
Development of Ethics Literacy Pedagogical Innovation for Pre-service Teachers within the Post Digital Society Context

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Abstract

This study is designed with the following objectives: 1) to examine the existing state and needs concerning ethics literacy pedagogy for pre-service teachers within the post-digital societal context; 2) to develop an ethics literacy pedagogy innovation for pre-service teachers within the post-digital societal context; and 3) to investigate the effects of implementing the developed ethics literacy pedagogy innovation for pre-service teachers within the post-digital societal context. Employing an action research methodology. The study involved 52 participants: 15 informants, 7 experts, and 30 pre-service teachers. Qualitative data will undergo content analysis, and quantitative data will be analyzed for means and standard deviations. Findings will be presented descriptively. The preliminary findings of the research indicate that 1) Current ethics literacy pedagogy for pre-service teachers in the post-digital society reveals a mismatch between existing teacher preparation innovations and the pedagogical demands for effectively educating future educators. Traditional ethics literacy pedagogy fails to engage digital native learners. Instructors often lack specialized expertise, and curriculum content is developmentally inappropriate, leading to inaccurate understanding. Therefore, developing enhanced ethics literacy pedagogy for pre-service teachers is crucial to cultivate appropriate professional ethics. 2) The development of an ethics literacy pedagogical innovation for pre-service teachers in the post-digital society context involved the creation of a process innovation termed the "ethics literacy pedagogical innovation." This innovation comprises five sequential stages: 1) Situating ethical dilemmas, 2) Scrutinizing ethical stances, 3) Strategizing ethical solutions, 4) Simulating ethical actions, and 5) Sharing ethical reflections. Evaluation indicated a high level of quality and suitability for this innovation. 3) Implementation of the ethics literacy pedagogy innovation for pre-service teachers in the post-digital societal context yielded the highest levels of ethics literacy among participating pre-service teachers.

Keywords: Pedagogical Innovation Development, Ethics Literacy, Pre-Service Teachers, Post Digital Society

1. Introduction

The rapid pace of innovation and technological advancements has instigated a period of disruptive technological change, exerting significant influence not only on global economic systems but also on the daily lives of populations across nations. Individuals increasingly navigate a multitude of digital technologies in their daily routines, encompassing educational practices within academic institutions, the utilization of information for administrative and managerial purposes, and various aspects of professional work. Indeed, technology has become pervasively integrated into virtually all facets of contemporary life. (Bamrungsetthapong, Tharnpanya & Satjharuthai, 2020) Consequently, education must adapt its paradigms in response to global dynamics, necessitating the pursuit of educational innovations that effectively address the diversity and transformations inherent in a disruptive society.

Higher education institutions play a pivotal role in producing graduates across various disciplines who serve as crucial resources for national population development and enhancing the country's competitive capacity. This is particularly true for teacher education faculties or colleges within higher education, which function as primary institutions responsible for preparing educators. The teaching profession is considered a highly esteemed vocation, vital for nurturing youth who will become the nation's future, and for elevating the quality of education. This recognition of the teaching profession's significance is evident in governmental emphasis on improving teacher quality. Teacher preparation curricula are designed to equip pre-service teachers with the readiness required for professional practice through instructional processes that promote and develop their diverse skills, knowledge, and abilities. (Niess, 2005; Goe, 2006; Agyei & Voogt, 2011)

The concept of teacher competency is fundamentally rooted in the belief that enhancing the capabilities of human resources, specifically educators, will empower them to leverage their skills in driving educational development towards its objectives and serve as a cornerstone for continuous professional growth. Professional competency encompasses behavioral attributes stemming from knowledge, skills, abilities, and other characteristics. The manifestation of any given competency typically necessitates the interplay of these constituent elements. Teachers must possess the competency to analyze problems and needs, engage in self-directed learning, and recognize the essential conditions for their own development. This analytical approach thus involves identifying developmental necessities by discerning the gap between the current state and desired outcomes. Teachers utilize the results of this self-analysis to seek knowledge, and the outcomes of their learning enable them to plan appropriate learning experiences by gathering relevant information to design learning activities that facilitate students' achievement of curriculum-defined goals. Cultivating teacher competency, thereby equipping educators with enhanced knowledge and skills, empowers them to transform their instructional processes, shift their attitudes towards a heightened sense of public service, and embrace the ethical principles inherent in the teaching profession, fostering a love for and commitment to their vocation, and pride in their professional identity. (McTich & Wiggins, 2004; Ministry of Education, 2010; Watcharanimit, Pimsan, & Tanawutpornpinit, 2020; Mangkhang, Yimsawat, Netti, & Kaewpanya, 2021) Furthermore, the imperative to cultivate the competencies of pre-service teachers necessitates an adaptation of pedagogical approaches to align with evolving global dynamics. It is crucial to explore area-based learning innovations to effectively address the diversity and fluidity inherent in a disruptive society. Such innovations should facilitate learning experiences that are adaptable to both physical (onsite) and virtual (online) classroom environments.

From a global citizenship education (GCE) perspective, which emphasizes the coexistence of global citizens at an international level characterized by diverse cultures, languages, ethics, skills, and the complexities of navigating life across social spheres, locales, workplaces, and educational institutions, it is argued that preparing citizens for global citizenship necessitates early development starting at the primary education level. Given the increasing prevalence of online learning modalities, traditional methods of assessing ethics should be adapted to align with the evolving context, ensuring that all pre-service teachers cultivate digital teacher ethics. This involves a transformation from conventional teaching paradigms to a hybrid learning approach, equipping educators with the skills to acquire knowledge in response to global changes, grounded in the application of digital innovations. Furthermore, this adaptation seeks to address the disparities in learners' access to and utilization of technology, acknowledging the significant role of technology in the professional lives of pre-service teachers. Consequently, it is imperative for educators to integrate technology into their practice to enhance efficiency and mitigate workplace challenges, underscoring its importance in the preparation of pre-service teachers who possess a passion for the profession, ethical integrity, and high quality. Teacher education institutions should therefore prioritize the development of teachers' skills in accordance with 21st-century competency frameworks, aligning with information and communication technology (ICT) competencies. (UNESCO, 2021) Cultivating 21st-century skills among pre-service teachers is an imperative for their future professional practice. Among these essential competencies, ethical awareness stands out as crucial for enabling them to manage their behavior and regulate their emotions effectively. Consequently, the ethics literacy of pre-service teachers equips them with the adaptability necessary to navigate diverse situations and respond adeptly to the evolving landscape of post-digital citizenship that will shape their future roles within society. (Van Laar, et al, 2017)

Since 2540 B.E., the educational system has witnessed ongoing efforts to cultivate ethics literacy among students. However, progress in developing ethics instruction across numerous educational institutions has been suboptimal, with many failing to achieve desired outcomes. A contributing factor is the suboptimal and misdirected utilization of available resources, despite the presence of resources within university-affiliated institutions that are conducive to integrating ethics for pre-service teachers. Data from the Office of the Higher Education Commission outlines the National Qualifications Framework for Higher Education, which specifies at least five desirable graduate attributes, including moral and ethical development. Nevertheless,

the specific guidelines for fostering moral and ethical development among pre-service teachers lack explicit practical guidance. Consequently, it is imperative to investigate the current challenges and needs concerning ethics literacy among pre-service teachers to establish effective approaches for instilling ethics that align with the desired attributes of future educators. (Bandura, 1977; Kohlberg, 1976; Piaget, 1960; Khiewphumpuang, 2014; Department of Religious Affairs, 2012; Buasri, 2006; Panthumnawin, 1979) Within the post-digital societal context, where information and communication technologies play a pervasive role, the cultivation of ethics literacy among pre-service teachers is of paramount importance. This is particularly salient in developing their capacity for ethical analysis and decision-making in complex and challenging situations arising from online interactions, the integration of digital social media in learning management, and the responsibility towards student data and rights in virtual environments. Educators possessing robust ethics literacy are better equipped to guide and serve as positive role models for students in the constructive, safe, and socially responsible utilization of technology.

Consequently, the research team is keenly interested in investigating the integration of ethics literacy into the teacher preparation process, which serves as a fundamental cornerstone for cultivating high-quality educational personnel capable of guiding society in a principled direction. Contemporary teacher development extends beyond mere content knowledge and pedagogical skills; it must also prioritize the profound cultivation of ethical awareness and understanding. Curriculum design and learning activities should intentionally incorporate ethical dilemmas directly relevant to the teaching profession, alongside opportunities for students to engage in simulated scenarios, analyze case studies, and engage in consistent ethical reflection. This approach aims to fortify their capacity for ethical decision-making grounded in principles of correctness and appropriateness across diverse contexts.

2. Methodology

2.1. Research Design

This study employs an action research methodology, involving the collection and analysis of data obtained through in-depth interviews, assessments of the pedagogical innovation's suitability, evaluations of ethics literacy levels, and focus group discussions. Subsequently, the research findings are presented using descriptive analysis.

2.2. Defining the Research Area, Population and Sample

The research site was designated as Suan Dusit University, Lampang Education Center, Thailand, which is a higher education institution offering teacher training programs aligned with the national standard framework of Thailand.

The research population comprises three distinct groups: 1) informants providing insights into the teaching of ethics literacy for pre-service teachers, including experts in social studies learning management who are university lecturers, social studies teachers, and social studies specialists; 2) evaluators assessing the appropriateness of the pedagogical innovation, consisting of university lecturers, social studies teachers, and social studies specialists; and 3) participants evaluating the outcomes of the pedagogical innovation, who are undergraduate pre-service teachers. The researcher employed convenience sampling for participant selection to facilitate data collection, with specific details outlined as follows:

1) Fifteen informants, providing data on the instruction of ethics literacy for pre-service teachers, were selected using snowball sampling.

2) The panel of seven experts tasked with evaluating the suitability of the pedagogical innovation was selected using purposive sampling, with the following inclusion criteria: 1) possession of a minimum educational qualification of a Master's degree; 2) demonstrated expertise in social studies or social studies education; and 3) a minimum of five years of professional experience working in educational institutions or universities.

3) The participants involved in evaluating the outcomes of the pedagogical innovation were undergraduate pre-service teachers, recruited through volunteer sampling.

2.3. The Tools

- 1) An in-depth interview protocols
- 2) A pedagogical innovation suitability assessment form
- 3) An ethics literacy assessment tool specifically designed for pre-service teachers
- 4) A focus group discussion recording forms

2.4. Data Collection

The documentary study involved the compilation of data from various sources, including documents, books, and academic journals, encompassing relevant theories, concepts, and prior research. This information was gathered to inform the analysis of the research questions and to establish a foundational understanding for the design of the ethics literacy pedagogical innovation.

In-depth interviews served as the qualitative data collection method, targeting informants involved in teaching ethics literacy to pre-service teachers. The data obtained from these interviews were subjected to content analysis to synthesize guidelines for the design of an ethics literacy pedagogical innovation. The instrument employed for this purpose was an in-depth interview protocol specifically focusing on pedagogical innovations in ethics literacy for pre-service teachers within the post-digital society context.

The design and development phase involved the collection of both quantitative and qualitative data through the creation of an ethics literacy pedagogical innovation. Subsequently, the suitability of this pedagogical innovation was evaluated by experts, and a focus group discussion was conducted with these experts to refine the innovation and enhance its comprehensiveness.

The instruments employed during this phase included a pedagogical innovation suitability assessment form and focus group discussion recording forms.

The examination of the pedagogical innovation's impact involved the collection of quantitative data through the implementation of the ethics literacy pedagogical innovation with pre-service teachers. Subsequently, their ethics literacy levels were assessed using ethics literacy assessment tool specifically designed for pre-service teachers.

2.5. Data Analysis

For the qualitative data, the research team employed an interpretive analysis approach, aligning the data analysis with the study's objectives. This process involved a thorough interpretation of the information gathered from in-depth interviews and focus group discussions. The analysis focused on synthesizing key themes within the data sets and exploring the interrelationships among these emergent themes.

For the quantitative data, the research team employed a statistical software package deemed appropriate for the analysis of the collected assessment data. The analysis was conducted using descriptive statistics, with the findings presented in terms of means and standard deviations to summarize the central tendency and dispersion of the data.

3. Results

In this research, the researcher(s) categorized the data obtained from the study and presented the research results according to the defined objectives. The research results can be summarized as follows:

1) The existing state and needs concerning ethics literacy pedagogy for pre-service teachers within the post-digital societal context indicates in the post-digital society, where information and communication technology is seamlessly integrated into the daily lives of individuals, the development of ethics literacy competence among pre-service teachers is paramount. Socio-cultural shifts have amplified the influence of online social media, while the unrestricted flow of information and advancements in artificial intelligence have engendered novel and intricate ethical challenges that are difficult to foresee in contemporary society. As crucial agents in nurturing youth, teachers must possess a profound understanding of ethical principles, be capable of critically analyzing and evaluating ethical dilemmas arising in the digital realm, and effectively apply their ethical knowledge to manage learning and cultivate an environment that fosters morality and ethics within the classroom. Illustrative case studies, such as students disseminating peers' personal information on social media without consent or utilizing writing applications without proper citation, underscore the necessity for pre-service teachers to be trained to recognize the ramifications of actions in the digital sphere. They must be adept at counseling and guiding students on ethical issues related to responsible technology use and capable of designing learning activities that promote ethical reasoning and decision-making grounded in ethical principles within the digital context. Enhancing ethics literacy encompasses not only the transmission of ethical principles but also the cultivation of critical thinking, reflection, and the application of these principles in real-world scenarios, thereby enabling pre-service teachers to serve as exemplary role models and effective leaders in promoting morality and ethics within the digital society.

The investigation into the instructional landscape of ethics literacy for pre-service teachers within the post-digital society revealed a misalignment between existing pedagogical innovations in teacher education institutions and the learning management needs of this cohort. Traditional teaching methodologies employed in ethics literacy instruction have proven ineffective in engaging digital-native pre-service teachers. Furthermore, instructors often lack specialized knowledge and expertise in this domain, resulting in instruction that primarily adheres to the prescribed curriculum content. The ethical content itself is frequently perceived as not being age-appropriate for pre-service teachers, potentially leading to misconceptions and hindering their comprehension. Consequently, the pedagogical approaches to fostering ethics literacy among pre-service teachers in the post-digital context necessitate the development of enhanced instructional strategies. This is crucial to ensure that all future educators cultivate appropriate professional ethics relevant to the contemporary post-digital landscape. Therefore, the cultivation of ethics literacy in pre-service teachers is of paramount importance for developing responsible and ethical citizens. Understanding ethical principles and the ability to critically analyze complex issues in the online sphere, such as the dissemination of misinformation (fake news), digital media copyright infringement, and cyberbullying, will empower future teachers to effectively guide and educate students to navigate the ethical challenges prevalent in the digital world.

2) The develop an ethics literacy pedagogy innovation for pre-service teachers within the post-digital societal context indicates the researcher developed a process innovation, termed the "ethics literacy pedagogical innovation," specifically designed for pre-service teachers within the post-digital society context. This innovation comprises five sequential stages: 1) Situation of ethical 2) Scrutinize ethical stances 3) Strategize ethical solutions 4) Simulate ethical actions and 5) Share ethical reflections The specific details are as follows:

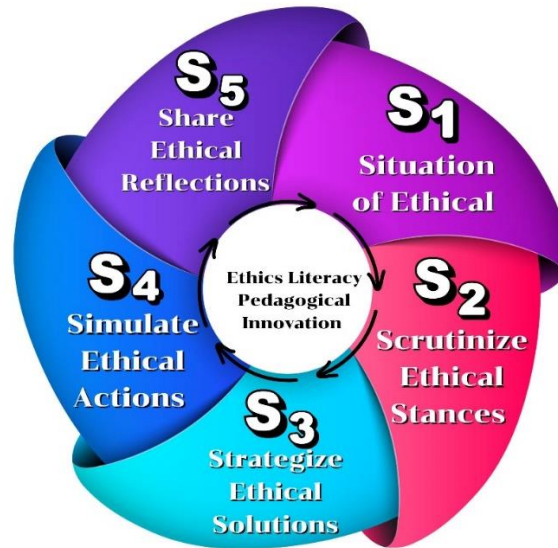


Figure 1. Ethics Literacy Pedagogy Innovation for Pre-Service Teachers within the Post Digital Society Context

1. **Situation of Ethical:** In this phase, the instructor will introduce case studies, simulated scenarios, or authentic ethical dilemmas pertinent to the post-digital society context and directly relevant to the future professional practice of educators. These scenarios should exhibit diversity and encompass critical issues such as the ethics of social media usage by teachers and students, data privacy and security in the digital realm, the fair and transparent application of technology for teaching and assessment, strategies for addressing fake news and information distortion, the impact of artificial intelligence (AI) on education and the role of teachers, the ethics of digital content creation and utilization, and online social responsibility. The instructor will design activities that encourage students to comprehensively observe the nuances of each situation, analyze the potential impacts on individuals, groups, or broader society, and identify the underlying ethical considerations. Furthermore, students will be prompted to question the appropriateness, justification, and consequences of various actions associated with the scenarios, potentially through small group discussions to foster diverse perspectives and cultivate critical ethical reasoning skills. Additionally, the instructor may integrate various digital tools, such as news video clips, online articles, opinion polls, or online discussion platforms, to enhance the realism and engagement of the scenarios. The analysis of these case studies will enable students to develop a profound and holistic understanding of ethical challenges within digital contexts, thereby preparing them for real-world encounters in their future careers.

2. **Scrutinize Ethical Stances:** In this phase, students will engage in learning and comprehending fundamental principles, concepts, and theories of ethics pertinent to the teaching profession and the post-digital society context. Instructors will present comprehensive content encompassing universal ethical principles, professional codes of conduct for teachers, relevant laws and regulations governing technology use in education, and emerging ethical considerations in the digital age, such as Digital Citizenship, Digital Responsibility, and AI Ethics. Subsequently, students will be encouraged to conduct further research from credible sources, including books, academic texts, relevant organizational websites, research articles, and successful case studies in ethical problem-solving. Students will synthesize the acquired information to develop a robust understanding of various ethical principles and establish connections between these principles and the ethical dilemmas considered in the initial phase. Activities within this stage may incorporate lecturing, group discussions, presentations, comparative analysis of ethical frameworks, and guest lectures by digital ethics experts or experienced educators. The primary objective is to cultivate a thorough understanding of ethical principles, which will serve as a crucial foundation for students to appropriately apply these principles in ethical decision-making and problem-solving within the post-digital society.

3. **Strategize Ethical Solutions:** Following the comprehension of relevant ethical principles in the second stage, students will engage in critical analysis and the development of strategies or approaches to address ethical dilemmas identified in the considered ethical scenarios. Students will participate in brainstorming sessions to generate a diverse range of potential solutions, taking into account ethical principles, potential consequences, and the feasibility of implementation. They will learn to meticulously evaluate the advantages, disadvantages, and impacts of each alternative, employing ethical principles as evaluative criteria. Furthermore, students will creatively construct problem-solving approaches that integrate ethical principles with the context of the post-digital society, appropriately and ethically leveraging technology for problem resolution. Techniques such as group discussions and collaborative work will be utilized to formulate action plans, alongside role-playing exercises to practice decision-making and communication in ethically challenging situations. Additionally, digital tools can be employed to create mind maps or comparative matrices of potential solutions, facilitating peer-to-peer learning and interaction with instructors, ultimately leading to the refinement of comprehensive problem-solving strategies.

4. **Simulate Ethical Actions:** This phase centers on providing students with opportunities to practice implementing planned ethical problem-solving approaches within simulated scenarios that closely mirror real-world situations. Instructors will design

activities that allow students to showcase their decision-making processes and actions within defined contexts, with careful consideration of the implications for various stakeholders. Students will learn to articulate the reasoning and ethical principles underpinning their decisions clearly and logically, and to experience the emotions and consequences of their actions and those of others within the given scenario. This simulation process aims to cultivate students' skills in confronting ethical challenges within a safe and supportive environment. Techniques such as role-playing, digital simulations, gamified platforms, or the analysis of documented real-world case studies can be employed. Post-simulation reflection is crucial, enabling students to recognize their strengths, weaknesses, and areas for improvement in their ethical decision-making and actions.

5. Share Ethical Reflections: In this phase, students will engage in summarizing key lessons and insights gleaned from their learning and experiences throughout the preceding stages. Subsequently, they will undertake an in-depth self-reflection on their ethical reasoning processes, any shifts in perspective or understanding regarding ethical dilemmas within the post-digital society context, as well as the emotions and awareness that have emerged. Students will communicate their reflections to peers and instructors through diverse modalities, such as reflective journals, presentations, group discussions, or the creation of digital media for sharing insights. This exchange of perspectives and experiences will serve to enhance comprehension and broaden the scope of students' learning. Furthermore, instructors may assign students the task of synthesizing personal ethical guidelines or principles to inform their future professional practice as educators in the digital age, drawing upon the knowledge and experiences acquired throughout the learning process. The sharing of these ethical reflections will also foster a community of ethical learning among pre-service teachers, which will serve as a crucial foundation for their development into virtuous and ethical educators in the post-digital society.

Following the design of the ethics literacy pedagogical innovation tailored for pre-service teachers within the post-digital society context, the research team proceeded to evaluate the suitability of this process innovation for practical implementation through expert review. The results of this evaluation are presented as follows.

Table 1. The Means, Standard Deviations, and Interpretations of the Suitability of the Ethics Literacy Pedagogical Innovation for Pre-Service Teachers within the Post-Digital Society, as Evaluated by Experts. (n=7)

Evaluation list	\bar{x}	SD	Interpretations
1) Process innovation plays a crucial role in fostering pre-service teachers' awareness of the significance of teacher ethics within the rapidly evolving context of the post-digital society	5.00	0.00	Most appropriate
2) Process innovation that integrates ethical considerations pertaining to digital technologies and social media utilization in learning management and interactions with learners is essential in contemporary educational contexts.	4.80	0.45	Most appropriate
3) Process innovation provides opportunities for students to analyze complex ethical dilemmas and scenarios within the digital context from multiple perspectives.	4.80	0.45	Most appropriate
4) Process innovation facilitates the development of students' critical thinking and ethical decision-making skills, enabling them to approach technology-related scenarios with reasoned and comprehensive analysis.	4.80	0.45	Most appropriate
5) Process innovation underscores the ethical responsibility of educators in cultivating digital learning environments that are secure, respectful of privacy, and conducive to the constructive utilization of technology.	4.80	0.45	Most appropriate
6) Process innovation fosters an environment where students can openly and constructively exchange ideas and engage in discussions on ethical issues with their peers and instructors.	4.60	0.89	Most appropriate
7) Process innovation involves the integration of diverse digital tools and platforms into learning management to foster enhanced understanding and experience in the realm of ethics.	4.60	0.55	Most appropriate
8) Process innovation facilitates students' continuous evaluation and reflection on their ethics literacy development.	4.60	0.89	Most appropriate
9) Process innovation in this context integrates universal ethical principles and concepts with the specific socio-cultural context of Thailand in the digital age.	4.40	0.89	Highly appropriate
10) Process innovation places significant emphasis on cultivating essential attributes of effective educators in the digital age, such as empathy, proficient communication skills, and the capacity for collaborative work within online environments.	4.40	0.55	Highly appropriate

11) Process innovation incorporates a multifaceted approach to evaluating student learning in ethics, employing diverse methods that align with the specified learning objectives.	4.20	0.84	Highly appropriate
12) Process innovation entails the continuous improvement and development of content and activities to remain current with the evolving landscape of digital technologies and emerging ethical considerations.	4.20	0.45	Highly appropriate
13) Process innovation facilitates students' learning and comprehension of laws and regulations pertinent to the utilization of digital technologies in educational management.	4.00	0.00	Highly appropriate
14) Process innovation provides opportunities for students to actively participate in the design of learning activities relevant to ethics within the digital context.	4.00	0.00	Highly appropriate
15) Process innovation plays a crucial role in enabling students to effectively and appropriately apply their knowledge and skills in ethics to real-world professional practice as educators within the post-digital society.	4.00	0.00	Highly appropriate
Overview	4.48	0.46	Highly appropriate

As indicated in Table 1, the overall suitability of the ethics literacy pedagogical innovation for pre-service teachers within the post-digital society was found to be at a high level ($\bar{x} = 4.48, SD=0.46$). This finding suggests that the developed ethics literacy pedagogical innovation is appropriate for implementation in instructional settings aimed at fostering ethics literacy among pre-service teachers.

3) The effects of implementing the ethics literacy pedagogy innovation for pre-service teachers within the post-digital societal context indicates the research team implemented the developed ethics literacy pedagogical innovation for pre-service teachers within the post-digital society context with the selected pre-service teacher participants. Subsequently, an evaluation of the pre-service teachers' ethics literacy levels was conducted, and the results of this assessment are as follows:

Table 2. The Means, Standard Deviations, and Interpretations of the Ethics Literacy Levels among Pre-Service Teachers. (n=30)

Evaluation list	\bar{x}	SD	Interpretations
1) Students demonstrate an awareness of the importance of teacher ethics in professional practice within the constantly evolving digital society.	4.80	0.45	Highest
2) Students are able to identify and analyze ethical issues related to the use of digital technology and online communication in learning management and interaction with students appropriately.	4.80	0.45	Highest
3) Students are able to critically consider and apply relevant ethical principles to reasonably resolve problems or situations encountered within the digital educational context.	4.80	0.45	Highest
4) Students can demonstrate accountability for the impact of using digital technology in learning management and communication, towards students, peers, and the broader online community.	4.60	0.55	Highest
5) Students are able to create and maintain a safe digital learning environment that respects privacy, and promotes creative and ethical technology use.	4.60	0.55	Highest
6) Students are able to communicate and interact with students and relevant individuals through various digital channels in a polite, respectful manner, and with consideration for potential ethical implications.	4.60	0.55	Highest
7) Students demonstrate an understanding of and the ability to comply with laws and regulations pertaining to the use of digital technology in education and the protection of personal data.	5.00	0.00	Highest
8) Students are able to evaluate and reflect on their own actions concerning ethical issues in the digital context, leading to the refinement of their behavior for greater appropriateness.	4.60	0.55	Highest
9) Students are able to appropriately integrate universal ethical principles with the socio-cultural context of Thailand in their professional practice as teachers in the digital age.	4.60	0.55	Highest
10) Students can demonstrate the attributes of an effective teacher in the digital age, such as empathy,	5.00	0.00	Highest

receptiveness to diverse perspectives, and ethical collaboration within online environments.			
11) Students demonstrate an awareness of the importance of maintaining the confidentiality and security of student data and educational information in the digital sphere.	4.80	0.45	Highest
12) Students can recognize and refrain from engaging in improper or unethical conduct when utilizing social media	5.00	0.00	Highest
13) Students demonstrate a commitment to the continuous development of their ethics literacy to remain current with digital technology advancements and emerging ethical issues.	5.00	0.00	Highest
14) Pre-service teacher students can serve as positive role models and promote students' awareness of the importance of ethical conduct in the use of digital technology and online communication.	4.80	0.45	Highest
15) Students demonstrate confidence in confronting and managing complex ethical dilemmas within the context of a post-digital society, grounded in sound principles.	4.80	0.45	Highest
Overview	4.79	0.36	Highest

According to Table 2, the overall level of ethics literacy for pre-service teachers was at the highest level (\bar{x} = 4.79, SD=0.36). Upon examining individual items, there were 4 assessment items with the highest evaluation (\bar{x} = 5.00, SD=0.00) namely 1) Students demonstrate an understanding of and the ability to comply with laws and regulations pertaining to the use of digital technology in education and the protection of personal data. 2) Students can demonstrate the attributes of an effective teacher in the digital age, such as empathy, receptiveness to diverse perspectives, and ethical collaboration within online environments. 3) Students can recognize and refrain from engaging in improper or unethical conduct when utilizing social media. And 4) Students demonstrate a commitment to the continuous development of their ethics literacy to remain current with digital technology advancements and emerging ethical issues.

4. Discussion

The existing state and needs concerning ethics literacy pedagogy for pre-service teachers within the post-digital societal context indicates a discrepancy between current pedagogical innovations in teacher preparation institutions and the pedagogical requirements for effectively educating pre-service teachers. Traditional instructional methods in ethics literacy education have proven ineffective in engaging digital-native learners. Moreover, instructors often lack specialized knowledge and expertise in ethics, leading to a reliance on curriculum content alone. The ethical content itself is frequently perceived as unsuitable for the developmental stage of learners, contributing to inaccurate understanding and negatively impacting their cognitive processing. Consequently, the pedagogical approaches to fostering ethics literacy among pre-service teachers within the post-digital society necessitate the development of enhanced instructional strategies. This is essential to ensure that all pre-service teachers cultivate appropriate professional ethics relevant to the demands of the post-digital era. This is consistent with the ideas of Knox (2019) It is proposed that, stemming from Neo-Modernism and Neo-Humanism, questions arise regarding the saturation point of the encroaching Digital Age. Technological advancement is diminishing the value of humanity and causing people to lack a sense of social participation. This gives rise to the concept of the post-digital society, which aims to present an alternative perspective between humans and technology. The challenge lies in studying the progress and efficiency of future technology in a way that returns the focus of citizens to a greater sense of 'nature' and 'humanity'. This is to be achieved while still being able to live amidst the rapidly changing world of technology, in order to drive equitable humanity in the society of the future. And This aligns with the concept of Dechakhup, & KhangKhan (2008) It has been posited that significant societal changes in Thailand necessitate highly competent teachers, not only to adapt learning management to learners' potential but also to develop learners' capacity to navigate both current and future social contexts. Furthermore, Campbell (2003) also suggested that the majority of students recognize the importance of ethics, but differences exist in their level of understanding and ability to apply them in real-world situations. This indicates the necessity of enhancing understanding and providing practical training related to the ethics of the teaching profession in teacher education curricula.

The develop an ethics literacy pedagogy innovation for pre-service teachers within the post-digital societal context indicates the researcher developed a process innovation, termed the "ethics literacy pedagogical innovation," specifically designed for pre-service teachers within the post-digital society context. This innovation comprises five sequential stages:1) Situation of ethical 2) Scrutinize ethical stances 3) Strategize ethical solutions 4) Simulate ethical actions and 5) Share ethical reflections. The quality and suitability of this innovation, as evaluated, were found to be at a high level. This aligns with the work of Khampol (2019), which posits that in developing students to possess the potential and readiness to be good citizens, ethics is a

crucial element that must be cultivated within students. Furthermore, ethics constitutes the rules and norms of conduct that members of society perceive as virtuous and acceptable to both themselves and society. It is a principle of cause and effect, enabling the discernment of what is right and should be done from what is wrong and should not be done. This is because ethics is rooted in culture, which serves as a guiding principle for human conduct in society to coexist peacefully. This is also consistent with Panich's (2015) assertion that engaging learners in hands-on activities, real-world experiences, or emotional engagement facilitates their development of an understanding of values, leading to higher-order paradigm shifts or thinking. And this aligns with Watcharanimit, Pimsan, & Tanawutpornpinit (2020), who proposed that teacher competency development should focus on enhancing teachers' knowledge and abilities, empowering them to transform their instructional processes, and cultivating a strong sense of public consciousness, professional ethics, and a profound sense of professional love and pride. The proper approach to development is to enable teachers to cultivate their self-development competencies.

The effects of implementing the ethics literacy pedagogy innovation for pre-service teachers within the post-digital societal context indicates pre-service teachers who underwent instruction utilizing the pedagogical innovation designed to enhance ethics literacy within the post-digital society context demonstrated the highest level of ethics literacy. This aligns with the concept proposed by the Secretariat of The Teachers' Council of Thailand. (2013), which states that ethics are important to the teaching profession. Professional ethics are crucial for maintaining professional standards as stipulated in the National Education Act B.E. 2542 (1999), and enable the profession to fulfill its duties to society, including its role in accordance with the esteemed status of a high-level profession. Service recipients and society benefit from education that meets educational quality assurance standards and the elevation of professional standards. Teachers' adherence to professional standards, as defined by the Teachers' Council and Educational Personnel Act B.E. 2546 (2003), is governed by the Teachers' Council's regulations concerning professional standards and professional ethics B.E. 2556 (2013), which outlines educational professional standards in three areas: professional knowledge and experience standards, performance standards, and conduct standards or professional ethics, to ensure the quality of work and the teaching profession. Furthermore, Mangkhang, Yimsawat, Netti, & Kaewpanya (2021) also emphasized that competence is a crucial aspect of the teaching profession, serving both as a professional performance standard and a career goal. Promoting competence in pre-service teacher students will contribute to the advancement of Thai educational policies and reform mechanisms, and has the potential to develop the Thai education system to be on par with international standards of quality.

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