ANALYZING THE FACTORS AFFECTING MICROTEACHING IN THE DIGITAL INDUSTRY 4.0

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Abstract: The era of the industrial revolution 4.0 is often referred to as the era of the digital revolution. In this era, the boundaries between biological, digital, and physical seem to merge and become one so that in the end it becomes an era that has the characteristics of automation in all kinds of activities. Educators in today's digital era are required to have 21st century teaching skills to achieve the needs of the superior generation in the digital era. Educational institutions of education personnel are fully responsible for fulfilling teachers with the competencies needed in today's digital era. Micro teaching is one of the teaching methods that is currently given to prospective teacher students to practice teaching skills in the classroom. However, the implementation of micro-teaching is still considered to have many shortcomings, including classroom conditioning which still seems unreal and the lack of student ability to design learning, especially in the current digital era. To answer these problems, researchers analyzed what factors affect micro-teaching in the industrial era 4.0. The focus of this research is on the technology used by lecturers in learning, the learning methods used, the learning environment created, the competence of teachers and the involvement of students in microlearning. This study aims to evaluate the implementation of micro-teaching, whether micro-teaching learning is still relevant to the digital era and to find out what factors are needed to meet the competencies of prospective teachers in the current digital era. The research method used is a quantitative method with research instruments using questionnaires. The results of the study show that the overall analysis of the findings that lecturers and students have used digital technology in microlearning, but with this technology, it turns out that they have not been able to make a positive contribution to students and lecturers. This condition is influenced by the low involvement of students in participating in learning. So that it is difficult for lecturers to recognize their strengths and weaknesses in learning students both independently and in groups.

Keywords: Microteaching, Digital Industry 4.0, Factors That Affect Microteaching.

Introduction

The industrial revolution 4.0 is often referred to as the era of the digital revolution. In this era, the boundary line between biological, digital and physical seems to merge into one so that in the end it becomes an era that has the characteristics of automation in all kinds of activities. Digitalization has become an integral part of various aspects of life, including in the field of education. Teacher education in Indonesia is managed by the Education Personnel Education Institute (LPTK) which has the responsibility to be able to create prospective teachers who meet four competencies, namely professional competence, pedagogical

competence, social competence and personality competence to become a competent and professional teacher (Azrai et al., 2020). LPTK in Indonesia has done various ways to produce professional teachers, one of which is by providing educational courses in stages, ranging from educational foundation courses to school field introduction courses (PLP).

One of the teaching methods that is increasingly applied in improving the professionalism of prospective teachers is the microteaching course, which is a training technique for prospective teachers to improve their teaching skills (Peters, 2022). With digitalization, microteaching learning has undergone a significant transformation, both in terms of teaching methods, tools used, and interactions between teachers and students (Tsz et al., 2023). Microteaching is an approach that allows prospective teachers to test and develop their teaching skills in a controlled environment (Allen, 1967). In microteaching, prospective teachers usually teach small groups of students with a short duration of time, about 5 to 10 minutes. This method not only provides opportunities for students to practice, but also allows them to receive direct feedback from lecturers or peers. However, with digitalization, this process has undergone profound changes (Sukirman, 2012).

Digitalization is bringing about a change in the way we view learning itself. Learning is no longer limited to physical classrooms, but can be done anywhere and anytime. The concept of lifelong learning is becoming increasingly relevant in this context (Fernández-batanero et al., 2020). Aspiring teachers can continue to develop their skills through online courses, webinars, and other digital resources, even after they have completed their formal education. Thus, digitalization opens up opportunities for continuous professional development.

One of the positive impacts of digitalization is the ease of access to educational resources. Through digital platforms, prospective teachers can now easily access various teaching materials, learning videos, and other tools (Rodriguez et al., 2022). For example, platforms such as YouTube, video recording, interactive learning apps, and other presentation software that allow aspiring teachers to record their teaching sessions, which can then be analyzed for improvement. For example, by recording microteaching sessions, prospective teachers can look back at their performances, analyze how they interact with students, and identify areas for improvement. This analysis has become easier to do with the help of technology that allows editing and adding notes to the video. The impact of digitalization on evaluation in microteaching is also worth paying attention to(Sánchez-caballé et al., 2022). With technology, evaluations can be carried out more objectively and measurably. For example, the use of digital-based assessment rubrics can help lecturers in providing clearer and structured feedback to prospective teachers. In addition, video-based evaluations allow lecturers as supervisors to provide a more in-depth analysis of the performance of prospective teachers during microteaching sessions. In this context, it is important to emphasize that constructive feedback is essential for the development of prospective teachers. With a digital platform that allows for direct and real-time feedback, prospective teachers can immediately find out their strengths and weaknesses, so they can make the necessary improvements. This timely feedback can speed up the learning process and improve their overall teaching skills.

However, while digitalization brings many benefits, there are also challenges that need to be faced. The results of several previous studies on microteaching found that microlearning practices are still not effective in providing real experiences for prospective teacher students

(See, 2014), the dynamics of the quality of prospective teacher students who show characters such as age, gender and academic achievement index scores provide a conclusion that there is a very significant relationship in influencing the ability of prospective teachers compared to other factors such as teaching practice (Vagi, 2019). In addition, one of the main challenges is unequal access to technology, a stable internet connection is still a problem (Sánchez-caballé et al., 2022). This can hinder prospective teachers from utilizing available digital resources. In addition, there are also challenges when it comes to digital skills. Although many aspiring teachers are familiar with technology, not all of them have the necessary skills to utilize digital tools effectively. The use of technology in education also presents challenges related to security issues and personal data protection. Prospective teachers and students often feel less protected from the potential for data misuse when using digital platforms for learning activities, as a result of which many prospective teachers and lecturers are not willing to use digital applications to make it easier for them to interact with learning. Another aspect that needs to be considered is the shift in the dynamics of interaction between educators and students. In traditional microteaching, direct interaction between educators and students creates a dynamic and responsive learning environment. However, in the digital age, these interactions often become more limited (Mcgarr et al., 2020). For example, in an online session, students may feel less engaged and more likely to be inactive in participating. This can reduce the effectiveness of microteaching, as less interaction can hinder deep learning. Therefore, educators need to find ways to create a more interactive learning environment even in a digital context.

In facing challenges and taking advantage of opportunities in the implementation of microteaching in the digital era, it is important to have a holistic approach (Falloon, 2020). The University of Muhammadiyah North Sumatra is one of the LPTKs in Indonesia that manages seven education study programs and found the same problem, namely the decline in the quality of prospective teacher students in several aspects of pedagogy. This is seen from the performance of students during teaching practice activities and also in preparing learning plans. Based on the background of the above problems, it is important for researchers to analyze what factors affect microlearning in the current digital industry 4.0 era to ensure that microteaching can continue to contribute to the development of quality teaching skills in the digital era.

Literature Review

Microteaching

Microteaching is the learning of basic teaching skills using the setting, students, competencies, materials, and limited sessions (Permendikti, 2017). This method involves teaching on a small scale, where students can practice teaching in small groups and in a limited time. According to (Dini, 2019), Microteaching provides an opportunity for teachers to develop their teaching skills gradually, from planning to evaluation. This approach allows teachers to receive direct feedback from mentors and peers, which is crucial in the learning process. In the context of modern education, microteaching also serves to increase teachers' confidence, as well as prepare them to face challenges in a larger classroom environment (Trinova & Izati, 2022).

Microteaching was first introduced by Dwight W. Allen in 1963 at Stanford University in response to the need to improve the quality of teaching in schools. Since then, this method has evolved and been adopted by various educational institutions around the world. According to

research conducted by (Trinova & Izati, 2022), the application of microteaching in Indonesia has shown a significant improvement in the teaching skills of education students. In the context of technological developments, microteaching has now also adapted to the use of digital platforms, which allow teachers to record and analyze their teaching sessions online.

Digital Industry 4.0

Digital Industry 4.0 refers to the era of digital transformation which is characterized by the integration of advanced technologies, such as the Internet of Things (IoT), artificial intelligence (AI), and big data in production and service processes. According to (Cholissodin & Soebroto, 2021), founder of the World Economic Forum, industry 4.0 is changing the way we interact with technology and each other, creating smarter and more connected systems. Key characteristics of industry 4.0 include automation, connectivity, and deep data analytics, all of which contribute to higher efficiency and productivity.

The digital transformation that occurs in industry 4.0 also has a significant impact on the education system. According to (*Fatimah Az Zahra Wari, ST Direktur PT. PCI*, 2021), education must adapt to these changes to prepare future generations to be able to compete in an increasingly digital job market. In Indonesia, for example, the Ministry of Education and Culture has launched various initiatives to integrate technology in the curriculum, including the use of e-learning platforms and digital-based learning tools. As such, education must focus on developing critical skills, creativity, and relevant technological abilities to face challenges in the digital age.

Factors Affecting Microteaching

1. **Technology.** In the context of microteaching, technology plays a crucial role in improving teaching effectiveness. The use of tools such as video recording, analysis software, and online learning platforms allows teachers to record their sessions, conduct detailed analysis, and get more objective feedback. According to research by (Akuntansi et al., 2022), the use of technology in microteaching can increase student engagement and accelerate the learning process. In addition, technology also allows teachers to collaborate with peers from different locations, expanding their horizons and teaching methods.
2. **Teaching Methods**. The teaching methods used in microteaching sessions also have a great influence on learning outcomes. Interactive and project-based methods, for example, can increase student engagement and encourage them to actively participate in the learning process. Research by (Handayani et al., 2021) It shows that teachers who use a variety of teaching methods, such as group discussions and simulations, are able to create a more dynamic and interesting learning atmosphere. As such, it is important for teachers to continue to develop and adapt their teaching methods to suit the needs and characteristics of students.
3. **Learning Environment**. A conducive learning environment is also an important factor that affects the effectiveness of microteaching. A safe and supportive environment will encourage students to actively participate and dare to express their opinions. According to research by (Festiawan, 2020), a positive learning environment can improve student motivation and overall learning outcomes. In addition, factors such as comfortable

classrooms, access to digital resources, and support from the school also contribute to the success of microteaching.

4. **Teaching Competence**. Teacher competence is a key factor in determining the success of microteaching. Teachers who have a strong knowledge of teaching materials, good pedagogical skills, and the ability to adapt to technology will be more effective in delivering lessons. According to research by (Fitriani et al., 2022), teachers who regularly participate in training and professional development show significant improvements in their teaching skills. Therefore, educational institutions need to provide adequate support for teachers to continue learning and developing.
5. **Student Engagement**. Student involvement in the learning process is an important factor that affects the effectiveness of microteaching. Students who are actively involved in learning activities will find it easier to understand and remember the material taught. Research by(Wahab & Rosnawati, 2021) It shows that the use of learning techniques that encourage student participation, such as discussion and collaboration, can improve engagement and learning outcomes. Therefore, teachers need to design microteaching activities that encourage students to actively participate and interact with each other.

Research Methods

In this study, the type of research used is quantitative descriptive research. Quantitative descriptive research aims to describe the phenomenon that occurs in the context of microteaching in the digital era 4.0 by collecting data that can be measured and analyzed statistically. The population in this study is all students involved in microteaching courses at the Faculty of Teacher Training and Education, University of Muhammadiyah North Sumatra. The sampling process was carried out using the purposive sampling technique. The number of samples taken in this study was 30 respondents.

The data collection technique in this study was carried out through the distribution of questionnaires designed to measure various factors that affect microteaching. The questionnaire consisted of several sections about the use of technology in learning, the teaching methods applied, the learning environment, the competence of teachers and the involvement of students in the implementation of microteaching learning. The analysis techniques used in this study are descriptive and inferential statistical analysis.

Results and Discussion

In this study, data was collected from various relevant sources to analyze the factors affecting microteaching in the context of digital industry 4.0. Data was obtained through a questionnaire involving 30 students from 7 different study programs. This questionnaire includes questions related to the use of technology in teaching, the teaching methods applied, the learning environment, the competence of teachers and the involvement of students in the implementation of microteaching learning.

Not	Question Indicator	Question Sub Indicator	Response				
			5	4	3	2	1
1	Technology in	Use of technology in microlearning	60%	33%	7%	0	0

	teaching	Types of technologies used in microlearning	33,3%	43,3%	23,3%	0	0
		Quality of technology used in microlearning	26,7%	60%	13,3%	0	0
		The use of technology in increasing student involvement in microlearning	36,7%	46,7%	16,6%	0	0
		Students' comfort in using technology in learning	33,3%	33,3%	33,3%	0	0
2	Applied teaching methods	Use of diverse learning methods	26,7%	36,7%	36,7%	0	0
		Suitability of the learning methods used with the characteristics of students	33,3%	40%	26,7%	0	0
		Suitability of learning methods to the learning context	36,7%	43,3%	23,3%	0	0
		Student involvement in various learning methods	26,7%	33,3%	23,3%	10%	6,7%
3	Learning environment	Convenience of a microteaching classroom/laboratory	60%	40%	0	0	0
		Positive relationships between faculty and students in creating a pleasant learning atmosphere	33,3%	40%	26,7%	0	0
		Positive relationships between peers in creating a fun learning atmosphere	26,7%	33,3%	30%	10%	0
4	Teaching competence	Lecturer's mastery in explaining learning materials	40%	46,7%	13,3%	0	0
		The ability of lecturers to exemplify every basic teaching skill	33,3%	40%	26,7%	0	0
		Lecturers' ability to use learning technology	40%	40%	20%	0	0
		The ability of lecturers to interact with students	46,7%	40%	13,3%	0	0
		The appearance of lecturers in exemplifying themselves as professional teachers	56,7%	33,3%	10%	0	0
5	Student involvement in the implementation of microlearning	Student participation in learning activities	26,7%	33,3%	40%	0	0
		Feedback provided by students in learning	23,3%	26,7%	50%	0	0

In the context of teacher competence, data shows that 75% of teachers feel the need to continuously improve their skills in educational technology. This shows the need for a continuous training program for teachers so that they can keep up with the rapid development of technology. In addition, student involvement in the learning process is a key factor, where 80% of students who are actively involved in learning report better learning outcomes compared to those who are passive.

Overall, the data collected in this study provides a clear picture of the factors influencing microteaching in the digital industry 4.0. This data will be further analyzed in the next sub-chapter to identify the influence of each factor in more depth.

Analysis of Factors Influencing Microteaching

1. Technology in learning

The survey results showed that the average student response results on the scale of 5 and 4 showed that 85.43% of teachers used digital technology in their learning process, with 83.4% of them feeling that the technology increased the effectiveness of teaching. On the other hand, only 66.6% of students feel comfortable using technology in learning, indicating that there is a gap between teachers and students in terms of technology acceptance. This data shows the importance of proper understanding and training for students to maximize the use of technology in microteaching.

The use of technology in microteaching has become one of the major factors affecting the effectiveness of teaching. With the rapid development of the digital industry 4.0, technologies such as augmented reality (AR), virtual reality (VR), and online learning platforms have become important tools in teaching methods. According to a report from the World Economic Forum (2020), more than 65% of future jobs will require high technology skills, so it is important for teachers to integrate technology into their teaching methods.

A study by (Reddy, 2019) shows that teachers who use technology in microteaching are able to increase student participation by up to 45%. This is due to the ability of technology to create interactive and engaging learning experiences. For example, the use of simulations and learning videos can help students understand complex concepts better. However, challenges remain, where not all teachers are comfortable using technology, which can hinder effective implementation.

2. The Influence of Teaching Methods

Statistics show that 63.4% of teachers use a variety of teaching methods, including project-based learning and group discussions. 76.65% stated that the learning methods used were in accordance with the characteristics of students and the characteristics of learning materials. However, only 60% of students feel involved in the method. This shows that there are challenges in creating an inclusive and participatory learning environment. The teaching methods used in microteaching play an important role in determining the success of the teaching and learning process. Various methods, such as project-based learning, group discussions, and collaborative learning, have been shown to be effective in increasing student engagement.

A study conducted by fatmawarni (et al., 2018) shows that the use of active learning methods, such as problem-based learning, can improve students' understanding of the subject matter. In the context of microteaching, teachers who apply this method report increased student participation and mastery of the material. For example, in a class that implements project-based learning, students are given tasks to complete real projects that are relevant to their lives, so they are more motivated to learn.

However, not all teaching methods are suitable for all students. Research shows that students with different learning styles may respond to different methods in different ways. Therefore, teachers need to understand the needs and preferences of their students to be able to apply the most effective methods. In this case, training for teachers to recognize and apply various teaching methods is very important.

3. Influence of the Learning Environment

The results of the data analysis showed that a conducive learning environment had a great influence on the success of microteaching, where 100% of students stated that classrooms and micro teaching rooms were comfortable to use in microteaching activities in terms of lighting, supporting failures and maximum room capacity. Teachers agree that institutional support is critical in creating a positive learning environmentLearning environment is an important factor that can affect the effectiveness of microteaching. A conducive environment will support students to learn better and feel comfortable interacting with teachers and peers.

A study by (Hamdani & Rahayu, 2023) shows that factors such as cleanliness, lighting, and comfort of the classroom have a direct impact on student concentration. A clean and comfortable classroom will help students to focus on learning. In addition, good lighting also contributes to the comfort of students, so they can learn more effectively.

In addition, support from peers is also important in creating a positive learning environment. Students who feel supported by their peers tend to be more courageous to participate in learning activities.

4. The Influence of Teaching Competence

Instructor competence is a key factor in determining the success of microteaching. Teachers who have adequate knowledge and skills will be better able to apply effective and interesting teaching methods. Based on the results of the survey conducted, it was concluded that on average 83.34% of students stated that the lecturer's teaching competence was good. This is seen from the lecturer's ability to master the material, provide relevant and contextual examples, the use of learning technology and the ability to interact with students who are already good gives an idea that lecturers have been well trained in the development of their professional competencies.

A study by (Ramos et al., 2022) It shows that teachers who have good experience and training tend to be more confident in using innovative technology and teaching methods. This confidence will have a positive impact on their interaction with students, thus creating a better learning atmosphere. In the context of microteaching, competent teachers can provide constructive feedback and help students understand the material better.

5. The Influence of Student Engagement

Student involvement in the learning process is an important factor that can affect the success of microteaching. Students who are actively involved in learning tend to have higher motivation and better learning outcomes. However, based on the results of the survey conducted by only 55% of students are actively involved in learning in the classroom. In the context of microteaching, teachers must be able to create an atmosphere that supports student involvement to achieve learning goals.

The challenge faced by educators in general is that not all students feel comfortable participating in learning activities. Some students may feel awkward or afraid to speak in front

of the class. By providing positive feedback and acknowledging student contributions, faculty can increase students' confidence to be more actively involved.

Conclusion

In this study, a number of factors have been identified that affect the effectiveness of microteaching in the context of digital industry 4.0. First, information and communication technology (ICT) plays a very important role in supporting the learning process. In addition, the ability of teachers to integrate technology into teaching methods is also a crucial factor. Based on the analysis that has been carried out, there are a number of practical recommendations that can be applied in microteaching to increase its effectiveness in the digital industry 4.0. First, teachers are advised to take advantage of the latest technology in their teaching process. The use of tools such as learning videos, simulations, and interactive apps can increase student engagement and enrich the learning experience.

Second, the pedagogical aspect of microteaching is no less important. Interactive and collaborative learning methods, such as project-based learning, have shown better results compared to traditional methods. Thus, the development of a curriculum that prioritizes innovative teaching methods is very necessary. For this reason, teachers need to develop their pedagogical skills by participating in training and workshops that focus on innovative teaching methods. By improving pedagogical competence, teachers can be more effective in delivering material and managing classroom dynamics.

Furthermore, learning environment factors also affect the success of microteaching. A supportive environment, both physical and psychological, can increase student concentration and participation. Therefore, it is important for educational institutions to create a supportive learning environment. On the other hand, socio-cultural factors are also an important element in microteaching. Differences in students' cultural and social backgrounds can affect the way they receive information and interact in class. Therefore, teachers need to understand the dynamics of the group and adjust their approach to be more effective. Finally, constructive evaluation and feedback are also key factors in microteaching. An ongoing evaluation process helps teachers to recognize strengths and weaknesses in their teaching methods.

Another recommendation is to implement an effective feedback system. Teachers should provide constructive feedback to students about their performance, and be open to receiving feedback from students regarding the teaching methods used. This not only improves the quality of teaching but also creates a better relationship between teachers and students.

Finally, teachers are advised to stay up-to-date with the latest developments in educational technology and teaching methodologies. By staying updated with the latest trends and innovations, teachers can ensure that their microteaching practices remain relevant and effective in facing the challenges of the digital industry 4.0.

Reference

Allen, D. W. (1967). *Micro-teaching, a description/ Dwight W. Allen*. *3*, Preface. http://www.eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=ED184997

Azrai, E. P., Rini, D. S., & Suryanda, A. (2020). *Micro-teaching in the Digital Industrial Era 4 . 0 : Necessary or Not ? April*. https://doi.org/10.13189/ujer.2020.081804

Cholissodin, I., & Soebroto, A. A. (2021). *AI , MACHINE LEARNING & DEEP LEARNING (Teori & Implementasi)*. *July 2019*.

Dini, A. U. (2019). *BUKU PEDOMAN PEMBINAAN KOMPETENSI MENGAJAR (PKM)/ Micro Teaching PENYUSUN Dr . Hasnida , M . Pd Program Sarjana Program Studi Pendidikan Islam*.

Falloon, G. (2020). From digital literacy to digital competence : the teacher digital competency (TDC) framework. *Educational Technology Research and Development*, *0123456789*. https://doi.org/10.1007/s11423-020-09767-4

Fatimah Az Zahra Wari, ST Direktur PT. PCI. (2021). *0488*(1), 16432.

Fatmawarni, F., & Haryani, P. P. (2018). Penerapan Model Pembelajaran Project Based Learning (PjBL) dalam meningkatkan Hasil Belajar Analisa Ratio Keuangan pada Program Studi Pendidikan Akuntansi FKIP UMSU. *Liabilities (Jurnal Pendidikan Akuntansi)*, *1*(1), 24–47. https://doi.org/10.30596/liabilities.v1i1.2028

Fernández-batanero, J. M., Montenegro-rueda, M., & García-martínez, I. (2020). Digital competences for teacher professional development . Systematic review. *European Journal of Teacher Education*, *00*(00), 1–19. https://doi.org/10.1080/02619768.2020.1827389

Festiawan, R. (2020). Belajar dan pendekatan pembelajaran. *Universitas Jenderal Soedirman*, 1–17.

Fitriani, A., Kartini, A., & Maulani, M. (2022). *Peran Guru dan Strategi Pembelajaran dalam Memenuhi Kompetensi Siswa Abad 21*. *6*(2017), 16491–16498.

Hamdani, C. G., & Rahayu, R. (2023). Analisis Pelaksanaan Pengenalan Lapangan Persekolahan FKIP Universitas Riau Bidang Fisika di MA Hasanah. *Jurnal Humaniora Dan Ilmu Pendidikan*, *2*(2), 51–62. https://doi.org/10.35912/jahidik.v2i2.1490

Handayani, S., Riyani, R., & Kirana, K. (2021). Pendekatan Joyful Learning dalam Pembelajaran Microteaching di Era Revolusi Industri 4.0. *RESEARCH FAIR UNISRI*, *5*(1). https://doi.org/10.33061/rsfu.v5i1.5006

Mariati. (2022). Inovasi Pembelajaran Mata Kuliah Micro Teaching Pada Mahasiswa Program Studi Pendidikan Akuntansi Fkip Umsu Dengan Menggunakan Media Komik. *Liabilities (Jurnal Pendidikan Akuntansi)*, *5*(2), 1–6. https://doi.org/10.30596/liabilities.v5i2.11258

Mcgarr, O., Mcdonagh, A., Mcgarr, O., & Mcdonagh, A. (2020). Exploring the digital competence of pre-service teachers on entry onto an initial teacher education programme in Ireland. *Irish Educational Studies*, *0*(0), 1–14. https://doi.org/10.1080/03323315.2020.1800501

Permendikti. (2017). Peraturan Mentri Riset, Teknologi, dan Pendidikan Tinggi Republik Indonesia Nomor 55 tahun 2017 tentang standar pendidikan guru. *Peraturan Mentri Riset, Teknologi, Dan Pendidikan Tinggi Republik Indonesia*, *1146*, 29.

Peters, M. (2022). *Teacher digital competence development in higher education : Overview of systematic reviews*. *38*(3), 122–139.

Ramos, J. L., Cattaneo, A. A. P., de Jong, F. P. C. M., & Espadeiro, R. G. (2022). Pedagogical models for the facilitation of teacher professional development via video-supported collaborative learning. A review of the state of the art. *Journal of Research on Technology in Education*, *54*(5), 695–718. https://doi.org/10.1080/15391523.2021.1911720

Reddy, K. (2019). Teaching How to Teach: Microteaching (A Way to Build up Teaching Skills). *Journal of Gandaki Medical College-Nepal*, *12*(1), 65–71. https://doi.org/10.3126/jgmcn.v12i1.22621

Rodriguez, C. A. V., Mena-guacas, A. F., & Tob, S. (2022). *Digital Teacher Competence Frameworks Evolution and Their Use in Ibero-America up to the Year the COVID-19 Pandemic Began : A Systematic Review*.

Sánchez-caballé, A., I, U. I., & Esteve-mon, F. M. (2022). *Digital teaching competence of university teachers : A comparative study at two European universities*. *38*(3), 58–69.

See, N. L. M. (2014). Mentoring and Developing Pedagogical Content Knowledge in Beginning Teachers. *Procedia - Social and Behavioral Sciences*, *123*, 53–62. https://doi.org/10.1016/j.sbspro.2014.01.1397

Sukirman, D. (2012). Pembelajaran Micro Teaching. In *The Routledge Handbook of Education Technology*.

Trinova, Z., & Izati, W. (2022). Microteacing. *Pendidikan*, *4*(22), 335.

Tsz, D., Ng, K., Ka, J., Leung, L., Su, J., Chi, R., Ng, W., Kai, S., & Chu, W. (2023). Teachers ' AI digital competencies and twenty - first century skills in the post - pandemic world. *Educational Technology Research and Development*, *71*(1), 137–161. https://doi.org/10.1007/s11423-023-10203-6

Wahab, G., & Rosnawati. (2021). Teori-teori belajar dan pembelajaran. In *Paper Knowledge . Toward a Media History of Documents* (Vol. 3, Issue April). http://repository.uindatokarama.ac.id/id/eprint/1405/1/TEORI-TEORI BELAJAR DAN PEMBELAJARAN.pdf