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Implementation of Grade 8 Science Curriculum in Bangladesh: Teachers' Class Performances

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Abstract

A mixed method research design was employed to assess the science teachers' class performance in contrast to the requirements of Science Curriculum 2012 at Grade 8. The population of this study was the Grade 8 Science teachers. Survey questionnaire, semi-structured interview schedule and observation checklist were used. Descriptive statistics and inferential statistics were employed for data analysis. Thematic categories for commonalities were used and coding was done. Teachers have serious limitations in understanding Grade 8 Science curriculum and in applying its instructions in the learning process. Lecture being the principal method used was in delivering lesson. Teaching practice indicated that teachers entered the classrooms without adequate preparation. Most of teachers readout the textbooks. Teachers' readiness and school's preparation should be made before the implementation of new education program. There should be policy guideline to develop professionalism among teachers. Training should be designed and conducted on the basis of teacher's needs.

Keywords: Curriculum; Grade 8; Teaching science; Implementation.

1. Introduction

Curriculum implementation process involves helping the learner to acquire knowledge and experience. Mkpa (2007), describes the concept of curriculum implementation as the actual engagement of learners with planned learning opportunities. Therefore, putting the curriculum into operation requires an implementing agent and teacher is the agent in the curriculum implementation. Implementation is the manner in which the teacher selects and mixes the various aspects of knowledge contained in a curriculum document or syllabus into practice. Labane (2009), defined curriculum implementation as the task of translating the curriculum document into the operating curriculum by the combined efforts of the students, teachers and others concerned. According to Fullan (2007), this requires a change in their beliefs, teaching approach and use of materials. Research indicates that teachers require a thorough understanding of the meaning of educational change before there is an acceptance and adoption of new program and approaches. Brain *et al.* (2006), agree that the success of any education policy depends on how the practitioners, namely the teachers, accept the mandated policy and adopt the desired practices. According to Sariono (2013), the most important factor in the implementation of curriculum is the readiness of the implementers of the curriculum. No matter how good the curriculum used, it depends on the readiness of teachers to implement them Febriya and Nuryono (2014). Afangideh (2009), describes the concept of curriculum implementation as the actual engagement of learners with planned learning opportunities. Ummah (2013), argued that the competence is a set of knowledge, skills, and behaviors that teachers should have, internalize, control and realize in carrying out their professional duties shown from their work. The role of teachers in the curriculum process is to help students develop an engaged relationship with the content. Active learning will increase the focus and retention of the curriculum, resulting in an exciting learning environment. A significant shift took place in the revised NCTB (2012) at Grade 8 in Bangladesh in the areas of contents, pedagogy and assessment (Hossain, 2015). Rahman and Begum (2012) showed that, in Bangladesh, teachers are facing problems in explaining the science content, in providing reallife examples in linking the principles of science with real life examples and, in providing current ideas regarding science content. The Ministry of Education in Bangladesh arranged two in-service trainings, one was Curriculum Dissemination Training (CDT) and other was Practical Science Teaching (PST) training, for enhancing teachers' competences to cope with the requirement of NCTB (2012).

1.1. Objectives of the Study

Keeping the teachers in the center, this study examined and documented the state of classroom competence of Grade 8 science teachers. The following specific issue was explored.

1. Grade 8 science teachers class performance in contrast to the requirements of Science Curriculum 2012

2. Method

This study employed a mixed method approach because of the nature of the research problem. A mixed-method approach provides rich and comprehensive data, because data from one source could enhance, elaborate or complement data from the other (or another) source (Creswell, 2005). Biesta (2012), explains that a qualitative-quantitative research design helps "to generate interpretive understanding that is giving an account of why people act as they act, where quantitative information can be added to deepen the interpretation and provide a more robust confirmation of the understandings acquired through the collection of qualitative data" (p. 149).

2.1. Population Sampling Techniques Sample Size and Instruments

The population of this study was the Grade 8 Science teachers. Secondary schools were identified in terms of their locations and financial types. In terms of location, schools were classified as rural schools and urban schools. In terms of financial status, schools were classified as Government (Govt.) schools. MPO schools (Govt. aided) and Self-Financed (SF) schools. Random sampling technique and stratified sampling techniques were used for selecting survey sample. A purposive sampling technique was employed in selecting teachers for interview and class observation. Total sample size was 392(320 survey teachers, 24 interview teachers and 48 class activities of Grade 8 science teachers). Survey questionnaire and semi-structure interview schedule and Observation checklist were used. Tools were piloted.

2.2. Data Analyses

Survey data was analyzed by using SPSS 21.0 versions. The quantitative analysis focused on providing descriptive statistics and establishing statistically significant relationships between the variables. Thematic categories for commonalities were used and coding was used. Triangulation techniques were used to combine all sorts of data using thematic approach.

3. Result

In view of identifying the techniques usually used in classroom by the survey teachers, 10 teaching-learning techniques were designed and offered to respondents. Among the 10 strategies, numbers 1, 4, and 6 were teachers centered and numbers 2, 3, 5, 7, 8, 9 and 10 were student centered. Each of these strategies was categorized into four possible options. These options were Always Used (AU), Sometimes Used (SU), Rarely Used (RU), and Never Used (NU). The scores for these four possible responses were 4 for AU, 3 for SU, 2 for RU and 1 for NU. Hence, scores above 2 indicates positive response in favour of the statements and scores below 2 express negative responses against the statements. Independent-samples t-test and ANOVA were used at the .05 level of significance.

Sl. No.	T/L Strategies	Teacher		Mean	Std. D	Sig. (2-tailed)	Remarks
1.	Continuous lecturing	Rural	188	2.54	.955	.004	S
		Urban	85	2.18	1.002		
2.	Use past experience' and link it with new lesson	Rural	189	3.74	.517	.845	NS
		Urban	88	3.73	.562		
3.	Use of real-life examples	Rural	188	3.65	.532	.525	NS
		Urban	88	3.69	.554		
4.	When students ask questions, I myself give the answer	Rural	190	3.42	.750	.021	S
		Urban	86	3.19	.847		
5.	Allow wait time to respond to a question or solve a problem	Rural	188	3.48	.607	.259	NS
		Urban	87	3.57	.640		
6.	I demonstrated the practical before the students	Rural	187	2.95	.788	.699	NS
		Urban	87	2.99	.934		
7.	Engage students in work	Rural	189	3.44	.630	.024	S
		Urban	87	3.62	.595		
8.	Engage students in making low cost and no cost learning aids	Rural	190	3.07	.810	.343	NS
		Urban	87	3.16	.608		
9.	Students' visit outside classroom to observe real life situation	Rural	187	2.61	.785	.556	NS
		Urban	88	2.67	.827		

10.	Students' engagement in affective domain activities	Rural	189	3.20	.785	.265	NS
		Urban	87	2.67	.827		

Table-1. T/L strategies used by rural and urban teachers

Table 1 shows the positive views of the research participants in favour of the statements. Both rural and urban teachers were the regular users of student centered teaching strategies (items 2, 3, 4, 5, 7, and 8). On the other hand, these teachers were sometimes users of teacher-centered teaching techniques (items 1 and 6). This table further discloses that student centered technique mentioned in item 9 were not regularly used by rural and urban teachers. The same table also finds that although rural teachers' were used regularly item 10 but urban teachers were used sometimes item 10. Statistical significant difference was found in items (2, 3, 5, 6, 8, 9 and 10) but not statistical significant difference was found in items 1, 4 and 7.

Table-2. T/L Strategies Used by Govt. MPO and SF Teacher

Sl. No.	T/L Strategies	Teachers		Teachers views			
				Mean	Std. D	Sig.	Remarks
1.	Continuous lecturing	Govt.	29	2.07	.961	.010	S
		MPO	219	2.42	.985		
		FS	25	2.88	.833		
2.	Use past experience and link it with new lesson	Govt.	30	3.77	.430	.940	NS
		MPO	222	3.73	.552		
		FS	25	3.72	.458		
3.	Use of real-life examples	Govt.	30	3.83	.379	.186	NS
		MPO	221	3.64	.559		
		FS	25	3.64	.490		
4.	When students ask questions, I myself give the answer	Govt.	29	3.17	.759	.135	NS
		MPO	222	3.34	.813		
		FS	25	3.60	.500		
5.	Allow `wait time' to respond to a question or to solve a problem	Govt.	30	3.60	.498	.119	NS
		MPO	220	3.53	.630		
		FS	25	3.28	.614		
6.	I demonstrated the practical before the students	Govt.	29	2.86	.953	.513	NS
		MPO	221	2.95	.841		
		FS	24	3.13	.612		
7.	Engage students in work	Govt.	30	3.60	.563	.142	NS
		MPO	221	3.51	.615		
		FS	25	3.28	.737		
8.	Engage students in making low cost and no cost learning aids	Govt.	30	3.17	.592	.432	NS
		MPO	222	3.11	.753		
		FS	25	2.92	.909		
9.	Students' visit outside classroom to observe real life situation	Govt.	30	2.70	.750	.570	NS
		MPO	220	2.64	.796		
		FS	25	2.48	.872		
10.	Students engagement in affective domain activities	Govt.	30	3.03	.809	.649	NS
		MPO	221	3.17	.785		
		FS	25	3.20	.913		

Table 2 shows the positive views of the research participants in favour of the statements These findings indicate that Govt., MPO and SF teachers were always users of most of the student centered teaching techniques mentioned in the items 2, 3, 4, 5, 7 and 10. On the other hand, these teachers were sometimes users of teachers centered teaching techniques mentioned in the items 1 and 9. This table further discloses that Govt., and MPO teachers were sometimes user of item 6 whereas SF teachers were always user of the same item. Govt., and MPO teachers were always users of item 8 whereas SF teachers were sometimes users of the same item. There was no statistically significant difference of opinion found among research respondents in all items except item 1.

Interviewed respondents acknowledged of using students-centered teaching learning strategies. Identifying students past experience, linked learning with situation to generate new knowledge, asking questions, group discussions were the major strategies usually used in class teaching. Although Science curriculum at Grade 8 emphasizes on applying investigation and project-based leaning approach in classroom teaching but all teachers frankly admitted of not using investigation, and project-based leaning and practical science teaching approach due to the limitation of understanding of these T/L methods. Teachers' statements revealed that teachers used very tradition teaching aids like chalk duster, textbook. Teachers did not use low cost and no cost teaching aids. All teachers recognized that they could not arrange field visit for students.

3.1. Observed Class Findings

In class observation, teacher-student activities and teachers' professional attributes were observed. Teachers' class performances were rated in three different levels as 'Satisfactory', 'Need Improvement' and 'Not done'. The classroom activities were classified by the ten indicators as intended in Grade 8 Science Curriculum 2012 and assessed in percentage.

Table-3. Teacher and Student Activities

Sl. No.	Indicators	Level of performance (%)	Observed Classes				
			Rural (33)	Urban (15)	Govt. (5)	MPO (39)	SF (4)
1.	Link students' prior knowledge to the content	Satisfactory	0	0	0	0	0
		Need Improvement	12.1	13.3	20.0	2.6	0
		Not Done	87.9	86.7	80.0	97.4	100.0
2.	Content explanation using real life examples	Satisfactory	0	0	0	0	0
		Need Improvement	9.1	20.0	20.0	5.1	0
		Not Done	90.9	80.0	80.0	94.9	100.0
3.	Students do practical work	Satisfactory	3.0	0	0	0	0
		Need Improvement	15.1	6.7	0	5.1	0
		Not Done	81.9	93.3	100.0	94.9	100.0
4.	Teacher demonstrate practical work	Satisfactory	0	0	0	0	0
		Need Improvement	12.1	26.7	20.0	17.9	0
		Not Done	87.9	73.3	80.0	82.1	100.0
5.	Provide task to lower order thinking	Satisfactory	0	0	0	0	0
		Need Improvement	69.7	73.3	60.0	74.3	75.0
		Not Done	30.3	26.7	40.0	25.7	25.0
6.	Provide task to higher order thinking	Satisfactory	0	0	0	0	0
		Need Improvement	0	0	0	0	0
		Not Done	100.0	100.0	100.0	100.0	100.0
7.	Provide task for affective learning outcome	Satisfactory	0	0	0	0	0
		Need Improvement	0	0	0	0	0
		Not Done	100.0	100.0	100.0	100.0	100.0
8.	Use of learning aids	Satisfactory	18.2	20.0	0	23.1	0
		Need Improvement	36.4	46.7	40.0	41.0	50.0
		Not Done	45.4	33.3	60.0	33.3	50.0
9.	Interactions	Satisfactory	15.2	20.0	20.0	17.9	0
		Need Improvement	21.1	26.7	40.0	20.5	25.0
		Not Done	63.7	53.3	40.0	61.6	75.0
10.	Continually assess students by using CA instruction	Satisfactory	0	0	0	0	0
		Need Improvement	0	0	0	0	0
		Not Done	100.0	100.0	100.0	100.0	100.0

Teachers-student's activities in relation to curriculum intentions were found very frustrating irrespective of schools' locations and schools' types. As seen in table 3, level of performance against the indicators reveal that teacher centric learning culture were prevailing at Grade 8 Science in contrast with the curriculum requirement. Most of the teachers did not identify student' prior knowledge and experiences and link it with new content although curriculum strongly emphasizes it. Only a few teachers (12.1% rural, 13.3% urban, 20.0% govt. and 2.6% MPO) took attempt to use students' prior knowledge at dissatisfactory level. Most of the teachers, 90.9% (30) of rural, 80.0% (12) of urban, 80.0% (4) of Govt., 94.9% (37) of MPO and 100.0% (4) of SF, were found explaining the content without linking it with real life situation. Teachers explained content exactly as it was in the textbook. Only a few teachers 9.1 % (3) rural, 20.0% (3) urban, 20.0 % (1) govt. and 5.1 % (2) MPO, used real life situation which were not consistent with the learning outcomes. No SF teachers were found in using real life examples. Practical either done by students or demonstrated by teachers both was in severe gloomy state. Only 3.0% (1) of rural schools engaged students in practical work by meeting the level of expectation. 15.1% (5) of the rural teachers, 6.7% (1) of the urban teachers and 5.1% (2) of the MPO teachers engaged students in practical which didn't satisfactory level. No Govt. and SF schools were observed doing practical activity. On the other hand, no teacher was found successfully demonstrating the practical activity. Around 80% observed teachers didn't demonstrated practical work and no SF teacher was also found demonstrating practical work.

Around 80% irrespective of locations and types, engaged students in theoretical activities but none was found doing in expected level. Around two third teachers engaged students in group work with lower order thinking activities. Teachers did not engage students in higher order thinking activities. Problems were taken directly from the textbook Students copied the answer from the textbook and used textbook language. A significant number of teachers, 30.3% (10) rural, 26.7% (4) urban, 40.0% (2) govt. and 25.7% (10) MPO and 25.0% (1) SF, didn't engage students in hands-on activities. Only 3.0 %(1) rural teacher used learning outcomes correctly mentioned in the curriculum and gave appropriate activities to students. A few teachers, 12.1 %(4) rural, 26.7% (4) urban, 20.0 %(1)

govt. and 17.9% (7) MPO, attempted to give activities to students were not relevant and consistent with learning outcomes. Activities around 80.0% were inconsistent with learning outcomes. Some teachers, rural 18.2 %(6) rural, 20.0% (3) urban, 23.1 %(9) MPO, used appropriate learning materials. Those teachers used locally collected materials such as flower, roots etc. No Govt. and SF teachers used appropriate learning materials. Around 40% observed teachers, irrespective of locations and types, didn't use appropriate learning materials. A large number of teachers, 45.4% (15) rural, 33.3% (5) urban, 60.0 % (3) govt. 33.3% MPO (13) and 50.0 % (2) SF, did not use any learning materials. Only a few teachers, around 10%, used writing boards. As seen in the table, only a few classrooms, 15.2% (5) rural, 20.0% (3) urban, 20.0% (1) govt. and 15.4% (6) MPO and 25.0% (1) SF, were rated as 'satisfactory' level of performance regarding the interactions between teacher-students and students-students. In these cases, teachers used more time than students. They invited questions from students and gave answer to students. A significant number of classrooms, 63.7% (21) rural, 53.3% (8) urban, 40.0% (3) Govt., 61.6% (24) MPO and 75.0% (3) SF, were found in the observation where teachers were dominating in the classroom.

3.2. Teachers' Professional Attributes

Table 3 shows the frequency distributions of teachers' professional attributes and attitudes of observed teachers. The observed attributes were dressing, supervision, capacity to make classroom interesting, group making, allowing students' interaction and displaying energy and enthusiasm. Three-point checklists were used. These were 'Meet expectation' 'Satisfactory' and 'Need Improvement' and assessed in percentage.

Table-4. Teachers professional attributes

Sl. No.	Indicators	Level of Performance%	Observed Classes				
			Rural (33)	Urban (15)	Govt. (5)	MPO (39)	SF (4)
1.	Supervising students in a supportive manner	Meet expectation	0	0	0	0	0
		Satisfactory	24.2	26.7	40.0	25.6	0
		Needs Improvement	75.8	73.3	60.0	74.4	100.0
2.	Competency to make a class interesting	Meet expectation	0	0	0	0	0
		Satisfactory	30.3	46.7	40.0	35.9	25.0
		Needs Improvement	60.6	40.0	20.0	56.4	75.0
3.	Making group with diverse ability	Meet expectation	0	0	0	0	0
		Satisfactory	0	0	0	0	0
		Needs Improvement	100.0	100.0	100.0	100.0	100.0
4.	Allowing students interaction	Meet expectation	9.1	6.7	20.0	10.2	0
		Satisfactory	21.2	26.6	20.0	23.1	25.0
		Needs Improvement	69.7	66.7	60.0	66.7	75.0
5.	Displaying energy & enthusiasm	Meet expectation	9.1	13.3	20.0	7.7	25.0
		Satisfactory	24.2	26.7	20.0	25.6	25.0
		Needs Improvement	66.7	60.0	60.0	66.7	50.0

Table 4 shows that only around 25% of the teachers (both rural (8), urban (4) and MPO (9)) had provided satisfactory level of support to students, and attitudes of all SF teachers' attitudes had required to improve. Table also shows that around 75% of the observed rural (25), urban (11), MPO (29) teachers' performances were found in dissatisfactory level. In making classroom interesting, rural teachers were far behind than urban teachers. It is also seen that govt. teachers are ahead to MPO and SF teachers in making classroom interesting. Only a few teachers (rural 7.7%, urban 13.3%, MPO 7.7%) found having ability in making classroom interesting. Only 30.3% of the rural teachers and 46.7% of the urban teachers were found in satisfactory level. Significant number of teachers (rural 60.6% urban 40.0 %, MPO 56.4% and 75.0%SF) showed poor performances in making classroom interesting. These teachers were seen delivering lectures most time by standing in the front of the classroom and the student were audience only. The common tradition, as found in classroom observation, in forming groups was that students sit face to face in two consecutive benches. Allowing students' interaction is a rarely found in during classroom observation. Although teachers didn't show themselves arrogant but their delivery ways and modes weren't in favor of interactive environment in class. A very few students raised question and interact with teachers and peers. Only 9.9% of the rural teachers and 13.3% of urban teachers were found very much energetic, lively and energetic throughout the lesson. I also found that 20.0% of the govt. teachers, 7.7% of the MPO teachers and 25% of the SF were extremely energetic, lively and enthusiastic. Around two third of the respondents under each category were found with poor performances in respect of energy and liveliness.

4. Discussion

Teachers' classroom performances in contrast with the intention of Science Curriculum 2012 at Grade 8 were found unsatisfactory. Although survey and interview findings indicated that a student-centered learning cultures were prevailing in all Grade 8 science classes but classroom observation revealed that traditional teacher centric teaching practice were dominated in science classes which was a big challenge in implementing Grade 8 Science Curriculum. Classroom observation has been to evaluate the quality of teaching provided and the consistency between the curriculum plan and the actual delivery of the material by teachers. The purpose of looking at

implementation is to see whether there is a mismatch between intention and strategies followed. Babu (2016) reported that, in reality, almost every teacher was unaware of the curriculum and did not have the TG. He further added that half of the teachers sampled reported not preparing for classes. He mentioned that they prepared class by reading science textbook. Babu (2016), further showed that the Science teachers need to study the subject matter given in curriculum and teacher's guide (TG) carefully prior to conducting lesson. Sarkar (2012), revealed that teachers found difficulties in conceptualizing many of the curriculum-identified values and consequently, found it difficulties to find, develop and implement suitable teaching approach to promote the values. Students' involvements in hands-on learning and in practical activities as prescribed in the curriculum were found almost absent from the classroom teaching. Teachers spent most of their time in classroom by using traditional monotonous lecture. Most of the teachers read out from textbook in delivering their lessons. Classroom teaching contributes nothing to develop creative thinking and critical thinking among students. Classroom teaching did not help to develop scientific attitudes and values among students. Class teaching did not reflect the Science Curriculum intentions. These situations were prevailing in almost all schools irrespective of their locations and financial types. Teachers' presentation skills and professional attributes were also found unsatisfactory. Effective science teaching practice in school is a must to ensure good science education Babu (2016). He argued that according to ideal teaching learning methods of science, students are expected to think rationally and solve problems in their daily life through science education. NCTB (2012) mentioned that science cannot be learnt solely by reading textbook; therefore, science teaching through 'learning by doing' is strongly emphasized NCTB (2012). Most of the teacher did not engage students in hands-on activities. Teachers engaged students in group work with lower order thinking activities very similar to Bangladesh Bureau of Educational Information and Statistics (2014) report which stated that Science teachers do not help student to practice group discussion, group or individual work, activity and experiments.

5. Conclusion and Recommendation

Teachers had serious limitations in understanding Grade 8 Science curriculum and in applying its instructions in the learning process. Lecture being the principal method used in delivering lesson. Teaching practice indicated that teachers entered into the classrooms without adequate preparation. Most of them directly readout the contents from the textbooks and were hardly comfortable in delivering the lessons. Teachers' readiness and school's preparation should be made before the implementation of new education program. Teachers should have regular in-service training opportunities. In-service training should be designed and conducted on the basis of teacher's needs. Inadequate and ineffective training can be a potential barrier to curriculum reform implementation. According to O'Sullivan (2002), in order to ensure successful and effective implementation, the professional support given to teachers need to be given careful consideration.

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