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ASSESSING THE IMPACT OF ONLINE LEARNING ON PROFESSIONALISM OF IN-SERVICE TEACHER PROFESSIONAL EDUCATION AT ISLAMIC HIGHER EDUCATION INSTITUTIONS

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ABSTRACT

This study investigates the impact of online learning on teacher professionalism within the in-service Teacher Professional Education (TPE) program at a State Islamic Higher Education (IHE) institution in Indonesia. Utilizing a mixed-methods approach, the research focuses on four key areas: online learning practices, curriculum adaptation, instructor preparation, and the development of professionalism. The study is grounded in heutagogy, peeragogy, and cybergogy, emphasizing the importance of self-directed, collaborative, and technology-enhanced learning for Generation X teachers. Quantitative analysis reveals a moderate but significant relationship between online learning and teacher professionalism ($R = 0.573$), with 32.9% of the variance in professionalism explained by online learning ($R^2 = 0.329$). The statistical significance of this effect ($p < 0.001$) affirms the positive impact of online learning. Qualitative findings corroborate these results, with participants highlighting the relevance of course materials, the development of learning tools, and the quality of instructor feedback as key contributors to professionalism. Curriculum adaptation through benchmarking and thorough preparation by lecturers, mentor teachers, and students are identified as crucial factors in the program's effectiveness. Despite challenges such as limited face-to-face interaction and internet access, online learning has significantly enhanced teacher professionalism by providing greater accessibility, flexibility, and engagement opportunities. The study concludes that, with appropriate strategies and innovations, online learning can substantially improve teacher professionalism in the TPE program.

Keywords: Cybergogy, Heutagogy, Peeragogy, Teacher Professional Development

INTRODUCTION

In recent years, integrating online learning into higher education has become increasingly prevalent worldwide, revolutionizing traditional ways of learning and teaching. This trend is particularly evident in the field of teacher education, where institutions seek to prepare future educators with the skills and knowledge necessary for a country's sustainable development (Azaiki & Shotte, 2020; Teo et al., 2021; Skenderi & Skenderi, 2022) and meet the evolving demands of modern classrooms (Zhang, 2022; Shurygin et al., 2024; Iqbal & Ali, 2024). For instance, in the United States, all 50 states offer K-12 online learning, and several states require K-12 students to complete at least one online learning experience before graduating from high school (Kennedy & Archambault, 2012; Larson & Archambault, 2015). This policy impacts teacher education practices significantly. In Indonesia, the implementation of online learning during the Covid-19 pandemic has gained momentum (Mariyudi et al., 2021; Nurwidodo et al., 2023), driven by technological advances and increasing awareness of its potential to improve

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education access and flexibility, including in teacher professional education programs (Quddus, 2019; Siregar et al., 2022).

In Indonesia, Teacher Professional Education (TPE) is a state policy stipulated in Law No. 14/2005, which mandates that all teachers must have teaching certificates (Admin PLPP, 2022). Despite this, more than 1.5 million teachers in Indonesia still lack certification and must participate in the TPE program, primarily through the In-Service TPE. These teachers face dual challenges as educators and students (Kommalasari, 2023). In 2021, online learning for in-service TPE began at State Islamic Higher Education (IHE) institutions to address teacher vacancies in schools, using a Learning Management System (LMS) known as SPACE (Electronic Religious Learning System) (Siregar, 2023).

Amid online learning, questions have arisen about its impact on cultivating teacher professionalism in Indonesia, particularly within the Ministry of Education, Culture, Research and Technology (MECRT) and the Ministry of Religious Affairs (MoRA). One main challenge is the limited educational infrastructure and the age of learners, most of whom are older teachers from Generation X (Syafitri et al., 2024). These teachers, who have yet to fully adapt to digital technology (Musthofa et.al., 2023), must meet educational goals and achieve teacher competencies through online learning (Hanun, 2021; Musthofa et al., 2023). Ensuring the quality of education and meeting competency demands are crucial for realizing teacher professionalism.

Professionalism in teacher education encompasses mastery of pedagogical techniques, subject matter knowledge, personal and ethical principles, interpersonal skills, and a commitment to continuous professional growth (Situmorang et al., 2022; Musthofa et al., 2023; Iqbal & Ali, 2024). These attributes are essential for educators to navigate school cultures and diverse classroom environments effectively, positively influence student learning outcomes, and lead students to reach their full potential (Helmi, 2015; Zaeni et al., 2018; Amtu et al., 2020). Online learning has become an innovative educational solution, including for the in-service TPE program, with several studies highlighting its significant impact on professional competence (Musthofa et al., 2023), pedagogical skills, use of technology, innovation, and collaboration (SA et al., 2021; Haryana et al., 2021), and its challenges (Tri Murdiyanto, 2020; Hanun, 2021).

However, online learning in Indonesia presents different challenges compared to developed countries. While the United States, Finland, and Singapore (Kentnor, 2015; Kupiainen, 2019; Huang et al., 2022) benefit from advanced online learning platforms, Indonesia faces issues related to internet access, educational quality, and stress levels. In Indonesia, TPE participants deal with limitations in infrastructure and internet accessibility (Musthofa et al., 2023).

Online learning has been associated with heutagogy, peeragogy, and cybergogy, emphasizing self-directed, collaborative, and technology-enhanced learning. Heutagogy, proposed by Hase and Kenyon (2000), advocates for learner autonomy, enabling teachers to manage their learning processes and adapt to new technologies. Peeragogy, introduced by Corneli and Danoff (2011), stresses the value of collaborative learning among teachers to create a community of practice. Cybergogy, developed by M. Wang & Hannafin in the early 2005, integrates digital tools to improve learning experiences and address technological barriers faced by Generation X teachers in Indonesia.

While previous studies have explored the benefits of online learning, including improved accessibility and flexibility (Kentnor, 2015; Kupiainen, 2019; Huang et al., 2022), there is a gap regarding its specific impact on teacher professionalism in Indonesia's PTKIN system. This study seeks to fill this gap by investigating how heutagogy, peeragogy, and cybergogy can effectively apply within this context. This research examines the impact of online learning on

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professionalism of in in-service TPE at the State IHE institutions in Indonesia, focusing on four key areas: online learning evaluation, curriculum adaptation, instructor preparation, and the influence on professionalism.

METHOD

This study adopted a mixed method, which has proven helpful in exploring issues using qualitative and quantitative approaches simultaneously (Tavakoli & Azad, 2017; Julia et al., 2019). Given the phenomenon's complexity, the qualitative approach was utilized to examine the views of In-Service TPE alumni regarding the impact of online learning on teacher professionalism. This approach provides space to understand intricate details such as feelings, thought processes, and emotions that are difficult to obtain through conventional approaches (Creswell, 2015). Meanwhile, the quantitative approach was applied to analyze survey data to get a broader picture of the phenomenon. The aim was to gain a more thorough understanding of the professionalism of In-Service TPE alumni from their own and their user's perspectives.

This study used purposive sampling to select TPE alumni from Universitas Islam Negeri (UIN) K.H. Abdurrahman Wahid Pekalongan, known for its top-ranking graduates from various Indonesian provinces. Out of 1500 surveyed participants from seven batches (2021-2023), 327 responded: Central Java (270), East Java (17), West Java (12), Aceh (11), North Sumatra (8), Nusa Tenggara Barat (NTB) (6), East Kalimantan (2), and West Kalimantan (1). Survey responses by graduation year were 6.4% in 2021, 9.5% in 2022, and 37.5% in 2023. All participants consented to the use of their data for research. Data collection involved surveys, observation, interviews, and documentation. The survey, distributed via Google Docs, assessed the environment, curriculum, and online learning's impact on graduate professionalism. Observations and documentation evaluated the implementation of online learning and student competence through practice and performance videos. Graduate professionalism was measured across seven aspects: integrity, expertise, English skills, IT mastery, communication, teamwork, and personal development. Interviews with managers, lecturers, mentor teachers, alumni, and graduate users provided additional insights into strategies for producing professional teachers and satisfaction with graduate professionalism.

In analyzing the data, this research involved iterative reading of data with steps such as data selection and coding and presentation of data in case and cross-case matrices (Miles et al., 2018). The coding pattern was based on the conceptual framework and research questions, and inductive codes were used. Sub-codes were created for each aspect of the dimension under investigation, focusing on participants' teaching experiences. Patterns found in the data analysis were used to search for relevant cases and patterns, resulting in more varied explanations. Responses from the interview stage were coded by the first author and checked to increase the confidence of the analysis. Involving multiple researchers with backgrounds in qualitative studies and education, co-authors also validated and discussed these coding and data analysis procedures to ensure accuracy and reliability (Miles et al., 2018; Julia et al., 2019). In addition, data were verified multiple times to prevent premature conclusions, and direct quotes from interviews were used to support the findings. The quantitative analysis used in this study is descriptive analysis and simple linear regression analysis.

RESULTS AND DISCUSSION

This study aims to investigate the impact of online learning on teacher professional development (TPD) by exploring the views of various parties, including managers, lecturers, mentor teachers,

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students, and administrators in related institutions. The research findings resulted in four main themes, namely: (1) evaluation of online learning to prepare future teachers and identify potential weaknesses in TPD, (2) adaptation of the TPE curriculum by IHE institutions regarding online learning, (3) preparation of instructors in delivering effective online learning to improve TPD, and (4) the impact of online learning on the formation of TPD.

Theme one: online learning

This study found that evaluation of TPE program at the university was conducted through questionnaires. The results show satisfactory results in several aspects of online learning implementation, as shown in Table 1.

Table 1. Results of Questionnaire regarding Online TPE Program Learning Implementation (N: 327)

No	Statement No. X: Implementation of Online TPE Program Learning Percentage	Percentage Yes (1)	Percentage No (0)
1	Did in-depth studies discuss material in accordance with subject expertise and future demands?	99,7%	0,3%
2	Did in-depth studies discuss problem-based material and train higher-order thinking?	99,7%	0,3%
3	Were learning tool development activities oriented to the current curriculum and 21st-century skills?	99,7%	0,3%
4	Were activities related to learning tools development problem-based and designed to train higher-order thinking?	99,7%	0,3%
5	Were activities related to learning tool development carried out by instructors (lecturers and teachers) who are experts in their fields?	99,7%	0,3%
6	Did instructors (lecturers and mentor teachers) provide feedback/input on the developed learning tools?	99,7%	0,3%
7	Did you receive any briefing before taking the Comprehensive Test?	100%	0%
8	Did the Comprehensive Test assess aspects of religious moderation and Al-Quran reading and writing (BTQ) in addition to testing aspects of pedagogical and professional competence?	99,7%	0,3%
9	Did you find assistance from lecturers and mentor teachers compelling?	99,7%	0,3%
10	Did the institution organize activities that improve technology Pedagogy Content Knowledge (TPACK)?	98,8	1,2%
11	Did the institution organize activities that improve research writing skills?	97,6	2,4%
12	Did you carry out research activities (Classroom Action Research)?	98,5%	1,5%

Based on Table 1. the questionnaire results of online learning implementation in TPE program at the university show satisfactory results. Based on the questionnaire results of 327 respondents, the majority stated that the learning materials were in accordance with the expertise and demands of future teachers, the development of learning tools based on HOTS and problem-solving went well, and the instructors provided constructive feedback. The comprehensive exam covers aspects of pedagogical competence, professionalism, insights into

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religious moderation, BTQ (Baca Tulis Quran / al-Quran Reading and Writing), and Practical Teaching Experience (PTE), which are conducted effectively. However, challenges such as limited internet accessibility and connectivity, especially in remote and outermost rural areas, and the motivation of teachers approaching retirement, many of whom are female, still need to be overcome.

Online learning provides greater accessibility, flexibility, and engagement opportunities using the Learning Management System (LMS). The LMS used has been equipped with a video conferencing feature, namely Jitsi Meet. However, lecturers and students were more familiar and choose to use other platforms, such as Zoom or Google Meet. This is due to several factors, including the platforms' smoothness, ease of use, and more recognizable features. In addition, for fast communication and announcements, WhatsApp (W.A.) was often used due to its broad capabilities in reaching all participants more efficiently. For supplementary materials and learning videos, lecturers and students frequently utilized YouTube due to its reliability in streaming videos and ease of access. The selection of these platforms shows the flexible adaptation of lecturers and students to ensure the learning process runs smoothly and effectively according to their needs and preferences.

Implementing online learning in TPE Program at the university has proven effective in several important aspects. This research supports previous findings that online education can provide greater flexibility and accessibility for learners (Anderson & Dron, 2011). In-depth study activities that align with teachers' expertise and future needs show that the materials offered were relevant and supported the development of teacher competencies (Kim et al., 2019). The development of learning tools based on HOTS (Higher Order Thinking Skill) and problem-solving, as well as the implementation of the 21st-century curriculum, shows that the program is aligned with the needs of modern education that emphasizes critical thinking and problem-solving skills (Sepriyanti et al., 2022; Mat et al., 2023). Constructive instructor feedback also supports constructivist learning theory, stressing the importance of interaction and reflection in learning (Vygotsky, 1978).

However, challenges are faced in implementing online learning, such as limited internet accessibility and connectivity in remote areas and the digital divide that still exists in Indonesia (Rohayani et al., 2015). The issue of motivation of teachers approaching retirement, especially those who are female and have high self-efficacy to continue completing online learning, also suggests the need for a more personalized approach and additional support for this group (Ertmer et al., 2012; Mustadi et al., 2023). Overall, while online learning for TPE at the university provides many benefits, challenges must be addressed to improve the effectiveness and sustainability of the program. Solutions such as improved digital infrastructure in remote areas and ongoing teacher professional development programs can be an essential first step (Tondeur et al., 2016).

Theme two: Curriculum Adaptation and Innovation

Interviews with managers revealed that the university has effectively applied a benchmarking strategy to enhance and innovate its curriculum for online TPE programs. The dean noted that the university's TPE has successfully launched several excellent programs, informed by comparative studies and documentation from leading institutions like UIN Sunan Kalijaga Yogyakarta and Yogyakarta State University (S, personal communiation, December 2023). Additionally, the Head of the TPE study Program highlighted the successful implementation of a student pre-conditioning system at each stage of TPE learning. This system uses LMS called SPACE, with Jitsi Meet for video conferencing, and includes a Computer-

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Based Test (CBT) similar to the knowledge exam application for practice (F, personal communiation, December 2023). These developments demonstrate the university's innovative and adaptive approach to advancing cybergogy learning practices..

In the Decree of MoRA Republic of Indonesia No. 754 of 2020 concerning guidelines for organizing In-Service TPE, it is stated that the curriculum structure has 36 credits, consisting of Recognition of Past Experience 24 credits, in-depth studies on Pedagogical and Professional 5 credits, Learning Tool Development 3 credits, Field Experience Practice 4 credits. Based on these guidelines and the benchmarking results, it is then analyzed and socialized to the entire academic community to be adapted and implemented. As a result of this process, various innovations and adaptations in the TPE curriculum have been carried out, including video development training programs, training of Teacher Action Research writing, CBT development for pre-conditioning students to take practical exams, and assisting students in filling out UKIN portfolios. These innovations are sometimes done in a hybrid model (blended learning).

These innovations show the efforts made by the university to remain relevant and responsive to the policy of organizing TPE online. Curriculum adaptation oriented toward developing HOTS and 21st-century skills is essential in preparing prospective teachers who can face the demands of modern education. According to some researchers (Katyara et al., 2023; Haryani et al., 2021), the implementation of technology in learning increases student motivation and engagement, while a study by (Sepriyanti et al., 2022; Setiawan et al., 2021) shows that training that focuses on HOTS development is efficacious in improving analytical and problem-solving skills in learners. Overall, TPE at the university can adapt to the latest developments in the world of education through benchmarking implementation strategies and curriculum innovation, resulting in adaptive programs and in accordance with the needs of digital-era education.

Theme three: Performance of lecturers and mentor teachers

The following are the results of interviews with lecturers and mentor teachers related to preparation in delivering effective online learning to improve teacher professionalism in the TPE program. Lecturer one and Mentor Teacher one highlighted the importance of attending training sessions, mastering online platforms, and collaborating with peers to develop effective teaching strategies (Lecturer one, personal communication, February 2024; Mentor Teacher one, personal communication, February 2024). Lecturer two emphasized skill development, innovative pedagogy, supportive technology, practical assignments, and regular feedback to enhance teachers' professionalism, while Mentor Teacher one focused on monitoring progress, gathering feedback, and fostering a supportive learning environment (Lecturer two, personal communication, February 2024; Mentor Teacher one, personal communication, February 2024). Alumnus one praised the guidance provided by lecturers and mentor teachers, noting their successful adaptation to new educational technologies, while Alumnus two underscored the value of learning discipline, peer collaboration, and regular feedback in maintaining motivation and updating teaching practices (Alumnus one, personal communication, February 2024; Alumni two, personal communication, February 2024). These insights reveal strategies that align with heutagogy, peeragogy, and cybergogy, reflecting a commitment to continuous professional development and self-directed learning in online education. By attending training sessions and learning the online platform, instructors demonstrate self-directed learning, taking the initiative in their professional growth (V. C. X. Wang & Torrisi-Steele, 2015)

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Collaboration with fellow lecturers and mentor teachers is a central theme in the instructors' preparation strategies, aligning with the concept of peeragogy (Keengwe & Kidd, 2010; Corneli et al., 2015; Sembiring et al., 2024). Peeragogy underscores the value of collaborative learning, where peers learn from each other's experiences and knowledge. By sharing the best strategies and developing interactive content, instructors create a supportive community of practice. This collaborative environment is essential for professional development, as it allows for exchanging ideas, addressing challenges collectively, and refining teaching methods through shared insights.

The emphasis on learning using platform SPACE in the TPE and integrating supporting technology into teaching aligns with cybergogy, which focuses on using digital tools to enhance learning experiences. Developing interactive content and innovative pedagogy indicates a proactive approach to creating engaging and effective online learning environments. Cybergogy integrates technology with pedagogy to create immersive and impactful educational experiences (Wang, M. J., & Kang, 2006). Instructors' efforts to learn the SPACE platform and develop technology-enhanced teaching methods demonstrate their commitment to leveraging digital tools to improve student engagement and learning outcomes (Koehler et al., 2013).

The use of practical, problem-based assignments and regular feedback is highlighted by the instructors as critical strategies to enhance teacher professionalism. Problem-based learning (PBL) is a pedagogical approach that encourages learners to engage with real-world problems, fostering critical thinking and practical application of knowledge. Regular feedback mechanisms ensure continuous assessment and improvement of teaching practices. These strategies are crucial for developing relevant skills and competencies in teachers, aligning with the vision and learning outcomes of the program.

Instructors prioritize creating a supportive and motivating learning environment for effective online education by monitoring progress, obtaining feedback, and tracking participation and engagement. This approach fosters student involvement and motivation, which are crucial for successful online learning and professional growth. The interview data reveals that instructors employ strategies based on heutagogy, peeragogy, and cybergogy, integrating practical problem-based learning and feedback mechanisms. These strategies form a robust framework for online education, enhancing teacher professionalism and improving overall educational quality. Theoretical support from academic resources underscores the relevance and effectiveness of these approaches in the context of online learning.

Theme four: The Impact of Online TPE Learning on the Professionalism Development

To determine the impact of online TPE learning, alumni were given a questionnaire consisting of specific questions. These questions aim to measure the extent of the effects of online TPE learning in improving teacher competence during online TPE. Overall, TPE alumni responded positively to the perceived impact of online TPE learning, as shown in Table 4.

Table 2. Questionnaire Results of Participants' Perception on the Impact of Online TPE Learning (N: 327)

No	Statement No. Perceived Impact of Online TPE Learning Percentage	Percentage Yes (1)	No (0)
1	Did the material deepening program activities improve your competence?	99,4%	0,6%

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No	Statement No. Perceived Impact of Online TPE Learning Percentage	Percentage	
		Yes (1)	No (0)
2	Do learning tool development activities improve your competence?	99,7%	0,3%
3	Does teaching practice experience improve your competence?	99,7%	0,3%

The questionnaire results in Table 2 indicate that the deepening program activities, development of learning tools, and teaching experience practice are very effective, with a percentage of positive responses reaching almost 100%. The assessment of alumni by graduate users on a scale of 1-4 (1 = Poor, 2 = Fair, 3 = Good, and 4 = Very Good) also shows a high level of professionalism, especially in the aspects of ethics, mastery of core competencies, communication skills, teamwork, and self-development, with an average assessment of 3.4 as shown in Table 3.

Table 3. Questionnaire Result of Graduate Professionalism (N: 169)

No	Y: Graduate Professionalism	Percentage %				Average
		Poor (1)	Fair (2)	Good (3)	Very Good (4)	
I	Ethics					
1	Individual ethics	1,2%	0%	30,2%	68,6%	3,7
2	Social Ethics	0,6%	0%	29%	69,8%	3,7
3	Professional ethics	0,6%	0,6%	36,1%	63,3%	3,6
II	Main Competencies					
A	Expertise in accordance with scientific fields (main competencies)					
4	Knowledge in the field or discipline	0%	0%	48,5%	50,3%	3,5
B	Foreign Language Proficiency					
5	Arabic language skills	5,9%	20,7%	60,4%	13%	2,8
6	English language skills	6,5%	27,8%	57,4%	8,3%	2,7
C	Use of Information Technology					
7	Internet skills	1,2%	4,7%	43,8%	50,3%	3,4
8	Computer skills	1,2%	7,1%	39,6%	52,1%	3,3
D	Ability to Communicate					
9	Ability to communicate with students	0,6%	0%	34,9%	64,5%	3,6
10	Ability to communicate with peers	0,6%	0%	33,1%	66,3%	3,7
11	Work in a team / cooperate with others	0,6%	0%	34,3%	65,1%	3,7
E	Teamwork					
12	Working in a team	0,6%	0%	33,1%	66,3%	3,6
13	Tolerance	0,6%	0,6%	29,6%	69,2%	3,6
14	Adaptability	0,6%	0,6%	37,9%	60,9%	3,6
15	Loyalty	0,6%	0,6%	37,3%	61,5%	3,4
16	Integrity	0,6%	1,2%	40,2%	58%	3,4

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No	Y: Graduate Professionalism	Percentage %				Average
		Poor (1)	Fair (2)	Good (3)	Very Good (4)	
17	Working with people from different cultures and backgrounds	1,2%	1,8%	53,8%	43,2%	3,6
18	Leadership	0,6%	3,6%	53,8%	42%	3,4
19	Ability to hold responsibility	0,6%	1,8%	37,3%	60,4%	3,5
20	Project/program management	0,6%	1,8%	55,6%	42%	3,5
F	Personal Development					
21	Al-Qur'an Reading and Writing	0,6%	2,4%	39,1%	58%	3,3
22	Knowledge in accordance with field or discipline	0,6%	0%	49,1%	50,3%	3,4
23	Knowledge outside the field or discipline	0,6%	1,2%	64,5%	33,7%	3,4
24	Critical thinking	1,2%	1,8%	55%	41,4%	3,2
25	Creative thinking	0,6%	0,6%	56,2%	42,6%	3,5
26	Research skills	1,2%	9,5%	60,9%	28,4%	3,4
27	Study skills	1,2%	0,6%	49,7%	48,5%	3,4
28	Time management	0,6%	2,4%	51,5%	45,6%	3,4
29	Working independently	0,6%	3%	47,3%	49,1%	3,3
30	Ability to solve problems	0,6%	3%	52,1%	44,4%	3,4
31	Analytical ability	0,6%	2,4%	61,5%	35,5%	3,6
32	Initiative	1,2%	1,8%	54,4%	42,6%	3,4
33	Empathy	0,6%	1,2%	40,8%	57,4%	3,6
34	Ability to present ideas/products/reports	0,6%	1,2%	60,4%	37,9%	3,4
35	Ability to write reports, memos, and documents	0,6%	3,6%	59,8%	36,1%	3,3
36	Ability to continue lifelong learning	(0,6%	1,8%)	(46,7%	50,9%	3,5
	Average					3,4

Table 3 shows a very positive percentage of knowledge of the subject matter, the use of information technology, communication skills, teamwork, and self-development in line with the profile of TPE graduates as stated (Decree of MoRA Number 745 of 2020 concerning Guidelines for the Implementation of In-Service TPE at MoRA). However, there is room for improvement in alumni foreign language skills, especially in English and Arabic. Furthermore, the effect of online TPE learning (X) on Professionalism (Y) is calculated with the help of JAMOVI.

Hypothesis testing:
Ho: Online learning (X) has no significant effect on Alumni Professionalism (Y)
Ha: Online learning (X) has a significant effect on Alumni Professionalism (Y)

Significance Testing Criteria:

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If the p value > α, then Ho is accepted.
If the p value < α, then Ho is rejected.

Table 4. Testing the Relationship between Variables based on Model Fit Measures

Model Fit Measures

			Overall Model Test			
Model	R	R^2	F	df1	df2	p
1	0.573	0.329	81.8	1	167	< .001

The Model Fit Measures in Table 4 shows the value of R = 0.573, which means a moderate relationship Chin (1998) exists between Online Learning and Learning Outcomes. To determine the contribution amount of variable X to Y, use the formula R Square x 100% = 0.329 x 100% = 32.9%. The contribution of online learning variables to professionalism is 32.9%, while the remaining 67.1% is contributed by other variables not examined or outside the scope of the study. The p value in the Overall Model Test column is used to test the significance of the regression line equation. The p-value = 0.001; if the p-value < α, then H0 is rejected, and Ha is accepted. This means that online learning significantly affects professionalism in TPE learning at state IHE institution.

This research shows that online learning has several positive impacts on teacher professionalism. First, online learning improves pedagogical skills through technology such as videos and simulations. This is an effective way to develop teachers' teaching skills. This finding aligns with research by Boling et al. (2012) and Sembiring et al. (2024), observing that integrating technology into learning can enrich teaching methods and make the teaching and learning process more interactive and exciting. Using technology in learning, such as videos and simulations, improves general pedagogical skills and supports the development of psychomotor competencies required in teacher certification (Musthofa et al., 2023). Teachers who used technology in teaching before certification suggest that their psychomotor skills may result from accumulated teaching experience, not just from the teacher professional education program itself (Mansurjonovich, 2023). Therefore, integrating technology in the online learning process and certification programs significantly contributes to improving teachers' professionalism and teaching skills (Etkina et al., 2017; Musthofa et al., 2023; Laili, S. R., ET AL., 2022).

Second, online learning expands the use of technology in teaching, consistent with the research by Koehler et al. 2013; Quddus, 2019; Ritonga, M., et al., 2024). The broader use of technology in teaching allows teachers to explore various digital tools and resources to enrich students' learning experiences and improve learning effectiveness. In theory, the use of technology in online learning can be analyzed through the TPACK (Technological Pedagogical Content Knowledge) perspective, which emphasizes the importance of integrating technology with pedagogical and content knowledge. TPACK helps teachers understand how technology can support and extend learning (Koehler et al., 2013). Third, online learning enhances collaboration between teachers, enabling the sharing of best practices (Keengwe & Kidd, 2010; Ertmer et al., 2012; Teo et al., 2021). This collaboration supports teachers' professional development by providing a platform for discussion, exchanging ideas, and developing innovative teaching strategies. Fourth, online learning increases the accessibility of education, providing more flexible and inclusive learning opportunities (Wang & Torrisi-Steele, 2015;

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Fauyan, 2019; Herliandry et al., 2020; Mariyudi et al., 2021). With online learning, teachers and students can access learning materials anytime and anywhere, which benefits those with time or location constraints.

These research findings align with new 21st-century pedagogical theories, namely heutagogy, peeragogy, and cybergogy, which are highly relevant in online learning within teacher professional development programs. The practical application of these theories can inspire and motivate educators to enhance their teaching methods. Heutagogy emphasizes self-directed learning with technology as a tool for exploration. Peeragogy focuses on collaboration through online platforms, while cybergogy combines traditional and digital pedagogy to support various learning styles and create meaningful interactive environments (Wang, M. J. & Kang, 2006; Blaschke, 2012; Corneli et al., 2015).

However, online learning also presents challenges. The lack of face-to-face interaction can hinder the formation of relationships between lecturers and students and the assessment of student progress (Rahmawati & Narsa, 2019). In addition, limited opportunities for classroom teaching practice may limit the development of practical teaching skills. Challenges in maintaining student engagement can also reduce the effectiveness of online learning (Boling et al., 2012).

This challenge is complex and multifaceted, one of the main factors being the quality of the internet signal. An unstable connection can hinder access to materials, discussions, and assignment uploading, even when taking UP (Uji Pengetahuan/ online knowledge testing), especially in areas with inadequate telecommunications infrastructure. Research (Bao, 2020) shows that this problem causes students to be frustrated and less motivated, as well as to miss important information during learning sessions, which affects their understanding. Furthermore, the theory of connectivism (Siemens, 2005) emphasizes the importance of networks and connections in digital learning, which is relevant to online teacher collaboration.

The points above should be taken into consideration (Dittmar & Mccracken, 2012). Previous study reports that TPE teachers should receive individualized mentoring, exhibit full engagement, and experience continuous professional development that incorporates technology to strengthen ongoing communication and interaction and constant assessment measures using self-evaluation, themes, and continuous learning. Overall, despite some challenges, the online TPE program at the university has shown significant results in developing teachers' professionalism. The majority of respondents gave positive assessments of various competencies. These findings support the argument that online learning can be effective for TPD in Indonesia when TPE is well- implemented. IHE is expected to deliver better service particularly in TPE program in addition to their effort to integrate science and religion Khozin, K., & Umiarso, U. (2019)

CONCLUSION

This study explores the impact of online learning on teachers' professionalism within the in-service TPE program at a State Islamic Higher Education (IHE) institution in Indonesia, focusing on online learning practices, curriculum adaptation, instructor preparation, and the development of professionalism. Grounded in heutagogy, peeragogy, and cybergogy, the research emphasizes the role of self-directed, collaborative, and technology-enhanced learning in addressing the challenges faced by Generation X teachers. The quantitative analysis reveals that online learning significantly enhances teacher professionalism, with statistical results showing a moderate relationship ($R = 0.573$) between online learning and professionalism, where 32.9% of the variance in professionalism is explained by the online learning variable (R^2

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= 0.329). The significance of this effect is confirmed by an F-test with a p-value of less than 0.001, leading to the rejection of the null hypothesis, thus affirming the positive impact of online learning.

Qualitative findings support these quantitative results, with participants providing positive feedback on the relevance of course materials, the development of learning tools, and the quality of instructor feedback. The curriculum adaptation through benchmarking has been identified as a critical factor in ensuring the program's responsiveness to the demands of the digital era. Additionally, the thorough preparation of lecturers, mentor teachers, and students has been highlighted as essential for the program's success. Alumni and graduate users reported improved competencies, reinforcing the quantitative evidence of online learning's significant contribution to professionalism. Despite challenges such as limited face-to-face interaction and internet access, the study demonstrates that online learning has effectively enhanced teacher professionalism by offering greater accessibility, flexibility, and engagement opportunities.

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