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INTEGRATION OF HIGH ORDER THINKING SKILL (HOTS) IN MICROTEACHING COURSE: A PREPARATION FOR DEVELOPING HOT-TEACH LEARNING MODEL USING DIGITAL SMART BOOK

HENI RITA SUSILA [1], ARIEF QOSIM [2], SULIA NINGSIH [3], PITRIYANTI [4]

[1,2,3] UNIVERSITAS BATURAJA, BATURAJA, INDONESIA
[4] SMA NEGERI 3 OKU, BATURAJA, INDONESIA
EMAIL: heni_ritasusila@fkip.unbara.ac.id, arief_qosim@fkip.unbara.ac.id, sulia_ningsih@fkip.unbara.ac.id, pitriyanti83@guru.sma.belajar.id

Abstract
Technology plays a crucial role in facilitating the learning process and improving student learning outcomes. Therefore, exploring the use of technology is a crucial step in designing new, more effective and relevant learning models. This research is a preliminary study in the development of the HOT-TEACH Learning Model, an innovative learning model designed to enhance higher-order thinking skills (HOTS) in prospective teachers. The purpose of this study was to analyze the level of HOTS integration in the learning process of the Microteaching course, evaluate the use of digital media as part of the applied learning strategy, and identify students' level of readiness to use digital media as a learning support tool. This study used an exploratory approach involving 50 prospective teacher students who had completed the Microteaching course. The results showed that HOTS integration has been implemented in Microteaching, particularly in the formulation of learning objectives, the application of active strategies, and assessment. However, several indicators still require strengthening, such as the development of a learning process that encourages exploration and problem-solving, and the development of instruments capable of measuring creativity, analytical skills, predictive ability, and the stimulation of critical thinking. Most students demonstrated good readiness to access and utilize digital media. Based on these findings, the recommended digital media to support the development of the HOT-TEACH model is a digital smartbook, which can be combined with interactive digital media, such as application based quizzes, to create a more engaging, adaptive, and immersive learning experience.
Keywords: Digital Smart Book; Digital Learning; HOT-Teach Model; Learning Model; Learning Media

1. INTRODUCTION

Data released by the Programme for International Student Assessment (PISA) shows that the majority of Indonesian students (≥60%) only reach Level 1 in HOTS, reflecting limited critical, analytical, and creative thinking skills (Trisna, 2024). The 2022 PISA results confirm that the Indonesian education sector still faces significant challenges, particularly in achieving equitable access to quality education (Ismawati et al., 2023). One crucial strategy to address this issue is improving the quality of prospective teachers in Indonesia. Teachers play a strategic role in shaping a young generation that is not only academically intelligent but also capable of critical and creative thinking. Therefore, students in teacher education programs (prospective teachers) are required not only to master teaching materials but also to develop higher-order thinking skills, such as critical, analytical, and creative thinking, as well as the ability to solve problems independently (Palavan, 2020; Roofiq et al., 2024). However, various studies indicate that the HOTS skills of teacher education students in Indonesia remain relatively low, particularly in the areas of analysis, evaluation, and creativity (Gradini et al., 2018; Herdianingsih et al., 2023; Sennen, 2017) this condition is caused by various factors, one of which is the limited availability of learning media capable of facilitating the development of higher-order thinking skills in a systematic, engaging, and student-centered manner (Herdianingsih et al., 2023).
On the other hand, efforts to improve HOTS skills among prospective teachers have been dominated by training focused solely on developing HOTS questions (Kristanti et al., 2020; Rahayu et al., 2020), without being balanced by the design of comprehensively integrated learning and assessment processes. However, to optimally develop higher-order thinking skills, innovative media and learning strategies are needed that can actively and continuously stimulate students in critical, analytical, and creative thinking. Based on this description, innovative efforts are needed to develop media and learning models specifically designed to improve HOTS skills in teacher education students. This is expected to be a strategic solution to address the problem of low HOTS, while also

supporting the improvement of the quality of prospective teachers as the main agents in producing a quality young generation in the future.

Therefore, before developing an appropriate learning model and media to enhance students' higher-order thinking skills, a preliminary study is needed to identify various aspects that influence the effectiveness of these models and media. These aspects include determining students' level of preparedness, both in terms of knowledge, skills, and the use of digital media to engage in HOTS-based learning. Furthermore, it is also necessary to assess the extent to which the current learning process in Microteaching courses accommodates the development of higher-order thinking skills. The purpose of this study is to know the level of HOTS integration in the learning process in the Microteaching course, evaluate the use of digital media as part of learning strategies, and determine students' readiness to use digital media in the learning process. The results of this preliminary study are expected to provide a strong foundation for designing learning media and models that are appropriate to student needs, relevant to the characteristics of the course, and effective in enhancing students' higher-order thinking skill.

2. LITERATURE REVIEW

2.1 Integrating HOTS in Microteaching Course

High Order Thinking Skills (HOTS) are advanced thinking skills that include the ability to analyze, evaluate, and create. All three of which are at the top level of the revised Bloom's Taxonomy (Anderson et al., 2001). HOTS requires students to think critically and creatively, not simply memorize or understand information. In modern education, HOTS has become a key skill needed to face the challenges of the 21st century, particularly in the context of globalization, technological development, and the need to solve complex problems (OECD, 2024; Saavedra et al., 2012). Therefore, HOTS development is very important to support students' readiness to face the dynamic world of work and in shaping the character of lifelong learners (UNESCO, 2021). Higher Order Thinking Skills (HOTS) are essential competencies in 21st-century education. Beyond mere memorization, HOTS fosters critical and creative thinking, enabling students to solve complex problems in the era of globalization and rapid technological advancement. Therefore, developing HOTS is crucial not only to prepare students for the demands of a dynamic workforce but also to foster lifelong learning and character building.

Microteaching is a course that is generally taught in education study programs, especially for prospective teachers in the Faculty of Teacher Training and Education. Microteaching is a learning method that allows prospective teacher students to practice teaching on a small scale before going directly into the real classroom (Khasanah, 2025). Microteaching is a training concept that can be used at various stages of competency and professional development for educational and teaching staff (Helmiati, 2013). Microteaching will train several professional skills, the technical abilities that teachers acquire through formal training, such as lesson planning, classroom management, and assessment (Iliasova et al., 2025) and help helps prospective teacher to gain more teaching experience (Arslan, 2021). Microteaching is an essential component in teacher education programs, designed to provide prospective teachers with practical teaching experience in a controlled, small-scale environment. It serves as a training method that supports the development of professional teaching competencies, including lesson planning, classroom management, and assessment. By engaging in microteaching, prospective teachers can enhance their technical skills and build confidence before entering real classroom settings.

Integrating HOTS into microteaching courses is crucial because prospective teachers not only need to master pedagogical and technical skills but also be able to design learning that encourages students' higher-order thinking. Through microteaching, prospective teachers can be trained to develop lesson plans, learning activities, and assessments that encourage analysis, evaluation, and creativity. This integration ensures that prospective educators are equipped with the skills to facilitate meaningful learning experiences that align with the demands of 21st-century education.

2.2 HOT-Teach Learning Model Using Digital Smart Book

HOT-Teach (High Order Thinking for Teacher Candidates) learning model is specifically designed for prospective teachers in microteaching courses. This model focuses on developing analytical, evaluative, and creative skills through a problem-based, collaborative, and reflective approach. The steps for implementing it are represented by the acronym TEACH, which stands for Transform Idea, Execute & Evaluate, Assess Deeply, Conclude & Connect, and Highlight Reflection. To support the implementation of this model, students are also provided with digital smart books as an interactive learning media.

A digital smartbook is a form of digital book that not only presents text and images but also includes various interactive multimedia features such as videos, quizzes, simulations, and external links that can enrich students' learning experiences. Smart Book has great potential to be an innovative medium for improving the quality of learning (Putra et al., 2022). Some research results show that this media can improve students' cognitive abilities (Heriadi et al., 2024), train students to be more independent in planning, evaluating and solving learning problems (Susantini et al., 2021). This media can support active and contextual learning processes, particularly in developing higher-order thinking skills (HOTS), which are essential for aspiring educators. In this context, the use of digital smartbook is seen as an innovative solution to overcome these limitations. This media not only provides flexible and enjoyable learning access but can also be specifically designed to stimulate higher-level thinking processes through structured, interactive features.

3. METHODOLOGY

This study is categorized as exploratory research aimed at investigating students' perceptions regarding the extent to which *Higher Order Thinking Skills* (HOTS) are integrated into the learning process of the Microteaching course, as well as the use of digital media in supporting this learning. The primary objective is to evaluate how digital media contributes to enhancing higher-order thinking skills among prospective teachers. Additionally, the study explores students' readiness for the development of a digital media-based learning model within the context of Microteaching.

The respondents consisted of 50 students from the Faculty of Teacher Training and Education at Baturaja University who had completed the Microteaching course. Primary data were collected through an online questionnaire distributed through the following link: https://forms.gle/hEmtVYSi2zSPoXJG8. The questionnaire employed a five-point Likert scale, including: (1) never, (2) rarely, (3) sometimes, (4) frequently, (5) always. Before completing the questionnaire, all participants were informed that their involvement in the research was voluntary and would not affect their academic grades in the relevant course. Furthermore, all collected data were used solely for research purposes and were treated confidentially in accordance with research ethics principles (Sugiyono, 2021) (Creswell & Poth, 2018).The data were analyzed using descriptive statistical techniques to simplify, interpret, and describe the main characteristics of the dataset. The initial step involved tabulating the data using Microsoft Excel software, calculating percentage scores, and identifying measures of central tendency, with a focus on the mean value. The analyzed data were then presented in summary tables to facilitate overall interpretation (Sudjana, 2009).

4. RESULTS AND FINDINGS

This questionnaire asked for various information, including general profile data, specific information about the implementation of HOTS in microteaching courses, and specific issues related to students' perceptions, attitudes, and readiness to learn using digital smartbooks. Data profile asked about study program background (ICT or non-ICT), level/semester, and gender. It is important to understand students' study program backgrounds to assess their ability to adapt to various learning media. Information about student levels and semesters is useful for identifying training needs or differing levels of digital readiness among students. Understanding gender data can help develop strategies for utilizing digital media that are inclusive and tailored to the needs of each group.

Table 1. The profile of respondents related to study program, level/semester and gender.

Gender	**Respondents**	**Percentage**
Male	17	72%
Female	36	28%
Total	**50**	**100%**
Level/Semster	**Respondents**	**Percentage**
Students <5th semester	48	96%
Students at 5th semester	2	4%
Students >5th semester	0	0%
Total	**50**	**100%**
Study Program	**Respondents**	**Percentage**
Non ICT Program	16	32%
ICT Program	34	68%
Total	**50**	**100%**

Table 1 describes the gender, students level/semester and study program of respondents. There are almost an equal number of male and female respondents. The vast majority of respondents are over than 5th semester while no respondents are from under 5th semester. The vast majority of respondents are from non-ICT study program.

4.1 Integration of High Order Thinking Skill (HOTS) in the instructional Process of Microteaching Course

This section is conducted to determine the extent to which Higher Order Thinking Skills (HOTS) are integrated into the learning process in the microteaching course. This aims to obtain a baseline description of the quality of existing learning and to identify gaps or deficiencies in the implementation of learning that encourages HOTs. Without a clear understanding of the existing level of HOTs integration, media development risks being out of context, irrelevant, or even ineffective in addressing the actual needs of students and lecturers. Statistical activity data for the Integration of High Order Thinking Skill (HOTS) in the Instructional Process of Microteaching Course can be seen below.

Table 2. Integration High Order Thinking Skill (HOTS) in the instructional Process of Microteaching Course

No	**Item**	**Scale**					**Total**
		1	**2**	**3**	**4**	**5**	
1	Including HOT in learning objectives	0%	2%	24%	30%	44%	100%

2	Incorporating HOT in choosing active learning strategy that support high cognitive involvement	0%	2%	20%	24%	52%	100%
3	Compiling learning materials that encourage students to explore, interpret, and solve problems.	2%	14%	12%	36%	36%	100%
4	Learn to design materials that use interactive digital media (simulations, digital mind maps, video analysis) to stimulate critical and creative thinking	4%	16%	10%	32%	38%	100%
5	Learn to provide high-level stimulating questions such as analytical questions, reflective, and predictive.	0%	16%	16%	20%	48%	100%
6	choose learning media that stimulates exploration and reflection.	8%	12%	12%	38%	30%	100%
7	develop assessment instruments that measure analytical, evaluation, and creative abilities.	0%	16%	12%	24%	48%	100%

Note: 1 = never, 2 = rarely, 3 = sometimes, 4 = Frequently, 5=always

4.2 The Use of Digital Media in Microteaching Courses

The use of digital media in microteaching courses serves not only as a technical aid but also as a pedagogical strategy to achieve professional competency for prospective teachers in a more holistic and contextual manner. This element is important to understand the extent of the use of digital media for microteaching courses.

Table 3. The Use of Digital Media in Microteaching Course

No	Item	Scale					Total
		1	2	3	4	5	
8	Instructional process in Microteaching Courses using *PowerPoint* media	0%	2%	16%	20%	62%	100%
9	Instructional process in Microteaching Course using Learning Videos	4%	10%	28%	26%	32%	100%
10	Instructional process in Microteaching Courses using e-learning	2%	12%	28%	32%	26%	100%
11	Instructional process in Microteaching Courses using Online Presentation Applications	22%	8%	14%	26%	30%	100%
12	Instructional process in Microteaching Courses using interactive media	26%	14%	16%	24%	20%	100%
13	Instructional process in Microteaching Courses using E-Books	8%	12%	34%	24%	22%	100%
14	Instructional process in Microteaching Courses using the Digital Smart Book Application	32%	12%	18%	22%	16%	100%
15	Instructional process in Microteaching Courses using digital discussion forums	26%	16%	14%	26%	18%	100%
16	Instructional process in Microteaching Course using microteaching simulation videos	2%	4%	36%	26%	32%	100%

17	Instructional process in Course using social media as a means of sharing learning content	6%	6%	32%	24%	32%	100%
18	Instructional process in Microteaching Courses using Class Management Applications	34%	14%	22%	14%	16%	100%

Note: 1 = never, 2 = rarely, 3 = sometimes, 4 = Frequently, 5=always

4.3 Experience of Accessing Digital Media

Every educational environment has varying levels of digital literacy. Understanding how easy or difficult it is for users to use digital media will help learning developers design interfaces, features, and navigation that are tailored to their abilities. This is crucial since Baturaja University's location is in a district with students from remote areas. This information will also support the development of products that are truly user-friendly and do not pose technical barriers to their use. To address this, several items are distributed below regarding user-friendliness in using digital media.

Table 4. The ease of accessing digital media

Ease of Access to Digital Media			
Item	**Answer**		**Total**
	Yes	**No**	
have a device to use digital media (e.g. laptop, computer, smartphone)	100%	0%	100%
have an internet connection	100%	0%	100%
have an internet connection with good stability	74%	26%	100%
Mean	**91%**	**9%**	**100%**
Daily Use of Digital Media			
use digital media (cellphone, internet, computer) more than 8 hours per day.	66%	34%	100%
use digital media for learning activities (outside the classroom)	80%	20%	100%
use digital media for learning activities to read material.	88%	12%	100%
use digital media for discussion activities about learning materials.	84%	16%	100%
use digital media for quizzes/practice activities	88%	12%	100%
Mean	**81%**	**19%**	**100%**
Attitudes Towards *Digital Smart Books*			
Know about digital media smart books	60%	40%	100%
interested in using the Digital Smart Book to study in the Microteaching Course	96%	4%	100%
Smart book digital media will increase learning motivation	98%	2%	100%
Mean	**85%**	**15%**	**100%**

The findings on the ease of access element show that 91% of respondents stated 'yes', which reflects the high level of readiness of students to access and utilize digital media as part of their learning activities. Meanwhile, as many as 81% of respondents stated 'yes' to the element of using digital media in everyday life, indicating that most students have the habit of using digital media regularly in their daily activities. Data on student attitudes toward digital media shows that 60% of respondents are aware of digital smartbooks. Interest in using this media in microteaching courses is high, with 96% of students expressing interest in using them. Furthermore, 96% of respondents also believe that digital smartbooks have the potential to increase their learning motivation.

5. DISCUSSION

5.1. Integration High Order Thinking Skill (HOTS) in instructional Process of Microteaching Course

The data shows that the integration of higher-order thinking (HOT) skills into the learning process has begun to be implemented by the majority of respondents, although with varying levels of achievement across indicators. This finding is consistent with research by Zohar & Barzilai (2013), which emphasizes that while many educators acknowledge the value of HOT skills, their actual application in instructional design and classroom activities is often superficial and inconsistent. Similarly, a study by (Gozali et al., 2021) on Indonesian pre-service teachers revealed that although there was high awareness of the importance of HOTS, many still lacked the pedagogical knowledge and confidence to implement them effectively in all aspects of instruction.

However, some indicators indicate that the level of integration still needs improvement. For example, in the development of teaching materials that encourage exploration and problem-solving, and the use of interactive digital media, the percentage of those in the strongly agree category (score 5) remained at 36–38%. Furthermore, regarding the selection of media that encourages exploration and reflection, only 30% strongly agreed, while 20%

remained at 1 and 2, indicating a need for increased understanding or practice in this element. This gap echoes the findings by Retnawati (Retnawati et al., 2018), who found that while teachers often integrate higher-order tasks in assessments, they struggle to design learning materials and media that stimulate student creativity and reflection. Additionally, Pasultri (Pasutri & Yeni, 2022) emphasized that the lack of training and limited access to digital resources often hinder the integration of technology-based HOTS instruction, especially in regions outside major urban areas.

These results indicate that the majority of students have demonstrated awareness and readiness to integrate HOTS into various learning components. However, further interventions such as training, reinforcement of practice, and provision of supporting learning resources are still needed to ensure that these skills are implemented evenly and optimally. This recommendation aligns with Khaeruddin et al. (2023), who highlighted the importance of contextual teaching support, such as the development of learning models, to improve HOTS competency, particularly for prospective teachers. Another recommendation aimed at improving prospective teachers' HOT competency is the provision of easily accessible supporting media (Ramadhani et al., 2022; Sartika et al., 2024).

5.2. The Use of Digital Media in Microteaching Courses

Data shows that the use of digital media in Microteaching courses has been implemented with considerable variation, although the level of acceptance and utilization varies by media type. The most widely used and approved media by students is PowerPoint, with 82% of respondents giving it a score of 4 and 5, indicating that this remains the primary choice for delivering material. Learning videos and microteaching simulation videos also received high acceptance, with 58% and 58% of respondents giving it a score of 4 and 5, respectively, indicating that audiovisual-based media are quite effective and preferred in microteaching practices. These findings are in line with research by Park (2022), which found that pre-service teachers tend to prefer digital content that is familiar, easy to use, and visually rich, such as PowerPoint and video-based instruction. Overall, The use of digital media, including learning videos, PowerPoint presentations, and interactive quizzes, has been found to significantly enhance students' psychological readiness for teaching practice, especially in performance-based courses like microteaching (Raya, 2025). A study by Yasin et al (2025) noted that audiovisual media significantly improves students' confidence in simulating teaching practices.

Digital media such as e-learning and social media show a positive trend, with over 50% of respondents giving high scores. This indicates that students are becoming accustomed to a more flexible digital-based learning environment. However, the use of several other digital media is still suboptimal. The use of digital discussion forums, classroom management applications, and interactive media (such as Kahoot, Quizizz, and Mentimeter) remains relatively low, as evidenced by over 50% of respondents giving scores between 1 and 3. Furthermore, the use of digital smartbooks is also low, due to the lack of digital smartbooks specifically designed to support the learning process in these course.

This finding indicates that despite enthusiasm for integrating digital media into microteaching, not all media types are being utilized optimally. Therefore, it is necessary to increase the capacity of lecturers and students to select and utilize more interactive and participatory digital media to more effectively support the achievement of pedagogical competencies.

5.3. Experience in Accessing Digital Media

The analysis results show that students are generally well-prepared and have good habits for accessing and utilizing digital media in their learning. Concerning ease of access to digital media, 91% of respondents indicated that they possessed personal digital devices and had suitable internet connection, reflecting a high level of readiness to engage in digital-based learning. However, 26% still experienced connection stability issues.

Regarding the use of digital media in daily life, an average of 81% of students reported actively using digital media for a wide range of academic activities, including reading materials, participating in discussions, completing quizzes, and doing practice exercises. This indicates that digital media use has become part of students' learning habits, even outside of class hours. Almahasees emphasized that online learning, including using digital media is a flexible and useful learning resource, despite having several limitations (Almahasees et al., 2021).

Meanwhile, regarding attitudes toward digital media, particularly digital smartbooks, it was found that although students' initial knowledge of this medium was still limited (60%), interest in using it was very high (96%), and almost all respondents (98%) believed that using digital smartbooks could increase their learning motivation, particularly in Microteaching courses. This reflects a strong receptivity to innovative digital tools, even among those who may initially lack exposure (Sung et al., 2016).

These findings emphasize the importance of designing user-friendly digital media, considering the diverse backgrounds of students—including those from remote areas such as Baturaja University. Therefore, the development of digital learning media, such as digital smart books, must consider the level of digital literacy, usage habits, and student perceptions so that they can be accessed and utilized optimally without significant technical barriers. As stated by Zhao (Zhao et al., 2021) that the development of digital media must take into account the level of digital literacy, daily usage patterns, and students' perceptions to ensure that technological solutions do not inadvertently create barriers, but rather support inclusive and effective learning.

6. CONCLUSION

The integration of higher-order thinking skills (HOTS) into microteaching has begun to be implemented by the majority of students, particularly in learning objectives, active strategies, and assessment. However, some

indicators indicate that the level of integration still needs improvement. For example, in the development of teaching materials that encourage exploration and problem-solving, and the use of interactive digital media. However, weaknesses remain in the development of teaching materials and the utilization of interactive media.
The use of digital media, such as PowerPoint and learning videos, is quite high and popular, but interactive media such as Quizizz, digital smart books, or classroom management applications remain underutilized. The majority of students are prepared and have good habits for accessing digital media, although technical challenges such as internet connection stability remain. Therefore, several alternative supports are needed, such as increased resources, the development of user-friendly digital media, or the development of learning models to support HOTS implementation and the overall effectiveness of microteaching.
The research results indicate that students' readiness to access and use digital media is quite good. These findings provide a strong basis for recommending the development of digital-based learning models that can serve as supporting media in the learning process, particularly in Microteaching courses. In this context, the development of the HOT-Teach learning model needs to be strategically designed to integrate higher-order thinking skills (HOTS) through a relevant and applicable approach. Several recommendations for developing the HOT-Teach model include:
a. To strengthen the integration of HOTS in Microteaching, it is recommended that the learning model be designed based on collaborative projects and teaching simulations. Furthermore, the development of teaching materials should focus on content that encourages students to explore ideas, solve problems, and make decisions critically and creatively.
b. Recommended digital media to support the HOT-Teach model is digital smartbook, which can be integrated with interactive media such as Quizizz and Kahoot. The presence of digital smartbook is expected to address the challenges of limited internet connections still experienced by some students, as this media can be designed to be flexible and accessible both offline and online.
By combining student preparedness, HOTS-based pedagogical approach, and the support of interactive and adaptive digital media, the development of the HOT-Teach model is expected to improve the quality of learning and encourage the achievement of optimal competencies for prospective teachers.

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