BELIEFS REGARDING TEACHING AND LEARNING: A CASE OF PRIMARY SCIENCE TEACHERS OF BANGLADESH

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Abstract

The present study aims to explore the primary science teachers' beliefs regarding teaching and learning in Bangladesh. Common aspects of teaching and learning- curriculum, teacher and student roles, teaching strategies/pedagogy, and classroom organization- were taken into account to reveal teachers belief on teaching and learning process. The respondents were purposively selected five science teachers. Data was gathered through interview by using a semi-structured interview protocol. An interpretive research methodology was adopted to extract meaning from the data. Responses regarding teachers beliefs about teaching and learning were analyzed into coded categories as either 'traditional/direct' or 'modern/contemporary' belief dimensions. Based on the responses of the teachers, it was found that teachers of the study hold traditional and inconsistent pattern of belief in various teaching and learning aspects. Teachers possessed direct (traditional) transmission belief regarding student role, classroom organization, and curriculum aspects of teaching and learning. On the other hand, the respondents had modern beliefs on teacher role and teaching style aspects. The study also revealed that teachers' belief did not vary in case of gender but divergence was found in teachers of greater job experiences and having much in-service trainings. As teachers' beliefs have strong influence on actual practice therefore, this study suggests that a further study is

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needed to explore the links between teachers' beliefs and practices in an ideal classroom setting to understand whether their beliefs are really reflected in actual practices or not.

Keywords: *Modern; Traditional; Teachers belief; Science teaching and learning; Primary school teachers; Bangladesh*

Introduction

The central determining factor in successful implementation of reform in science education is the science teachers (Tobin et al., 1994). Therefore the role of science teachers is increasingly attention (Osborne, et al., 2003; National Research Council, 1996; AAAS, 1989; Bybee, 1993) because students' enjoyment of science subjects is highly affected by teacher behavior (Darby, 2005). Previous research (for example, Anamuah-Mensha, and Asabere-Ameyaw & Mereku, 2004) reported that the low achievements are attributed to poor quality of teaching. It has been demonstrated that quality of instruction is fundamental to student learning (OECD, 2009). In contrast, a substantial body of research suggests these teachers' beliefs and values about teaching and learning affect their teaching practices (Clark & Peterson, 1986; Nespor, 1987; Wolley et al., 2004; Markic & Eilks, 2010; Prawat, 1992; Haney et al., 2003; Brousseau, et al., 1998; Jones & Carter, 2007; Pedersen &Liu, 2003; Fulton, 1999; Tsai, 2004; Levitt, 2002; OECD, 2009; Stipek, et al., 2001; Pajares, 1992; Tobin et al.,1994). People' 'beliefs' are important influences on the ways they conceptualize tasks and learn from experience (Clark & Peterson, 1986). Bandura (1986) stated that beliefs represent the best indicator of why one person behaves acts, and makes decisions in a certain way. Kobella et al. (2000) concluded that beliefs influence all kind of interactions between teachers and pupils and also suggested that teachers' beliefs about teaching and learning always include aspects of beliefs exclusive to their chosen discipline or subject. Maor and Taylor (1995) concluded that, even in computerized classroom environments, teachers' epistemologies continue to perform an essential role in mediating the quality of student science learning. In their view, teachers'' epistemologies are mainly concerned with pedagogical beliefs about teaching and learning (cited *in* Tsai, 2002). Nespor (1987) stated various belief systems and their role in teaching and learning especially non-consensuality, existence beliefs, and beliefs in alternative worlds make belief systems very important determinants of how individuals organize the world into task environment and define tasks and problems (Nespor,

1987, p. 322). Pajares (1992) illustrate the notion that beliefs play a critical role in defining behavior and in organizing knowledge and information.

In educational research, beliefs about teaching and learning are categorized into two dimensions- Traditional and Modern (OECD, 2009; Wolley et al., 2004). These two belief dimensions are variously termed as direct vs. indirect; conventional vs. contemporary; teacher-centered vs. student-centered; constructivist vs. non-constructivist approach of teaching-learning process. Recent reforms of science education are based on modern theories of learning (Fosnot, 1996, Nation Research Council, 1996). Discussion of modern teaching i.e. inquiry approach of teaching dominate many professional conferences and scholarly and practitioner journals (Wolley et al., 2004). A reflection of modern approaches are shown in state and local policies and in the K-12 standards set by many professional organizations, including the National Council for Teachers of Mathematics, the National Science Teachers Association, and the National Council of Teachers of English with the International Reading Association (Fosnot, 1996).

In line with this global trend, inquiry approach of teaching and learning are portrayed in primary teacher education curriculum(*C-IN-ED*) of Bangladesh. It states that:

> Inquiry approach of teaching were accentuated that student will able to acquire scientific skills of classifying and comparing things and events of environment around through observation of characteristics and reach quick conclusion (NAPE, 2001).

A paradigm shift of teachers and students responsibility has been noticed in the education policy document where teachers are shown as a guide to student independent learning. One of the strategies in education policy regarding primary science education states that:

> "Teachers will always encourage the learners' curiosity and their quality to think independently. Teacher will also help theme use facts and information from practical life rather than asking them to memorize a lot of information" (MoE , 2010).

Since teacher education curriculum which firmly stands in the modern view of science teaching and learning, it is timely to investigate Bangladeshi teachers' beliefs of science teaching and learning to see if these beliefs coincide with the intentions of the curriculum. The purpose of this study is to explore the beliefs of Bangladeshi primary science teachers about teaching and learning aspects. The specific question that guided this research was: What kind of beliefs do the primary science teachers possess about teaching and learning aspects?

Although a lot of research regarding teachers' beliefs has been carried out in western countries, research regarding beliefs is still scarce in South-Asian countries. This study, therefore, is an initial effort regarding teachers' beliefs on teaching and learning especially in Bangladesh. The result of this study is expected to provide information especially teacher educators, teachers and curriculum developers and other stakeholders about the beliefs on teaching and learning at primary levels science teachers in Bangladesh.

Theoretical perspectives of teacher's beliefs about teaching and learning

Prawat (1992) discusses four questionable set of beliefs about teaching and learning which are core of the educational enterprise because they influence many aspects of teachers behavior as follows:

Learner and content as relatively fixed entities: The fact that teachers view content and students in static, noninteractive terms explains why so much time and attention is devoted to delivery of content instead of more substantive issues relating to content selection and meaning making on the part of students. In the context of a fixed set of curricular demands, variation in the style and pace of instruction may be perceived as only way to accommodate what are regarded as equally hard and fast individual differences.

Naïve constructivism: This set of beliefs is just as problematic form a constructivist perspective: This is the tendency to equate activity with learning- a notion that Dewey attempted to counter. He argued that student engagement is not the best measure of educational value.

Constructivism: This set of beliefs perpetuates a distinction that would like to do away with: that between comprehension and application, learning and problem solving. It may be the most intractable of the four under consideration. The comprehension-application distinction is intuitively appealing and supported by research on transfer; it has also been legitimated in various taxonomies of educational outcomes.

Fixed curriculum: The popular view of curriculum as fixed agenda, a daily course to be run that consists of preset means(i.e., a certain material to cover) and predetermined ends(i.e., a discrete set of skill or competencies). Many constructivist, favor a more interactive and dynamic approach to curriculum, believing that it should be viewed more as a matrix of ideas to be

explored over a period time than as road map. One would enter this matrix at various points depending on where students are in their current understanding.

However, by considering the teaching-learning aspects-curriculum, teachers and students roles, teaching strategies, and classroom organization- most educator differentiate teaching beliefs into traditional and modern dimensions (Fulton, 1999; OECD, 2009; Wolley et al., 2004; Levitt, 2002).

The teacher-centered classroom (the traditional dimension teaching) is a central elements of transmission based on behaviorist approach to teaching and learning. Psychologists working within this paradigm are interested in the effect of reinforcement, practice, and external motivation on a network of associations and learned behaviors (Fosnot, 1996). Educator using such a behaviorist frame work preplan a curriculum by breaking a content area(usually seen as a finite body of predetermined knowledge) into assumed component parts-"skill"- and then sequencing these parts into a hierarchy ranging from simple to more complex. It is assumed (1) that observations, listening to explanations from teachers who communicate clearly, or engaging in experiences, activities, or practice sessions with feedback will result in learning and (2) that proficient skills will quantify to produce the whole or more encompassing concept (Bloom, 1956; Gagne, 1965, cited in Fosnot, 1996, p. 9). Further, learners are viewed as passive and they are simply tested to see where he or she falls on the curriculum continuum and then expected to progress in a continuous, quantitative fashion as long as clear communication and appropriate reinforcement are provided (Fosnot, 1996, p. 9).

Modern theory of learning, in contrast, has a dozen bands (Geelan, 1997a, cited in Dawkins, 2004), each of which emphasizes a different aspect of learning, most agree that it involves a dramatic change in the focus of teaching, putting the students' own efforts to understand at the centre of the educational enterprise (Prawat, 1992). There are two principles in modern learning theory that would likely be found in every one:

- Students construct their own understandings
- The new understandings that student construct rest on the foundations of knowledge and understandings that they already exist (Dawkins, 2004, p.107)

The adoption of such an approach to teaching and learning would result in major changes in the teachers' role. Thus, in all modern teaching-learning scenarios, the traditional telling-listing

relationship between teacher and student is replaced by one that is more complex and interactive (Prawat, 1992).

Fosnot (1996), draw an image of such a more complex and interactive teaching- learning scenarios. According to her, perhaps first and foremost, the phenomenon students are asked to think about needs to be interesting, worthy of engaging their time and attention. In addition, it should offer a variety of avenues for exploration various routes of approach. Once these parameters are established, the teachers needs to listen carefully to students' interpretation of data, paying particular attention to any individual's conundrums, puzzlements, confusions. And the teachers equally needs to pay attention to differences of opinion within the class, giving equal respect to each one, for as long as any student still takes it seriously. By focusing on puzzlements and contradictions, the teachers establishes the notion that ideas are complicated and worthy of time and consideration and that each student is capable of formulating interesting ideas.

Table1; Aspects of Traditional vs. Modern teaching

Teaching aspects	Traditional belief	Modern belief
Teaching strategy	Teacher-centered, teacher lectures, clearly communicating predetermined knowledge;	Student-centered, student set their own goal, determine resources, and activities that will help them meet those goals, hands-on activities, practical work, investigation
Teacher role	Dispense accurate knowledge; set learning goal, and check student knowledge by searching predetermined response. This is teacher who will determine what to teach and how to teach as a dictator.	Facilitator, help student to develop their own inquiry, listen carefully to students' interpretation of data, paying particular attention to any individual's conundrums, puzzlements, confusions. Student ideas (correct or incorrect) are always respected.
Student role	Passive role, teacher directed, recipient of information, listening to explanation from teachers, taking notes, raising questions only occasion, learning until mastery.	Active role, creator of knowledge as an autonomous explorer. Self-directed learning
Curriculum	Popular view, planed and well sequenced structured curriculum, a finite body of predetermined knowledge; fixed and rigid in nature.	More interactive and dynamic curriculum like as matrix. Relaxed and flexible. Focusing on thinking and understanding by problem solving or inquiry.
Classroom organization	Whole class instruction, routine activities, more formal, calm and quite in nature.	Offer a variety of avenues for exploration various routes of approach. More casual, many things happening; small or peer group.

Further, the teacher acknowledges that "not knowing" is a state that is important to live with-the state that most of us are in most of the time (Fosnot, 1996, p. 71). Such a type educational enterprise, students are encouraged to express feeling related to their work (their frustrations as well as their interests), and to considered the entirety of the learning process within a playful learning environment. On the basis of theoretical framework a summary of modern and traditional teaching aspects are given in the table1.

Markic & Eilks (2010) described a broad and triangulated picture about the science student teachers' beliefs on teaching learning science from four different domain of science teaching. A mixed method approach was adopted to conduct this research. The results suggest that beginning chemistry and, even more pronouncedly physics student teachers profess quite traditional beliefs about teaching and learning science. Biology and primary science student teachers express beliefs towards teaching and learning in their subjects more in line with modern educational theory.

Tsai (2002) categorized student teachers' beliefs about teaching, learning and science as traditional, process oriented, or constructivistic. In his study, the majority of 37 Taiwanese science teachers held traditional beliefs. More importantly, over half of these student teaches has beliefs about teaching, learning and science that that were closely aligned. Tsai (2006) performed an evaluation of the relationship between the different beliefs. He concluded that "adequate coherence" existed between the subjects' scientific epistemological beliefs and their classroom teaching.

Levitt (2002) in his study tried to ascertain the beliefs of elementary teachers regarding the teaching and learning of science and the extent to which the teachers' beliefs were consistent with the philosophy underlying science education reform. Sixteen teachers from two school districts involved in a local systemic initiative for science education reform participated in the study. Data was collected through classroom observation and interview with the teachers. One overarching belief emerged: teachers believed that the teaching and learning of science should be student centered. The study also revealed gaps between teachers' beliefs and the principles of reform and suggested that the teachers are moving in a direction consistent with science education reform.

Aguirre, et al. (1990) showed that science student teachers often conceptualize teaching as 'a knowledge transfer' or an influence or change in understanding'. They view learning as 'an

intake of knowledge,' 'an attempt to make sense in terms of existing understanding' or 'an effective response'. Koballa et al. (2000) described German chemistry student teachers' beliefs as reproductive rather than constructive. Fischler (1999) evaluated German physics student teachers' beliefs in terms of thinking about their own physics classes at school. The usual response was a very dominant teacher, vary passive pupils, and bad images of physics.

In Germany, Niehaus and Vogt (2005) performed a study with Biology teachers and student teachers. The study showed that biology (student) teachers' beliefs are a mosaic of different categories and cover a wide range without showing any clear tendency towards more conventional or more traditional beliefs.

Research Method

An interpretative research (Strauss & Cobin, 1990) method was chosen to conduct this study. It focuses on the in-depth meanings that participants ascribed to the emphasized teaching and learning aspects. Apart from the author's PhD research this data was collected from February 12, 2012 to March 20, 2012.

Participants

In a desire to develop a deep profile of the participants' beliefs about teaching and learning, five primary science teachers from Dhaka (see table 2) were selected by using maximum variation sampling technique (Glaser & Strauss, 1967). It was reasoned that findings from even "a small sample of great diversity" yields " important shared patterns that cut across case and derive their significance from having emerged out of heterogeneity" (Patton, 1990, p.172 cited in Merriam,1998). Sometimes this technique involves "a deliberate hunt for negative" or disconfirming "instances or variations" of the phenomenon (Miles & Huberman, 1994, p. 29). Among the participants 2 was female. The teaching experiences of the participants ranging between 5 to 12 years, held Certificate in Education(C- in-Ed), have studied separate subjects of Physics (P) and Chemistry(C) along with either Mathematics (M) or Biology (B) at Graduation level, received Sub-Cluster training(SC), Subject Based training(SB), Multiple Ways of Teaching and Learning(MWTL), and short term overseas training (OT). With these participants, this study tried to draw an in-depth image of their views about teaching and learning in the context of Bangladesh.

Table 2. Demography of the participant teachers

Background factors	Participant Teacher(PT)

	PT1	PT2	PT3	PT4	PT5
sex	F	M	M	F	M
Teaching experience(Year)	5	8	>11	6	12
Subject studied at graduation*	PCM	PCB	PCB	PCM	PCM
In-service training	C-in-ED, SC	C-in-ED SC, SB, MWTL	C-in-ED, SC, SB, MWTL, OT	C-in-ED, SC, SB	C-in-ED, SC, SB, MWTL, OT

*PCB=Physics, Chemistry & Biology; PCM= Physics, Chemistry & Mathematics

Data Collection- interview

Data of the study was collected by interviewing the sample teachers. All interviews were conducted by researcher during the school day in the teachers' school during a free period. With due permission of the school heads, the subject was requested to sit for interview. The interview began with the researcher giving participants background information on the study and the purpose for the interview. Participants were encouraged to be open and candid in their responses, and assured that they would remain anonymous for reporting purposes. In the interview protocol the participants were asked about " best ways of teaching; teacher's responsibilities; ideal science teaching environment(classroom organization); best ways of learning science; student's responsibilities; and learning contents/curriculum(reason for teaching facts/or development of thinking)" in a desire to develop a deep profile of the participants' beliefs about teaching and learning. In particular, teachers were asked to respond to the following open-ended questions:

- In which approach or strategy do you think that science should be taught?
- Could you describe what an ideal science teaching environment would look like?
- What do you think teachers should do for effective learning?
- What are the best ways to learn science? Explain your ideas.
- What do you think about responsibilities of student when learning science?
- What should teacher focus on teaching "presenting facts (definition, theory, process, concepts, etc.) or students' individual development of thinking and reasoning"? Please explain your idea/s with reasoning.

Each interview lasted for about 25-30 minutes and audio-taped and transcribed for analysis.

Method of Analysis

A strategy described by Miles & Huberman (1994) was employed for coding and categorizing of data. After carefully examining teachers' interview transcripts a summary was developed. After that, the summaries were searched for pattern and /or categories. These categories were then checked against confirmatory or otherwise contradictory evidence in the data and modified accordingly. Thus, conducted several rounds of category generation, confirmation, and modification to satisfactorily reduce and organize the data. This process was repeated for all questionnaires. Koballa et al., (2000) and Tsai (2002) applied same process for analyzing interview transcript. Responses regarding teachers beliefs about teaching and learning were analyzed into coded categories as either 'traditional/direct' or 'modern/contemporary' belief dimensions. A response was considered as *modern belief*, if it was consistent with the modern thought of the teaching aspects as described in the introduction section in this paper (see table 1) and coded as "M". Using same process *Traditional belief* category was determined and coded as "T". For example, a participants responded that "*the best way of teaching is to give student clear information*", this response was categorized as *traditional belief* and coded as "T" regarding teaching strategies. On the other hand, a participant responded that "*the best way of teaching is to help student to make their own understanding*", this response was categorized as *modern belief* of teaching and coded as "M". An illustrative example regarding category and code was given in the table 3.

Table 3. Illustrative example of participant teacher's (PT1) responses to the open-ended questions by teaching aspects, category and code

Interview Items	Teaching aspects	Summary of the responses	Category: Traditional	Category: Modern	Code
1	Best way of teaching	Presenting scientific facts from credible sources	×		T
2	Ideal setting for teaching	Noise less atmospheres for instruction	×		T
3	Teachers' role	Communication predetermine	×		T

		knowledge		
4	Best way of learning	Hard working on practicing class work	×	T
5	Students' role	Listening teacher talks carefully	×	T
6	Reason for teaching facts/or developing thinking	Teaching facts is for passing the exam	×	T

After that, percentage distribution of "modern belief" category under each one of the teaching aspect were calculated (table 4). For the discussion, some direct quotations were taken from the interviews.

Results of the study

Table 4 shows the results of teachers' beliefs about teaching and learning. Analysis of the results organized by the aspects of teaching and learning with direct quotations selected from interview responses of the participants regarding each aspect.

Table 4. Summary of the findings

Background factor					Teaching aspects					
Participant teacher	Sex	Teaching experience (Year)	Main subject studied at graduation	In-service training	Best way of teaching	Ideal setting for teaching	Teachers' role	Best way of learning	Student s' role	Reason for focusing (facts/ thinking)
PT1	F	5	PCM	**C-in Ed, SC**	**T**	**T**	**T**	**T**	**T**	**T**
PT2	M	8	PCB	**C-in Ed, SC, SB, MWTL**	**M**	**M**	**M**	**M**	**M**	**T**
PT3	F	>11	PCB	**C-in Ed, SC, SB, MWTL, OT**	**M**	**T**	**M**	**M**	**T**	**M**
PT4	M	6	PCM	**C-in Ed, SC, SB**	**T**	**T**	**T**	**T**	**T**	**T**
PT5	M	12	PCM	**C-in Ed, SC, SB, MWTL, OT**	**M**	**M**	**M**	**M**	**T**	**T**
					60%(3)	**40%(2)**	**60%(3)**	**60%(3)**	**80%(4)**	**20%(1)**

Teaching style/ Pedagogies

Participant teachers acknowledged learners as the heart of their instruction generally called student-centered learning (Table 4). Three participants' teachers out of five expressed their ideas of teaching by using the terms "encouraging", "helping students to discuss", "to express their feeling". The following statements quoted directly from the interview:

- *helping student to discuss about the content is the best way of teaching…* (PT2)
- *student will learn by themselves, I encouraging them to discuss with each other for developing a good idea…* (PT3)
- *learners have their own ideas. allowing them to express their feelings is my way of best teaching...* (PT5)

On the other hand, two participant teacher beliefs line up with direct transmission belief of teaching. They could not recognize students as the central part of teaching. According to them,

best way of teaching is giving student clear information from credible sources. They claimed that:

- *students will make mistake if they are not giving clear and accurate information so best way of teaching is to give student clear information… (*PT1)
- *by using suitable sources (e.g. books & references), teacher should inculcate true knowledge…* (PT4)

Teachers' role

Three participant teachers out of five accredited in teachers' facilitating role (Table 4). In stating their views regarding teachers role, the participants applied the terms "allow student to interact with peers", "paying attention to students' prior knowledge"; "let student discuss to come up with a solution". The teacher in this group considered in student's understanding but not in mastery learning. The following statements quoted directly from the interview:

- *I believe that through interaction student build up their ideas so if teachers allow student to interact they will gain authentic experiences…* (PT2)
- *Students solve their own problems if teachers allow them to discuss…teacher will provide information if they require…* (PT3)
- *teachers role is to check student prior knowledge to make an authentic context of teaching environment …* (PT5)

Quite the reverse, two participant teachers' beliefs regarding teachers' role parallel to those of traditional dimension where teachers' role is to dispense accurate knowledge; correct way to solve problem; set learning goal, and check student knowledge by searching predetermined response (Fosnot, 1996). They stated that:

- *if teachers make mistakes certainly it will do harm to students, so teachers main responsibility is to transfer true and authentic knowledge…* (PT1)
- *science is full of problems so I believe teachers should demonstrate accurate way to solve problems…* (PT4)

Teachers in this category believed in students' mastery learning (Table 4). According to them, best ways of learning are finding the right answer; drilling until mastery.

Students' role

Four of the participant teachers did not give credibility to students as active participants of teaching and learning rather thought as passive recipient of the information (Table 4). They

believed that student responsibilities are to cope what teachers do; passive listening and listening teachers talk carefully. They said that:

- *Student should listen carefully what teacher talk and should cope what teachers do…* (PT1 & PT4)
- *the information (knowledge) given by the teacher is very important for the student to pass the exam so student should take the notes while teacher talk and listen him very carefully…*(PT3 & PT5)

on the other hand, only one participant teacher out of five, recognized students as independent knowledge discoverer (table 4). He ascribed students as a creator of knowledge as an autonomous explorer. According to him:

- *actual learning occurs when student learn something by themselves through observation not following the teachers…* (PT2)

Ideal setting for teaching

Three of the participant teachers out of five, did not support the contemporary classroom scenario rather a quiet and calm classroom state was appealing to perform whole class instruction and routine activities (Table 4). They claimed that:

- *teachers' lecture is very important for student, so noise free environment is necessary for lecturing…*(PT1 & PT4)
- *since teacher has very limited time in giving lecture, so classroom should be well managed and disturb free because otherwise student cannot follow teacher's lecture…*(PT3)

In contrast, two of the participant teachers' belief regarding classroom setting analogous to modern belief (table 4) where teachers offer a variety of avenues for exploration various routes of approaches (Fosnot, 1996) and where unexpected classroom happening is anticipated by the teachers. They stated that:

- *Classroom is a place of variety of works between teacher and student no specific setting can give guaranty of real learning... there is no single way of teaching…*(PT2)
- *a risk-free atmospheres is very necessary especially in sciences so that student can share their wrong idea and join various activities without hesitating…*(PT5)

Curriculum/ learning content

Four participant teachers out of five, beliefs in popular view of the curriculum(table 4). Popular view (Prawat, 1992) of the curriculum thought as a daily course to be run that consists of preset

means (i.e., a certain material to cover), planned and well sequenced structured, a finite body of predetermined knowledge (i.e., a discrete set of skill or competencies); fixed and rigid in nature. The participants stated that:

- *students should learn scientific facts because otherwise they will not fail the exam,.. and will not promoted* …(PT1 & PT4)
- *if teacher do not complete the whole syllabus consisting of facts, student may not pass in the exam*… (PT2)
- *if teachers do not focus on teaching facts student will not pass and will not be promoted to next grade*…(PT5)

Startling, only one of the participant teacher's belief endorsed more interactive and dynamic curriculum (table 4). Dynamic view of curriculum is like as matrix of ideas to be explored over a period time than as road map (Prawat, 1992) which is relaxed and flexible in nature and focusing on thinking and understanding by problem solving or inquiry. He stated that:

- *if students were given factual knowledge during teaching they just memorize but if they are given opportunities to develop thinking they will generate new ideas which is very necessary*… (PT3)

A careful analysis of the table (4) revealed that teachers' beliefs varying in terms of teaching experiences and in-service trainings but remained constant in terms of sex and subjects studied at the graduation level. The participant teachers who had more teaching experience and in-service trainings confessed modern beliefs regarding various aspect of teaching. On the other hand, least teaching experience and few in-service training ascribed teachers' belief in traditional dimension. It is shown that the subject that teacher taught at the graduation level, found dispassionate regarding teachers beliefs.

Discussion & Conclusion

It was found that teachers of the study hold traditional and inconsistent pattern of belief in various teaching and learning aspects. Teachers possessed direct (traditional) transmission belief regarding students' role, classroom organization, and curriculum aspects of teaching and learning. On the other hand, the respondents had modern beliefs on teaching strategies and teachers' role aspects. The study also revealed that teachers' belief did not vary in case of gender but divergence was found in teachers of greater job experiences and having much in-service

training. The findings are parallel to the previous research conducted by Levitt, (2002); Tsai (2002); Koballa, et al. (2000); and OECD (2009).

The most promising result of the present study is that the participants are aware of the contemporary teaching strategies (table4). They believed that pupils are the heart of the instructions generally called learner–centered teaching and learning. Student-centered learning requires students to set their own goal, determine resources, and activities that will help them meet those goals (Jonassen, 2000). This result coincides with other research performed by Levitt (2002). He concluded that teachers believe that the teaching and learning of science should be student centered. It is assured that the primary schools' teachers of Bangladesh have gained this notion of modern teaching from the in-service training "especially MWTL training'. It is evident that teachers who received MWTL training along with short term OT, and SB professed modern beliefs about teaching and learning (table 4).

Concerning the teachers' role aspect of teaching and learning, the participants' belief aligned with modern notion about teacher's responsibilities (table 4). Belief in the role of teacher as facilitators, guide, provocateur, friends and so on (Tobin, et al., 1994). This result is similar with the result of Levitt (2002) and Tsai (2002). However, it was revealed that participants had traditional belief that the role of teachers is to dispense facts or to transmit a body of knowledge (table 4). It is vivid that teachers, who had least teaching experience, received a few or no training possessed traditional beliefs (table 4). It is found that teaching experience shows a significant effect on the vast majority of beliefs (Brousseau, et al., 1998, OECD, 2009).

An important finding of this research is that teachers were incoherent in expressing their beliefs to a particular aspect of teaching and learning to its associated aspects. For example, three of the participant teachers out of five, believed in teachers mediating role that is supposed to monitor student understanding and guide discussion so that all student have opportunities to express their understanding in language and engage in activities such as clarifying, elaborating, justifying and evaluating alternative points of view (Tobin, et al, 1994). However, participant teachers did not believe in students' autonomous behavior as independent knowledge discoverer rather thought as passive recipients of the information, listening to explanation from teachers and taking notes (Prawat, 1992; Fosnot, 1996). Four of the participant teachers were shown this type of beliefs (Table 4). It is evident that when teachers provide student with opportunities to feel supported, challenged, and autonomous in the classroom, student' motivation increase.

Conversely, when teachers predominate role in the classroom is to transmit knowledge as an authority students' intrinsic motivation decreases (Wetzel, 1998). It can be speculated that low think ability, low convictions as well as low interest of science of Bangladeshi primary science student attributed by passive recipients of information. When children are governed continually by the values, beliefs, and ideas of others, they practice a submission that can lead to mindless conformity in both moral and intellectual life. In other words, so long as adults keep children occupied with learning what adults want them to do and with obeying adult rules, they will not be motivated to question, analyze, or examine their own convictions (DeVries & Zan, 1996). Researchers and practitioners agree that meaningful learning occurs best when students are active participants, not passive recipients (Dawkins, 2004). However, good teachers can provide environments that support learners in the process of establishing these connections and making senses of what they experience (Dawkins, 2004).

The participants belief about classroom organization were corresponding with the beliefs those of traditional ones where a quite classroom state was appealing to perform whole class instruction and routine activities (table 4). The participant teachers (3 out of 5) of the study tried to avoid unexpected happening in the classroom through this mechanical teaching. It is said that teachers who are insecure in their knowledge of science can find the uncomplicated transmission of knowledge attractive (Osborne and Freyberg, 1985). Transmissive teaching avoids discussion (since learners lack knowledge worthy of consideration) and interactions which might reveal teachers' uncertain knowledge and so alter power relationships in their classroom (Malcolm Carr, et al., 1994). However, two of the participant teachers beliefs in more interactive classroom, they were expected various teaching strategies including peer and group discussion for meaning making learning.

Concerning the curriculum/learning contents the participant teachers of the study held popular view of curriculum (table 4) which is a daily course to be run consisted of preset means, planned and well sequenced structured (Prawat, 1992). This finding is similar to the findings of Tobin, et al. (1994). The teachers of the study (4) stated that the reason for teaching facts is to cut good scores to promote next grade or passing the exam. Although science teachers of Bangladesh have modern beliefs about curriculum aspect of teaching and learning but due to the constraint (i.e. social expectations) they could not translate it into real culture. When constraints act as myths for culture (i.e. time, scarce resources, control, social expectations), they may

suppress any changes considered, even when teachers are strongly committed to personal change (Tobin, et al., 1992).

Most promising and encouraging finding of the study was that background factor, for example, sex as well as studied subjects did not have influence on teachers' belief (Table 4). This finding is in contrast with the previous research. For example, OECD (2009) found that female teachers endorse direct transmission beliefs less strongly than the male teachers. Similarly, Niehaus and Vogt (2005) found that biology (student) teachers' beliefs are a mosaic of different categories and cover a wide range without showing any clear tendency towards more conventional or more traditional beliefs. However, other background factors (i.e. teaching experiences, and in-service trainings were found influential on teachers' beliefs.

This is not unexpected that Bangladeshi primary science teachers have variegated beliefs regarding teaching and learning aspects because like other countries' teachers (see Tobin et al, 2004), they do not have the opportunities to inquire their own epistemological beliefs. As stated by Taylor (1998) that epistemological self-inquiry involves reflecting critically on the myths that frame one's own pedagogy, particularly the framing assumptions which shape and are shaped by the daily routine enactment of classroom roles. In addition to that constraints are the major obstacles to change in teachers in line with modern beliefs of teaching and learning.

Researches have shown that teachers' belief has strong influence on teachers' practice therefore, this study suggests that a further study is needed to explore the links between teachers' beliefs and practices in an ideal classroom setting to understand whether their beliefs are really reflected in actual practices or not.

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