information that reveals corresponding information was being kept under lock and key during the duration of the research process. The permission of the Permanent Secretary (PS) – Ministry of Education was obtained and the ensuing consent letter from the PS was given out to the respective Education districts and Head Teachers. The aims and objectives of the research were fully explained to all participants prior to the commencement of the survey. Participation was voluntary and thus was allowed to quit the survey at any point during the research.

**Limitations of the study**

There was a dearth of local literatures on teachers’ perceptions in teaching mathematics and as such international literatures were used as a guide. Additionally, the constraints of time as both the researchers held full time academic positions at the time of this project. Hence, the
sample schools were around their vicinity of researchers’ institution that they were teaching in at the time.

Data Results and Analysis
The five-part survey dictated the analysis of the themes. These five theoretical variables lead to high efficacy in teaching mathematics, resulting in well motivated mathematics teachers. The five variables were; ‘prior experience of mathematics’, ‘value of mathematics’, ‘enjoyment of mathematics’, ‘self confidence with mathematics’ and ‘motivation with mathematics’.

i. Prior Experience of Mathematics
A positive prior experience in mathematics was found to be essential in order to inculcate positive experience at upper primary. Those teachers who disliked mathematics in their younger school days had difficulty in relating to the subject when they taught in school. Teachers in the study were found to have a positive experience towards mathematics. There were five items that measured their prior experience; (i) Mathematics was my favourite subject during my school days – 72%; (ii) I have won mathematics awards during my school days – 53%; (iii) The mathematics lessons were very interesting – 67%; (iv) Wide range of strategies were being used by my teachers – 61% and (v) The mathematics/numeracy course at teacher training college really assists me in teaching mathematics – 56%. Of the five items, mathematics as the favourite subject had the strongest preference (72%) whilst being recipients of mathematics awards was the least (51%). It is understandable that mathematics is not every teacher’s strong suit and not everyone will receive a special award for mathematics during their schools years.

Therefore, a positive prior experience of mathematics tends to lead to the teachers liking the subject later on in life.
A teacher echoed these sentiments during a talanoa session;

Participant 17: I think the main reason for me to dislike the mathematics class during my school days was my teachers – they never had any interesting ways of teaching this subject. This thought has motivated me to become a more innovative and exciting maths teachers so that my students won’t feel the same.

Some upper primary teachers showed concern that basic mathematics concepts are not taught well in lower primary, hence they find difficulty in trying to address these anomaly or discrepancies at upper level. To address these misconceptions in one year before they proceed to the next level is a bit of a challenge as teachers have their own way of teaching mathematics.
Hence, teachers tend to ‘impose’ their learning styles on their students and only those with similar learning styles will benefit whilst others who may possess different learning styles tend to miss out. A teacher voiced similar sentiments;

Participant 32: …Teaching of mathematics depends and teacher knowledge and attitude towards mathematics…
In this way some students do miss out as they may not share similar learning styles or attitudes with the teacher.

ii. Value of Mathematics

Teachers in the survey were found to have varying degrees of valuing mathematics. The five item that measured the how teachers valued mathematics had the following; (i) Mathematics is a worthwhile subject – 89%; (ii) I develop my mathematical skills through problem solving – 79%; (iii) I use mathematics knowledge in my everyday life – 86%; (iv) Mathematics requires memorization of rules and procedures – 66% and (v) I am willing to further my knowledge in mathematics – 71%. There was a strong correlation (Pearson’s correlation of 0.780) of those who found the mathematics subject to be interesting during their school days and those who were confident to work with mathematics problem during their teaching career. These teachers tend to engage the students in mathematical activities beyond the four walls of the classroom. Common sentiments of ‘mathematics is everywhere’ were received from respondents.

<table>
<thead>
<tr>
<th>The mathematics lessons were very interesting.</th>
<th>I am confident when working with mathematics problems</th>
</tr>
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<tbody>
<tr>
<td>Pearson Correlation</td>
<td>Pearson Correlation</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>Sig. (2-tailed)</td>
</tr>
<tr>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>1</td>
<td>.780**</td>
</tr>
<tr>
<td>54</td>
<td>.005</td>
</tr>
<tr>
<td>.780**</td>
<td>54</td>
</tr>
<tr>
<td>.005</td>
<td>1</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

Gender differences were also highlighted by participants. It is important to note that most teachers at upper primary levels are male teachers and they may lack the experiences of the female students hence relating less to their prior knowledge and experiences. Some of the gender related comments uttered in the various talanoa sessions were;

Participant 3: …Boys perform better in mathematics than girls. That’s a fact!

Participant 42: School admin plays a vital role in selecting good teachers in upper primary for numeracy. Whereas lower primary needs to have a good literacy teacher.

The latter comments stems out from the belief that female teachers are good infant class teachers, hence they provide a good foundation for literacy as they engage in more ‘motherese’ tone and other motherly instincts, this will better develop the language skills of
the students. Hence, male teachers are good in mathematics and their skills will be utilized well at upper primary level. These genders–differentiation stereotypes do poses challenges in the classroom as teachers already have possessed such perspectives that will be difficult to provide an equal playing field for the two genders. This is evidently reflected in about 75% of teachers at upper primary were males.

However it was also encouraging to collate views that highlighted the importance of mathematics in everyday life.

*Participant 19:* Mathematics is very interesting subject, which all individuals encounter in their lives. However, a teacher needs to be very effective and creative in imparting the knowledge and the skills to arouse the interest in students to love mathematics.

*Participant 30:* Mathematics is a challenging subject. Teaching mathematics takes lots of effort and strategies. Teaching of mathematics should be fun and activity based but time is a main factor and the broadness of coverage limits teachers to expose their children with wide range of techniques and ideas in maths.

*Participant 48:* Mathematics is a very important subject in our curriculum which helps a student throughout his or her life. Mathematics can best be learnt through doing hands on activities and solving as many problems as possible.

*Participant 53:* Mathematics is a subject that caters for lifelong learning. It is always based on real life situations which itself makes the subject interesting since children experiences the situations and learn at the same time. E.g. topics like measurement, money, etc.

The above sentiments highlight the value of mathematics which transcends gender, race, social class or geographical differences. This has been effectively highlighted by the participants in this study.

### iii. Enjoyment of mathematics

Most of the teachers have expressed their enjoyments in the five items that measured their efficacy in mathematics; (i) *I enjoy solving a mathematics problem* – 76%; (ii) *When I hear the word mathematics, I have a feeling of dislike* - 7%; (iii) *I would prefer for someone to come and take my mathematics class for me – 8%*; (iv) *I am comfortable in solving difficult problems in mathematics* - 73% and (v) *I invest my personal time outside school contact hours towards mathematics – 37%*. Teachers in the study showed enjoyment in mathematics as only 7% have a feeling of anxiety on hearing the word – mathematics.

Those that had positive prior experiences with mathematics, displayed more joy in teaching mathematics in adulthood and also displayed a positive attitude towards mathematics.

Several participants highlighted the interesting nature of mathematics;

*Participant 7:* Teaching mathematics has never been more interesting before than now with the help and valuable information freely provided in the internet.

*Participant 1:* Teaching mathematics I just like going on a discovery. However, I believe student need to practice maths a lot to have a liking towards the subject and perform better.
Participant 16: Mathematics is a challenging subject in our curriculum. Problem solving approach need to be inculcated in students to learn mathematics. Further training to teachers may be needed to boost mathematics percentages in schools.

Participant 38: Mathematics is one of the most interesting subjects to teach. The problem is that the current mathematics curriculum is overloaded with so many things to teach in a single grade. There are students who do not perform well in maths because practical and real life maths cannot be taught due to time factor and so many topics to teach. A more blended and realistic curriculum is warranted. maths at teacher training colleges for me was not worth it and could be greatly improved for future teachers.

Participant 27: Mathematics can be one of the most interesting subjects as it deals with solving day to day problems. If students use a lot of teaching aids and practical work the lesson outcomes are better. This is my 33rd year of teaching. Solving mathematical problems gives me a lot of joy.

Participant 35: Mathematics is one of the many subjects in the current curriculum that challenges and makes a child to critically think in teaching/learning process.

Participant 44: We find that many children in upper primary level take less interest in mathematics and mostly score lower marks. We teachers need to be equipped with different approaches in mathematics to develop our children to be critical thinkers and problem solvers. We need children to love mathematics from lower level.

The traditional perceptions of teacher-centered learning where the teachers possess the wealth of knowledge that have to ‘downloaded’ to students do also affect the enjoyment of mathematics.

iv. Self-Confidence with Mathematics
The survey found out that teachers with a positive outlook in mathematics and displayed encouraging self-confidence in teaching mathematics and hardly gave their mathematics lessons away to be taught by a mathematics expert. The five items that measured the teachers self confidence rendered positive results; (i) Mathematics is one of my most dreaded subjects – 10%; (ii) I am confident when working with mathematics problems – 85%; (iii) I love teaching mathematics – 82%; (iii) I do fairly well in any mathematics class that I teach - 79% and (v) I always use the prescribed textbooks to teach mathematics – 47%. Teachers in the study emphasised that it was important for teachers to impart mathematics knowledge to suit the class that they were teaching.

One participant sentiments reflected this view when he stated that;

Participant 33: I do not always use prescribed textbooks to teach mathematics as I believe that a teacher should teach concepts rather than pages. Concept teaching takes account of all that is involved rather than revisiting concepts again and again. Once you teach from the book the knowledge is constrained to what is prescribed in the book. It can be only used as a reference.

Teaching from the textbooks is a symptom of lack of self-confidence, where the teachers ritualistically adhere to the prescribed textbooks by the Ministry of Education. Such teachers unfailingly follow the exercises or activities and do not let the students to explore other mathematical concepts.

Participant 9: Some teachers are so concerned by the coverage of the textbooks that they make sure that students do all the activities in the textbook. If students have mastered a concept, there is no use of
doing additional exercises or activities. It becomes a torture for the students and they lose interest in the subject.

These concerns are further complicated by the over-emphasis of assessment that teachers are more concerned with coverage of the prescribed syllabus.

A typical concern that was raised during the study that reflected this injustices;

*Participant 16*…these large composite classes are not of any help since normal lesson period has to be divided for the two different levels. Even though we have less class roll but we have two distinct classes that we have to ensure that they undergo the same experience as their urban counterparts.

However, some participants in the study displayed strong self-confidence in mathematics;

*Participant 3*: I strongly believe that as mathematic curriculum facilitators we should use expert theoretical and practical knowledge to promote and lead the development of contextually relevant, inclusive teaching strategies. Finally, I suggest we should use expert mathematics minds-on and hands-on knowledge of students’ diversity to develop affective and practical policies programs and teaching strategies that address student social, ethnic, cultural and religious background.

*Participant 48*: Mathematics skills are used by people daily for example dealing with money. I personally believe teachers to use real life examples when taking mathematics lesson so that students now where to use these skills and how important it is in their life. These way students will also take great interest in learning mathematics skills.

*Participant 17*: The challenge of mathematics should be appealing to the children and the teachers should be confident enough to teach mathematics to remove the fear of children about the subject. As it is a worthwhile subject which helps everybody in their everyday life.

Having self-confidence is essential in teaching mathematics or otherwise, teachers will just teach from the prescribed textbooks or they will try and influence other teachers to come and take their mathematics lessons. In the latter, teachers do not realize that they will are segregating mathematics from other subjects where they can meaningfully aligned their mathematical concepts.

v. **Motivation with Mathematics**

Most of the students in the survey were motivated to teach mathematics; (i) *I am willing to learn advanced mathematics* –75%; (ii) *The challenge of mathematics appeals to me* – 85%; (iii) *I am committed towards the teaching of mathematics* –89 %; (iv) *I create an effective climate for teaching mathematics* –87% and (iv) *I encourage practical teaching in mathematics* – 87%. Teachers who are well motivated should be able to exemplary impart mathematical concepts by creating momentous ways to engage meaningful learning.

The general notion of mathematics being a difficult subject was also evident in the study as being observed by some of the participants. This was noted in some teachers that lacked the motivation and rarely ventured outside of the four walls of the classroom or attempt to make meaningful learning.

*Participant 49*: Primary schools teachers are not specialists in terms of subject teaching. They are not specialist in maths teaching so this is a drawback. Teachers in primary school need a lot of training it to
attend workshop and seminars to develop their mathematic teaching skills, otherwise students will be affected.

Participant 6: The teaching of these subjects requires a lot of preparation and children need to be diverse with a lot of hands on activity for better understanding.

Participant 30: Mathematics in upper primary should be taught by teachers who are maths lovers themselves. It should not be not only taken as a subject but as a contextual learning which should be felt like a necessity by all (teachers/students).

Whilst mathematics is not every teacher’s strong suit but mathematical concepts at upper primary level are still basic, hence teachers can still learn and impart the mathematical concepts with ease. It is obvious that with a little nudge in teachers effort to basically understand and master how to impart these basic concepts seamlessly. Those who were better motivated tend to offer more eagerness or passion in the teaching of mathematics.

Discussion and Recommendations
Firstly, a positive prior experience is necessary for teachers to effectively teach mathematics and this has been noted in this study. This prior experience definitely influence the way they teach mathematics. Recent studies such as Smith (2014) and Sonawat & Kothari (2013) had highlighted that teacher’s prior experiences on rote learning and meaningful learning play an important role in their views of mathematics teaching and there is a strong resemblance between how teachers learn and how they teach. It is important to note that occasionally slightly below half of the teachers in the study religiously follow the prescribed text book to teach mathematics.

However, Utley, Moseley and Bryant (2005) had highlighted that attitudes and perceptions regarding mathematics and science teaching tend to change over time. This is after teachers become aware of their own misconceptions and tend to venture and explore other meaningful ways of being the conduit of concepts and ideas. Some avenues that provide opportunities for teachers to identify these anomalies are when they attend courses or professional development programmes and engage in more thought provoking activities to allay these discrepancies. Ambrose (2001) had also alluded to this by suggesting several avenues for changing belief systems. The first involves the process of reflection and examination of personal beliefs. In this way, inconsistencies can be identified. The second involves making connections among beliefs. This allows one to activate new beliefs in situations where they might not previously have been activated. Another way that belief systems can be changed is by developing a new belief that is connected to existing beliefs. The last belief change is the reversal of an existing belief.

Secondly, teachers ‘valuing’ mathematics will always have an impact on students learning as was established in this study. This has been argued by various studies (see Asante, 2012 and Forgaz & Leder, 1996) highlighting school environment, teachers’ attitudes and beliefs and behavior and parental attitudes as factors that influence students’ attitude towards mathematics. The study managed to establish that there were still some gender based perceptions being held by teachers. These socialization and gender varied roles contribute significantly to the pedagogy of teaching utilized and how female students perceive the value mathematics. However, a UNESCO commissioned study (1992) in the Pacific region offered
a differing view that females do much better than their male counterparts in numeracy. This area warrants further research that needs to be explored and consolidated to as to ascertain the gender opportunities. This survey has managed to establish that about 75% of teachers at upper primary levels in the sampled population in the Western division were males.

Additionally, for teachers to successfully implement effective mathematics lesson, they should enjoy mathematics and some teachers have alluded to the fact that they enjoy teaching mathematics. Prendergas and O’Donoghue (2014) had highlighted that it was necessary to have fun and enjoyment in a mathematics classroom. This will ensure that the lesson is interesting, engaging and memorable that targets the essence of students learning. However, less than 40% have claimed that do not invest personal time to research or learn about mathematics. This is understandable as not everyone will pursue a career in mathematics or as a mathematics teacher but the teachers are comfortable with teaching basic mathematical concepts at upper primary level.

Teachers still embracing traditional teaching methods are also another concern being raised in the study. Van de Walle (2004) had highlighted the predominance of traditional teaching styles that still dominates mathematics classroom. According to Dollard and Christensen, (1996; 3), teacher centered pedagogy is when students are not actively engaged as “control is of primary importance” and discourages ‘noisy’ classroom where students are ‘interactively’ engaged in activities or exercises. Knowledge or authority is transmitted hierarchically and discourages the lateral learning from their peers and surroundings. This would result in the teacher losing ‘control’ of the students which does not augur well in the authoritative praxis of the teacher-centred pedagogy.

A feasible way to inculcate more fun activities is by having mathematics club or a form of network for mathematics lovers. They can be included into co-curricular activities and students with teachers who have a strong interest in mathematics do engage in more challenging activities based on mathematical concepts that exist in their daily lives. This will also enable students to experience fun activities and also allow teachers who may not have strong interest to extract or elicit resources or teaching styles into their mainstream classrooms.

A strong self-confidence is another area that is a necessary ingredient towards having an effective mathematics classroom. Recent studies have found that there was a strong relationship between self belief of teachers and the pedagogy that they embrace during mathematics class teaching (see Foster, 2016; Toland and Usher, 2016 & Straus; 2014). The more confident the teachers were, the more they engaged in interactive pedagogies that maximized student learning. According to Mathison and Freeman (1998), coordinating disciplines has been a primary feature of curriculum planning but knowledge does not exist in isolation and have to be learnt in contexts which are embedded in other disciplines. Teachers in different contexts have to tailor make their lessons to adapt to this and as general teachers, they can infuse mathematical concepts into other areas to reinforce their mathematical learning.

A strong self-confidence will lead to a better motivated teacher who can address challenges and tackle all odds.
The study managed to ascertain that teachers with positive prior experience in mathematics displayed enjoyment and were better motivated to teach mathematics. So it is important for teachers to create a positive mathematics platform that students can allude to in future. Current teachers should have the commitment to implement this positive environment despite the setback from the earlier experiences. Otherwise, this ‘negativeness’ towards the subject will continue. To break this cycle, it is necessary to improve the attitudes of primary school teachers (Philippou & Christou, 1998).

This could be achieved with the support of Fiji’s Ministry of Education by having more professional development on mathematics to alleviate and assist teachers in ensuring this positive experience. The emphasis of numeracy rather than mathematics by Fiji’s MoE is a positive start in this path as the terminology of mathematics is usually associated with calculus, algebra, geometry, and trigonometry. Teachers who do not perform well in mathematics during their secondary school have developed distaste for the subject, hence tends to be a conduit of this negative experience to their students.

On the other hand, numeracy is very mathematical concepts and focuses on relating to other subjects or to their contextual surroundings. Teachers need to refrain from having a compartmentalized perspective of mathematics and should try to relate more to other subjects or disciplines. In this way they can make mathematics lessons interesting, fun and enjoyable.

Furthermore, the over-emphasis of examinations results will eventually lead teachers to revert back to rote learning where students regurgitate knowledge for assessment purposes and lack the applicability of those facts into the real-life contexts. Dayal and Lingam (2015, 53) had highlighted one of the respondents in their study into perceptions of assessments that teachers do possess; “it will narrow the curriculum and only surface learning will take place”. The Fiji Ministry of Education in 2014 has embarked on a more thematic approach where key learning areas are the focus instead of compartmentalizing concepts into subject areas or discipline. A participant voiced his concern about the nature of assessment;

Participant 42: If we take our students out of the classroom to learn, then assessment should also be done in a similar context rather than sitting down for one hour and answering the questions on the script.

The above utterance is highlighting the emphasis of rote learning inclined assessments where students are expected to regurgitate what they have learnt during the prescribed assessment time period. In 2015, Government re-introduced external examinations in primary schools that phased out in 2010. With the re-introduction, teachers are more concerned with the examination results as it will also influence their appraisal and assessment reports. In the past, schools were ranked according to their examination achievements and schools in the rural schools tend to be disadvantaged as they are poorly resourced and faced challenging working conditions (Tuimavana, 2010). The institutional readiness of rural and maritime schools to fair comparatively to their urban counterparts is being deprived as they are being assessed with the same yard stick.

**Conclusion**

The study managed to establish a strong positive attitude towards teaching of mathematics at upper primary and they were comfortable with the teaching of mathematics at that particular
level. From the 25 item survey, it was found that about 73% of the teachers have positive attitudes towards mathematics. It can be establish that most of the Fiji’s Ministry of Education efforts is being directed and has fulfilled the needs of most teachers in the study.

However, there were some concerns raised with a heavy reliant on examinations, that it will distort the pedagogies utilized by teachers and they will just revert back to rote learning. Whilst ranking of schools using academic achievement of schools is a good indicator of ‘progress’, it will also dilute some effective teaching strategies that teachers want to utilize. Teaching for examination is not a panacea for ensuring meaningful mathematics experience. The ranking of teachers or schools according to the examination results is not a reasonable option as teachers and schools are faced with different challenges. A follow up study on devising a meaningful way of assessing teachers and schools is another area that can generate research interest. Such data would greatly assist school leaders, administrators and other educational stakeholders.

Whilst this research was small in nature and it utilized teachers’ personal perceptions of teaching mathematics at upper primary level. Teachers’ views are a useful way of establishing or gauging the effectiveness of classroom learning (Bogdan and Biklen, 2007). The authors are of the view that Fiji is placed well for a more effective mathematics classroom to address the anomalies that have been highlighted in this study. Future studies would be useful if it is directed into how to effectively monitor the teaching/learning process apart from the solely relying on external examination results.

Finally, teacher training institutions can try to tailor make programs to meet the demand of teacher who wish to pursue numeracy at primary schools. At the moment, we only have mathematics and that is geared for more conventional mathematics concepts which are only available at upper secondary or in tertiary institutions. This particular program could entirely focus on numeracy and literacy which is very essential for primary school teachers.
References


