



Perception of SSTs for Developing Higher Order Thinking Skills (HOTS) of Students: Challenges and Issues

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Abstract

To develop the cognitive and problem-solving competencies of the learners, higher order thinking skill is the best ability. The aim of the present research was to examine the challenges and issues faced by academic staff in creating HOTS for students. The population was secondary school teachers who teach mathematics from Bahawalnagar and 161 (Female 76 and Male 85) participants were selected by simple random sampling technique. Based on five points, Likert scale self-administered questionnaire was used for data collection by applying survey method. Objectives of the study were evaluated by using SPSS. The results indicated a significant difference in gender about instructional skills and students' attitude. In addition, significant differences were shown regarding the professional experience of the respondents. The study is considered as springboard in creating HOTS of the students by assuming new approaches.

Keywords: HOTS, SSTs, Challenges and Issues

1. Introduction

In the present era, a massive development has been seen for upgradation of knowledge progression. For this concern, higher order thinking skills of students is a major tool. The teachers are facing numerous challenges to create logical and cognitive skills among students; curricula development and policy making are major issues (Fareed et al., 2018; Hanif et al., 2022). Among the best skills for solving problems, critical thinking is the best skill for the development of cognitive ability of the students. Teachers must adopt various approaches to create HOTS in students. To develop these skills, it is necessary to get specific information and knowledge to utilize these updated strategies (Malik et al., 2016; Parveen et al., 2021).

A positive relationship among teachers and students and democratic classroom environment provides opportunities for creation of HOTS. The positive actions of teachers towards students are an important factor for decreasing anxiety, developing curiosity and confidence (Ali et al., 2021). Teachers perform different activities during their class i.e., teaching, providing feedback, group activities and checking the homework. Due to the number of students, there are many problems managing all these activities within a short time. To enhance higher order thinking skills requires individual interaction towards the students to understand the rules and mathematics concepts (Ibrahim et al., 2019; Purnomo, 2017).

In Pakistan, learning process mostly based on the traditional methods. To understand mathematics with logic requires focus on the conceptual concepts. In the teaching process, the teacher is considered as an advisor of students to teach them how to think for themselves and solve problems. Higher order thinking skills enable students to know about the problems and provide the better solution with their competencies (Ali et al., 2021; Hanif et al., 2022).

2. Literature Review

Many students in class lead to ineffective classroom management strategies. The teachers face a heavy burden of work during the curricular activities. There is no extra time for the evaluation of teaching strategies. At secondary school level constant periods in different classes per day and in a week create difficulties in the teaching learning process. Due to these issues, teachers cannot make any enthusiastic effort for creating HOTS in students (Brown, 2013; McKenney, & Reeves, 2014). Therefore, to understand the logical and analytical concepts there is a need for appropriate equipment and useful material related to the subject activities. It seems there are many flaws in the curriculum. The curriculum does not meet the subject standards and innovative challenges. On the other hand, the syllabus of mathematics does not meet the potential of secondary school students. The students have difficulties understanding the basic concepts, so they depend on cramming rather than proper rules and concepts. It has been observed that the students who obtain more than 60 % marks in other subjects get no more than 45 % marks in mathematics. It has been suggested by previous research studies that Higher order thinking skills are required to learn mathematics (Confrey, 2012; Drijvers et al., 2010).

There is also a lack of professional knowledge to develop HOTS in students. The teachers of mathematics also behave like other subjects but the teaching in mathematics is completely different as compared to other subjects. On the other hand, the students are also fond of cramming rather than understanding the concepts. The students have a fear and feel insecure in this subject. To develop the level of confidence among students it can be useful, but it is possible if the teachers can manage all these issues effectively (Brown, 2015; Opfer, & Pedder, 2011). Many areas of the country are facing the problems with classrooms that are literally too small that they cannot entertain a reasonable number of students. A report at NEA 2008 says, 'today, it is revealed that the large number

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of classes create a chaos between the teaching and learning interaction. During maximum number of classes cannot uplift the academic grades of the students. Several strategies have been adopted for the progress of the students, but several financial crises hinder these projects. To manage all these issues there is a need to increase the financial asserts by the state (Thomas et al., 2013).

No more than 30 students in a class are the policy for an emerging source for the up gradation of the secondary education institutions. The class size matters to the managerial practices during the teaching process. The teachers and students' positive interaction is a fundamental tool for creating the HOTS among the mathematics students. In small number of classes, there is enough time to concentrate individually, give feedback, conduct group discussion, complete assignments, and clarify the logical concepts effectively (Mohammed, 2004). The classrooms are also congested and very small. Schools throughout the country are opened in small houses like mushrooms. Also, there are many government schools in Punjab and Pakistan as well, that have no proper classrooms or even no boundary wall. Therefore, the need of the hour is to work on the classroom size, and it should be increased in any way according to the standards (Hu et al., 2017).

To render education to every individual is a slogan of all countries throughout the world. Providing education is considered as a human development. It can be only possible through higher order thinking skills. Thinking skills separate the human from the non-rational. Education, perhaps the most basic need for people, is the process that provides the development of humans. Thinking skills based on the students' attitude towards the activities. If the students feel confidence, then they take interest in performing the academic activities. The teachers' motivation plays a vital role for this concern (McKenney & Reeves 2014). The positive attitude and behavior of the teacher is a key factor for the development of students' HOTS, especially in mathematics. Participation of the students in different logical and analytical activities enhances the thinking skills. Effective instructions and proper guidelines are also the best source for the development of learning abilities. It creates the potential of the students (Maher, 2008).

Sharing knowledge between teacher and students during creative activities and in group learning develops the real sense of creativity in mathematics. During this process, students share their ideas, feelings and knowledge and it is the best tool in creating HOTS. Lack of cooperation among students and teachers creates lack of interest and confidence among students (Van Driel, & Berry, 2012). Higher order thinking skills help students to manage their work effectively. It targets the emotions and feelings towards the activities during the learning process. Teachers adopt different approaches for the interaction with students so that students can be able to understand their responsibilities and handle them effectively. Creating HOTS helps the students to face difficulties and problem solving in future (Hayder, 2002).

Moreover, when students feel anxiety and disturbance for setting their strategies, how they can perform well in crucial situations then higher order thinking skill helps them for selecting the right decision at the right time for betterment. Survival of the achievements mostly depends upon the students' HOTS. Previous literature suggested that HOTS are an important factor for the development of analytical and logical abilities (Nitsch et al., 2013). The creative and instructional environment of the classroom based on assessment and project-based learning is also a great source to create HOTS and helps students to obtain maximum grades in mathematics subjects. The cooperation between the students and teachers articulates the best performance. Different kinds of activities enhance the confidence level of the students. Lack of interaction and cooperation creates the issue for creating the HOTS (Dogany & Bal, 2010).

3. Methodology

The study was administered quantitative and casual comparative research design. The target population was secondary teachers from Bahawalnagar for sample, 161 (Male= 85, Female= 76) mathematics teachers were selected as sample of this study through simple random sampling technique. Based on five points, Likert scale self-administered questionnaire was used for data collection by applying survey method. The factors contained, incompatible curriculum, instructional environment, instructional skills, students' attitude and examination system. For this study the Cronbach's Alpha Coefficient was applied to analyze the reliability of the questionnaire that was greater than 0.7 (Nunnally 1978). Moreover, content and face validity were administered with the help of experts. After collecting the data from the respondents. it was entered in sheets by using Statistical package for social science (SPSS). The descriptive statistics; Mean, Standard Deviation and inferential statistics; independent sample t-test was used to find the gender difference of teachers in creating higher order critical thinking skills while one way analysis of variance (ANOVA) was applied for determining the difference about professional experience and academic qualification of the respondents.

4. Findings

Objective 1: To find out the challenges faced by teachers in developing HOTS among students.

Table 1. Descriptive Analysis

Factors	M	SD
Incompatible curriculum	3.81	.95
Instructional environment	3.65	.93
Instructional skills	3.69	.96

Students' attitude	3.55	.96
Examination system	3.61	.92

To evaluate the level of secondary school teachers about the challenges related to the development of HOTS of students. Statistical findings show that the mean of the factors was from 3.61 to 3.81. It means the respondents agreed about all the factors.

Objective 2: To identify the significant gender difference between mathematics teachers in developing HOTS of students.

Table 2. Independent Sample t-test

Statements	Gender	M	SD	T	Sig.
Incompatible curriculum	Female	3.83	1.11	.58	.41
	Male	3.92	1.06		
Instructional environment	Female	4.01	1.02	-.47	.48
	Male	4.07	.91		
Instructional skills	Female	3.47	1.58	-1.80	.01*
	Male	3.91	1.13		
Students' attitude	Female	3.32	1.39	-1.39	.04*
	Male	3.77	1.09		
Examination system	Female	3.55	1.24	-1.17	.11
	Male	3.76	1.16		

Significance level <.05

To examine the gender difference regarding incompatible curriculum, the results did not show a positive difference while male mean value was (M= 3.92, SD= 1.06) greater than female (M= 3.83, SD= 1.11).

To identify the gender difference about instructional environment, the results did not show a positive difference while male mean value was (M= 4.07, SD= .91) greater than female (M= 4.01, SD= 1.02).

To evaluate the gender difference about instructional skills, the results indicated a significant difference while male mean value was (M= 3.91, SD= 1.13) greater than female (M= 3.47, SD= 1.58).

To evaluate the gender difference regarding students' attitude, the results indicated a significant difference while male mean value was (M= 3.77, SD= 1.09) greater than female (M= 3.32, SD= 1.39).

To evaluate the gender difference regarding examination system, the results did not indicate a significant difference while male mean value was (M= 3.76, SD= 1.16) greater than female (M= 3.45, SD= 1.24).

Objective 3: To examine the significant difference among the professional experience of teachers in developing HOTS of students.

Table 3. ANOVA

	SS	df	M. Sq	F	Sig
Between Groups	3.408	3	1.708	2.89	.03*
Within Groups	55.543	94	.559		
Total	58.953	96			

Significance Level P<0.05

To administer the difference opinion of the respondents regarding their professional experience (1-5 Y, 6-10 Y, 11-15 Y, >15 Y). The results indicate a significant difference among these groups about professional experience because p value was less than 0.05.

Objective 4: To determine the significant difference among the academic qualification of teachers in developing HOTS of students.

Table 4. ANOVA

	SS	df	M. Sq	F	Sig
Between Groups	3.358	2	1.655	3.44	.062
Within Groups	41.467	96	.487		
Total	53.648	98			

Significance Level P<0.05

To administer the difference opinion of the respondents regarding their professional experience (Master, M. Phil, PhD). The statistical findings revealed that there was not a significant difference among these groups about professional experience because the p value was greater than 0.05.

5. Conclusions

It was found that secondary school mathematics teachers are well conscious about the issues faced by secondary school teachers in creating HOTS of students. Further, it indicated a significant difference in gender about instructional skills and students' attitude. In addition, significant differences were shown regarding the professional experience of the respondents.

6. Discussion and Recommendations

Mathematics is a compulsory and unique subject among all the compulsory and optional subjects at secondary level. It also requires embracing the various techniques and teaching methods. This study is helpful for future researchers who want to conduct research in the same area or field. The study is also helpful for the policy makers and curriculum planners for the enhancement of HOTS of students. This research gives awareness of problems faced by the secondary school mathematics teachers for developing higher order thinking skills to the students. This study highlights the issues and challenges raised in the classroom for learning higher order thinking skills in the subject of mathematics. The research is helpful for teachers to provide ways they may overcome these challenges, how they can effectively handle students and change their behavior and attitudes. This research is helpful for educationists, curriculum designers and policy makers to frame policies and design curriculum aligned with content provided for higher order critical thinking skills.

Following are the recommendation presented based on findings:

1. It should be advanced curriculum for developing HOTS of learners.
2. The professional development of teachers must be based on the HOTS.
3. Several workshops and seminars should be conducted for the awareness of teachers and parents to develop higher order critical thinking among students.
4. It is recommended that the curriculum development, instructional skills, students' attitude, instructional environment and system of examination should be based on the creating higher order critical thinking of the students

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