
THEMATIC ANALYSIS OF PHYSICS EDUCATION STUDENT THESIS RESEARCH (2023–2025) WITHIN THE FRAMEWORK OF "RISING TOGETHER IN UNCERTAIN TIMES: RESILIENT STRATEGIES FOR AN INCLUSIVE & ROBUST ASEAN ECONOMY"

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Abstract

This research aims to analyze the themes of physics education students' theses from 2023–2025 to identify their contribution to inclusive and resilient ASEAN economic development strategies. Using a thematic analysis approach (Braun & Clarke, 2006), this study examined thesis titles and grouped them into main themes: digital transformation in physics learning, strengthening science literacy and 21st-century skills, developing digital teaching materials, integrating Islamic values in science education, and innovating low-cost teaching aids and digital laboratory technology. The analysis results indicate that student research is not only relevant to the needs of modern education but also has strategic implications for human capital development and educational innovation that support a knowledge-based economy in ASEAN. This finding confirms that research by Physics Education students has the potential to become one of the drivers of the local edutech ecosystem, strengthening the Islamic economy, and forming human resources that are adaptive, innovative, and ethical in facing the dynamics of the VUCA era.

Keywords: thematic analysis, Physics Teaching, digital transformation, scientific literacy, ASEAN economy, Islamic economy.

INTRODUCTION

ASEAN countries are currently facing extremely rapid structural changes due to technological disruption, geopolitical uncertainty, and global economic dynamics. This condition strongly reflects the characteristics of VUCA (Volatility, Uncertainty, Complexity, and Ambiguity), which requires countries in the region to develop greater adaptive capacity. Digital transformation, regional economic integration, and economic resilience challenges are crucial components of the region's policy strategy (ASEAN Secretariat, 2025). Policies such as the ASEAN Economic Community Strategic Plan and the ASEAN Declaration on Human Resources Development emphasize that human resource development is a key pillar in facing global disruption. (ASEAN Declaration on Human Resources Development for the Changing World of Work and Its Roadmap, n.d.).

In the realm of education, collaboration among ASEAN countries thru forums like the ASEAN Senior Officials Meeting on Education (SOM-ED) demonstrates that educational integration is not only about academics but also an economic strategy. Jan Gawron (2017) explains that ASEAN countries strengthen cooperation in the education sector due to economic motives – namely, to improve the quality of the workforce and regional competitiveness (Gawron, 2017). Thru this synergy, ASEAN seeks to bridge the digital skills and literacy gap among its members so that all countries can participate in the knowledge-based economy.

Science education – particularly physics – plays a strategic role in shaping innovative and adaptable human capital. In the literature, it is proven that the development of scientific and engineering human capital in ASEAN is crucial for long-term economic growth (Tullao & Cabuay, 2015). Higher education in physics can produce graduates who not only master theory but are also capable of contributing to technological innovation,

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research, and digital transformation. This is consistent with the results of empirical studies showing that higher education has a significant impact on economic growth in ASEAN countries (Maneejuk & Yamaka, 2021).

The Physics Education Study Program at Islamic universities holds unique potential: combining science education with Islamic values. Thru student research (the thesis), various innovations emerged such as digital modules, inquiry methods with Islamic values, and contextual learning tools based on local wisdom. This integration not only strengthens scientific understanding but also fosters Islamic character and ethics in a modern context – a significant contribution to the construction of ethical and resilient human capital in ASEAN.

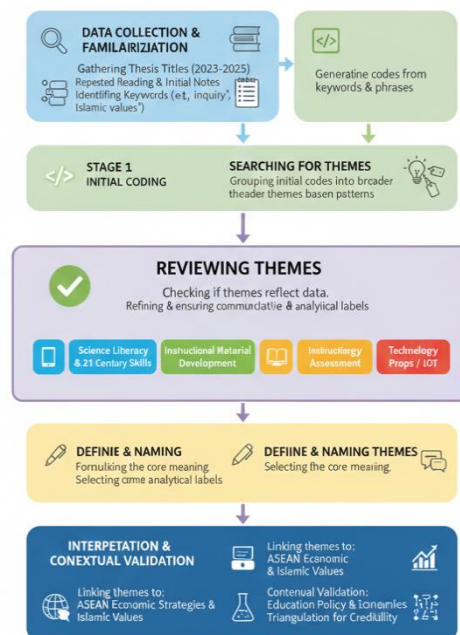
Analyzing the thesis topics of Physics Education students from 2019–2025 is highly relevant for assessing their academic contributions to ASEAN's inclusive and resilient economic strategy. A thematic exploration of the research topics can demonstrate how physics education plays a role in building an innovation ecosystem, enhancing digital literacy, and strengthening cultural/Islamic values in order to develop adaptive and sustainable human capacity..

METHODOLOGY

This study uses Braun and Clarke's (2006) thematic analysis as a qualitative approach to understand the main patterns in the thesis titles of Physics Education students from the 2023–2025 period. Thematic analysis was chosen for its flexibility in interpreting textual data and its ability to identify meaningful themes thru a reflective process (Braun & Clarke, 2006). The stage-by-stage diagram can be seen in **Figure 1**.

THEMATIC ANALYSIS OF PHYSICS EDUCATION THESIS TITLES (2023-2025)

Based on Braun & Clarke (2006) Methoology



Picture. 1 Diagram of thematic analysis adapted from Braun and Clarke (2006)

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The analysis process begins with the collection of data in the form of a list of Physics Education thesis titles from 2023 to 2025. After the data was collected, the researcher familiarized themselves with it by repeatedly reading each title, noting initial impressions, and identifying frequently occurring keywords such as "e-learning," "inquiry," "Islamic values," "simulation," and "module." This stage is important so that the researcher truly understands the context and hidden meaning behind the thesis phrases.

Next, coding was performed by creating initial codes from important keywords and phrases. These codes were then grouped into larger themes according to emerging patterns. In this study, the codes were grouped into five main themes: (1) digital learning media, (2) science literacy & 21st-century skills, (3) instructional material development, (4) technology assessment, and (5) laboratory innovation / props / IoT. This step follows the coding and organizing phases of the code as described by Braun & Clarke (2006).

After the initial themes are formed, the researcher conducts a theme review to check whether the themes truly reflect the original data and corrects the themes if necessary to make them representative and cohesive. Then, in the theme definition and naming stage, the researcher formulates the core meaning of each theme and selects appropriate labels to reflect the essence of each theme, making the themes more communicative and analytical (Braun & Clarke, 2006)).

Finally, the researchers interpreted the findings by linking the emerging themes to ASEAN's economic strategies and Islamic values. This interpretation is enriched by contextual validation thru relevant literature on education policy and Islamic economics, making the analysis not only descriptive but also contextual. The validity of the analysis is strengthened thru triangulation with literature reviews (policy and theoretical) so that the conclusions drawn are more credible and relevant to the research objectives.

RESULT AND DISCUSSION

A thematic analysis of 185 undergraduate theses from Physics Education students between 2023 and 2025 revealed that digital transformation is the most dominant theme. This theme is evident in the numerous theses that focus on the use of digital simulations, virtual laboratories, and technology-based inquiry learning models. This innovation becomes highly relevant in addressing Volatility, Uncertainty, Complexity, and Ambiguity (VUCA) conditions, as technology enables more flexible learning, safe exploration of physics concepts, and provides space for developing higher-order thinking skills. This finding aligns with empirical reports indicating that guided inquiry-based digital simulations can enhance the critical thinking abilities of university-level physics students (Lahme et al., 2023)

Beside digital transformation, scientific literacy and 21st-century skills have also emerged as a focus of student research. Many theses develop e-modules, digital worksheets, and problem-solving-based teaching materials designed to improve scientific representation, argumentation, and conceptual understanding. A systematic study by Andriyani et al., (2024) also confirms that interactive physics learning media significantly impacts improving students' scientific literacy. Thus, the development of scientific literacy in student research serves not only as a reinforcement of academic competence but also as an important contributor to human capital development in a knowledge-based economy.

Another prominent theme is the development of digital teaching materials, including physics modules, e-modules, and digital student worksheets. The production of digital teaching materials reflects a pedagogical

response to the needs of distance learning and blended learning. Additionally, the availability of digital teaching materials enhances the efficiency of learning governance thru ease of access, distribution, and material customization according to students' needs in the era of technological disruption.

The aspect of integrating Islamic values into physics learning is also an important theme. Several theses incorporate Islamic values such as monotheism, scientific ethics, and spiritual reflection into physics modules. This integration reflects a more holistic view of science education, where moral and spiritual values are not separated from the mastery of scientific concepts. In Islamic educational literature, Wahyuni (2020) states that integrating Islamic values into science education is a reconstructive effort to harmonize scientific and spiritual understanding (Wahyuni, 2020). Additionally, other research states that the integration of Islam and science in integrated Islamic schools has been implemented in the curriculum and strengthens students' character with religious values (Fajri et al., 2025; Sofianto & Irawati, 2025).

Additionally, student research also contributes to the innovation of low-cost teaching aids and experiments. Many theses design simple experimental devices, low-cost digital tools, and microcontroller-based prototypes that can reduce dependence on conventional laboratories. This innovation is highly relevant in the context of equalizing access to science education, while also providing opportunities for the development of local edutech products. This approach aligns with the idea that integrating technology and Islam can strengthen the ethics of scientific innovation, including in the context of efficiency and sustainability (Kusuma et al., 2025).

A summary of these findings is presented in **Table 1**, which provides a quantitative overview of the distribution of themes that emerged in student theses during the analysis period.

Table 1. Thematic Findings of Undergraduate Theses in the Tadris Physics Program (2023–2025)

No.	Theme	Frequency (n)	Description	Sample Thesis Titles
1	Digital Transformation in Physics Learning	62	Use of digital simulations, virtual labs, and technology-assisted inquiry to enhance flexible learning in VUCA contexts.	<i>PhET-Based Guided Inquiry Simulation for Critical Thinking</i>
2	Scientific Literacy and 21st-Century Skills	48	Development of e-modules and digital worksheets aimed at strengthening scientific reasoning and representation.	<i>Interactive Media to Improve Scientific Literacy</i>
3	Digital Teaching Materials and Adaptive Governance	39	Creation of digital modules and learning kits supporting blended and remote learning ecosystems.	<i>Design of a Physics E-Module for Blended Learning</i>
4	Integration of Islamic Values in Science Education	23	Alignment of physics learning with Islamic ethics, spirituality, and tawhid-based frameworks.	<i>Physics Module Integrated With Islamic Values</i>

No. Theme	Frequency (n)	Description	Sample Thesis Titles
5 Low-Cost Teaching Aids and Local Edutech Innovation	13	Development of affordable experimental tools and microcontroller devices for resource-limited schools.	<i>Low-Cost Digital Experiment Kits</i>
Total	185		

Overall, the research findings indicate that the theses of Physics Education students not only reflect the development of technology-based pedagogy but also demonstrate the integration of Islamic values, innovation in teaching aids, and an orientation toward the economic efficiency of education. Thus, student research has the potential to contribute to the development of human capital that is adaptive, ethical, and responsive to global challenges within the context of an inclusive and resilient ASEAN economy.

CONCLUSION

The results of a thematic analysis of physics education students' theses from the 2023–2025 period indicate that their research has strategic relevance to ASEAN's inclusive and resilient economic development agenda. This finding confirms that digital transformation in physics learning is an important response to the dynamics of the VUCA era characterized by volatility, uncertainty, complexity, and ambiguity while also serving as a foundation for improving the quality of science learning. Additionally, strengthening scientific literacy and 21st-century thinking skills is a significant contribution to shaping future educators and innovators who can compete in a knowledge-based economy. The development of digital learning materials also shows that students play a role in creating an educational governance system that is more adaptive, flexible, and responsive to contemporary educational challenges. Integrating Islamic values into physics learning provides a moral and ethical dimension that enriches the pedagogical approach, aligning with the development of sharia economics in the region. In addition, the innovation of low-cost and effective teaching aids opens up opportunities for the emergence of local edutech products with the potential for commercial development. Thus, research by Physics Education students not only contributes academically to the field of education but also presents strategic potential in supporting sustainable human resource and economic development in ASEAN.

REFERENCES

1. Andriyani, D. R., Sari, K. A., Putri, P. I., Desnita, D., & Usmeldi, U. (2024). Effectiveness of physics interactive learning media in improving learners's science literacy skills: Systematic literature. *EduFisika: Jurnal Pendidikan Fisika*, 9(3), 168–175.
2. *ASEAN Declaration on Human Resources Development for the Changing World of Work and Its Roadmap*. (n.d.).
3. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.

4. Fajri, I., Jamiat, A., Andika, R. R., Kosim, M., & Zalnur, M. (2025). Integrasi Al-Qur'an dan Sains dalam Pembelajaran MTK di MTs. *Quranic Scientia. Edu Society: Jurnal Pendidikan, Ilmu Sosial Dan Pengabdian Kepada Masyarakat*, 5(2), 956–968.
5. Gawron, J. (2017). Why ASEAN is Cooperating in the Education Sector? *IKAT: The Indonesian Journal of Southeast Asian Studies*, 1(1), 87–113.
6. Kusuma, A. C., Safitri, E., & Asifa, N. A. (2025). Integrasi Nilai Islam Dalam Inovasi Teknologi: Menyongsong Era Digital. *MARAS: Jurnal Penelitian Multidisiplin*, 3(1), 229–234.
7. Lahme, S. Z., Klein, P., Lehtinen, A., Müller, A., Pirinen, P., Rončević, L., & Sušac, A. (2023). Physics lab courses under digital transformation: A trinational survey among university lab instructors about the role of new digital technologies and learning objectives. *Physical Review Physics Education Research*, 19(2), 020159.
8. Maneejuk, P., & Yamaka, W. (2021). The impact of higher education on economic growth in ASEAN-5 countries. *Sustainability*, 13(2), 520.
9. Sofianto, E. W. N., & Irawati, R. K. (2025). Nilai Integrasi Islam pada Mata Kuliah Keterpaduan Islam dan Sains. *Global Perspectives in Education Journal*, 1(2), 45–52.
10. Tullao, T., & Cabuay, C. (2015). Education and human capital development to Strengthen R&D capacity in ASEAN. *Draft Paper for Explicating Jakarta Framework of Moving ASEAN Economic Community (AEC) Beyond*.
11. Wahyuni, A. (2020). Integration of Islamic Values in Science Education'A Reconstruction Effort in Education'. *Halaqa: Islamic Education Journal*, 4(2), 163–168.