DOI: http://dx.doi.org/10.4314/star.v4i4.25
ISSN: 2226-7522 (Print) and 2305-3372 (Online)
Science, Technology and Arts Research Journal
Sci. Technol. Arts Res. J., Oct-Dec 2015, 4(4): 174-181
Journal Homepage: http://www.starjournal.org/

Original Research

The Effect of Some Constraints on Mathematics Instructors' Problem Solving Practices: Universities in Amhara Region in Focus

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Abstract

This study was designed to examine the effect of perceived constraints on four universities mathematics department instructors' classroom practices of problem solving in teaching mathematics. To this end, the target population of the study includes mathematics instructors in the Amhara Regional state universities. From a total of seven functioning universities, four universities were selected using simple random sampling technique. The four universities' respective mathematics departments were selected using purposive sampling techniques. Then, all mathematics instructors of the four universities selected using comprehensive sampling technique were samples of this study. Five mathematics instructors from each of the four universities were selected using simple random sampling technique for classroom observation and similarly three instructors from each of the sample universities were selected using simple random sampling technique for interviewing. Questionnaire, classroom observation, and semi-structured interviews were used as the basic instruments for collecting data. The quantitative data were analysed using one sample t-test whereas the qualitative one was analysed using narration.The findings showed that teachers have claimed to have adequate experience concerning problem-solving teaching in mathematics. This further shows that teachers possess the theories and their application of indirect instruction, organizing mathematics lessons, classroom management using assessment techniques. Teachers have also explained that the training has helped them to relate it with their actual teaching strategies, to organize their lessons into problem-solving approach, to manage the classroom and to align assessment techniques in line with problem-solving approach. In spite of the presence of constraints in implementing problem-solving method at an average level, their obstruction effect was not significant. The findings also implied that there are opportunities to implement problem-solving approach in mathematics in the universities to the expected level. In spite of the existence of opportunities at an adequate level, their extent of availability was found insignificant. In relation to the findings of the study, recommendations are forwarded.

Article Information

Article History:

Received : 30-10-2015

Revised : 08-12-2015

Accepted : 16-12-2015

Keywords:

Constraints

Mathematics Instructors

Problem Solving

Practice

Universities

Amhara Region

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INTRODUCTION

Many research works in the area of mathematical problem solving has focused on how students develop problem-solving abilities and how instructors' enhance these abilities (Schoenfeld, 1992). However, little is done on the effects of some factors to teachers' practice of problem solving in mathematics classes (Thompson, 1992). As a result of this gap, it has been also argued that the impact of instructors' subject matter knowledge and belief in mathematics are critical factors in their teaching practice (Thompson, 1992). However, understandings needed by mathematics instructors are complex and varied (Chamberlin, Farmer, and Novak, 2008). It is believed that mathematics knowledge for teaching becomes the knowledge needed by instructors when an understanding of subject matter is linked to pedagogical knowledge (Silverman and Thompson, 2008). Instructors also need to identify how to base mathematical lessons on the knowledge students already possess in order to bring students toward the lesson goals (Silverman and Thompson, 2008). To this end, mathematics instructors need to believe in reform-based methodologies as well as deeply understand the complexities of mathematics knowledge for teaching.

Addressing subject matter knowledge in mathematics without addressing beliefs may also not be effective as mathematics knowledge for teaching is not just knowledge of subject matter (Ball, et. al., 2008; Kajander, 2010). It is important that mathematics instructors' knowledge includes knowledge of students and of teaching mathematics (PCK in mathematics). Instructors need to deeply understand mathematics, see connections among mathematical ideas, have knowledge of mathematical pedagogy, and be able to break down all the concepts with students in order to teach mathematics (Ma, 1999). As instructors develop this knowledge, their level of understanding the students and teaching improves and grows (Potari and Georgiadou-Kabouridis, 2009). As Potari and Georgiadou-Kabouridis further argue, although an instructor may believe in more reform-based or exploratory ways of learning, a lack of knowledge impedes being able to fully implement the strategies. It is noted that the subject matter knowledge an instructor needs to have is something that goes beyond what any non-instructor studying mathematics would need (Ma, 1999). The subject matter knowledge needed by instructors also differs from the knowledge a student would need or gain during a typical classroom learning experience (Chamberlin *et al*., 2008; Davis and Simmt, 2006; Kajander, 2010).

Recent research suggests that an instructor's strongest beliefs have an effect on their teaching practice (Wilkins, 2008). Because beliefs impact practice (Cross, 2009; Potari and Georgiadou-Kabouridis, 2009; Wilkins, 2008), instructors professional development needs to include a focus on beliefs if there are to be authentic changes in classroom practices. Although, choices made by instructors are influenced by both beliefs and knowledge of the subject matter instructors possess (Phillip, 2007), as discussed before, it is believed that simply targeting the beliefs and values instructors have of mathematics and their capabilities as mathematics teachers or their subject matter knowledge base is insufficient to bring an impact on long-term changes. In particular, instructors' problem solving practice are influenced by their beliefs, by their knowledge and interpretation of recommendation about mathematics teaching, by their use and understanding of curriculum materials, and by their own experiences as learners of mathematics (Putnam, 2003; Schoenfeld, 1999).

Although instructor beliefs about mathematics and their views of themselves as instructors of mathematics influence the pedagogical choices made in a classroom, they are often not well defined in the research literature (Philipp, 2007). One definition is that beliefs might be thought of as lenses that affect one's view of some aspect of the world or as dispositions toward action (Philipp, 2007). As such, beliefs are situated and specific to the instructor and student interactions (Philipp, 2007). If the current vision of mathematics education continues, teachers entering the profession would ideally need to be open to more reform-based methodologies and new pedagogies vastly different from their own experiences (McNeal and Simon, 2000). Moreover, classroom practices appear to be influenced by their beliefs, by the constraints and opportunities that occur within the educational context (Raymond, 1997).

Few studies have examined the relationship between possible constraints to instructors' problem-solving practices. Beliefs must be implied and are, therefore, difficult to measure. Cooney, Shealy and Arvold (1998) note that beliefs tend to be context specific, and they can be thought of as dispositions towards actions. Moreover, Pajares (1992) suggested that beliefs are held with different intensities, and that beliefs influence perception in that they filter situations to make them more understandable. To identify the extremes of instructors' beliefs and to facilitate categorization of responses, a traditional-modern teaching and learning continuum will be used in this study.

At one end of this continuum, mathematics is seen as a fixed body of facts to be delivered by instructors and internalized by students, referred to as a traditional teaching approach. This perspective is associated with individual student work, rehearsal of routine questions, and reliance on textbooks or worksheets. This view may be accompanied by a belief that problem solving is an end by itself and that problems should be presented to students after they have mastered basic facts and skills. At the other end of the continuum, termed a contemporary teaching approach, mathematics is seen as a dynamic subject to be explored and investigated. Classroom practices associated with this perspective usually involve group work and the use of non-routine questions that promote mathematical thinking, and the development of problem solving as a means to learning mathematics. This concept of a continuum of teaching and learning with descriptions of particular perspectives was informed by the work of Ernest (1997). Ernest described a range of approaches to teaching problem solving in mathematics classrooms.

Ernest (1997) proposed five ideologies of mathematics education and argued that there are three distinct views about the role of problem solving in the mathematics curriculum. Ernest argued that "Industrial Trainers" rejected problem solving as frivolous and a waste of time. The educator proposed that both the "Technological Pragmatists" and the "Old Humanists" ideology followers viewed problem solving as additional content in the curriculum since they valued problems as important applications of mathematical content and processes and so problems were treated as objects of inquiry. Finally, Ernest suggested that the "Progressive Educators" and "Public Educators" held the third view of problem solving as a pedagogical approach and not an adjunct to the curriculum. As stated by Ernest, "the full incorporation of these processes into the curriculum, including problem posing, leads to a problem solving and investigational pedagogy" (Ernest, 1997, p. 288).

It is, therefore, pertinent to seek to identify beliefs, knowledge, as well as other factors or constraints, which may be moderating instructors' plans to implement problem solving in their classrooms. Most of the identified constraints from previous studies can be grouped into four broad categories: those relating to the instructors themselves (Jaworski, 1991), to students (Thompson, 1992), to school culture (Hoyles, 1992), and to system requirements (Clark, 1993). These will be treated in detail so that they will be used as frameworks in working through the present study.

Conceptual Framework of the Study

Basically this research is to see how far perceived constraints put an impact upon instructors' beliefs and knowledge and in turn impact their own practices. Experience and different literature (e.g., Cross, 2009; Potari and Georgiadou-Kabouridis, 2009; Philipp, 2007; Putnam, 2003; Schoenfeld, 1999; Wilkins, 2008) asserted that there exist many factors which may put an impact in mathematics instructors' problem-solving practices. A proposed model of the relationship between these factors is presented in Figure 1.

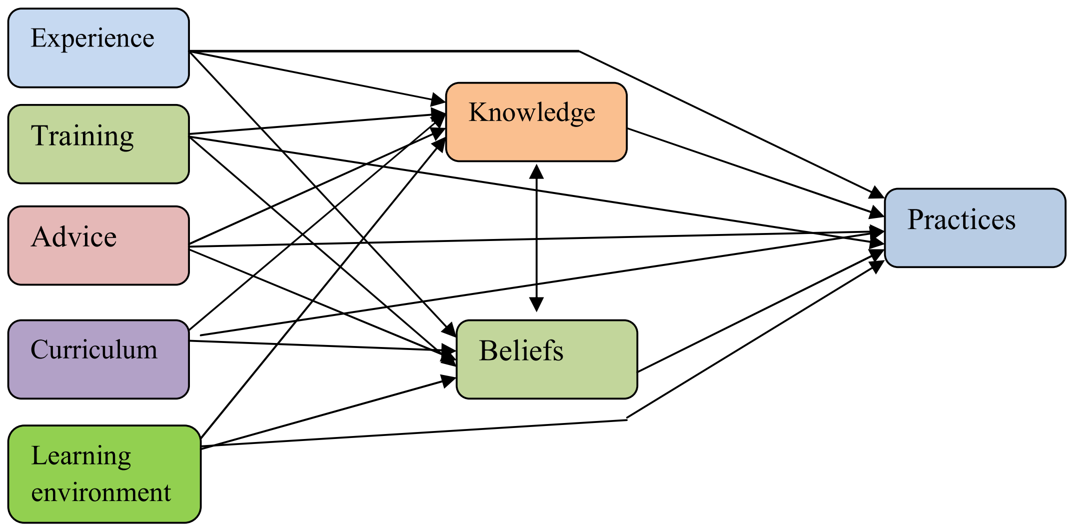

Figure 1: Conceptual Framework of the Study

As indicated by the framework, it can be disclosed that instructors' practices are affected by their own beliefs (e.g., Cross, 2009; Potari and Georgiadou-Kabouridis, 2009; Thompson, 1992; Wilkins, 2008), by their knowledge and interpretation of suggestions about how to teach problem solving provided by experts in the area (e.g., TGE,1994), by their use and understanding of curriculum materials (Morine-Dershimer and Corrigan, 1996; ESDP, 2008), and by their own experiences as learners of mathematics as well as by their experiences in classroom teaching as instructors' of mathematics (e.g., Silverman and Thompson, 2008). The framework further reveal that instructors' classroom practices are affected by their knowledge, by the constraints and opportunities that occur within the educational context (Chamberlin *et al*., 2008; Davis and Simmt, 2006; Kajander, 2010; Silverman and Thompson, 2008; Tobin and Imwold, 1993).

So as to facilitate a discussion about the effect of some constraints on instructors' problem solving practices, a modern-traditional continuum of ideas about teaching and learning were used. One end of this dichotomy is the belief that mathematics is a fixed body of facts to be delivered by instructors and internalized by students. This belief is often associated with classroom practices involving individual student work with rehearsal of routine questions and reliance on curricular materials. This view may be accompanied by a belief that problem solving is an end by itself (Wright, 1992) and that problems should be presented to students after they have mastered basic facts and skills. This perspective was described by Ernest (1997) and is referred to as a traditional teaching approach.

Another perspective, referred to as a contemporary teaching approach, has been described as representing a reformed classroom (Clarke, 1997). Instructors who adhered to this view believe that mathematics is a dynamic subject to be explored and investigated. Classroom practices associated with this perspective usually involve more group work and the use of non-routine questions that promote mathematical thinking and the development of problem solving skills. This view may be accompanied by a belief that problem solving is a means to an end (Wright, 1992) and that problems can be the focus of learning in mathematics lessons.

These two perspectives represent extreme points of beliefs about mathematical problem solving with many instructors holding beliefs that lie within this range mainly inclined towards the traditional extreme (ESDP IV, 2010). Researchers of this paper hope that these perspectives will be used as the basis of the construction of the instruments to be used in this study.

Notwithstanding all the attempts made to usher in modern strategies into the educational system, still classroom instructors in Ethiopia fail to practice problem solving strategy in their instructional delivery (MoE, 2003). Though there is a strong belief that education with science and mathematics determines the level of prosperity and welfare of the people and the nation (ESDP IV, 2010) and as a result much emphasis is given to these fields nowadays, things are not going as expected. The researchers peer observations as Higher Diploma Program (hereafter HDP) participants in 2005/06, confirmed the same problem among observed colleagues in Bahir Dar, Woldia and Debre Markos Universities. It is this and other informal discussions made with instructors who are close colleagues of the researchers that initiate us to focus on the present problem. To this end, therefore, an attempt will be made to unfold the effect of some constraints on instructors' problem-solving practices in mathematics classrooms of universities in the Amhara region.

MATERIALS AND METHODS

The research design used in this study is analytical research design. Moreover, the research approach used in the study was a quantitative approach supplemented or complemented by a qualitative research approach.

Subjects of the Study and Sampling Techniques

The study was designed to explore the effect of perceived constraints on how far instructors practice mathematics problem solving strategies. Specifically, this study was designed to examine the effect of perceived constraints on four universities mathematics department instructors' classroom practices of problem solving in teaching mathematics. Moreover, this research further aimed to discover the relationship between beliefs and knowledge of mathematical problem solving. And, the effects of some factors that instructors identified as constraining their implementation of problem-solving strategies in mathematics sessions was intensively investigated.

To this end, the target population of the study includes mathematics instructors in the Amhara Regional state universities. From a total of seven functioning universities, four universities were selected using simple random sampling technique. The four universities' respective mathematics departments were selected using purposive sampling techniques. Then, all mathematics instructors of the four universities selected using comprehensive sampling technique were samples of this study. Five mathematics instructors from each of the four universities were selected using simple random sampling technique for classroom observation and similarly three instructors from each of the sample universities were selected using simple random sampling technique for interviewing.

Data Gathering Instruments

In this study, questionnaire, classroom observation, and semi-structured interviews were used as the basic instruments for collecting data. Questionnaire including both close ended and open ended questions that encompasses questions of different variables was used as the main data gathering tool. The close ended questions were Likert scale questions whereas open-ended questions request instructors to describe a recently used problem, explain why they prefer particular types of questions, identify opportunities and constraints of practicing problem solving strategies in mathematics sessions in their respective university campuses and describe the professional development needs of the staff at their school in relation to the implementation of problem-solving approaches. Besides, semi-structured interviews and classroom observations with teachers were used as additional data gathering instruments. The semi-structured interview and observation guides were designed in such a way that they provide relevant data that helped us to answer the basic research questions of this study. To this end, their preparation was done vis-à-vis the conceptual framework charted out in this study.

Methods of Data Analysis

Basically, quantitative data analysis technique was used to analyze the data and qualitative analysis technique was also used as a supplement to a quantitative data analysis. To see the extent to which the perceived constraints affect the practices of problem solving skills of Mathematics instructors, one sample t-test analysis was applied. The data drawn from observation and interview were thematically analyzed qualitatively using descriptions.

Presentation of the Findings

This part deals with the analysis of results obtained from the questionnaire distributed to mathematics teachers of the four universities situated in Amhara Regional State. Sixty mathematics teachers were involved in filling the questionnaire. The questionnaire constitutes 77 items categorized under nine themes. One sample t-test was employed to examine teachers' mathematical knowledge, practice and level of support. The findings are presented, analyzed and interpreted as follows.

Table 1: Instructors' problem solving experience

Variable	No.	Expected mean	Observed mean	sd	df	Sig
Experience	60	4	7.08	1.12	59	0.000*

*significant at alpha value of 0.05

The results in Table one portrayed that there is significant mean difference between the expected (4) and the observed mean (7.08) regarding teachers' experience of applying problem-solving approach in mathematics teaching and learning, which is in favor of the observed mean. This implies that teachers have claimed to have adequate experience concerning problem-solving teaching in mathematics. This further shows that teachers possess the theories and their application of indirect instruction, organizing mathematics lessons, classroom management using assessment techniques.

Table 2: Instructors' problem solving training

Variable	No.	Expected mean	Observed mean	sd	df	Sig
Training	60	4	6.06	1.6	59	.000*

*significant at alpha value of 0.05

One of the themes examined in this study was availability and adequacy of the training teachers have taken regarding problem-solving approach in teaching mathematics. In doing so, one sample t-test was applied to assess the level of training as indications are made in Table 2. The result in Table 2 indicated that the observed mean (6.06) significantly exceeds the expected mean. Teachers have explained that the training has helped them to relate it with their actual teaching strategies, to organize their lessons into problem-solving approach, to manage the classroom and to align assessment techniques in line with problem-solving approach.

Table 3: Constraints to implementing problem solving

Variable	No.	Expected mean	Observed mean	sd	df	Sig
Constraints	60	12	12.35	3.13	59	0.343NS

NS – significant at alpha value of 0.05

The third category that was measured in this study was the nature of constraints teachers have faced while implementing problem-solving approach in mathematics lessons. As the responses obtained from teachers disclosed, the nature of constraints include the institutions demand to adhere to prescribed programs, to adhere to specific assessment and reporting practices, to adhere to the expectations of the stakeholders and fellow staff members influence to adhere to traditional belief systems.

A one sample t-test analysis in Table 3 has shown non-significant difference between the expected (12) and the observed (12.35) means that imply mathematics instructors claim that there are constraints in implementing problem-solving method. In spite of their presence at an average level, their obstruction effect was not significant.

Table 4: Opportunities to implementing problem solving

Variable	No.	Expected mean	Observed mean	sd	df	Sig
Opportunity	60	12	12.2	3.23	59	0.581

Mathematics instructors were also asked whether or not there are opportunities in the universities to implement problem-solving approach. One sample t-test was employed in the data to examine the adequacy of opportunities. The result in Table 4 depicts that there is no significant difference between the expected (12) and the observed (12.2) means. This shows that there are opportunities to implement problem-solving approach in mathematics in the universities to the expected level. In spite of the existence of opportunities at an adequate level, their extent of availability was found insignificant at alpha value of 0.05

Table 5: The status of the curriculum in implementing problem solving

Variable	No.	Expected mean	Observed mean	sd	df	Sig
status of the curriculum	60	12	10.34	1.7	59	0.000*

*significant at alpha value of 0.05

One of the major components in implementing problem-solving method in mathematics subject is the nature of the curriculum, i.e., how it is being organized. That is, when the curriculum materials such as textbooks are prepared, they must organize contents in the form of challenges, the contents should reflect the society's day-to-day life experience and problems where the society encounters in its walk of life, they should encourage students to apply what they have learnt in the classroom and life situation, etc. However, the results of one sample t-test portrayed in Table 5 identified that there exists significant difference between the expected mean (12) and the observed mean (10.34), which is in favor of the expected mean. This implies that the curriculum is not prepared in a way it fosters the implementation of problem-solving method in mathematics.

Table 6: Advices forwarded to implementing problem solving

Variable	No.	Expected mean	Observed mean	sd	df	Sig
Advice	60	6	3.54	1.5	59	0.000*

*significant at alpha value of 0.05

Mathematics instructors were asked as to whether they are getting proper advice from senior staff and curriculum experts on how to implement problem-solving teaching method in their teaching. A five point likert scale questionnaire was used to collect data. The result of one sample t-test in Table 6 confirms that there is no adequate advice, as the expected mean (6) was found greater than the observed mean (3.54). this difference was found significant at alpha value of 0.05.

Table 7: Teachers' beliefs and Knowledge about problem-solving

Variable	No.	Expected mean	Observed mean	sd	df	Sig
Beliefs	60	75	100	12.42	59	0.000*
Knowledge	60	18	18.33	3.3	59	0.437

*significant at alpha value of 0.05

An attempt was made to measure mathematics instructors' beliefs and knowledge about the application of problem-solving method in mathematics lesson. As it is disclosed in Table 7, while significant mean differences are obtained between the expected (75) and observed (100) mean in belief test, non-significant mean difference was obtained in instructors' knowledge about problem-solving teaching method, as the expected (18) and observed (18.33) means are not statistically significant at alpha value of 0.05. This shows that while mathematics instructors have high belief as to the implementation of problem-solving teaching methods in their lessons their knowledge is to the expected level.

Table 8: Teaching Strategies

Variable	N	Expected mean	Observed mean	sd	df	Sig
Perceived practices of problem solving strategies	60	22.5	46.08	9.19	59	.000*

*significant at alpha value of 0.05

Finally, mathematics instructors were asked about their perceived practices of problem-solving teaching methods in their lessons. As it is indicated in Table 8, encouraging results were obtained that is instructors claim that they implement problem-solving method significantly, as the expected mean (22.5) is far below the observed mean at alpha value of 0.05.

DISCUSSION

The results in Table one portrayed that there is significant mean difference between the expected (4) and the observed mean (7.08) regarding teachers' experience of applying problem-solving approach in mathematics teaching and learning, which is in favor of the observed mean. This implies that teachers have claimed to have adequate experience concerning problem-solving teaching in mathematics. This further shows that teachers possess the theories and their application of indirect instruction, organizing mathematics lessons, classroom management using assessment techniques.

The current finding is consistent with findings of early studies. Silverman and Thompson (2008), for example, disclosed that instructors' practices are affected by their own experiences as learners of mathematics as well as by their experiences in classroom teaching as instructors' of mathematics.

One of the themes examined in this study was availability and adequacy of the training teachers have taken regarding problem-solving approach in teaching mathematics. In doing so, one sample t-test was applied to assess the level of training as indications are made in Table 2. The result in Table 2 indicated that the observed mean (6.06) significantly exceeds the expected mean. Teachers have explained that the training has helped them to relate it with their actual teaching strategies, to organize their lessons into problem-solving approach, to manage the classroom and to align assessment techniques in line with problem-solving approach.

Supporting the current finding, early researchers' disclosed that instructors' practices are affected by their own knowledge, by the constraints and opportunities that occur within the educational context (e.g., Chamberlin *et al*., 2008; Davis and Simmt, 2006; Kajander, 2010; Silverman and Thompson, 2008; Tobin and Imwold, 1993).

The third category that was measured in this study was the nature of constraints teachers have faced while implementing problem-solving approach in mathematics lessons. As the responses obtained from teachers disclosed, the nature of constraints include the institutions demand to adhere to prescribed programs, to adhere to specific assessment and reporting practices, to adhere to the expectations of the stakeholders and fellow staff members influence to adhere to traditional belief systems. The findings imply that mathematics instructors claim that there are constraints in implementing problem-solving method. In spite of their presence at an average level, their obstruction effect was not significant.

Mathematics instructors were also asked whether or not there are opportunities in the universities to implement problem-solving approach. One sample t-test was employed in the data to examine the adequacy of opportunities. The result in Table 4 depicts that there is no significant difference between the expected (12) and the observed (12.2) means. This shows that there are opportunities to implement problem-solving approach in mathematics in the universities to the expected level. In spite of the existence of opportunities at an adequate level, their extent of availability was found insignificant at alpha value of 0.05

One of the major components in implementing problem-solving method in mathematics subject is the nature of the curriculum, i.e., how it is being organized. That is, when the curriculum materials such as textbooks are prepared, they must organize contents in the form of challenges, the contents should reflect the society's day-to-day life experience and problems where the society encounters in its walk of life, they should encourage students to apply what they have learnt in the classroom and life situation, etc. However, the results of one sample t-test portrayed in Table 5 identified that there exists significant difference between the expected mean (12) and the observed mean (10.34), which is in favor of the expected mean. This implies that the curriculum is not prepared in a way it fosters the implementation of problem-solving method in mathematics.

Mathematics instructors were asked as to whether they are getting proper advice from senior staff and curriculum experts on how to implement problem-solving teaching method in their teaching. A five point likert scale questionnaire was used to collect data. The result of one sample t-test in Table 6 confirms that there is no adequate advice, as the expected mean (6) was found greater than the observed mean (3.54). This difference was found significant at alpha value of 0.05.

An attempt was made to measure mathematics instructors' beliefs and knowledge about the application of problem-solving method in mathematics lesson. As it is disclosed in Table 7, while significant mean differences are obtained between the expected (75) and observed (100) mean in belief test, non-significant mean difference was obtained in instructors' knowledge about problem-solving teaching method, as the expected (18) and observed (18.33) means are not statistically significant at alpha value of 0.05. This shows that while mathematics instructors have high belief as to the implementation of problem-solving teaching methods in their lessons their knowledge is to the expected level.

Finally, mathematics instructors were asked about their perceived practices of problem-solving teaching methods in their lessons. As it is indicated in Table 8, encouraging results were obtained that is instructors claim that they implement problem-solving method significantly, as the expected mean (22.5) is far below the observed mean at alpha value of 0.05.

Generally, it can be disclosed that instructors' practices are affected by their own beliefs (Cross, 2009; Potari and Georgiadou-Kabouridis, 2009; Thompson, 1992; Wilkins, 2008), by their knowledge and interpretation of suggestions about how to teach problem solving provided by experts in the area (TGE,1994), by their use and understanding of curriculum materials (Morine-Dershimer and Corrigan, 1996; ESDP, 2008), and by their own experiences as learners of mathematics as well as by their experiences in classroom teaching as instructors' of mathematics (Silverman and Thompson, 2008). The framework further reveal that instructors' classroom practices are affected by their knowledge, by the constraints and opportunities that occur within the educational context (e.g., Chamberlin *et al*., 2008; Davis and Simmt, 2006; Kajander, 2010; Silverman and Thompson, 2008; Tobin and Imwold, 1993).

CONCLUSIONS

As indicated in the findings of this study, teachers have claimed to have adequate experience concerning problem-solving teaching in mathematics. This further shows that teachers possess the theories and their application of indirect instruction, organizing mathematics lessons, classroom management using assessment techniques.

Teachers have also explained that the training has helped them to relate it with their actual teaching strategies, to organize their lessons into problem-solving approach, to manage the classroom and to align assessment techniques in line with problem-solving approach.

The third category that was measured in this study was the nature of constraints teachers have faced while implementing problem-solving approach in mathematics lessons. As the responses obtained from teachers disclosed, the nature of constraints include the institutions demand to adhere to prescribed programs, to adhere to specific assessment and reporting practices, to adhere to the expectations of the stakeholders and fellow staff members influence to adhere to traditional belief systems. In spite of the presence of constraints in implementing problem-solving method at an average level, their obstruction effect was not significant. The findings also implied that there are opportunities to implement problem-solving approach in mathematics in the universities to the expected level. In spite of the existence of opportunities at an adequate level, their extent of availability was found insignificant.

One of the major components in implementing problem-solving method in mathematics subject is the nature of the curriculum, i.e., how it is being organized. That is, when the curriculum materials such as textbooks are prepared, they must organize contents in the form of challenges, the contents should reflect the society's day-to-day life experience and problems where the society encounters in its walk of life, they should encourage students to apply what they have learnt in the classroom and life situation, etc. The finding implies that the curriculum is not prepared in a way it fosters the implementation of problem-solving method in mathematics.

Mathematics instructors were asked as to whether they are getting proper advice from senior staff and curriculum experts on how to implement problem-solving teaching method in their teaching. The finding implied that there is significant difference.

An attempt was made to measure mathematics instructors' beliefs and knowledge about the application of problem-solving method in mathematics lesson. The finding implied that mathematics instructors have high belief as to the implementation of problem-solving teaching methods in their lessons their knowledge is to the expected level.

Finally, mathematics instructors were asked about their perceived practices of problem-solving teaching methods in their lessons. Encouraging results were obtained, that is, instructors claim that they implement problem-solving method significantly.

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