

Ethical Constructs in Sustainable Technology Integration among English Student Teachers in Islamic Higher Education

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Abstract

Background: Sustainable development in education depends on how future teachers adopt technology ethically and responsibly. **Objective:** This study examined how Islamic values function as ethical mediators of technology integration efficacy among English student teachers in PTKIN institutions. **Methods:** Using a hermeneutic phenomenological design, data were collected through two rounds of in-depth interviews with seven participants (P-01 to P-07) and analyzed through an integrated lens of DigComp 2.2, TPACK, and Bandura's sources of self-efficacy. **Results:** The study uncovered three related themes: mentor modeling as ethical exemplarity rather than technical instruction; the active role of Islamic values (*amanah*, *tabayyun*, *maslahah*) as filters guiding the selection and adaptation of digital content; and an uneven transfer between personal and professional digital competence. **Conclusion:** Ethical reasoning, not infrastructure alone, sustains responsible technology use in faith-based teacher education, offering a locally grounded pathway toward Education for Sustainable Development.

Keywords: digital literacy; hermeneutic phenomenology; Islamic values; sustainable education; technology integration efficacy

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INTRODUCTION

Sustainable development in higher education is becoming more contingent on the way future teachers are utilizing technology responsibly and ethically. Digital literacy can no longer be considered a value-free technical skill. It is an ethic-loaded skill, especially in institutions whose professionalization processes are heavily influenced by religion. The dynamics for the adoption of digital technology and digital skills in the case of PTKIN institutions are culturally, technologically, and institutionally different, and the lecturers in these institutions still grapple with digitalization in the age of industry[1].

Studies have found technology integration efficacy in existing literature to be in accordance with the four sources of self-efficacy outlined by Bandura; namely, mastery experience, vicarious experience, social persuasion, and physiological states [2]. Further literature establishes the role of digital technology in developing sustainable education practices in significant ways [3]; however, there is an absence of studies that use DigComp 2.2 and TPACK framework in Islamic higher education. Recent studies confirm this gap among Indonesian EFL pre-service teachers [4,5], as both studies point out that they still have problems transferring their technological competence into the classrooms. This phenomenon has also been observed among pre-service teachers in European countries who do not feel ready enough to develop digital competencies in students [6]. Both of these frameworks were primarily designed for secular educational settings and do not cover the impact of religious and cultural values on technology integration.

This gap is relevant to sustainable development within the context of education. The research conducted by Suyadi et al. posits that institutional approaches to reform and sustainability in Indonesian Islamic higher education are necessary, however, the influence of individual ethical values on teachers' approaches to technology has not been sufficiently studied [7]. This corresponds to a number of general research results about unevenness of alignment between teacher training programs and sustainability in general [8] and how the digital literacy of future teachers influences Sustainable Development Goal 4 on quality education [9]. Research on Islamic values in educational process indicates that project approach based on Islamic values is effective in terms of increasing civic and environmental literacy [10]. Hence, it might be possible that the ethical dimension could be applicable in the area of digital literacy as well. Such Islamic values as *amanah* (trustworthiness), *tabayyun* (verification before action) and *maslahah* (general benefit) could become an instrument of evaluation of digital literacy by student teachers.

The gap in research is filled by conducting a hermeneutic phenomenology study [11] of the lived experience of seven English student teachers at PTKIN institution. The study analyzes the role of Islamic values as ethical mediators of technology integration efficacy based on the DigComp 2.2, TPACK, and sources of self-efficacy theory by Bandura. The results can be used for the discourse on sustainable development because technology integration based on values can become a local approach to digital transformation.

Theoretical Framework

This research combines three different frameworks that are used at once not sequentially: DigComp 2.2, TPACK, and self-efficacy sources suggested by Bandura [2]. Every framework represents a separate aspect of technology integration efficacy, which altogether makes up a multilayered perspective on participants' experiences.

Five areas of competence are mentioned in DigComp 2.2; namely, information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving [12]. It is a model explaining what digital competence is all about. The model of TPACK provides an extension to DigComp 2.2 in order to embed digital competence in pedagogical and content decision making in the case of English student teachers [13]. There have been recent findings indicating that digital literacy partially mediates the relationship between TPACK and twenty-first-century teaching competencies [14].

Bandura's four sources of self-efficacy, mastery experience, vicarious experience, social persuasion, and physiological and emotional states, explain how confidence in technology use develops over time [2]. These sources are typically treated as psychologically neutral processes, and recent research continues to position self-efficacy as a critical design component of technology-infused teacher preparation programs [15]. This study repositions them within an ethical frame specific to Islamic higher education.

Islamic values, namely *amanah* (trustworthiness), *tabayyun* (verification before action), and *maslahah* (public benefit), function as an ethical mediating layer across all three frameworks. Rather than treating digital competence, pedagogical knowledge, and self-efficacy as value-neutral constructs, this study proposes that participants filter each through an Islamic ethical lens. This integrated model positions ethical mediation as central to sustainable, responsible technology integration in faith-based teacher education.

METHODS

Study design and setting

The present study adopted a hermeneutic phenomenological design based on van Manen [11] for studying the lived experience of English student teachers regarding their efficacy in integrating technology into teaching within the Islamic higher education setting. This method is consistent with an interpretivist ontology and constructivist epistemology in which the meaning that participants have can be constructed through conversation between researcher and participant. This method was chosen because it is more concerned with lived experience than with outcomes and thus ethics and culture emerge organically from the participants themselves.

Population, samples and sampling

Seven English students-teachers (P-01 to P-07) were purposely selected according to certain criteria, which included having practical teaching experience and being willing to reflect on their use of technology. Purposeful selection made sure that the participants could provide detailed experiences related to the study's questions. No specific criterion other than insufficient practicum experience was used for exclusion.

Instruments and criteria

Data collection involved conducting a semi-structured and in-depth interview guide which focused on digital literacy skills, mentoring experiences, and value-based decision making. This interview guide was designed based on the three theoretical frameworks used in the study, which include DigComp 2.2, TPACK, and Bandura's sources of self-efficacy framework.

Procedure and data collection

The data were gathered by means of semi-structured, in-depth interviews, which were conducted in two stages. The second stage transcripts were utilized as the main source of verbatim data, while the first stage interviews provided additional triangulation. Interviews were conducted in Indonesian and recorded with the respondents' consent.

Statistical analysis

Since this research is of qualitative nature, no statistics have been done. However, the collected data was analyzed through the use of seven-stage hermeneutic phenomenological method suggested by van Manen [11]. It was an iterative process starting from entire transcripts and going down to thematic units, and it resulted in identifying of repetitive themes reflecting the way of how Islamic values influenced participants' integration of technology into their lives.

Ethical considerations

Written informed consent was secured from all subjects prior to conducting the study. Recruitment processes were conducted via an external agency so that there would be no appearance of coercion because of the researcher's organizational affiliation. Transcripts were anonymized during transcription, while the environment in which interviews were conducted was kept informal.

Trustworthiness

The validity of the research was attained through the application of the four validity criteria as put forward by Lincoln and Guba: credibility, transferability, dependability, and confirmability [16]. Credibility was enhanced through member checking and long-term engagement with the participants, in line with the new interpretations of member checking as a hermeneutic approach in recent times [17]. Transferability was achieved by way of thick description of the setting and participant backgrounds.

RESULTS

The analysis of the interviews conducted in round two involving seven participants (P-01 to P-07) yielded three themes concerning the implementation of sustainable and ethical technology integration. The themes, along with the sub-themes and verbatim excerpts, are illustrated in Table 1 below.

Table 1. Themes, Sub-themes, and Representative Verbatim Codes Relevant to Sustainable Technology Integration (n = 7)

Theme	Sub-theme	Illustrative Verbatim (translated)	Participant
1. Mentor Modeling and Relational Guidance	1a. Mentor as technology role model (<i>uswatun hasanah</i>)	"He became an <i>uswatun hasanah</i> , a good example, for me"	P-03

Theme	Sub-theme	Illustrative Verbatim (translated)	Participant
2. Islamic Values as Ethical Filter for Digital Practice	1b. Autonomy-supportive mentoring	"She never told me I had to use a specific app"	P-01
	1c. Purposeful, non-excessive technology use modeled	"Use it if it helps students, don't let it burden you"	P-02
	2a. Content screening for religious-cultural appropriateness (<i>adab</i>)	"I don't take it directly, I check it first"	P-02
	2b. Amanah and <i>tabayyun</i> in source use	"I cite my sources as a form of <i>amanah</i> "	P-03
	2c. Adapting Western content to Islamic-Indonesian context (<i>masalah</i>)	"I kept the idea but changed the dialogue examples myself"	P-02
	3. Personal-Professional Digital Transfer	3a. Personal fluency transferring to teaching practice	P-06
		3b. Confidence gap between personal and professional use	P-03
		3c. Social media as informal source of pedagogical ideas	P-02
		"The idea for teaching sometimes comes when I'm not preparing material at all"	

Table 1 shows the three themes and the sub-themes associated with them in distinct analytical categories. But it should be noted that the experiences of the participants as individuals did not manifest themselves as independent elements. Mentorship, ethical filtering, and digital transfer would often be experienced simultaneously.

Mentor Modeling and Relational Guidance

The participants never portrayed the mentors as being role models only technically, but more as role models ethically. P-03 mentioned that a mentor is like *uswatun hasanah*, making the role of teaching technology part of Islamic education, whereby the mentors set good examples to the mentees. P-01 stated that mentoring

was supportive of autonomy, whereby the mentors offered the mentees flexibility on what to use.

Islamic Values as Ethical Filter for Digital Practice

Content was deliberately filtered based on the Islamic ethics principles before adopting it. For instance, P-02 explained the process that he goes through to verify external content before using it, which is related to the principle of *tabayyun*. On the other hand, P-03 linked citation practices directly to *amanah*, framing academic honesty as a religious obligation

Personal-Professional Digital Transfer

The participants also discussed how they were able to apply the digital skills that they learned within the context of themselves into their professional practice as teachers, but this was done inconsistently. Participant P-06 talked about how he used his design program that he acquired through himself for instructional purposes. This shows that the skill was transferred spontaneously. Participant P-03 talked about how she hesitated even though she had the skills from herself.

DISCUSSION

Mentor Modeling and Relational Guidance

The importance of mentorship in this study corroborates the idea of Bandura's theory of vicarious experience as the main source of self-efficacy [2]. The explanation provided by P-03 of an *uswatun hasanah* as a mentor reveals the role of observational learning that happens in an ethically particular cultural context and not through general role modeling. This finding echoes Yim's conclusion about the importance of vicarious experiences in building the self-efficacy of pre-service teachers [18] and fits well with the findings of a recent systematic review of mentoring competencies in teacher education, where cognitive, social, and emotional components have been identified [19]. Nonetheless, this study contributes to this body of literature through showing that in the case of PTKIN vicarious learning is intrinsically linked to the example set by religion. In addition, the explanation of P-01 about autonomous mentorship confirms the importance of context-specific pedagogy stressed in TPACK since the mentors demonstrated flexibility rather than rigidity in using technologies.

Islamic Values as Ethical Filter for Digital Practice

This theme shows how information and data literacy dimension of DigComp 2.2 works through a consciously religious evaluative process. The P-02 case of verifying content before using it is an example of how *tabayyun* is used as an effective implementation of critical digital literacy. It corroborates the findings of Suyadi et al., stating that for sustainable reform in Indonesian Islamic higher education value-based institutional strategies should be implemented along with technical changes [7]. Linking citation practice to the concept of *amanah* in P-03 shows that digital literacy is adopted by students as a part of their moral obligation, not procedural one. This is in line with the findings showing that Islamic value internalization, particularly *amanah* and accountability, creates a separate faith-based basis of digital ethics beyond that of the secular digital citizenship [20]. Adaptation of Western instructional materials in P-02 by local context demonstrates the use of *maslahah* as a guiding principle in design, similar to the findings of Farida et al. who stated that Islamic values

can enhance contextual literacy if incorporated in the learning design [10]. Generally, these findings correspond to the calls for new modernized moral framework adequate for cyberspace communication [21].

Personal-Professional Digital Transfer

Research findings associated with this topic highlight the issue of unequal transfer of digital skills from private to professional spheres, which correlates with TPACK's hypothesis that technology knowledge per se is not sufficient for its pedagogical use. The spontaneous transfer of Canva into instruction material by P-06, as well as P-03's hesitancy although being proficient in the use of digital technologies in private life, is a sign of self-efficacy gap, related to the situation of professional usage rather than technological knowledge, as Bandura argued [2]. Moreover, the self-efficacy gap is relevant for the sustainable training of teachers, because there is a scholarly consensus that digital technologies could contribute to sustainable educational processes only under certain structural support for their pedagogical application [3]. P-02's narrative of the socially derived pedagogical ideas shows that professional digital skills could be formed spontaneously, therefore providing grounds for the development of scaffolding in PTKIN institutions.

CONCLUSIONS

This research has been carried out to understand the role played by the Islamic values as ethical mediators of technology integration efficacy among the English student teachers at the Indonesian Islamic higher education institutions. It has been found that the modeling by mentors, ethical filtering of the digital content and digital transfer from personal to professional domain have been working together in contributing to the preparedness of the participants to use technology ethically. The mentors were regarded by the participants as ethical models rather than technical models, thus developing an understanding of vicarious experience put forward by Bandura [2] through culturally and religiously rooted role modeling.

These results add to Education for Sustainable Development debates as they show that sustainability in digital transformation is not achieved through infrastructure or technological skills alone, but also through the value framework within which technology is implemented and taught. Value-based implementation of technologies used by those involved in this research provides an example of such digital transformation that can be replicated in other faith-based universities.

This study is bound by its reliance on only seven participants within one PTKIN university setting, and generalizations should not be drawn statistically from the results obtained. Further studies may look into whether such an ethical mediation approach holds true in other Islamic universities or if mentorship schemes can close the transfer gap noted here.

CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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DECLARATION OF ARTIFICIAL INTELLIGENCE USE

We confirm that all AI-assisted processes were critically reviewed by the authors to ensure the integrity and reliability of the results. The final decisions and interpretations presented in this article were solely made by the authors.

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