



Higher-Order Thinking Skills (Hots) In the Classroom: A Review of Teacher Readiness and Needs

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Abstract

HOTS's potential impact on classroom instruction will be determined in large part by how well-prepared and equipped the teachers are to adopt this new instructional strategy in their classrooms. This report conducts a systematic review of five prior studies on teachers' readiness and needs for HOTS implementation in the classroom. According to the chosen articles, the contents and contexts of the research were analyzed critically. According to the findings of the studies that were selected, the topic of the study that is frequently discussed is the perceptions of teachers regarding the implementation of HOTS in teaching in terms of the cognitive, effective, and behavioral aspects of the teachers. Among the factors that influence the level of readiness of a teacher included knowledge of HOTS, teaching experience, classroom management skills and pedagogy, the background of students in terms of knowledge, motivation, and different learning styles, teacher motivation and perception, technology integration skills as well as school climate influence. All of these aspects have received extensive analysis and discussion in the selected studies. Additionally, there are notable findings such as the study's emphasis and the parallels and variations across the articles chosen. This systematic review paper will help readers identify and understand previous studies on teachers' readiness and the necessities to apply HOTS in the classroom.

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Introduction

Because education dictates the course and direction of one's life, education and life are closely intertwined. Strong and honorable people and nations can be created through a good education. A frail education, on the other hand, makes people and the country weak and contemptible. A nation's power is not exclusively determined by its resources and technological advancements. To overcome obstacles and go forward in order to succeed and attain glory, knowledge, a noble soul, and strong self-confidence must be used as a platform. Education must be developed and grown on a firm foundation to ensure that it can produce strong people and powerful nations.

The education system plays a very important role as the real strength of a nation and country. According

to Rajendran (2001), the real strength of a country lies in the level of knowledge and skills mastered by the people of that country. According to him, if a country's education system is less effective or fails to provide knowledge and skills to its people, then the country will be left behind. Therefore, thinking skills are seen as one of the most important skills that must be present for every educator and student to produce a generation that is able to compete globally.

Through the Malaysian Education Development Plan (PPPM) 2013-2025, the Ministry of Education Malaysia (MOE) has introduced HOTS. In this regard, HOTS is no stranger to the field of education in Malaysia. However, teachers face some constraints in coping with change and the process of adaptation

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in an effort to fully integrate HOTS into the classroom. In this 21st century, students are required to master thinking skills to deal with many situations that arise in the real world. Therefore, one needs to understand HOTS, translate, analyze, and manipulate information. This survey was conducted to analyze the application and understanding of teachers in integrating HOTS into schools. Through PPPM 2013-2025, various teacher professional development programs are planned to improve the quality of teachers. The majority of programs are implemented at the school level due to show more results and improve the level of teachers' skills. According to Goetsch (2002), training is important so that employee skills are more robust, knowledge is more extensive, competitive, always the best, and in line with the change. Therefore, teachers' knowledge of HOTS will increase if teachers are given relevant training. Teachers' teaching needs to have the integration of HOTS and conduct effective assessments of students. According to Sharifah Nor et al. (2012), teachers are aware of the importance of the teaching and learning aspects of HOTS even though their knowledge and skills in integrating HOTS are still at a low level in teaching.

Research Background

In the era of education curriculum transformation through PPPM 2013-2025, HOTS is a branch of thinking skills that is the main focus to produce creative and critical human capital to be able to compete globally (Zaidir et al. 2019). Therefore, Shairah et al. (2017) stated that teachers are the main pillars of integrating HOTS in mathematics lessons in schools. The readiness of teachers in implementing HOTS in teaching and lessons is important because teachers act as teaching and lesson leaders preparing themselves for the application of HOTS. Therefore, teachers as agents of change must be prepared to bear this trust in producing students who are competitive and have a high level of thinking on par with students in other developed countries. Therefore, the readiness of teachers as leaders of MOE transformation must be seen and studied so that the desired objectives and goals are achieved successfully.

In the opinion of Rafferty et. al. (2013), readiness is one of the challenges for every reform practiced in an organization or system in a country. The success of reform in a system or organization depends on the willingness of the members involved in the change. Such statements were reviewed in a study by Davis,

1989; Teo, 2010; Anghelachea & Bentea (2012). The statement is in line with the changes taking place in the national education system, especially the practice of HOTS and its management which requires the readiness of effective teachers. As a result of these developments and changes, educational institutions and classroom situations have become more difficult to manage than ever before. The results of a study by Ahmad & Ghavifekr (2014) also support the point. In the opinion of Hall & Hord (2011), the issues and problems of teacher readiness are significant as previous studies have shown that the influence and stance of teachers are very important in determining the outcome and effectiveness of reform.

According to Erwin and Garman (2010), stubbornness to not change or individual unwillingness has been identified as a factor of deterioration in the implementation of a change. Educational reform can find a decline if support in terms of self-readiness among teachers is not fully available. This is because teachers are the implementers of an education reform system and the delivery agent to future generations.

Literature Review

Siti Norzaidah & Anuar (2022) conducted a study to see the level of readiness of secondary school teachers to apply HOTS in the subject of History in terms of knowledge, skills, and attitudes of teachers. In addition, the researcher would like to see the difference in readiness between male and female teachers to apply HOTS in secondary schools in the subject of History. A survey study using a quantitative approach was conducted involving a total of 192 History Education teachers in Segamat District who were selected as study respondents. Questionnaires were used to obtain data relevant to the study. The data obtained were analyzed using SPSS (Statistical Package for Social Science) version 26.0. The findings of the study found that the level of readiness of secondary school teachers to apply HOTS in the subject of History in the district of Segamat, Johor is at a high level. In addition, there is no significant difference between the level of readiness of teachers according to gender in applying HOTS. This means that teachers who teach History can practice HOTS during the teaching and learning sessions of History well.

Maxwell & Siti Mistima (2021) have studied the level of understanding and application of HOTS skills by primary school Mathematics teachers in Bintulu, Sarawak. The study sample was selected by 120



primary school mathematics teachers in Bintulu, Sarawak. The researcher conducted the study by a survey. The research instrument used is a survey form that was analyzed using SPSS version 23.0. The findings of the study found that the level of application of HOTS mathematics teachers in teaching is at a high level. In addition, the study explains that the level of understanding of HOTS mathematics teachers is at a high level. The implication of this study is to help overcome and refine all the shortcomings that occur in the process of applying HOTS in schools and give a great impact to students in schools where they will always be well guided and in line with current developments in line with the rapid development of education.

In Nur Hawa Hanis & Ghazali (2018), the researcher investigates the extent of the readiness of the history teachers in the state of Perak for the implementation of Higher Order Thinking Skills in teaching and evaluates their attitudes towards the implementation. This study employs a quantitative approach involving 143 samples consisting of all trained teachers teaching History subjects at national secondary schools in the district of Kinta Utara, Perak. A questionnaire was used as the research instrument. The findings show that the level of readiness of the history teachers for Higher Order Thinking Skills in teaching is moderate and that their attitude toward the implementation of Higher Order Thinking Skills in teaching is positive. Syazana & Zamri (2018) surveyed the perceptions of Malay language teachers in primary schools in Sri Aman District on the implementation of HOTS in terms of understanding, knowledge, and implementation of HOTS in teaching, attitude, and evaluation. A total of 90 teachers teach Malay language subjects in primary schools from 3 divisions, namely the Sri Aman zone, Undup Zone, and Lingga Zone. These three zones are from the Sri Aman district. This study uses a survey method by using a survey form as a research instrument. Data were analyzed using SPSS version 22.0 to analyze descriptive and inferential data involving t-test analysis. Therefore, the findings of this study are important to see the readiness and acceptance of Malay language teachers to the implementation of HOTS in addition to providing information to the parties involved such as MOE to help teachers

implement HOTS in teaching and learning (PdP), especially in Malay.

Irma & Zolkepli (2017) conducted a study to see the level of readiness of Mathematics teachers in Hulu Langat district to implement KBAT in PdP. This study uses a quantitative approach involving 169 sample persons consisting of teachers who teach Mathematics in primary schools around the Hulu Langat district. Questionnaires were used as research instruments. Descriptive findings indicate that teachers' skill levels are moderate. The t-Test showed no significant difference in the level of readiness of teachers based on gender. This study recommends that research on the readiness of teachers be done from time to time to ensure that teachers are always ready to face every transformation that will be done.

Findings

Sampling

Based on the five articles selected, the sample involved was the teachers. The sampling was carried out in a variety of locations around Malaysia, including secondary schools and primary schools, among other educational institutions. Studies that were conducted by (Siti Norzaidah & Anuar, 2022; Maxwell & Siti Mistima, 2021; Nur Hawa Hanis & Ghazali, 2018; Syazana & Zamri, 2018; Irma & Zolkepli, 2017) involved random sampling in particular states. Figure 1 illustrates the results of the analysis of these articles, which shows that two articles (40%) used a sample of secondary school teachers, and three publications (60%) used a sample of primary school teachers.

In comparison to all of the other publications, the research conducted by Siti Norzaidah & Anuar (2022) had the highest number of research respondents, which were 192 schoolteachers who were chosen through random sampling. Only 384 samples are needed to detect a 95% confidence level for a population of more than 100,000 teachers using the weights of Krejcie and Morgan (1970). Thus, the number of 192 samples included in this study is more than sufficient to accurately reflect the population (N=312).

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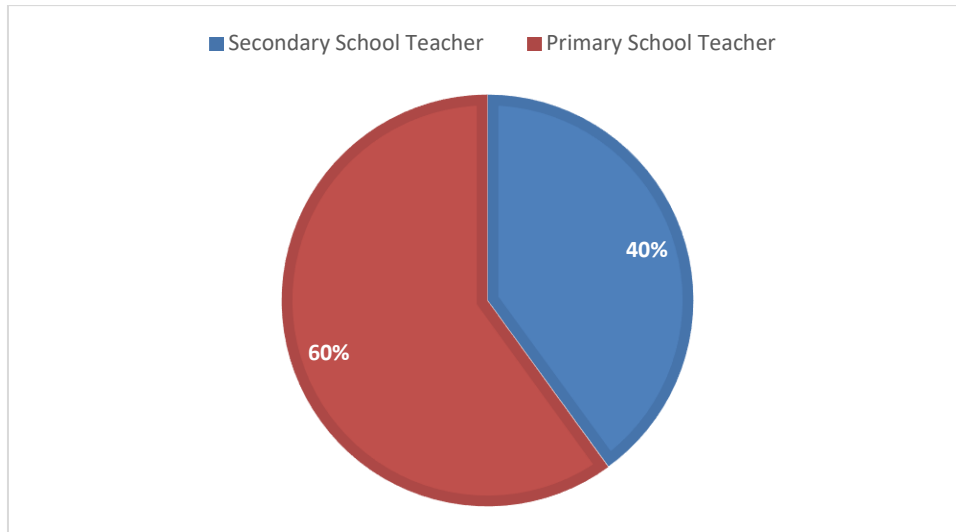


Figure 1: Percentage of Sample Selection Type

Teachers’ readiness in High-Order Thinking Skills (HOTS)

The teacher's readiness in applying High-Order Thinking Skills (HOTS) in their teaching is very important to enable their teaching and learning session to be carried out smoothly and effectively. It is undeniably true that without the teachers' readiness in implementing HOTS in their classes would cause HOTS-based teaching cannot be implemented well and the application of HOTS in student learning may also be disrupted. Therefore, this paper will dissect the readiness and unreadiness of teachers in implementing HOTS-based teaching in either primary education or secondary education level. The teachers' readiness in implementing HOTS in teaching and learning is an

important aspect in order to implement and understand HOTS among both teachers and students.

Table 1 shows the level of readiness among teachers in applying HOTS in their teaching. It was found that teachers are still not fully prepared in implementing HOTS because they lack exposure to the right way to teach HOTS-based learning. This is supported by Wan Nor Shairah Sharuji and Norazah Mohd Nordin (2017), which explain that teachers are less prepared to implement HOTS in their teaching due to a lack of exposure to the teaching methods and pedagogy of HOTS. Thus, exposure to the correct method to implement HOTS-based teaching is very important for Malay language teachers so that they can conduct teaching and learning effectively and easily understood by students.

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Table 1: Teacher’s readiness to implement HOTS.

Researcher (Year)	Title	Teachers’ Readiness
Siti Norzaidah and Anuar (2022)	Readiness of Secondary School History Teachers in Segamat District, Johor in applying HOTS in History subject.	“...the analysis results show that the level of readiness of secondary school History teachers to apply HOTS in History subject is at high level”
Maxwell Aling and Siti Mistina Maat (2021)	Level of Application and Understanding of Mathematics Teachers on High Order Thinking Skills (HOTS) in Teaching Mathematics at Primary School	“...the application of HOTS by Mathematics teachers in teaching and learning showed a mean score of 3.50 and the standard deviation of 0.89 and was interpreted at a high level”



Nur Hawa Hanis dan Ghazali (2018)	Teachers' Readiness to Implement High Order Thinking Skills (HOTS) in Teaching	"...showed that the level of readiness of History teachers to implement HOTS in teaching is moderate"
Syazana dan Zamri (2018)	The Perception of Malay Language Teachers in Sri Aman District Primary Schools Towards the Implementation of Higher Order Thinking Skills in Teaching dan Learning	"Most teachers are still lack a full understanding of HOTS. Therefore, they are unable to ensure that their HOTS-based teaching meets the real objectives of HOTS"
Irma dan Zolkepli (2017)	Teachers' Readiness to Implement HOTS in Primary School Mathematics.	"...it is found that teachers are less prepared to implement HOTS in terms of skills"

Teachers' Necessities to implement an effective High-Order Thinking Skills (HOTS)

In order to implement a success HOTS among teachers, teachers must have an adequate understanding of HOTS, good knowledge of HOTS, right skills in teaching HOTS and a positive attitude towards the implementation of HOTS in teaching and learning. Therefore, the needs of teachers must be given attention so that teachers can implement HOTS effectively and meet the requirements of the Ministry of Education so that students and teachers can effectively master HOTS-based learnings.

Table 2 shows some of the teacher necessities expressed by some researchers. One of their needs is a continuous exposure to the courses and classes as well as more focus on a subject taught. However, it is undeniable that many HOTS related courses or classes have been implemented but most of the courses attended did not succeed in applying effective skills to teach HOTS-based learnings (Irma and Zolkepli, 2017; Maxwell Aling and Siti Mistina Maat, 2021). In reality, teachers need more specific courses that focus on how to implement HOTS on a single subject so that they can apply it more effectively. It is so that they not only understand the subject theoretically, but can implement it practically as well, as all teachers should be able to implement a success HOTS-based learning in their classes.

In addition, teachers also need modules as an emphasis to implement HOTS -based teaching. The preparation of modules in implementing KBAT act as a guideline and guidance to teachers on how to implement KBAT in teaching (Siti Norzaidah and Anuar, 2022). Teachers will be more prepared and confident with the preparation of modules to implement HOTS in their teachings. Furthermore, the modules can also be able to change the way teachers teach from traditional to HOTS-based teaching. Other than courses and modules, teachers also need resource materials. The resource materials actually play an important role as a guide to question-and-answer activity between students and teachers. They are also serves to provide suggestions for hands-on activities.

Based on the explanations related to the needs of teachers in implementing HOTS, it can be concluded that teachers need exposure to HOTS courses that focus on a subject, need HOTS teaching modules, resource materials that help HOTS-based learning, exposure to the concept of HOTS, along with how to apply HOTS as well as course refinement content appropriate to KBAT. If all the needs and requirements of teachers in can be provided and purified, then more teachers will be able to carry out HOTS-based learning successfully and effectively, which can result in producing more students who can do well in HOTS.



Table 2: Teachers' needs to implement HOTS.

Researcher (Year)	Title	Teachers' Needs
Siti Norzaidah and Anuar (2022)	Readiness of Secondary School History Teachers in Segamat District, Johor in applying HOTS in History subject.	"History teachers should also be given support materials such as the HOTS module as a guide and reference for their teaching. The Curriculum Development Department needs to make improvements to the HOTS modules and handbooks so that teachers can apply them to students in schools."
Maxwell Aling and Siti Mistina Maat (2021)	Level of Application and Understanding of Mathematics Teachers on High Order Thinking Skills (HOTS) in Teaching Mathematics at Primary School	"...teachers' readiness for HOTS can be enhanced by creating continuous training. This is so that teachers can apply the right HOTS techniques and methods with more systematically in Mathematics classes"
Nur Hawa Hanis and Ghazali (2018)	Teachers' Readiness to Implement High Order Thinking Skills (HOTS) in Teaching	"...they (teachers) need more time and training to improve their knowledge and skills to implement HOTS effectively and comprehensively"
Syazana and Zamri (2018)	The Perception of Malay Language Teachers in Sri Aman District Primary Schools Towards the Implementation of Higher Order Thinking Skills in Teaching dan Learning	"In order to produce professional teachers, the authorities must take this matter into account and focus their efforts on exposing teachers to HOTS effectively and continuously, thereby improving teachers' competencies towards a better student achievement."
Irma and Zolkepeli (2017)	Teachers' Readiness to Implement HOTS in Primary School Mathematics.	"Regular courses should be held to ensure that the teachers gain knowledge and skills to implement the transformation. Teachers also need to be provided not only with knowledge but also with teaching skills" "Administrators who know the problems faced by their teachers can take appropriate action to overcome the problems that arise so that teachers can implement the transformation successfully."

Conclusion

The role of teachers to implement successful HOTS-based learning in schools in all subjects is very important to produce a good thinking skill generation, as needed in the 21st century. This generation will master HOTS as well to compete globally and improve the rank of the Malaysian education system on the international stage. As is well known, teachers are the backbone of educating students to achieve excellent performance in all subjects. Therefore, to HOTS in all subjects, teachers

must first understand and master HOTS so that the teaching process can be carried out smoothly and effectively. However, based on several previous studies found that there are still teachers who are not ready to implement HOTS in their teaching, which surely affects the effectiveness to implement HOTS-based learning in students. According to previous studies, most teachers were not ready to implement HOTS in their teaching due to a lack of understanding of the right method to implement it in their teachings, causing them to not be able to



implement HOTS effectively as intended.

The study also mentioned some of the teachers' needs to implement effective HOTS-based learning. However, other than the teachers' readiness and needs to implement HOTS-based teaching, detailed HOTS-based teaching strategies also need to be emphasized to implement a more effective and smooth HOTS-based learning. Aspects of research related to HOTS that have not been studied include the application of HOTS to teachers' teaching in general and the teaching strategies, particularly at the school level. Research on the HOTS application strategy by teachers is one of the main aspects that need to be given attention because the effectiveness of the HOTS application strategies is the backbone to master HOTS in student learning. Therefore, it is hoped that there are other researchers who will explore the HOTS application strategy in teachers' teachings in all subjects.

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