

THE CONCEPT CONSTRUCTION OF INDONESIAN LANGUAGE E-MODULE DEVELOPMENT BASED ON TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE IN INCLUSIVE SENIOR HIGH SCHOOLS IN BALI PROVINCE

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ABSTRACT

The Indonesian language e-module in inclusive schools plays a crucial role in coordinating students, including those with special needs. Technological Pedagogical Content Knowledge (TPACK) is a framework that emphasizes the importance of integrating technology and pedagogy in educational content development. This study aimed to: (1) develop a TPACK-based e-module for inclusive senior high schools and (2) explore and analyze the concept of an Indonesian language learning e-module based on TPACK in inclusive senior high schools. The research employed both qualitative and quantitative approaches with the following stages: (1) exploring and analyzing the implementation of TPACK in inclusive senior high schools and (2) constructing a draft concept for a TPACK-based Indonesian language e-module. The e-module development followed the IDDEI model. This approach provides new guidance for teachers in implementing technology in learning, ensuring that teaching and learning activities are conducted effectively and efficiently in alignment with 21st-century demands, where teachers are required to be proficient in applying technology. The findings revealed that the developed e-module was valid, practical, and effective, making it suitable for use in Indonesian language learning, particularly in drama materials. The advancement of science and technology can be leveraged to enhance the quality of learning, and teachers need to understand and possess TPACK competencies. Therefore, the use of TPACK-based e-modules in inclusive senior high schools is essential, and the concept of Indonesian language e-module development based on TPACK needs to be implemented.

Keywords: Indonesian language; e-module; concept construction; inclusive schools; TPACK

INTRODUCTION

Children with special needs are defined as those requiring education tailored to their learning barriers and individual needs (Ulva et al., 2020). Inclusive schools, with their educational service systems, require that children with special needs be accommodated according to their abilities alongside their peers (Fransisca et al., 2021). Inclusive education is an approach aimed

at meeting the learning needs of all children without discrimination or segregation. It involves the full placement of children with mild, moderate, and severe disabilities in regular classrooms (Sakiinatullaila, 2020). Learning in inclusive schools requires additional teaching materials, such as e-modules. E-modules facilitate student access to learning materials, as they can be accessed through various

devices such as smartphones, computers, tablets, and laptops (Fitriyah, 2021). Inclusive schools accommodate and assist the development of students with special needs by implementing various educational approaches. They treat children with special needs equally to regular students by providing the same learning environment and educational experiences. Inclusive schools modify and adapt educational strategies to meet the diverse needs of students with special needs (Krisnanda et al., 2023).

The purpose of using e-modules is to obtain information that can be used as a reference in planning learning programs for students (Diana & Dahlan, 2021). The Indonesian language e-module serves as a process for acquiring data or information regarding students' skill mastery, which is then used to design appropriate learning programs (Saputra, 2023). E-modules are modifications of conventional modules that integrate information technology to create more engaging and interactive materials. E-modules allow for the inclusion of multimedia features such as images, animations, audio, and video (Sukendra et al., 2023). Interactive e-modules are developed electronically and can be accessed through mobile

phones or other electronic reading devices. However, an e-module is only meaningful if teachers understand the subject matter, the types of skills being developed, and the stages of student learning (Artawan & Suarta, 2022). Thus, a learning approach based on Technological Pedagogical Content Knowledge (TPACK) is necessary. TPACK is a framework that emphasizes the integration of technology and pedagogy in content development for education. This approach provides new guidance for educators on how to incorporate technology into teaching, ensuring that learning activities are conducted effectively and efficiently (Malik et al., 2020). TPACK consists of three core components: technology, pedagogy, and content knowledge.

Aligned with 21st-century education, teachers are expected to be proficient in integrating technology into learning (Jayantika & Namur, 2022). TPACK represents the integration of technology, pedagogy, and content knowledge (Surat et al., 2022). In today's technology-driven era, teachers must be adept at integrating these three elements. Concept construction is an active process of forming new concepts or knowledge. In this process, concepts are linked to

existing ones to generate new understandings (Mayudana et al., 2020). Research findings indicate that Indonesian language e-modules in inclusive senior high schools must be designed differently from those in regular schools (Lestari & Kurnia, 2023). A TPACK-based Indonesian language e-module is expected to accommodate all students, including those with special needs. Therefore, a new concept for a TPACK-based Indonesian

language e-module in inclusive senior high schools is necessary to meet students' learning needs.

Developing more efficient and engaging modules can enhance students' interest and motivation in reading learning materials, as electronic modules often incorporate interactive features such as animations, videos, images, and audio. The advancement of science and technology in the 21st century supports interactive learning processes. For instance, various technology-based learning media and computer-assisted learning tools have been widely adopted in academic settings. This aligns with Karno (2015), who stated that e-learning plays a significant role in the learning process. Besides e-learning, digital

modules have emerged as a teaching medium driven by technological advancements (Suarta et al., 2022). Essentially, module development should address the challenges posed by the era of disruption. In other words, learning modules should be designed based on technological advancements. In language modules, the structure and characteristics of teaching materials are organized in a way that mimics an instructor's teaching style (Suarta, 2020).

E-modules are a form of self-learning media developed in digital format, aiming to support the achievement of learning competencies and encourage student interactivity through digital applications (Sukendra & Fridayanthi, 2021). This is supported by previous studies (Fausih, 2015) on e-module development, which found that the use of e-modules in computer network engineering programs at SMK Negeri 1 Labang improved students' learning outcomes, as evidenced by t-test results where the calculated t-value was greater than the critical t-value.

Previous research on TPACK (Wijaya et al., 2020) indicated that the development of TPACK-based learning media had passed validation and could

be implemented for students. Similarly, Aulia et al. (2021) found that a TPACK-STEM-based e-module significantly improved students' scientific literacy skills. The difference between this study and previous research is that this study specifically focuses on facilitating problem-solving skills in Indonesian language learning. In the era of globalization, where technology continues to advance, teachers must be skilled in utilizing learning support tools, such as TPACK-based media, to create engaging and enjoyable learning experiences (Rahmatiah et al., 2022). The purpose of this study is to develop a TPACK-based Indonesian language e-module for inclusive senior high schools and to construct the concept and quality of the TPACK-based Indonesian language e-module for inclusive senior high schools in Bali Province.

METHOD

This study employed a mixed-methods approach, integrating qualitative and quantitative methods to develop a Technological Pedagogical Content Knowledge (TPACK)-based Indonesian language e-module for inclusive senior high schools in Bali Province. The study was conducted

using the ADDIE development model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation.

1) Research Approach

This study applied both qualitative and quantitative approaches. Qualitative data were collected through observations, in-depth interviews, document analysis, and focus group discussions (FGDs). Observations were conducted to understand the learning needs in inclusive schools, while interviews with educators provided in-depth insights into the challenges of teaching the Indonesian language. Document analysis was used to examine the curriculum, material needs, and student characteristics (Sukendra et al., 2023).

Quantitative data were collected using questionnaires as the primary instrument. The instrument was designed and validated by experts through validity testing (Pearson Product Moment) and reliability testing (Cronbach's Alpha). The analysis results supported qualitative data in developing the e-module (Sukendra et al., 2023).

2) ADDIE Model Stages

a. Analysis: Identifying learning needs, including learning objectives, student characteristics, and challenges in

inclusive schools. This analysis was conducted through teacher interviews and field observations in several inclusive senior high schools in Bali Province.

b. Design: Developing an e-module framework based on the analysis results. The storyboard and learning materials were designed according to learning indicators, with a focus on analyzing texts and linguistic elements of a drama.

c. Development: The initial draft of the e-module was developed, incorporating text, images, animations, and videos. Validation was carried out by three expert groups: (1) Media Experts: Evaluated the visual design and interactivity of the e-module. (2) Content Experts: Assessed the alignment of content with the curriculum and learning objectives. (3) Language Experts: Ensured the appropriate use of language for inclusive high school students. Revisions were made based on expert feedback.

d. Implementation: The trial phase was conducted in two stages: (1) Limited Trial: Involving 4 students to test the initial feasibility and usability of the e-module. (2) Field Trial: Involving 40 students to evaluate the effectiveness of the e-module in Indonesian language

learning. Likert scales and open-ended questionnaires were used for assessment.

e. Evaluation: Conducted in two forms: (1) formative evaluation: carried out during the development phase, and (2) summative evaluation: conducted after implementation.

The evaluation results were used to refine the e-module and finalize its concept.

3) Research Population and Sample

The research population included inclusive senior high schools in Bali Province. The research sample was determined using purposive sampling, selecting schools that met the criteria of having technology-supported learning facilities.

4) Data Collection and Analysis Techniques

a. Data Collection: Data were collected through interview guidelines, observations, questionnaires, and document analysis (Atmaja et al., 2021).

b. Data Analysis: Qualitative data were analyzed descriptively to identify learning needs and challenges, and quantitative data were analyzed using descriptive statistics to measure the validity, reliability, and student responses toward the e-module.

5) Validation and Finalization

The final validation was conducted through a focus group discussion (FGD) with experts, educators, and the education department. The obtained data served as the foundation for the finalization of the TPACK-based Indonesian language e-module.

RESULTS AND DISCUSSION

Based on interviews towards some students regarding the development process of the TPACK-Based E-Module for Indonesian language learning, students felt the need for additional materials to support independent learning and improve their mastery of the Indonesian language. The development of a TPACK-based e-module for inclusive senior high schools was deemed highly suitable. This study employed the ADDIE instructional design model, which consists of five stages:

1) Analysis Stage

This research began with an analysis of the education curriculum, learning needs, and technology integration. Curriculum analysis was done by doing interviews with educators which implemented the Merdeka Curriculum. Needs analysis was conducted through teacher interviews and direct classroom

observations, where students were given test questions on analyzing the content and linguistic aspects of drama. Findings from teacher interviews show that there was a lack of innovative teaching materials in Indonesian language learning, causing students to feel bored and disengaged. Students needed an instructional guide that incorporated computer-based learning media aligned with technological advancements. There was no existing innovative teaching guide focused on analyzing the content and language of drama.

The findings from the needs analysis indicated that Indonesian language learning was not engaging due to a lack of modification in teaching methods, including the absence of multimedia learning tools. Consequently, students experienced boredom and had difficulty concentrating during lessons. To address these issues, a digital learning tool was required to enhance teaching effectiveness and student engagement. Based on teacher interviews conducted from October 23–30, 2024, at SMA Negeri 8 Denpasar, SMA Negeri 1 Semarapura, and SMA PGRI 1 Denpasar, it was found that facilities such as computer labs and LCD

projectors were available to support technology-enhanced learning. Technology analysis shows that in the modern era, technology utilization in education has become essential. The lack of engaging learning media led students to struggle in understanding drama scripts in terms of content and linguistic features. This issue hindered learning effectiveness, prompting the need for a TPACK-based e-module to facilitate drama script demonstrations while focusing on content and language comprehension.

2) Planning / Design Stage

At this stage, a storyboard was created based on the findings from the analysis stage. The e-module was designed as a structured framework for instructional material development. Then, the researcher collected relevant materials, exercises, and illustrations for the e-module. The researcher also designed

validation instruments for expert reviews, including media experts, Indonesian language content experts, and Indonesian language education experts. These instruments were validated by academic supervisors before being refined for further use. The initial e-module draft was designed following specific indicators related to analyzing the content and language of drama scripts. The e-module structure covered drama plot structure, acts in drama, linguistic features of drama, drama performance preparation, and drama staging techniques.

3) Development Stage

After completing the initial draft, the e-module underwent expert validation involving media experts, Indonesian language education experts, and content experts.

Table 1. Media Expert Eligibility Test

Aspect				
A	B	C	Percentage	Category
4	15	37	89.50%	Highly Feasible for Use

Table 2. Indonesian Language Material Expert Eligibility Test

Aspect					
A	B	C	D	Percentage	Category
7	21	13	16	87.50%	Highly Feasible for Use

The media expert provided feedback that the e-module was well-developed and ready for implementation. The validation results showed a score of 89.5%, categorized as "Highly Feasible for Use." The Indonesian language content experts, consisting of lecturers in Indonesian language education, evaluated the e-module based on content feasibility, presentation feasibility, language feasibility, and the alignment with the TPACK framework. The Indonesian language education expert provided minor suggestions and critiques that the introductory video should include concrete two-dimensional objects to help students

relate the material to real-life experiences, and the bibliography should be expanded with references related to analyzing the content and language features of drama scripts.

The validation results from the Indonesian language education expert yielded a score of 87.50%, categorized as "Highly Feasible for Use." The e-module was considered well-developed, with minor revisions needed based on the suggestions. Finally, the Indonesian language expert conducted an evaluation to determine the overall feasibility of the e-module as an instructional tool for Indonesian language learning.

Table 3. Conclusion of the Results of the Expert Feasibility Test of Indonesian Language Material

Aspect					
A	B	C	D	Percentage	Category
8	23	11	15	92.50%	Highly Feasible for Use

The language expert validation results showed a score of 92.5%, categorized as "Highly Feasible for Use." At this stage, the feasibility level was considered excellent, provided that the suggested revisions were implemented. After the revisions, it was concluded that the Indonesian language e-module for Drama material in Grade X

was highly suitable for use without further revisions and ready for trial implementation.

4. Implementation Phase

The TPACK-based interactive e-module, having been validated and deemed feasible by experts, proceeded to the implementation phase, which involved two stages of trials such as limited-scale

trial and field trial. Limited-scale trial was conducted with four students selected homogeneously. The student questionnaire results for the teaching material showed content completeness 90%, attractive design 89%, excellent color combination 88%, easily understandable language 90%, illustrations representing drama material 70%, and E-module's ability to assist in analyzing drama content and language 86%.

Field trial was conducted with 40 students using a Likert scale questionnaire via Google Forms. The results showed content completeness 75%, attractive design 68%, excellent color combination 70%, easily understandable language 59%, illustrations representing drama material 66%, and E-module's ability to assist in analyzing drama content and language 67%.

5. Evaluation Phase

The final version of the TPACK-based Indonesian language e-module was refined based on expert validation, limited-scale trials, and field trials. The final product focused on two main subtopics, such as: analyzing the content and language of drama texts and demonstrating drama scripts while

considering content and language aspects. Through the evaluation phase, subject matter experts, media experts, language experts, and student response surveys provided comprehensive feedback on the e-module's feasibility. Their evaluations also served as a foundation for future e-module developments.

DISCUSSION

The Technological Pedagogical Content Knowledge (TPACK) framework integrates technology, pedagogy, and content knowledge to enhance effective learning. This framework does not merely focus on each component separately but emphasizes their integration to address specific pedagogical needs. In inclusive education, TPACK assists teachers in designing learning experiences that are relevant, interactive, and inclusive, catering to diverse student needs, including those with special educational needs.

This study demonstrated that developing a TPACK-based e-module using the ADDIE model yielded significant results. Expert validation indicated a high level of feasibility across content, media, and language aspects.

Additionally, positive student responses confirmed that the e-module enhanced learning motivation, particularly in Indonesian language learning. These findings align with previous studies, such as Chai, Koh, and Tsai (2013), which emphasized that TPACK enhances effective classroom teaching and serves as a critical foundation for measuring teachers' readiness to integrate technology in education.

Beyond student benefits, TPACK adoption also enhances teacher professionalism. Educators are encouraged to actively function as curriculum designers, utilizing technology to deliver meaningful learning experiences. This study also highlights that TPACK-based e-module development fosters educational innovation aligned with 21st-century learning demands.

In terms of implementation, the trial results indicated that interactive multimedia elements—such as animations, videos, and illustrations—made the learning material more engaging and easier to understand. This aligns with the perspective that technology-enhanced e-modules not only support content comprehension but also increase student engagement.

However, further development is necessary to expand the e-module's applicability, particularly in inclusive education settings. The evaluation findings provide a strong basis for future e-module improvements, including applications in other subjects and educational levels.

Thus, this study makes a significant contribution to technology-based educational innovation, particularly in inclusive schools. Furthermore, it reinforces the importance of TPACK as a theoretical and practical foundation for designing adaptive and relevant learning experiences in the digital age.

CONCLUSION

The integration of information and communication technology in education requires the Technological Pedagogical Content Knowledge (TPACK) framework, which is an essential competency for 21st-century educators. This study found that the development of a TPACK-based Indonesian language e-module using the ADDIE model resulted in a valid, practical, and effective learning tool for inclusive high schools.

The validation results revealed that: (1) Content experts provided an average

rating of 87.5% (Highly Feasible); (2) Media experts provided an average rating of 89.5% (Highly Feasible); and (3) Language experts provided an average rating of 92.5% (Highly Feasible). Student responses indicated an overall satisfaction rate of 90.5%, demonstrating that the e-module supports interactive, relevant, and inclusive learning needs.

Thus, the TPACK-based Indonesian language e-module is suitable for classroom use, enhancing learning quality, particularly in inclusive education settings in Bali Province. This study contributes significantly to technology-based learning innovations, supporting the national education goals.

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