

## **TEACHERS' BELIEF AND TEACHING PRACTICES ON NEW CURRICULUM IN LOWER PRIMARY SCIENCE TEACHING**

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### **Abstract**

The purpose of this study is to find out primary teachers' belief about science teaching and learning and their teaching practices to implement the new curriculum in Dala Township and it also investigates the mediation effect of teachers' science teaching efficacy belief on the relationship between teachers' belief about science teaching and learning and teaching practices. One hundred and two primary teachers from the selected schools participated in this study. Simple random sampling technique was used in selecting schools and the primary teachers in the selected schools were chosen for this study. Types of teachers' belief about science teaching and learning and teaching practices, level of science teaching efficacy belief and the relationship between belief and practices were explored. Quantitative method was applied in this study. Questionnaire included four parts; demographic items, belief about science teaching and learning items, science teaching efficacy belief items and teaching practices items. The reliability coefficient (the Cronbach's alpha) of the questionnaire was 0.82. Descriptive statistics, Pearson correlation and mediation analysis were conducted for the analysis of quantitative data. A majority of teachers demonstrated constructivist belief to implement new curriculum. Teachers had moderately high level of science teaching efficacy belief and they strongly believed that they had the capability to implement the new science curriculum. However, they demonstrated moderately low level of efficacy in taking responsibility of the outcomes. A vast majority of the teachers use teaching practices in line with the reforms. Although teachers in this study were familiar with the types of methods that are currently advocated by the New Curriculum reform, there were many contextual factors leading to dissimilarity between belief and practices. According to the findings, teachers should be provided with more resources and effective professional development programs that will reconcile teachers' beliefs with the goals of the new science curriculum.

**Keywords:** teachers' belief, science teaching efficacy belief, teaching practices

### **Introduction**

The success of a nation fundamentally depends on the knowledge, skills, competences and morale of its people and the provision of quality and equitable education is essential for our country. Myanmar's Education System has been criticized for its examination-oriented system which makes children grow up with less critical thinking skills and is left behind compared with the international community. Thus, the Ministry of Education (MOE) planned to make an educational reform and has been redesigned and launched a new basic education curriculum.

In this critical period, teachers as the major stakeholders, play a central role to bring about an effective implementation of new curriculum. Teachers' belief, practice and attitudes are important for implementing new science curriculum. These are closely linked to teachers' strategies for coping with challenges in their daily professional life, shaping learning environment and influence student motivation and achievement. The way the teachers teach has a greater effect on student learning outcomes than any other factors and the way the teachers teach in turn based on their belief about teaching and learning.

I believe that the first step to successfully implement the new science curriculum is to know how teachers think about science teaching and learning and whether they believe in constructivist ways of teaching and learning. Therefore, teachers' belief and teaching practices and the

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consistency between them is extremely important to bring about the effective curriculum reform. One of my concerns in this study is to investigate science teachers' belief about science teaching and learning and their teaching practices, and whether they believe in their science teaching efficacy for implementing new curriculum effectively and successfully.

### **Significance of the Study**

The MOE started drawing up a new curriculum in 2012 with the aim of providing the quality, equitable and relevant education to provide all the children with new knowledge and competencies, creativity and critical thinking skills and cultural and ethical values that will enable them to meet the life-long-learning and career aspirations of the 21<sup>st</sup> century economic development. New curriculum reform would lead to the changes in educational beliefs and practices. To change the curriculum and pedagogy, the most important thing is to change the educational belief of all stakeholders. Thus, teachers' belief plays an important role in bringing about a more effective curriculum reform.

Bryan (2012) stated that teacher's belief is far more influential than academic knowledge in framing, analyzing and solving problems and making teaching decisions. The OECD (2012) stated that instructional practices depend on the teachers' belief about teaching and learning. The American Association for the Advancement of Science (AAAS, 1998) stated that the major goal of the 21<sup>st</sup> century science education is fostering students' intellectual competencies and science teaching must be shifted from traditional schooling to more constructivist-oriented instruction. Benson (1989) stated that the gap between what teachers say they believe about the nature of science and what they do in practice is apparent as a result of various factors. Ford (1993) stated that the efficacy belief as one of the factors leading to the dissimilarity between beliefs and practices.

This study would provide the teachers' belief about science teaching and learning, teachers' science teaching efficacy beliefs to implement the new curriculum, and the consistency between these beliefs and teaching practices. It would also investigate whether the teachers' science teaching efficacy belief mediates the relationships between teachers' belief about science teaching and learning and teaching practices. This study would be able to point out the factors leading to dissimilarity between teachers' beliefs and the goals of new science curriculum. In addition, curriculum developers will be able to bring about a closer alignment of the intended and enacted curriculum.

### **Research Objectives**

#### **General Objective**

- To investigate the teachers' belief and teaching practices on new curriculum in lower primary science teaching

#### **Specific Objectives**

- To study teachers' belief about science teaching and learning
- To study the teaching practices of lower primary science teachers
- To study the level of teachers' science teaching efficacy belief to implement the new science curriculum
- To investigate the relationship between the teachers' belief and their teaching practices in implementing the new curriculum

- To investigate whether the teachers' science teaching efficacy belief mediates the relationship between the teachers' belief about science teaching and learning and teaching practices.

### **Research Questions**

- What kinds of belief do the teachers hold about science teaching and learning?
- What is the level of teachers' science teaching efficacy belief to implement new curriculum?
- What types of teaching practices do teachers use in the actual classroom?
- Is there any significant relationship between the teachers' belief and their teaching practices in implementing new science curriculum?
- Is there any mediating effect of the teachers' science teaching efficacy belief between teachers' belief about science teaching and learning and teaching practices?

### **Conceptual Framework**

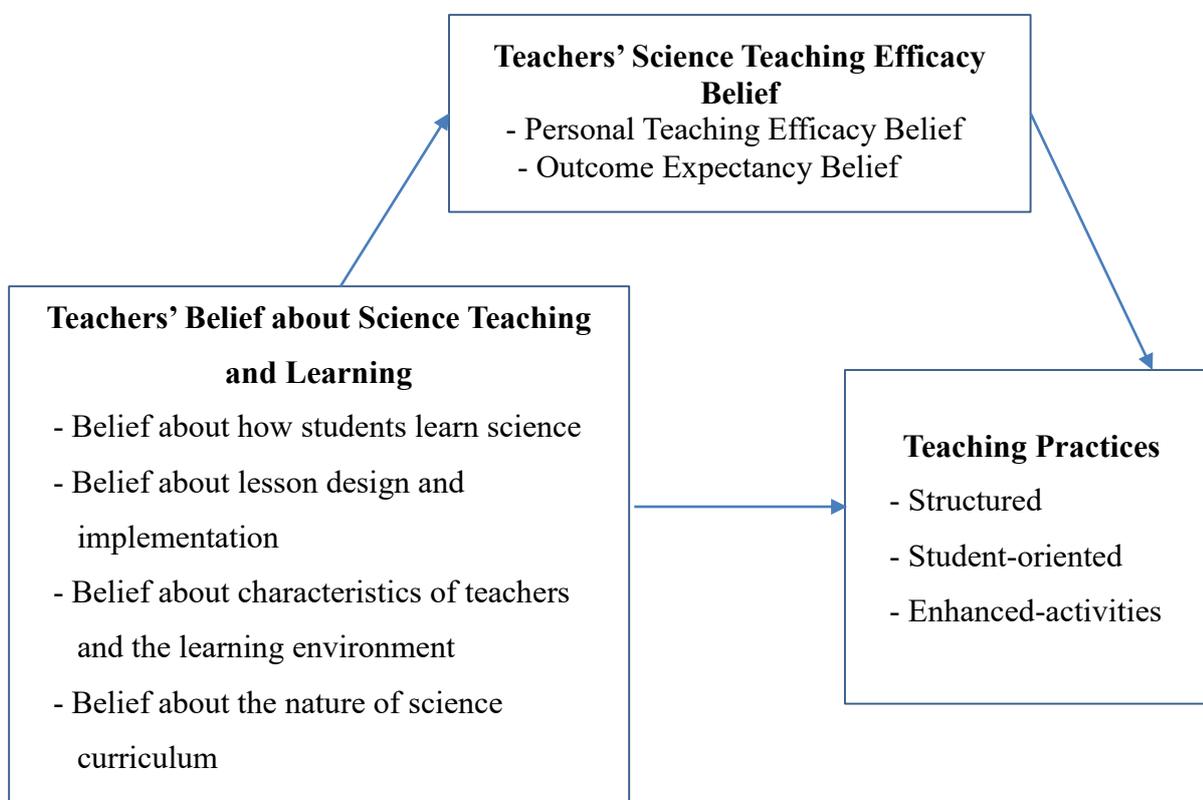
Teachers' belief about science teaching and learning plays a role in influencing classroom practices related to science instruction. This belief includes the teachers' beliefs about the nature of the science, science curriculum, how students learn science, teachers' role in science class and nature of learning environment. Sampson and Benton (2006) identified the four dimensions of the teachers' belief about science teaching and learning; belief about the nature of science curriculum, belief about the ways the students learn science, belief about the lesson design and implementation, belief about the characteristics of teachers and learning environment. Philosophically, the contemporary reform movement in science education is based on Constructivism.

The essence of constructivism is "that knowledge is not transmitted directly from one knower to another, but is actively built up by the learner" Specifically for learning science, constructivism is seen as a social process that serves as a catalyst for cognitive development. There is an emphasis on student-centered investigations to engage learners and build upon their prior knowledge. The teacher acts as a facilitator and promotes a collaborative environment in the classroom where multiple ideas are encouraged and valued. The curriculum is viewed as being flexible and focuses on depth to promote conceptual understanding.

The reformed perspective of teaching and learning science is in complete opposition to the traditional view, direct transmission. The traditional stance envisions learners as blank slates that accumulate information through teacher-centered instruction. Learners are encouraged to work independently with a heavy reliance on textbooks and learn by rote memorization. There is also a heavy reliance on the teacher as the main dispenser of knowledge where basic skills are emphasized. Furthermore, the curriculum is viewed as a fixed entity that lacks depth.

Teaching practice or instructional practice will be regarded as the collection of interaction of teachers and their teaching in a classroom context which include teaching methods and strategies. In TALIS (2009), OECD identified teaching practices into three dimensions: structuring practices (correspond to teacher centered teaching); student-oriented practices (Correspond to student-centered teaching); and Enhanced activities (Correspond to student-centered teaching). In this research, teaching practices will be identified into three dimensions: structuring practices, student-oriented practice, and Enhanced activities. Ford (1992) stated three factors that lead to dissimilarity between beliefs and practices are efficacy beliefs, contextual beliefs and goals. Teachers' efficacy beliefs are impacting on how teachers think, feel, and teach. Teachers with a strong sense of efficacy tend to be more organized and generally plan better than those without a strong sense of efficacy. According to Bandura (1997), studies of teachers' efficacy beliefs have

been based on two separate dimensions: the first is personal efficacy and the second is outcome expectancy. Teaching efficacy belief is what teachers think about their ability to teach (personal teaching efficacy) and to have students learn (teaching outcome expectancy). Riggs and Enochs (1990) argued that the elementary teachers with high science teaching self-efficacy belief may have a more reformed view of ideal science teaching than her lower-efficacy colleagues. This study rests on the assumption that, by increasing teachers' science teaching efficacy, their belief about science teaching and learning will become part of their daily teaching practices. Thus, this study aims to investigate whether the teachers' science teaching efficacy belief mediates the relationship between teachers' belief about science teaching and learning and their practices.



**Figure 1** Conceptual Framework for the Study

## Definition of Key Terms

### *Teacher's belief*

Teachers' belief is defined as personal constructs that can provide understandings, judgements and evaluations of teachers' practices (Pajares, 1992).

### *Teacher Efficacy*

Teacher efficacy is the teacher's belief in his or her capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context (Bandura, 1977).

### **Teaching Practices**

Teaching practices or actions are considered to be knowing-in-action or observable pedagogical behavior (Fishbein & Ajzen, 1975).

## **Operational Definitions**

### ***Teachers' Belief about Science Teaching and Learning***

Teachers' belief about science teaching and learning is defined as the teachers' unconsciously held assumptions about the nature of science and the ways of students learning science. It is measured on a traditional-reformed pedagogical belief continuum. Higher mean values are reflective of the reformed pedagogical belief and lower mean values are reflective of the traditional pedagogical belief.

### ***Science Teaching Efficacy Belief***

Science teaching efficacy belief is the teachers' belief in their teaching capability to successfully implement the new science curriculum in accordance with their belief about science teaching and learning. The Higher mean values describe the higher level of science teaching efficacy belief.

### ***Teaching Practices***

Teaching Practices are defined as the observable pedagogical behaviors relating to teaching styles, assessment and feedback to deliver the new science curriculum. The greater mean values represent the more the teacher use of the learner-centered teaching practices.

## **Review of Related Literature**

### **Curriculum Ideology**

Schiro (2008) described the four curriculum ideologies which have exerted the greatest influence on educators' practices and aspirations. Schiro defined each of these ideologies in terms of its conception of the definition of knowledge, the nature of learning, how the learning should be evaluated, the role of the teacher and student in the learning experience, and what instructional strategies are best suited to support such learning.

#### ***Scholar Academic ideology***

The Scholar Academic ideology defines curriculum through a classical, academic discipline-based approach to education. Knowledge and the manner in which such knowledge should be taught, is defined by the individual academic fields. Roles within this paradigm are hierarchical in nature and the role of the classroom teacher is that of transmitter of knowledge and the students are the recipients of knowledge. The role of public education is to perpetuate the academic disciplines. Teaching approaches within this curriculum ideology are primarily didactic discourse and student learning is assessed through objective, standardized assessments.

#### ***Social Efficiency ideology***

The Social Efficiency ideology suggests that the purpose of schooling is to meet the needs of society by training youth to function as contributing members of that society. This approach suggests that there is a set of knowledge and skills that society deems important and which members of society must possess in order to function in society. The role of the teacher is as manager, responsible for establishing the learning environment and ensuring mastery of skills around a predetermined set of standards established by those outside the classroom.

#### ***Learner-Centered ideology***

Learner-Centered ideology has had a consistent presence in the curriculum field for the last hundred years. It has been referred to as Constructivism, Experiential, Humanist and Progressive Education. It assumes that each child is not a blank slate but comes to school with individual

experiences, abilities, interests, and challenges. The role of the teacher is facilitator, tasked with organizing learning while supporting individual students in a process towards self-actualization. Learning is viewed as a social process whereby the learner constructs meaning through interaction with social, physical, and intellectual environments. Learner-Centered ideology suggests that it is the teacher's role to create a constructivist learning environment and then observe and diagnose the needs and interests of the learner in order to effectively facilitate individual growth. Learning goals are individualized in a Learner-Centered environment. Curriculum is not standardized but flexible and learner driven, co-created by teacher and learner. Curriculum is not cleanly divided into distinct academic disciplines but is integrated across disciplines and designed to promote deeper understanding with an emphasis on depth over breadth.

### ***Social Reconstruction ideology***

This ideology views schools as institutions of social and political change charged with the responsibility for creating a new and more just society through the education of our youth. This paradigm is commonly used when the current society is problematic and that schools can, and should, play a role in solving such social issues. Critical educators are typically concerned with hidden curriculum. The teacher's role is as facilitator of learning and teachers are viewed as agents of social change, and their role is political within the public sphere of schools. Teaching strategies often include group discussion and learning tasks are problem-based. Sometimes referred to as social justice education, the curriculum in this type of learning environment is intended to be dynamic and action-oriented.

Philosophically, the contemporary reform movement in science education is based on the learner-centered ideology and rely more on one of the most influential theories in science education known as constructivism (Driver, 1989).

### **Teachers' Beliefs and Teaching Practices**

Pajares (1992) stated that "beliefs are the best indicators of the decisions individuals make throughout their lives". Teachers' classroom practices are influenced by their beliefs, there is still a need to examine teachers' beliefs in order to clarify how they affect their practice. Beliefs become personal pedagogies or theories to guide teachers' practices. Teachers' beliefs play a major role in defining teaching tasks and organizing the knowledge and information relevant to those tasks. Bryan (2012) stated that teacher's belief is far more influential than academic knowledge in framing, analyzing and solving problems and making teaching decisions.

Philip (2003) stated three interconnected dimensions of teachers' beliefs are: teachers' expressed beliefs, teachers' entrenched beliefs and teachers' manifested beliefs which are responsible for shaping the curriculum. Teachers' expressed beliefs are those sets of beliefs that were often expressed by the teacher during an interview or focus session but were rarely acted upon. These expressed beliefs later provided valuable insight and explanation for teachers' behavior. Entrenched beliefs are foundational to a person's actions and may also be verbally expressed. The entrenched beliefs are reinforced by the teacher's experience over time. Hence the teacher would often refer to his/her experience as a validation of his/her belief. Manifested beliefs are those sets of beliefs that are acted upon consciously or unconsciously as demonstrated by the strategies of the teachers. The teacher will demonstrate manifested beliefs as part of their daily routine. They are in fact entrenched beliefs being acted upon in a certain manner. Hence manifested beliefs are an outworking of entrenched beliefs.

### **Teaching Practices**

Teaching practices or actions are considered to be knowing-in-action or observable pedagogical behavior (Fishbein & Ajzen, 1975). Teaching practice or instructional practice will be regarded as the collection of interaction of teachers and their teaching in a classroom context which

include teaching methods and strategies. Three main styles of teaching practices are propounded: didactic, Socratic and facilitative under two main philosophical ideas; teacher-centered and student-centered teaching approaches (Jarvis, 2006).

### ***Didactic Teaching Approach***

The didactic approach to teaching primarily involves lecturing and is essentially teacher-centered. It is a means of transmitting factual information to a large audience, which rarely creates interest or draws attention of the young people. Here the teacher talks and the class listens; thus, the teacher is the only active individuals in the class and the pupils are passive listeners. Lecturing is one the best representing feature of the non-interactive or authoritative approach of teaching by which teacher presents normative ideas in a monologue. The didactic method relies upon various form of authority.

### ***Facilitative Teaching Approach***

Teaching is “no longer seen as imparting knowledge but is redefined as facilitation of self-directed learning. Facilitation is associated with student-centered learning. Literally facilitation means “easing” by which drawing out the wisdom already embedded and lying dormant in the psyche of the learner. Facilitation may thus be seen as re-awakening our latent talents and store of unconscious wisdom. It is the art of helping learners realize their capacity to learn is the hallmark of the facilitator, moving education from a delivery of static knowledge to a dialogical relationship where knowledge is co-created. The facilitator’ role is one that encourages students to engage in intellectual analysis, critical thinking, problem solving, describing experiences and challenge learning (Jarvis, 2006).

### ***Socratic Teaching Approach***

The Socratic method of teaching emphasizes student-centeredness and strongly opposes didacticism. Socratic teaching emphasizes the importance of seeking evidence, closely examining reasoning and assumptions, and analyzing basic concepts. With Socratic teaching, the focus is on providing students with questions, not answers, by modeling inquiry and probing. As a result, students develop the ability to reason in a disciplined, self-assessing manner. Students also benefit by communicating with their peers through discussion in the classroom setting. Through questioning, teachers help learners to recall pre-conscious learning or tacit knowledge and leading learners through a carefully constructed sequence of questions towards a pre-determined conclusion (Jarvis, 2006).

## **Three Factors Leading to Dissimilarity between Beliefs and Practices**

Ford (1992) stated three factors that lead to dissimilarity between beliefs and practices. These factors are contextual beliefs, goals and capability beliefs.

### ***Context Beliefs***

Ford defined contextual beliefs as those sets of beliefs, which have environmental constraints that inhibit a teacher from teaching or implementing the curriculum in a certain expected manner. The teacher reasons, that given appropriate conditions, he/she will be able to implement a certain approach. This reasoning represents what the teacher believes.

### ***Goals***

A second factor that may contribute to teachers not making expressed beliefs part of their entrenched and manifested beliefs is the need to provide a goal or purpose. A goal is a future state that an individual is striving to attain. Ford (1992), in his motivational strategy theory, argued that the link between goals and personal agency beliefs (capability and contextual beliefs). If there is no goal, emotion and personal agency beliefs, a person may produce short-term effects, but in the

long run they are likely to fail or backfire. Teachers, like every other individual, do not change unless they have a compelling reason to do so.

### **Capability Beliefs**

Capability beliefs described as perceived self-efficacy beliefs. It is the perceived ability and judgment of the individual to undertake a certain task. Bandura (1982) defined self-efficacy belief as the judgements of how one can execute course of action required to deal with prospective situations. The person's perceived ability is based upon positive and negative past experience and knowledge. People's belief in their self-efficacy or capability beliefs will have varying effects on their behavior and actions. Teachers with a strong sense of efficacy tend to be more organized and generally plan better than those without a strong sense of efficacy. They also tend to be more open to new ideas and innovations, more willing to experiment with new teaching methods, are better in meeting the needs of their students, and are more likely to use powerful but potentially difficult to manage methods such as inquiry and small-group work (Ashton & Webb, 1986).

### **Methodology**

Quantitative method was used to collect the required data in this study. By using simple random sampling technique, three middle schools, five post primary schools and sixteen primary schools in the Dala Township were selected and all the primary teachers in the selected schools having more than one year of science teaching experiences were selected as the sample. The questionnaire includes four parts; demographic items, belief about science teaching and learning items, science teaching efficacy belief items and teaching practices items. The questionnaire was based on the literature, the BARSL and STEBI questionnaires and modified in accordance with the Myanmar curriculum reform. The reliability coefficient of Teachers' Beliefs about Science Teaching and Learning is 0.65, that of science teaching efficacy beliefs is 0.63 and that of teaching practices is 0.77. The total reliability coefficient (the Cronbach's alpha) of the questionnaires is 0.82. Descriptive statistics, Pearson correlation and mediation analysis were used to analyze the quantitative data.

### **Findings**

The purpose of this research is to find out primary teachers' belief about science teaching and learning and their teaching practices to implement the new curriculum effectively and it also investigate the mediation effect of teachers' science teaching efficacy belief on the relationship between teachers' beliefs and teaching practices. One hundred and two primary teachers from the selected schools participated in this study.

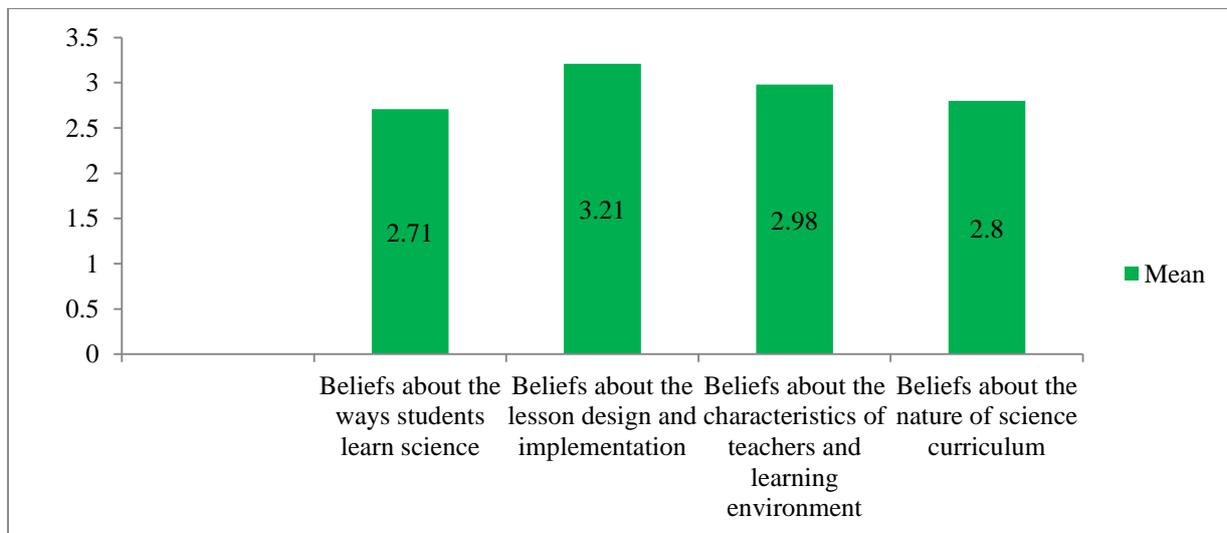
To investigate the types of teachers' belief about science teaching and learning, primary teachers from selected schools were asked to give the answers related to their beliefs about science teaching and learning. The Beliefs about Reformed Science Teaching and Learning (BARSTL) questionnaire was used and it consists of four sub-scales; belief about how students learn science, belief about the lesson design and implementation, belief about the characteristics of teachers and learning environment, and belief about the nature of science curriculum.

**Table 1 Mean Values and Standard Deviations Showing the Types of Teachers’ Belief about Science Teaching and Learning**

No.	Sub-Scales	N	Mean (SD)	Type of Belief
1.	Beliefs about the ways of students learn science	102	2.71 (.57)	Reformed Belief
2.	Beliefs about the lesson design and implementation	102	3.21 (.63)	Reformed Belief
3.	Beliefs about the characteristics of teachers and learning environment	102	2.98 (.62)	Reformed Belief
4.	Beliefs about the nature of science curriculum	102	2.80 (.54)	Reformed Belief
Teachers’ Beliefs about Science Teaching and Learning			2.95 (.61)	Reformed Belief

**Scoring Direction:** Traditional < 2.5 < Reformed

According to the overall mean score of belief about science teaching and learning, a majority of teachers demonstrated constructivist belief to implement new curriculum ( $M=2.95$ ). They strongly believed that constructivist way of teaching and learning make students developed the 21<sup>st</sup> century skills and their potential.



**Figure 2 Mean Values of Teachers’ Belief about Science Teaching and Learning**

Figure 2 displays the mean scores of teachers’ belief about science teaching and learning. According to figure, teachers’ belief about science teaching and learning is composed of four sub-scales namely belief about how students learn science, belief about lesson design and implementation, belief about characteristics of teachers and learning environment, and belief about the nature of science curriculum. Among the four sub-scales, lesson design and implementation sub-scales was slightly higher in mean values than the others because teachers believed that students learn best through experiment, exploration, inquiry and group discussion. They also believed that formative assessment is the best way to know how students understand about the material covered in the class.

Mean scores of teachers’ belief about how students learn science is the lowest among four scales. This is because some teachers believed in constructivist way of teaching and learning but some teachers still had believed the lecturing method as effective ways of teaching and learning and they believed that student achievement in science is a reflection of their natural ability. Some teachers demonstrated the traditional belief in which students know very little about science before they learn science at school.

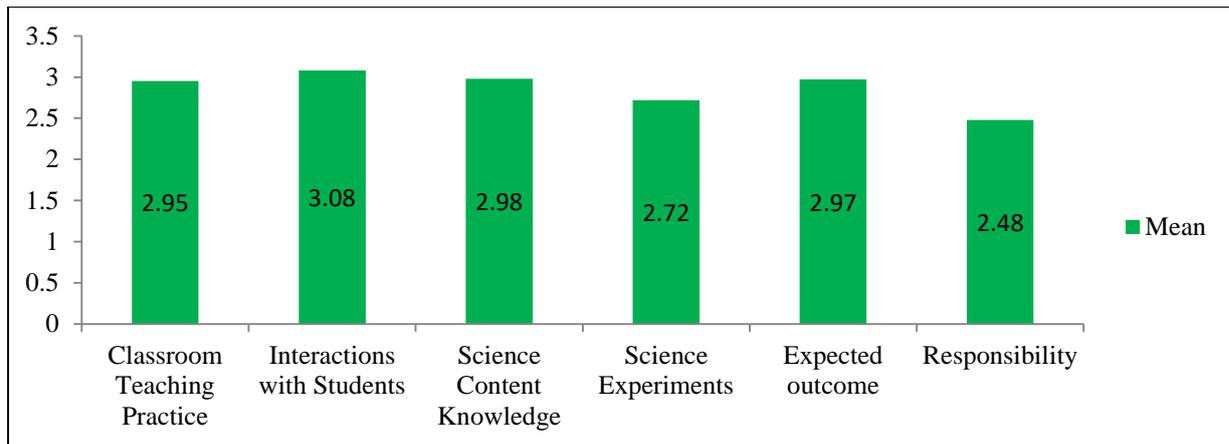
To conduct the mediation analysis, primary teachers in the selected schools were asked to give the answers related to their science teaching efficacy belief. The Science Teaching Efficacy Belief Instrument (STEBI) was used to investigate the level of teachers' science teaching efficacy belief. In this study, the concept of teachers' efficacy was composed of two concepts such as personal teaching efficacy belief and outcome expectancy belief.

**Table 2 Mean Values and Standard Deviation Showing the Level of Teachers' Science Teaching Efficacy Belief**

Science Teaching Efficacy Belief		Mean	Level of Efficacy
Personal Teaching Efficacy Belief	Classroom Teaching Practice	2.95 (.60)	Moderately High
	Interactions with Students	3.08 (.47)	Moderately High
	Science Content Knowledge	2.98 (.45)	Moderately High
	Science Experiments	2.72 (.66)	Moderately High
Outcome Expectancy Belief	Expected outcome	2.97 (.51)	Moderately High
	Responsibility	2.48 (.65)	Moderately Low
	Total	2.86 (.55)	Moderately High

**Scoring Direction:** 1.00 – 1.49 = low  
 2.50 – 3.49 = moderately high  
 1.50 – 2.49 = moderately low  
 3.50 – 4.00 = high

In classroom teaching practices items, teachers presented their capability to teach students by using various methods in their teaching. The teachers in this study demonstrated that they continued to find better ways to teach science and they had high efficacy in using various teaching methods to explain students who were confused in the lesson till they have understood ( $M=2.95$ ). When interactions-with -student items were investigated, it was found that teachers had moderately high efficacy in their ability to interact with students ( $M=3.08$ ). They presented that they always welcome students' questions, stimulate discussion and prompt questions and they act as facilitators, motivator and resource persons. According the mean scores of science content knowledge items, teachers had the confidence in their content knowledge and had knowledge in scaffolding steps ( $M=2.98$ ). According to table 2, teachers had the moderately high efficacy in monitoring science experiments ( $M=2.72$ ). Teachers had moderately high level of outcome expectancies ( $M=2.97$ ) because they presented that teachers' effort, extra attention and effective teaching approaches could improve the students' achievement, overcome the inadequacy of students' science background. Teachers presented moderately low level of efficacy in responsibility ( $M=2.48$ ). They believed that the low science achievement of students were not probably due to the performance of the teachers and they had only little desire to take responsibility for the achievement of students in science.



**Figure 3** Mean Values of Teachers' Science Teaching Efficacy Belief

A majority of teachers had moderately high level of efficacy ( $M=2.86$ ) because they strongly believed that they had the capability to implement the new science curriculum. However, they demonstrated moderately low level of efficacy in taking responsibility of the outcomes.

**Types of Teaching Practices**

Primary teachers from selected schools were asked to give the answers related to their teaching practices. The conceptual development of the inventory drew on the philosophy of constructivism and direct transmission. Teaching practices questionnaire was composed of three domains: structuring practices, student-oriented practices and enhanced activities.

**Table 3** Mean Values Showing of Teaching Practices

Teaching Practices	Mean	Types of Teaching Practices
Structuring	3.04	Learner-centered
Student-oriented	3.15	Learner-centered
Enhanced Activities	3.12	Learner-centered
Total	3.11	Learner-centered

**Scoring Direction:** Didactic Practices < 2.5 < Learner-centered Practices

A vast majority of the teachers use teaching practices in line with the reforms such as open-ended questions, class discussion, group work, inquiry-based learning, applied activities, teacher demonstration, games, hand on activities and opportunities for students to express their own ideas and opinions. There were also some teachers who still used lecture, memorization and recitation, drill and choral response and assigning homework which are considered to be consistent with traditional examination oriented education. Teacher self-reports of classroom practice differed markedly from observation reports of teachers' classroom practice. However, it was found that teachers were familiar with the types of teaching methods that are currently advocated by the New Curriculum reforms.

**Mediation Analysis**

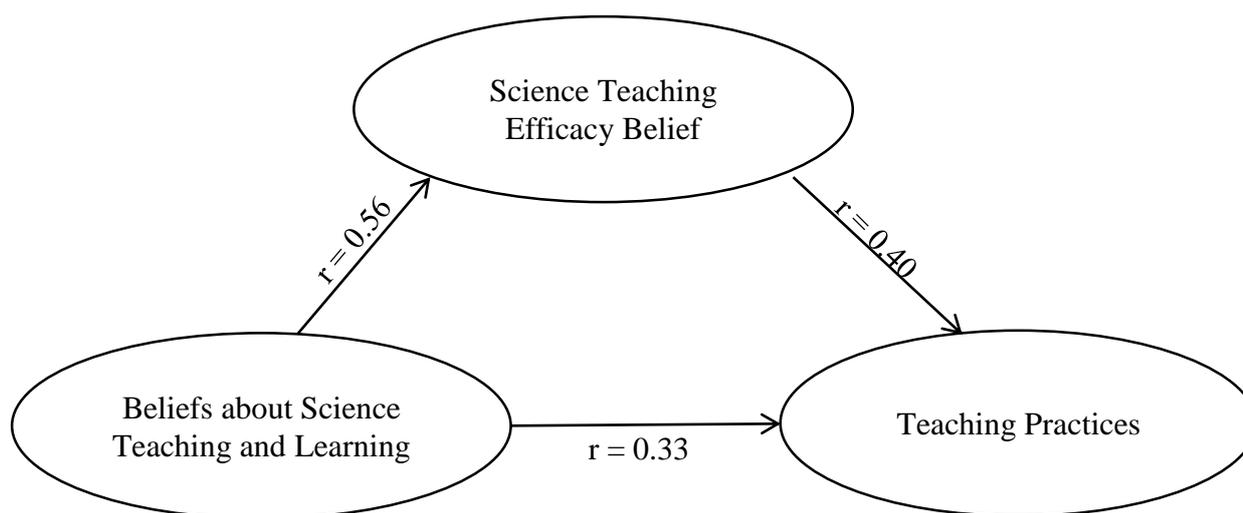
The mediation model utilizes three variables with two causal paths leading into the outcome variable. This study was partially designed to examine whether teachers' science teaching efficacy belief mediates the relationship between teachers' beliefs about reformed science teaching and learning and teaching practices. Teachers' belief about science teaching and learning represents the predictor variable. The teaching practices are dependent variable. Teachers' Science Teaching Efficacy Belief represents the mediator through which teachers' belief about reformed science

teaching and learning affect their teaching practices. Bivariate analysis were conducted to assess correlations among the three target variables.

**Table 4 Correlations Among Belief about Science Teaching and Learning, Science Teaching Efficacy Beliefs and Teaching Practices**

Variables	Belief about Science Teaching and Learning	Science Teaching Efficacy Belief	Teaching Practices
Belief about Science Teaching and Learning	1		
Science Teaching Efficacy Belief	.559**	1	
Teaching Practices	.332**	.402**	1

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



**Figure 4** Mediation Analysis Among Belief about Science Teaching and Learning, Science Teaching Efficacy Beliefs and Teaching Practice

In accordance with the above table and figure, predictor and mediator were related to the dependent variable. Thus it can be said that the core conditions for testing the mediation had been met. Teachers' science teaching efficacy beliefs and Teachers' beliefs about science teaching and learning were moderately correlated with the correlation coefficient  $r = 0.56$ . Teachers' science teaching efficacy beliefs and Teachers' teaching practices were also moderately correlated with the correlation coefficient  $r = 0.40$  while the Teachers' beliefs about science teaching and learning and teaching practices are poorly correlated ( $r = 0.33$ ). The correlation coefficient of teachers' science teaching efficacy beliefs with teachers' beliefs about reformed science teaching and learning and teaching practices was significantly higher than the direct correlation coefficient of beliefs about reformed science teaching and learning and teaching practices. Thus teachers' science teaching efficacy belief could partially mediate the relationship between teachers' beliefs about reformed science teaching and learning and teaching practices.

### Conclusion and Discussion

Based on the related literature and findings of this research study, it would be concluded as follows.

In the study of the types of teachers' belief about science teaching and learning, it was found that majority of the teachers demonstrated the constructivist belief for implementing the new science curriculum.

The overall mean score of the teachers' beliefs about science teaching and learning was 2.95. The mean scores of teachers in this study appeared to be hovering around the middle of a traditional-reformed belief continuum. Their scores were not remarkably polarizing towards the traditional or the reformed perspective of teaching and learning science. Although the teachers in this study demonstrated the shift of their beliefs to constructivism, they did not completely believe in constructivism and they still sometimes demonstrated the traditional way of science teaching and learning. However, they are familiar with the constructivist ways of science teaching and learning which is becoming their idealist belief and they need more training and experience relating to new curriculum to make their idealist belief into the transition beliefs for their daily practices.

Ford (1992) stated three factors that lead to dissimilarity between beliefs and practices are efficacy beliefs, contextual beliefs and goals. Thus, teachers' science teaching efficacy beliefs was also investigate in this study to determine whether the efficacy belief mediates the relationship between teachers' belief and teaching practices. In this study, the concept of teachers' efficacy was composed of two concepts such as self-efficacy and outcome expectancies. It was found that teachers had moderately high level of personal teaching efficacy belief. They presented their capacity to teach students in constructivist way of teaching and learning, their ability to interact positively with students and their roles as facilitators, motivators and resources persons. It can be concluded that teachers believed in their own capability to implement the new curriculum.

In the investigation of teaching practices, teaching practices were classified into teacher-centered teaching practices corresponding to traditional belief, and student-oriented teaching practices corresponding to constructivist belief. It was found that a vast majority of the teachers use teaching practices in line with the reforms. There were also some teachers who still used traditional ways of teaching and learning. Teacher self-reports of classroom practice differed markedly from observation reports of teachers' classroom practice. It can be concluded that although teachers were familiar with the types of methods that are currently advocated by the New Curriculum reforms, their daily practices were not consistent with the new curriculum trend. The inconsistency between belief and practices may be due to the contextual factors such as class size, inadequacy of resources and teachers.

In the mediation analysis, it was found that the teachers' beliefs about science teaching and learning and teaching practices are poorly correlated ( $r = 0.33$ ). Teachers' science teaching efficacy beliefs and Teachers' beliefs about science teaching and learning were moderately correlated with the correlation coefficient  $r = 0.56$  and teachers' science teaching efficacy beliefs and teachers' teaching practices were also moderately correlated with the correlation coefficient  $r = 0.40$ . The correlation coefficient of teachers' science teaching efficacy beliefs with teachers' beliefs about reformed science teaching and learning and teaching practices was significantly higher than the direct correlation coefficient of beliefs about reformed science teaching and learning and teaching practices. Thus teachers' science teaching efficacy belief could partially mediates the relationship between teachers' beliefs about reformed science teaching and learning and teaching practices.

To sum up, the main factors that lead to the inconsistency between teachers' belief about science teaching and learning and their teaching practices are contextual factors such class size, inadequacy of teachers and resources. Teachers' efficacy belief plays a key role to overcome such contextual factors because the teachers in this study create additional resources on their own and they are trying to implement the new curriculum effectively.

## Needs for Further Research

This study concerned with finding out the lower primary science teachers' beliefs about science teaching and learning and their teaching practices to implement the new curriculum. It also aimed to investigate whether the teachers' efficacy belief mediates the relationship between their beliefs and teaching practices. The collected data were based on the teachers' perception of their own belief, teaching efficacy and teaching practices. But it is still needed to investigate students' and principals' perceptions of their teachers' teaching practices. This research work was conducted only in the Dala Township. Researchers who are interested in the areas of teachers' belief and practices can be conducted in other townships. Further research should be conducted by mixed method and observation is strongly recommended. Further researchers are recommended to investigate the transformation of teachers' beliefs throughout the curriculum transform.

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## References

- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Stanford University, Psychology Review*, Vol.84, No.2, Printed in USA.
- Larrivee, B. (2000). *Transforming Teaching Practice: Becoming the Critically Reflective Teacher*. Published by SAGE, California.
- Fishbein, H. & Ajzen, I. (1975). *Belief, Attitudes, Intention and Behavior*. Published by Addison -Wesley, New York.
- Ford, M. E. (1992). *Motivating Humans: Goals, Emotions, and Personal Agency Beliefs*. Published by SAGE, California.
- Mansour, N. (2008). *Science Teachers' Beliefs and Practices: Issues, Implications and Research Agenda*. *International Journal of Environment & Science Education*. Vol.4. UK. Retrieved on 5<sup>th</sup> August, 2018 from <http://eric.ed.gov/?id=EJ884384.pdf>
- National Education Strategic Plan (2016). Ministry of Education. The Government of the Republic of the Union of Myanmar.
- OECD (2009). *Teaching and Learning International Survey (TALIS): Teaching Practices, Teachers' Beliefs and Attitudes for Creating Effective Teaching and Learning Environments*. Published by OECD, Paris.
- Pajares, M. F. (1992). *Teachers' Beliefs and Education Research: Review of Education Research*. Published by SAGE, California.
- Philip, M. K. (2003). *Primary and Secondary Teacher Shaping the Science Curriculum: The Influence of Teacher*. Published by Queensland University of Technology.
- Shulman, L. S. (1987). *Knowledge and teaching: Foundations of the new reform*. *Harvard Educational Review*, Vol.57, No.2, 1987, pp. 21-34.
- Sargent, T.C (2011). *New Curriculum Reform Implementation and The Transformation of Educational Beliefs, Practices and Structures*. *Chinese Education & Society Journal* Volume 44. Retrieved on 17<sup>th</sup> July, 2018 from <http://www.tandfonline.com/doi/abs/10.2753/CED1061-1932440604>
- Van Driel, J. H., Beijard, D., & Verloop, N. (2001). *Professional Development and Reforming Science Education: The Role of Teachers' Practical Knowledge*. *Journal of Research Science Teaching*.
- Woolfolk, A.H., & Wayne, K.H. (2006). *Instructional Leadership*. Published by Pearson Education Company, Boston