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Perceptions of Secondary School Teachers on HOTS: A Qualitative Analysis

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Article Info	Abstract
	This study aimed to explore secondary school teachers' perceptions, awareness and knowledgeof Higher-Order Thinking Skills (HOTS) in the classroom setting.Eight Focus Group Discussions (FGD)were conducted among the secondary school teachers of Mizoramto collectthe data. The study includes the conceptual understanding, barriers and strategiesas themes discussed with the participants concerning HOTS.This research study revealed that teachers are not well-versed in dealing with HOTS due to a lack of pedagogical knowledge and constant upskilling. The study's findings also indicatethat some teaching strategies like group discussions, project-based activities, co-operative teaching, and debates help facilitate HOTS among students.

Introduction

It is a well-established notion that traditional teaching cannot prepare skilled human capital in this complex knowledge-driven society that requires HOT-based rational decision-making ability (Ben-Chaim, Ron& Zoller, 2000).Thus, nowadays, mastery over higher-order thinking skillsis considered a fundamental educational goal (Zohar & Dori, 2003) and became an inevitable reality in academic and professional careers andthe guarantee of success. Higher-order thinking skills enable students to understand the facts and information, connect them to other facts, classify them, evaluate them, interpret and put them together in a novel way and apply them in different situations to generate new solutions (Thomas & Thorne, 2009). That is why elementary to tertiary education includes HOTS-based activities to excel students' minds.Higher-order thinking skills promote critical thinking and problem-solving essential in students' academic career andenrichingexperience in life. Higher-order thinking is a skill that can be taught and improved through practice. The teacher needs to create opportunities and establish a classroom culture that encourages a spirit of inquiry inclassrooms to hone students' HOTS (Cummins, 2020)."…much of our thinking, left to itself, is biased, distorted, partial, uninformed or down-right prejudiced. Yet the quality of our life and that of which we produce, make, or build depends precisely on the quality of our thought…(Paul & Elder, 2014, p. 19)." Therefore, higher-order thinking skills is considered as an indispensable element of secondary education which is also mentioned by the World Economic Forum (2015) in its report on *New Vision for Education* as twenty-first-century skills.

Higher-order thinking skills are needed to promote open-mindedness and tolerance and help students achieve their intellectual potential with a true spirit of inquiry (Simister, 2007). Cummins (2020) stated that it is necessary to make it a habit to facilitate HOTS among students. For this, classroom displays and question prompt cards are two effective ways to keep higher-order thinking prominent in the classroom.Miri et al. (2007) asserted that if the teachers knowingly consistently and deliberately teach higher-order thinking skills among students, they can have fair chances to succeed. Teachers disinterest (Ivie,1998) and pre-conception of teachers (Broadbear, 2003) found critical barriers in cultivating HOTS.

One of the fundamental goals of teaching for the advancement of HOT is to transmit these skills transdisciplinary (Zoller, 1999). Zohar (2004) classified some cognitive activities that demonstrate higher-order thinking: asking research questions, making comparisons, constructing arguments, establishing causal relationships, drawing inferences, and many more.Research findings signified teachers' role to scaffold students to accomplish tasks that required higher-order thinking by applying varied instructional strategies (Dillon & Scott, 2002; Miri et al., 2007; Ten Dam &Volman,2004).Socratic Seminar or Socratic Circle is a strategy for

higher-order thinking and critical inquiry based on the Socratic method of dialogic approach in which students gain a more profound understanding of concepts through the student-led process of thoughtful questioning and discussion (Davenport, 2016). Higher-order thinking quizzes facilitate classroom tests performance (Barnett & Francis, 2011). Miri, David and Uri (2007) identified three teaching strategies as promoting higher-order thinking skills: first, dealing with interdisciplinary real-world cases that encourage students to cope with comparable situations;second, facilitating open-ended class discussions thatencourage students to ask questions and present their answers and third, fostering short inquiry-oriented experiments in groups which enable students to learn in a co-operative manner.

Students' active engagement is needed to be involved in higher-level thinking rather than as recipients of transmitted information (Fazey, 2010).King, Goodson and Rohani (1998) advocated that instruction for thinking skills promotes intellectual growth and fosters academic achievement gains.Strengthening the connections between educational theory and practice in the classroom is regarded as an integral part of effective teaching-learning process; therefore, in-service training programs emphasizing excel teachers' higher-order thinking to ensure the synchronization between theory and practice (Miri et al., 2007; Osborne, Erduran, & Simon, 2004).Sometimes, teachers' teaching strategies are not complying with the encouragement of HOT(Watts, Jofili&Bezerra, 1997). So, teachers need to ensure the intellectual level and individualdifferences of the students. Experiential exercises (Hannon, McBride& Burns, 2004), graded assignments (Schafersman,1991), collaborative activities (Yazici, 2004), project-based learning (Snyder & Snyder, 2008), self-reflection (Roets&Martiz, 2016),critical thinking opportunities (Ladyshewsky, 2006), peer coaching techniquesand self-investigating of phenomena were found implicative in facilitating higher-order thinking skills.

Zohar and Agmon (2018) reported that teachers devoted more time to engaging students with higher-order thinking rather than to teaching higher-order thinking; it further analyzed that in reality, teachers could not be thought that they were not teaching students how to think but only trained them how to respond to specific kind of questions algorithmically. Researches showed that only a few teachers deliberately combined teaching strategies in facilitating HOTS while others engaged in the transmission of knowledge (Miri et al., 2007; Tobin & Fraser, 1989). A research study found teachers' belief that higher-order thinking is inappropriate for low-achieving students (Zohar,Degani&Vaaknin, 2001); however, another research study indicates that low-achieving students can also be benefitted from the instruction of higher-order thinking (Zohar & Dori, 2003).

Researchers emphasized integrating questioning techniquesto stimulate students' higher-order thinking into class discussions to support a classroom climate where students can reflect and practice HOTS (Haynes & Bailey, 2003; Hemming, 2000). Epstein (2008) pointed out careful observation and planning as the trigger to create an academic environment that encourages studentsfor higher-order thinking.Regrettably, students are not usually taught how to think or learn independently (Rippen, Booth, Bowie, & Jordan, 2002). Teaching can enhance students'higher-order thinkingby using appropriate approaches to learning (Magno, 2013). Miri, David and Uri (2007) mentioned that professional development programs are needed to be well-structured so that teachers would better understandhigher-order thinking in a more harmonious way.

The objective of the study was to provide insight into the following research questions:
- What are the perceptions of secondary school teachers of Mizoram on HOTS?
- What constraints and impediments do secondary school teachers found in facilitating HOTS among students?
- What activities do secondary school teachers adopt in fosteringHOTSin the classroom?

Research Methodology and Procedure of Data Collection
This qualitative study aimed to explore the perceptions of secondary school teachers of Mizoram in facilitating the HOTS. The FGD was considered the most appropriate data collection method to produce qualitative information to facilitate this exploration.Therefore, researchers conducted FGD to simultaneously collect multiple individual reactions (Carey & Smith, 1994) and comprehensive secondary school teachers' broad perspectives on various issues pertaining to a deeper understanding of HOTS. All the secondary school teachers of Mizoram was the population of the study.The sample includes sixty-four government secondary school teachers of Mizoram, comprising all the education streams such as science, social science, language and arts. The whole eight homogeneous groups of secondary school teachers participated in the FGD.

Each session of FGD consist of eight secondary school teachers and lasted approximately an hour. All the sessions were audio recorded by the facilitator,and the co-facilitator did the task of notetaking. Participants responses were initially coded and further categorized in different themes. Resultantly, three thematic constructs emerged as conceptual understanding, barriers, and strategies after organizing and categorizing participants' comments.The result of the qualitative analysis is being presented under the themes concerning research questions. Researchers collected data between April and December 2019. Participants gave their consent forbeing interviewed and tape-recorded. The Faculty Development Centre (FDC), Mizoram University, was selected as the focus group site because participants often came to the FDC for training programs and

workshops.The researchers themselves selected the participants. The researchers developed a screener form to obtain the required information based on pre-determined specificity. Potential participants were offered transportation fare and refreshment for smoother conduction of FGD to ensure their participation. All focus group were conducted in English; audio-recorded andtranscribedsubsequently. There were 60 percent female and 40 percent male focus group participants ranging from 30 to 50 years.

A set of leadingquestions used to guide the FGD:

- How do you understand the HOTS; what is the significance of HOTS in the day-to-day life of students?
- Which type of barriers did you face during teaching-learning in facilitating the HOTS?
- What strategies and resources do you use to foster the HOTS in the classroom?

Data Analysis

The data collected in this study was participants' responses and written notes taken by co-facilitator during all the eight FGDs. After the data collection, audio recordings were transcribed verbatim. The researchers identified the major themes independently to ensure the reliability of each FGD.

Focus Group Discussion Findings

Findings are being presented in conjunction with the three themes that emerged during the FGD.

Conceptual Understanding

The participants were positively responsive when answering, "what is your perception of HOTS?" Hardly anyone chose not to respond. It was continually a detailed opinion in all the FGDs. The overriding consensus was that HOTS is synonymous with creativity, critical thinking, problem-solving, creative thinking and reasoning. The following are representative responses:

"Higher-order thinking skills enable students to think in their way and empowered them to do tasks without the help of teachers or textbooks."

"Thinking Sills that include upper three cognitive levels of Blooms' taxonomy."

"Curricular activities train the minds of the young to understand the concepts and facts. HOTS activities regarding their studies can make them confident, creative and perform good in their exams."

"Co-curricular activities train the students to become an expert person in the concerned field."

"It helps the children' courage and confidence to express their thoughts and feelings."

"It is necessary to give training from the elementary level of schooling to get command over HOTS."

"HOTS is difficult to teach and learn, as well."

"HOTS is immeasurable. No one can be perfect in HOTS."

The majority of participants believed that HOTS is crucial in anybody's life. The following are selected responses: *"HOTS can be useful in daily problem-solving." "It can help in solving complex real-life challenges." "HOTS was behind the Archimedes' illumination." "It can solve the third world countries' academic problems." "HOTS can revolutionize our school system." "It can resolve unemployability issue to a large extent."*

The respondents were also likely to think of HOTS as a training type to get expertise on it. *"We can enrich our knowledge through professional development training programs and workshops."*Interestingly, one participant from a Psychology background mentioned the *"need for thinking schools"*and expressed the necessity of opening this kind of schools in this State. However, she associated its possibility with the will power of the State government.*"We are not trained to teach what and how to think that makes learning outcome effective." "Some teachers provided students with opportunities to reflect themselves, but it is not plenty enough to make them independent thinkers."*

Barriers

The majority of the secondary school teachers responded "yes" when asked, "Do you perceive any barrier in facilitating HOTS in the classroom?" Several stated that "syllabus" is the foremost hurdle to foster HOTS in the classroom. *The syllabus is very lengthy that hinders our effort to promote HOTS. It does not provide the spare time to devote to HOTS activities. We became helpless."*

Another mentioned administrative barriers. *"There areno such directives from the School board to teach HOTS separately or taking any initiatives in this regard." "We are bound to finish our syllabus within the stipulated timeframe. Despite that, sometimes we are unable to complete the course on time. It became quite frustrating."*

School authorities were not supportive enough to start novel steps to inculcate HOTS among students. Students were not asked about their inclination on HOTS. When asked about their perceptions on teacher-related barriers to HOTS, their responses included: *"Few of us are still unaware of the HOTS. Young teachers know better how to implement higher-order thinking in classrooms. Teachers' lack of interest and incompetence is also a big hurdle."* Sometimes teachers want to exercise HOTS activities, but due to inadequate content knowledge and pedagogical knowledge, they were much pained and made many self-reproaches for not having excellent skills to transact effectively. *"We are not trained enough to teach HOTS. We hardly get opportunities to participate in in-service training programs that include the elements of HOTS."*

There was a belief that teachers become master and expert of their concerned subjects with increasing teaching experience. It is mastery over content knowledge to some extent indeed; if they do not incorporate

updated technique to more comprehensive their teaching range, it will be of no use in knowledge societies.*"We think that in the absence of professional development training from time to time, we cannot equip ourselves to train students with HOTS."*

Another reason given was the students' disinterest and indifferent disposition towards HOTS. *"Some teachers argued that if students are not ready to get involved in HOTS-bound activities, we cannot force them to learn beyond their aptitude and interest."*In support of this statement, others opined similar concerns. *"Students prefer traditional lecture method predominated by teachers." "Even though students like closed-ended questions and lower-order thinking based assignments. Only a few students actively participate in group discussions and debates;the rest of them acted as a passive audience."*

As far as curriculum is related tohigher-order thinking development, dissented voices come across all the FGDs.One of the high school teachers opined that *"The Mizoram Board of Secondary Education (MBSE) curriculum is of a lower standard than that of their counterparts such as Central Board of Secondary Education (CBSE) and Indian Certificate of Secondary Education (ICSE). Therefore, students of MBSE faced multiple difficulties to qualify for the national-level medical and engineering entrance examinations. "* A teacher who has more than a decade old teaching experience shared his view in these words, *"The educational system of India is not considerably modernized till today like other western and Scandinavian countries. In our country, teachers struggle to realize the indispensability of embedding the HOTS in the curriculum as an integral component.*"The curriculum's objective must not only to pass the examination but to enable the students with critical and creative thinking skills to secure future job opportunities."*

The majority of participants drew attention to the examination system and confess that they are teaching in such a way so that students score good marks and pass the examination. They also pointed out the workload and responsibilities designated in schools as an obstacle to deal with HOTS. One participant raised an interesting point, *"Some of the qualified and energetic teachers lost their pace and motivation to implement effective teaching strategies that can improve HOTS."*Because they firmly put their view on how they are busy with clerical work, sometimes with the managerial role, and other fieldworks duties assigned by the Central and State governments.

Strategies

There were a handful of responses to the question, "What are different strategies you adopted in facilitating HOTS in your classroom?" Of the few answers given, the most frequent term given for strategies was "Blooms taxonomy." Others included "constructivist approach", "brainstorming", "group discussion", and "project-based activities".Some newly recruited teachers expressed their strategies onthe importance of Science corner/Mathematics corner/ Social science corner in the development of HOTS. Still,they were not able to fix such learning space in classrooms. The reasons why they were unable to include some necessary facilities included the following: *"Rarely we are getting an opportunity to implement the constructive approach, discovery learning, problem-solving activities in our teaching methods as a strategy to facilitate HOTS." "It is due to the lack of laboratory and library facility."*At some schools, laboratory and library are present, but again improper focus on maintenance and up-gradationmake them not more than showpieces.

They also stated that they tried project-based learning and found it useful in demonstrating HOTS. *"Students showed their creativity in working with projects as an assignment." "Co-operative teaching also proved fruitful in developing HOTS." "In response to the open-ended questions, we seldom received good answers."*As expected, they tended to remain silent when questions based on higher-order thinking asked. In these cases, we motivated them to become part of active learning. *"We asked them to conclude the classroom episodes." "We insisted on givinga detailed answer instead of to point one." "It is a strategy we use to make it as a habit formation to reply elaborately." "Reinforcement technique used by us to keep their intellectual level high."*

Few participants shared their views on how they involved their family in promoting HOTS among students. *"Home environment must be supportive of retaining HOTS activities and exercises." "We requested parents to provide sufficient time for study at home and not to involve them in unnecessary household activities." "Community participation is robust here, so we raised our concerns in public gatherings to promote HOTS for the benefit of society."*

Only a few participants who passed their master degree in education listed some strategies theoretically but not applied in classroom situation due to inexperience of their practical application. *"Six Thinking Hats," "5E Instruction," "Socratic Seminar," "HOTS-based Quizzes," "Lateral Thinking,"* and *"Structured HOTS programs are the few popular ones using worldwide."*

Conclusion

Researchers conductedfocus groups,presented an opportunity to understand secondary school teachers' perceptions of higher-order thinking skills. Although these groups were not representative of all secondary school teachers, the perceptions attained provide a base for the development of HOTS in secondary schools. The opinion obtained in the focus groups is crucial to the MBSE and State government authorities because it

provides insight into HOTS that is not well understood among teaching fraternity and students. By and large, all the participants well-received the focus group discussions. Several of the participants showed their expression of admiration for having the opportunity to learn about HOTS. These findings indicate a lack of awareness over HOTS and its educational implications among secondary school teachers. This study provides insight into the perceived barriers and strategies and revealsa few critical issues that needed immediate action.

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