
Research Article

How do teacher educators understand and develop higher order thinking skills in multilingual classrooms in Mexico?

Oscar Manuel Narvaez Trejo
Universidad Veracruzana

Carolina Reyes Galindo
Universidad Veracruzana

Deon Victoria Heffington*
Universidad Autónoma del Estado de Quintana Roo

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Abstract: Professionals in the 21st century must be able to handle global competition, globalisation, technology-driven information, and rapid media saturation. Higher Order Thinking Skills (HOTS), which include critical thinking (CT), problem-solving (PS), and creative thinking (CRT), are crucial in modern society; education is considered the primary vehicle for achieving these objectives. However, one of the main problems for teachers is how to develop HOTS in classrooms. This situation is aggravated among multilingual teachers, who might not understand the implications of language for developing HOTS. This research discusses the findings from a qualitative multiple case study that aimed to explore how teacher educators in a public university located in southeast Mexico understand HOTS and the strategies used to develop HOTS in multilingual classrooms. Twenty teacher educators in a teacher preparation program in southeast Mexico were interviewed. The findings demonstrate that educators understand HOTS and recognise the need to develop HOTS skills with multilingual students to prepare them for 21st-century skills and, thus, the workforce. However, despite teachers' understanding of the construct of HOTS, they lack expertise in using activities to build HOTS and the implications of language when teaching HOTS. The findings underscore the need to include HOTS in teacher education programs.

Keywords: creative thinking, critical thinking, English learners, EL, higher order thinking skills, HOTS, multilingual students, perceptions, problem solving, teachers, 21st century skills

Resumen: Las y los profesionales del siglo XXI deben tener la capacidad de hacer frente a la competencia mundial, la globalización, la información impulsada por la tecnología y la rápida saturación de los medios de comunicación. Las Habilidades de Pensamiento Superior, por sus siglas en inglés (HOTS), que incluyen el pensamiento crítico (CT), la resolución de problemas (PS) y el pensamiento creativo (CRT), son cruciales en la sociedad moderna, siendo la educación el medio para alcanzar estos objetivos. Sin embargo, una de las principales problemáticas para los profesores es el desarrollo de las HOTS en las aulas. Esta situación se ve agravada con profesores multilingües, quienes podrían no comprender las implicaciones lingüísticas en la enseñanza de HOTS. Esta investigación presenta los resultados de un estudio cualitativo de caso múltiple cuyo objetivo es explorar las percepciones de profesores sobre la definición y las estrategias utilizadas en el aula para el desarrollo de HOTS con estudiantes multilingües. Se entrevistó a veinte formadores de docentes de un programa de formación docente en el sureste de México. Los resultados demuestran que los educadores comprenden la definición y la necesidad de desarrollar HOTS con estudiantes multilingües para prepararlos con las habilidades del siglo XXI y, por ende, para la fuerza laboral. Sin embargo, aunque entienden conceptualmente HOTS, carecen de experiencia en el uso

*Corresponding author: Deon Victoria Heffington, E-mail: deon@uqroo.edu.mx

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de actividades para desarrollar estas habilidades de pensamiento superior, así como de las implicaciones lingüísticas en la enseñanza de HOTS. Los hallazgos subrayan la necesidad de integrar HOTS en los programas para la formación docente.

Palabras clave: EL, estudiantes multilingües, habilidades de pensamiento superior, habilidades del siglo XXI, HOTS, pensamiento crítico, pensamiento creativo, percepciones, profesores, resolución de problemas.

1 Introduction

Previous research suggests that developing Higher Order Thinking Skills (HOTS) is crucial for creating global citizens who can respond and adapt to the current workforce needs, including innovating and creating solutions to problems (Schulz & Fitzpatrick, 2016). Considering their relevance, Higher Order Thinking Skills (HOTS) have become a priority in education since the 1980s (Cuban, 1983). HOTS are crucial to the educational process because they influence students' learning capacity and efficiency (Avargil et al., 2012). According to Li (2016), a review of various educational systems reveals that HOTS is a learning objective in the curricula of several countries, including England (1999), Hong Kong (2000), Malaysia (2003), and China (2001). Other emerging countries, including Thailand, Mexico, and Brazil, have also integrated HOTS into their curricula (Li & Wegerif, 2014). Therefore, teachers are expected to incorporate complex thinking skills throughout the teaching process to ensure that students learn both content knowledge and how to apply it using complex reasoning (Jerome et al., 2017; Yeung, 2015).

Previous scholars have highlighted the connection between teaching HOTS and learners' academic success. Li and Walsh (2011) investigated EFL classroom interactions and found that teachers' beliefs in fostering critical, analytical, and evaluative thinking are directly linked to students' academic performance at higher cognitive levels. Likewise, Wilson and Narasuman (2020) found a positive correlation between HOTS-oriented assessment and student achievement. HOTS are not only important for scoring higher on standardised tests and achieving the goals established in educational curricula, but also for preparing students to navigate the 21st-century context in which they live. Thus, developing HOTS in current education is not only important but necessary (Cancino & Capredoni, 2020). It is, therefore, essential to ensure that teachers are prepared to teach these 21st-century skills (Vu, Winsor, & Walsh, 2020).

Given the current relevance of HOTS in education and the relationship between academic success and HOTS development, it is essential to consider the implications for multilingual students. Several scholars have studied the lack of development of HOTS in multilingual classrooms, the watered-down curriculum for English Learners (ELs), and the monolingual and monocultural stance in traditional conceptualisations of HOTS (Heffington, 2019). Studies in the field of English Language Teaching (ELT) also highlight the connection between HOTS and language-learning processes (Antonio, Carrión, & Lopez, 2021; Johansson, 2020). Similar to monolingual educational settings and the needs described previously, multilingual teachers must also be prepared to help students develop HOTS. Thus, teachers must first understand the construct to design activities that help students develop these complex skills.

Innovative teaching pedagogies highlight the important roles that both teachers and students play in achieving learning outcomes. In multilingual classrooms, educators are responsible not only for creating an environment that fosters meaningful academic and content learning but also for supporting language learning. To achieve this, recent research (Heffington, 2019) suggests that teachers can use several language-learning techniques that intersect with higher order thinking activities (e.g., the Keyword method and questioning).

2 Research aim and questions

One of the main problems identified within the literature is that the construct of HOTS is a 'conceptual swamp' (Cuban, 1983). This makes it difficult for educators to teach and assess HOTS because the definition itself is abstract, leading to multiple interpretations (Heffington, 2019; Johansson, 2020). Furthermore, there seems to be a lack of research exploring the relationship between HOTS and multilingual classrooms. To the best of our knowledge, there has been limited research on HOTS in language classrooms in Mexico. Thus, this study aimed to explore how teacher educators at a public university in southeastern Mexico understand HOTS and the strategies they use to develop HOTS in multilingual classrooms. The research questions that guide this study are the following:

- 1) How do teacher educators in a public university located in southeast Mexico understand HOTS?
- 2) What strategies do teacher educators in a public university located in southeast Mexico use to develop HOTS in multilingual classrooms?

3 Theoretical lens and literature review

This paper's theoretical basis is framed in Higher Order Thinking Skills (HOTS) and their intersection with English learners (ELs) in multilingual classrooms. Although integrated into curricula in some Western countries between the 1980s and 1990s, the predominance of HOTS in multilingual education is much more recent. Therefore, it is relevant to understand how language teacher educators in Mexico understand and develop HOTS in their classrooms.

Multilingual education frameworks provide strategies for language learning across different contexts (e.g., English as a Second Language, English as a Foreign Language, English as an International Language) by recognising the learner's first language(s), also known as the mother tongue, as a resource rather than an interference. Throughout the history of language learning and teaching, multiple theories have addressed the additive component of multilingualism. For instance, in the 1970s and 1980s, Cummins (1979) proposed the Common Underlying Proficiency Theory (CUP), which highlights the deeper underlying cognitive and academic skills that form the basis for language transfer from L1 to L2. One of the most recent theories that promotes the strategic use of all linguistic resources to make meaning and facilitate learning is Translanguaging (Cenoz et al., 2017; García & Wei, 2014). These theories are crucial when connecting HOTS to language education, as previous research highlights the importance of enabling students to use their L1 to engage in higher order thinking tasks (Heffington & Coady, 2023; Li & Walsh, 2011; Wilson & Narasuman, 2020).

Higher Order Thinking Skills (HOTS) can be considered an umbrella term for several complex reasoning skills, including critical thinking (CT), problem-solving (PS), and creative thinking (CRT), which are considered crucial to developing twenty-first-century skills. Higher order thinking skills are difficult to define due to their multifaceted, complex nature, encompassing intricate cognitive processes such as reasoning and judgment, as well as a range of mental and emotional traits, including intellectual empathy, fair-mindedness, and persistence (Heffington, 2019). Sulaiman et al. (2017) define HOTS as the broad use of one's thinking to create or discover something original. HOTS entail shifting to deeper levels of processing, such as application, analysis, synthesis, and evaluation (Heffington, 2019). According to Brookhart (2010), the three components of HOTS are transfer, critical thinking, and problem solving. With HOTS, students can apply newly acquired knowledge to novel situations (transfer), critically

examine situations or information (critical thinking), and potentially develop solutions (problem-solving), rather than simply memorising facts and delivering them verbatim. Transfer implies students' ability to apply new information or knowledge to solve previously unforeseen problems. Problem-solving skills involve identifying strategies for solving problems (Alkhatib, 2022). Regardless of the difficulty in precisely defining HOTS, many researchers have advocated studying its impact on students' development.

Multiple frameworks have also been proposed to theorise Higher Order Thinking Skills (HOTS). According to Anderson & Krathwohl (2001), Bloom's Taxonomy, proposed in the 1950s and revised in the 1990s, argues that HOTS are mental processes that go beyond recall and comprehension, and include application, analysis, evaluation, and creation. A second framework, Webb's Depth of Knowledge (DOK, 2009), focuses not only on cognitive complexity but also on the contextual demands of tasks. In this framework, strategic thinking and reasoning, as well as extended thinking, require students to develop HOTS. A third theory, Costa's Level of Questioning (Costa & Kallick, 2015), allows for differentiating lower and higher order thinking from a three-level standpoint, where the last one – application and transformation – requires students to engage in HOTS. Although there are differences between what is considered lower and higher order thinking among the three frameworks, all authors agree that specific basic skills – memorisation and recall – progress towards more complex skills, requiring deeper mental connections, which differentiate lower from higher order thinking. Additionally, another perspective that could integrate these three frameworks is that Bloom's taxonomy provides a framework for defining higher order thinking; Webb's DOK situates how deeply students must engage with content and that one skill can vary depending on the situation provided; while Costa's Levels of Questioning helps to operationalise the lower and higher order thinking through the technique of Questioning.

Previous studies on HOTS in educational settings have been conducted in various countries and contexts; however, most have been carried out outside of Mexico. For instance, Mursyid and Kurniawati (2019) explored the perceptions of English teachers from three generations (Baby Boomers, Generation X, and Generation Y) regarding HOTS. The results indicated that teachers from all three generations were aware of HOTS and incorporated them into their classrooms in various ways. However, teachers from Generation X were more conscious about the significance of HOTS than those from Generation Y.

Likewise, Utami et al. (2019) investigated four areas of HOTS perceptions: planning, implementation, assessment, and responsibility for HOTS teaching and learning activities. They surveyed 28 pre-service and 10 in-service high school English teachers. Their results suggest that pre-service teachers demonstrated more positive results than in-service teachers in the areas of planning, implementation, and assessment. On the other hand, in-service teachers demonstrated more positive results in responsibility than pre-service teachers.

Similarly, Baker (2020) examined HOTS knowledge among junior high school (JHS) and senior high school (SHS) English teachers in Indonesia. Data were obtained through a Likert-scale questionnaire administered to 69 JHS and 74 SHS English teachers. The results of this study revealed that, in terms of HOTS, JHS English teachers had an acceptable level of knowledge (3.24/5), and SHS teachers had a very good level of knowledge (3.31/5).

Rachmawati et al. (2021) examined secondary-level teachers' perceptions of HOTS in EFL classrooms using interviews and a questionnaire. The researchers focused their data analysis on how participants conceptualised HOTS and how HOTS were used in learning activities. Although the participants demonstrated awareness of the connection between HOTS and curriculum, this study showed that teachers had a limited understanding of HOTS. They

advocated the urgent need for educators to receive rapid training to improve pedagogical practice in implementing HOTS.

Brilian Dima (2020) sought to explain English teachers' perceptions of HOTS implementation using a qualitative research design. The author concluded that participants had an adequate understanding of the concepts and definitions related to HOTS as defined in Bloom's Taxonomy. Additionally, the participants reported having implemented HOTS in their teaching. However, the implementation of HOTS was deemed inadequate due to problems faced by teachers. These problems included students' low level of English, teachers' competence in designing HOTS questions, and limitations in infrastructure (i.e., access to the internet, learning media, and sources), all of which were considered crucial for the effective development of HOTS. Comparable results were reported by Pasutri et al. (2021), who found that, despite the teacher following the prescribed steps to promote HOTS, the strategy was ineffective. The researchers concluded that the development of HOTS in rural areas was not reaching the expected results.

Ginting and Kuswandono (2020) were particularly interested in examining the challenges faced by English teachers in East Indonesia when using HOTS in the classroom. Their results showed that participants had a positive perception regarding their capability to design HOTS tasks. However, they claimed to have faced significant challenges, including teachers' lack of knowledge and preparation, and students' limited experience engaging in HOTS.

The previous literature review suggests that even when HOTS have been integrated into the national curriculum in several countries and educators are strongly encouraged to develop HOTS in classrooms, language teachers have yet to master practical techniques for developing HOTS with multilingual students. As some authors suggest, one key strategy could be to include specific training in teacher preparation programs to consolidate teachers' implementation techniques. Other strategies could include helping teachers and students build language skills while developing HOTS. Notably, most research on HOTS has been conducted from a monolingual perspective, across various educational levels, contexts, and countries. Few studies have aimed to understand how teacher educators frame and develop HOTS, as well as the linguistic and/or cultural implications for teaching HOTS, particularly in multilingual settings and in Latin American contexts.

4 Methodology and methods

This paper reports on findings from a qualitative study that explored how teacher educators at a public university in southeast Mexico understand HOTS and the strategies they use to develop HOTS in multilingual classrooms. A multiple-case study design was employed to understand a specific phenomenon through participants' individual experiences. According to Narváez Trejo et al. (2017), the researcher may study an individual in isolation (single-case study) or a group of individuals who share common features and are bound by specific characteristics (multiple-case study). The researchers also employed data collection techniques (e.g., interviews, observations) that enabled the collection of in-depth, detailed data on experiences (Wellington, 2015).

4.1 Sampling

Given the study's qualitative, in-depth focus on understanding context-specific phenomena, a convenience sampling approach (Merriam, 2009) was adopted to select teacher educators who

were readily accessible and highly relevant to the research aim (Narváez Trejo et al., 2017). As suggested by Merriam (2009), when using convenience sampling, it is important to establish criteria to guide sample selection. Therefore, participants were required to meet the following selection criteria: being EFL teacher educators, working at the time of the research with multilingual students, and having more than 3 years of experience.

4.2 Participants

Semi-structured interviews were conducted with 10 teacher educators (6 females and 4 males). The participants' ages ranged from 25 to 60 years: 2 were under 29 years old; 3 were between 30 and 39; 3 were between 40 and 49; and the remaining 2 were between 50 and 60 years old. The educators' experience differed significantly; one had three years of teaching experience, whereas another had taught for over thirty years. In terms of academic preparation, all of them held an MA degree in teaching English. Among these, 2 have additionally earned a PhD in Education and 2 in Applied Linguistics.

4.3 Methods of data collection

Semi-structured interviews were considered the best instrument for eliciting lengthy, in-depth information while allowing participants to share their knowledge and strategies regarding the implementation of HOTS. The questions were formulated to be stimulating and experiential, prompting participants to share their insights on how the defined HOTS apply, the implications for multilingual learners, and strategies for implementing HOTS in their classrooms. Each participant was interviewed once, with interview lengths ranging from 15 to 30 minutes.

4.4 Data analysis

Data analysis followed the 6-phase thematic analysis proposed by Braun and Clarke (2006) to identify themes and patterns in the data. The phases included:

1. **Familiarisation with the data.** During this phase, the researchers immersed themselves in the data to identify initial patterns and key ideas emerging from the data. This was conducted by repeatedly reading the transcripts, listening to recordings, and taking preliminary notes.
2. **Generation of initial codes.** During this phase, the data were organised into meaningful groups by systematically identifying and labelling key aspects relevant to the research question.
3. **Combining codes into themes.** During this phase, initial codes (from the previous phase) were grouped and combined, based on shared meanings, in order to create broader themes.
4. **Reviewing themes.** To refine and validate the proposed themes, two levels of review were conducted. First, the researchers ensured that the data within each theme was coherent. Second, they verified that the themes accurately reflected the entire data set.
5. **Determining the significance of themes.** During this phase, each theme was revised to ensure it captured its essence and aligned with the scope.

6. **Reporting of findings.** During the final phase, data were used to portray participants' voices by selecting vivid and compelling extracts, linking findings to the literature review and research aims/questions, and interpreting the data based on the researchers' experience.

5 Results and discussion

When exploring how teacher educators understood and developed HOTS in classrooms, two main themes emerged from the thematic analysis, which were categorised as Teacher educators' knowledge of HOTS and Teacher educators' implementation of HOTS. Each of these themes is addressed in more detail in the following sections.

5.1 Teacher educators' knowledge of HOTS

When queried about their understanding of higher order thinking skills (HOTS), all participants referenced certain domains outlined in Bloom's taxonomy. It was mutually acknowledged that the construct of HOTS encompasses a cognitive process that surpasses mere memorisation and is characterised by distinct layers of knowledge. The participants further emphasised that this process occurs daily. Consequently, they indicated their acquaintance with Bloom's taxonomy and a subset of them expressed their reliance on this framework when designing instructional materials, such is the case of Teacher 3, who claims that "Higher order thinking skills are embedded in learning processes which involve problem-solving, synthesizing, analyzing, reasoning, comprehending, application, evaluation, and creating, among others depending on the level of difficulty of the cognition to be assimilated."

To encourage critical thinking among students, educators are expected to incorporate HOTS into their instructional practices within the context of 21st-century pedagogy (Miri et al., 2007). This implies prior training in incorporating HOTS into the syllabus and in teaching strategies to develop higher order skills among multilingual students. Regarding their previous training in HOTS, only one participant acknowledged having taken one course related to critical thinking (one type of HOTS) and using HOTS in other courses, "Methodologies courses and specifically one called Integrating Critical Thinking into the Teaching of Culture" (Teacher 9). However, all other participants reported not having taken any courses on HOTS during their teacher preparation program. Several participants reported that they had learned about HOTS in other teaching-related courses and subsequently incorporated HOTS into their instructional practices. They then assessed their students' academic progress and evaluated the impact of these strategies on their overall performance. Nevertheless, participants reported perceiving a correlation between the majority of the courses they have undertaken and the enhancement of their higher order thinking skills, particularly in courses that incorporate research methodologies and language theories. For example, Teacher 3, despite not being able to reference a specific course on HOTS, considered developing skills leading to HOTS in "All the courses I've taken. In a different level of course, and depending on the level of difficulty of what I am learning."

Chinedu et al. (2015) suggested that when HOTS are taught effectively, students can engage in problem-solving. When students construct and integrate HOTS into their learning methodologies, they demonstrate their potential for growth and advancement. In this context, educators were asked about the experiences and activities that have facilitated their learning process. Some of the most prevalent activities included research, reading, problem-solving, and

interactive games. This was the case with Teacher 2, who considered the most helpful ones to be "reading, decision making, problem solving, research." Additionally, participants identified various methods to foster HOTS, including task-based and content-based approaches.

In sum, teacher educators seem familiar with the importance of developing HOTS and the construct of HOTS itself. They identified specific skills (i.e., critical thinking, problem-solving) related to the construct, although these skills were often used interchangeably with HOTS. They also identified specific subskills (i.e., synthesising, analysing, reasoning, evaluating, and creating), primarily related to Bloom's Taxonomy. This confirms previous findings indicating a positive relationship between experience and proficiency in comprehending and integrating HOTS in instructional practice. In Mursyid and Kurniawati's (2019) study, educators from older cohorts demonstrated a higher level of awareness of higher order thinking skills. Findings from this study also reflect a lack of knowledge and understanding of how language intersects with HOTS, aligning with the scholarship of Li and Walsh (2011) and Wilson and Narasuman (2020). Teacher educators' definition of HOTS appears to be framed from a monolingual standpoint (as suggested by Heffington & Coady, 2023), without considering other skills or subskills inherent to language education that could, arguably, develop higher order thinking. It also reflects how teachers themselves have difficulty engaging in HOTS and critically questioning the concept and application of HOTS for multilingual students.

5.2 Teacher educators' implementation of HOTS

While HOTS have been integrated into the curricula of educational systems throughout the world, how they are implemented in classroom instruction, as well as the implications for language teaching, remain largely unknown. Consequently, it was imperative to understand how educators developed HOTS with their students. The majority of participants reported incorporating this practice during the design process of activities that required students to apply prior knowledge. They also suggested creating spaces for students to reflect on their understanding and identify the contexts in which they could effectively apply the knowledge acquired:

I use questions to reflect, different types of arguments, analyse them, and organise students' ideas to have concluding ideas from different points of view (Teacher 3). I like giving them inductive teaching activities, in which they have to analyze texts, sentences or examples of any kind of language or content knowledge so that they find on their own whatever aspect in relation to the learning objectives, and then finding ways to put them into practice and then reflect about it (Teacher 7).

Although the aim of this study did not include observations to contrast teacher educator perceptions with actual practices, the teaching strategies reported by participants align with those documented by Chinedu et al. (2015), who determined that employing innovative approaches, such as research-based activities, problem-solving, and the learning cycle, can effectively foster students' higher order thinking skills. When prompted to yield specific instances of the activities employed, the respondents cited problem-solving tasks, open-ended questions, textual analysis, research papers, and written reflections. As previously demonstrated, the educators participating in this study seem to be aware of the type of activities that facilitate the development of HOTS. This suggests that their prior teaching experience may

have fostered an awareness of the advantages of employing HOTS, even in the absence of formal training on the subject.

When I discuss a topic with students and elicit their points of view and enhance their analytical skills. I also ask them to reflect on possible solutions for different issues such as pollution or the number of stray animals increasing. Another example would be when they write a composition and apply peer assessment to help an acquaintance upgrade the quality of his writing. (Teacher 2)

Regarding the timing of implementing these activities, the majority of participants emphasised the importance of incorporating HOTS into the teaching agenda. Specifically, they should be seamlessly incorporated into the lesson content. However, educators also pointed out that all activities implemented should primarily aim to cultivate HOTS. Moreover, some participants contended that the cultivation of advanced cognitive abilities is facilitated by particular language skills, specifically speaking and writing. Conversely, others suggested that this phenomenon is an innate, automatic occurrence, which happens regularly across diverse academic subjects and linguistic skills. This can be seen in Teacher 8, who commented that "There is no choice for that, I always try to make my students go beyond their learning." Likewise, Teacher 1 said, "I never decide. It must be naturally embedded in the development of a series of learning activities."

Regarding the efficacy of the activities, participants highlighted various factors, including the fulfilment of learning objectives, the quality of students' arguments, the adequacy of responses to diverse questions, and their interrelationships with other subjects or domains. Such is the case of the following participants: "When they argue and give creative solutions to problems" (Teacher 1) and "When they are able to express their thoughts, ideas, opinions with clear arguments, or they can solve any hard task successfully" (Teacher 8).

Most of the participants agreed that their students engaged in critical thinking. When asked about how they evaluated students' higher order thinking skills, the respondents indicated that they employed various strategies, including encouraging active participation, posing thought-provoking questions to stimulate discussion, providing open-ended questions upon project completion, and offering constructive feedback. This can be illustrated in the words of Teacher 3, "I record their participation, production, and involvement along with the development of an activity. Even though I provide feedback and use trigger questions to enhance the discussion." Several researchers have suggested that implementing explicit, targeted HOTS instruction can effectively enhance higher order thinking skills (Li & Walsh, 2011; Miri et al., 2007; Wilson & Narasuman, 2020). Furthermore, Heffington (2019) and Heffington and Coady (2023) suggest that students' prior experiences in developing complex reasoning skills enhance their engagement in HOTS and create a bridge for multilingual students to transfer the newly acquired skills across languages (i.e., forward and backwards transfer).

When teachers were asked how they integrated higher order thinking skills into their instructional practices, participants noted a lack of awareness among their students about the importance of cultivating HOTS. For example, Teacher 3 stated, "Students usually memorise, but they hardly ever learn." Participants also acknowledged that further preparation is required in the realm of HOTS, specifically in using Information and Communication Technologies (ICT) to foster their development. Such is the case of Teacher 2, who claimed, "Perhaps that I need to learn more about integrating ICT and HOTS into my English lessons." This result aligns with the work of Garay Alemany (2015), who found that ICT teachers seemed to easily implement HOTS teaching in their classes, despite the official rules implemented by the Chilean

government for teaching, which focused more on the transmission of information than on the application of HOTS.

Finally, participants expressed that time is a detrimental factor, as they believe that additional time is required to effectively design instructional materials that promote the development of higher order thinking skills and to develop these skills in the classroom. The aforementioned aspects bear resemblance to the suggestions put forth by Singh et al. (2020), who recommended that educators benefit from training in cultivating pedagogical approaches that foster HOTS. Further, participants acknowledged that teacher educators should also be encouraged to engage in reflective practice, as it is recommended that educators conduct their research on the matter. Subsequently, it is recommended that educators engage in action research and peer evaluation to critically examine and assess their instructional methodologies. It is imperative to allocate additional time for educators to plan lessons.

The results of this study indicate that an in-depth understanding of HOTS was not observed among all participants. Some educators still exhibited confusion about the distinction between higher order thinking skills and related concepts, such as abilities, skills, learning techniques, learning models, and learning activities. Despite the recognition of the educational significance of HOTS among participants, their understanding of HOTS remains limited in terms of acquiring and enhancing these skills. Teacher educators are familiar with innovative teaching and learning strategies that can be used to develop higher order thinking skills (HOTS) in students, such as problem-based learning, inquiry learning, and cooperative learning.

The results of this study show that teacher educators possess some knowledge of HOTS and Bloom's taxonomy, which is one dimension of understanding HOTS. However, the findings suggest that participants still require further training in designing activities that foster higher order thinking. This may be caused by the lack of courses on HOTS and the limited research participants do. Nevertheless, as previously mentioned, time is one of the most significant barriers. So, institutions should provide more time for lesson preparation and research, as well as offer courses on HOTS. Findings from this study suggest that teacher educators faced difficulties, particularly when developing HOTS in their classrooms; this is likely because teachers themselves were unclear about the definition of HOTS and how to develop them.

One of the most concerning findings from this study is the lack of awareness regarding how language is intertwined with HOTS. In their understanding and implementation of HOTS, teacher educators relied on monolingual and traditional frameworks, without considering the implications for multilingual students. For instance, when discussing "time", participants did not consider the additional time and cognitive effort required by students who are thinking in two languages simultaneously. When describing strategies and activities used to develop HOTS, teacher educators did not demonstrate the interrelationship between language strategies (e.g., the Keyword Method) and higher order thinking frameworks (e.g., Bloom's Taxonomy).

In language teaching, educators have two fundamental responsibilities: fostering and creating a meaningful learning environment for academic content while also developing language skills (Kusumastuti et al., 2019). Language teachers play a key role in the learning process; thus, they need to be informed and prepared to use current teaching strategies in multilingual education, not only to help students develop their linguistic skills and communicative competencies but also to help them develop HOTS. Furthermore, teacher educators must understand the importance of promoting activities that enable learners to utilise their entire linguistic repertoire (i.e., L1 and L2) to engage in higher order thinking.

6 Conclusions

In the field of education, there are frequent calls for teaching that focuses on higher order thinking skills (HOTS) rather than merely on recalling information. HOTS are essential for individuals to face 21st-century challenges. Moreover, the rationale for HOTS-based instruction has been acknowledged by many teachers and educational researchers, who argue that HOTS have a positive impact on students' cognitive development. Considering this, educational institutions have set among their key goals to develop students' HOTS. They are considered essential to help learners achieve competence in their future personal and professional goals. In this regard, the present study was designed to determine how teacher educators understand and develop higher order thinking skills in their classrooms in southeast Mexico.

This study found that teacher educators demonstrated some understanding of HOTS, primarily limited to recognising the importance of HOTS and its relationship to Bloom's Taxonomy. This suggests a lack of conceptual knowledge and practical knowledge on how HOTS can be developed in classrooms. Furthermore, although teacher educators are aware that students can be trained in HOTS through certain teaching and learning strategies (e.g., problem-based learning, project-based learning, inquiry learning, cooperative learning), there remains confusion about how these strategies relate to HOTS. Findings from this study reveal that teacher educators report significant challenges in integrating HOTS into their teaching practice. Nonetheless, some of the strategies employed by teacher educators to integrate HOTS in multilingual classrooms in Mexico were revealed.

The most obvious finding from this study is that teacher educators recognise the significance of HOTS and the importance of developing them in multilingual students to prepare them for the professional workforce. However, teacher educators did not demonstrate awareness of how HOTS can be framed differently from a multilingual perspective. Furthermore, they did not exhibit awareness about how specific language teaching and learning strategies can be used to develop HOTS. Furthermore, they did not seem to understand how the encouragement, or lack thereof, regarding the use of students' linguistic repertoire could impact students' development of HOTS.

Another interesting finding is that further research should be conducted on HOTS and their role in teacher preparation programs and multilingual education. Firstly, one area of opportunity is the role of HOTS in teacher preparation programs, particularly in language teacher preparation programs. Secondly, more research is needed to understand how HOTS are best developed and assessed in classrooms, particularly multilingual classrooms. Finally, further studies are needed that delve into the connection between monolingual and multilingual lenses for framing and developing HOTS.

7 Implications

The findings of this study have several important implications for future practice. There is therefore a clear need to incorporate HOTS into teacher education programs, as English is a compulsory subject at all levels of education in Mexico. Language teachers should collaborate with other teachers to ensure that different types of HOTS are systematically developed with students. Furthermore, training on HOTS implementation should be conducted progressively for language teachers to enhance their knowledge and teaching practices. The findings from this study indicate a worrisome lack of preparation among teacher educators regarding HOTS.

Considering the importance of incorporating 21st-century skills at all levels of education, teachers and educators should grasp not only the foundations of HOTS and their relevance, but also specific strategies for developing HOTS and the implications of language and HOTS.

Further implications of this study are directed to educational institutions, curriculum developers, and teacher educators. School authorities and educators need to work together to create professional development programs that integrate courses on understanding HOTS, strategies for their development, and HOTS assessments. Secondly, it is important to establish mechanisms that help monitor and provide feedback to teachers regarding the development of HOTS in classrooms. Lastly, it is hoped that this study will provide insight into the connection between HOTS and language learning, in an attempt to advance the agenda for the further development of strategies linking HOTS and language learning.

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