

JEMPITA Model: 21st Century Learning Innovation in Elementary Schools

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Abstract—This research explores the Joyful, Experiential, Meaningful, Personalized, Integrated Technology, and Sustainability Oriented (JEMPITA) learning model as an innovative 21st-century pedagogical approach in Indonesia. This research is grounded in the observation that existing learning models have yet to fully accommodate 21st-century skills such as critical thinking, collaboration, communication, creativity, and technological integration. The JEMPITA model was designed by integrating deep learning theory to create engaging, meaningful, and contextually relevant learning experiences, and has received significant support from both teachers and educational experts. Employing a research and development (R&D) approach, this study adopts the 4D Model (Define, Design, Develop, Disseminate), though it is limited to the defining and designing phases. The research participants consist of Elementary School teachers in West Java, Indonesia. Data were collected through closed- and open-ended questionnaires, interviews, and focus group discussions (FGDs). A needs analysis involving 1,875 respondents indicated a strong demand for a learning model that enhances learning motivation, personalization, technological integration, and sustainability orientation. Among the model's components, joyful and meaningful factors emerged as the most urgently needed, whereas the primary challenges identified were limited training and inadequate infrastructure. These findings suggest that the JEMPITA model holds strong potential as a transformative approach to primary education that is responsive to 21st-century challenges.

Index Terms—JEMPITA, deep learning, 21st-century competencies, primary education innovation model

I. INTRODUCTION

In Indonesia, particularly in West Java Province, primary education continues to face substantial challenges in promoting effective, meaningful, and in-depth learning experiences for students. Although less engaging, conventional instructional models remain predominant, limiting opportunities for personalized learning and rarely incorporating sustainability principles. Consequently, they often fail to meet the demands of 21st-century education, which requires the cultivation of critical thinking, communication, collaboration, and creativity (Trilling & Fadel, 2009; Kaufman, 2013; Bamalli, 2014; Erdoğan, 2019; Aryana et al., 2022; Aryana, 2024). Moreover, the limited integration of technology and sustainability has further contributed to the inadequacy of existing pedagogical approaches in responding to contemporary educational developments (Mishra & Koehler, 2006; Ghavifekr & Rosdy, 2015; Aryana et al., 2024).

In response to this current state of affairs, the Indonesian Ministry of Primary and Secondary Education has introduced a deep learning approach through mindful, meaningful, and joyful learning. The theory of deep learning underscores the importance of experiential and reflective approaches to cultivating twenty-first-century competencies (Lamb, 2004; Buczkowski et al., 2018; Dingli & Fournier, 2017; Gonçalves et al., 2018). Previous studies have highlighted that joyful and experience-based learning models enhance students' motivation and academic performance (Brophy, 2004; Rahmawati et al., 2024; Aryana et al., 2025).

However, its application in Indonesian language instruction remains limited, as teaching practices still emphasize linguistic skills in isolation while neglecting the dimensions of personalization and sustainability (Aryana et al., 2022; Syihabudin & Ratnasari, 2020; Albantani & Madkur, 2018). Furthermore, research indicates that although technology integration has been shown to enhance language learning (Tilahun et al., 2017; Wekke & Hamid, 2013; Aryana & Salsabila, 2024), pedagogical approaches combining technology, sustainability, and personalization within Indonesian language education remain scarce. This implicates an urgent need for innovative learning frameworks which are more closely aligned with the holistic learning needs of Indonesian Elementary School pupils. One such framework is the Joyful, Experiential, Meaningful, Personalized, Integrated Technology, and Sustainability-Oriented (JEMPITA) model.

The JEMPITA model is structured around six core components: (1) joyful learning, which promotes enjoyable learning experiences that enhance motivation (Brophy, 2004; Rahmawati et al., 2024); (2) experiential learning, emphasizing hands-on, experience-based learning (Kolb, 1984; Akella, 2010); (3) meaningful learning that connects learning materials to real-life contexts (Ausubel, 1968, as cited in Bryce & Blown, 2024; Reber, 2019; Bryce & Blown, 2024); (4) personalized learning which tailors instruction to meet individual learners' needs (Tomlinson et al., 2003; Rickabaugh, 2016; Essa et al., 2023); (5) integrated technology, or utilizing digital tools to enrich and transform pedagogy (Mishra & Koehler, 2006; Davies & West, 2014); and (6) sustainability-oriented learning which embeds both global and local sustainability perspectives within classroom practice (Prihantini et al., 2024; Sterling, 2024; Wang et al., 2022). In combination, these components aim to address the cognitive, affective and psychomotor domains while simultaneously fostering environmental and social responsibility.

Nevertheless, despite extensive literature on joyful learning, technology-enhanced learning, and project-based approaches, most studies within the Indonesian context remain limited to quantitative designs, primarily focusing on basic skills without holistic integration (Aryana et al., 2022; Zulfikar, 2018; Sugiyono, 2019). Only a few have adopted innovative methodologies, such as research and development (R&D), to design, validate, and implement comprehensive learning models that systematically integrate deep learning and twenty-first-century competencies. Therefore, this study aims to fill this gap by developing the JEMPITA model as a sustainability-oriented and competence-based learning framework for primary education in Indonesia. Specifically, this study seeks to address the following research questions:

- 1) What are the needs of Elementary School teachers in West Java regarding the development of the JEMPITA learning model based on the deep learning theory and 21st-century competencies?
- 2) How is the JEMPITA learning model, grounded in deep learning theory and 21st-century competencies, designed and implemented for primary education?

II. LITERATURE REVIEW

A. 21st-Century Competencies and Challenges in Primary Education

Twenty-first-century education necessitates the development of the 4C skills, namely critical thinking, communication, collaboration and creativity, as well as the integration of technology into teaching and learning processes (Trilling & Fadel, 2009; Kaufman, 2013). Nevertheless, the reality in the field, particularly at the Elementary School level in Indonesia, indicates that learning practices remain largely conventional, insufficiently engaging, and have yet to become fully meaningful or responsive to contemporary educational changes (Erdoğan, 2019; Aryana et al., 2022; Aryana et al., 2024). Inequitable access to learning facilities and teachers' limited capacity to effectively utilize technology further exacerbate these challenges (Ghavifekr & Rosdy, 2015).

B. Deep Learning Theory in Education

In the educational context, deep learning extends beyond rote memorisation by focusing on profound meaning-making derived from contextual, reflective, and sustainable learning experiences (Lamb, 2004; Buczkowski et al., 2018). Deep learning incorporates joyful, experiential, and meaningful approaches that collectively enhance pupils' emotional, cognitive, and social engagement (Fredrickson, 2001; Kolb, 1984). Nevertheless, the implementation of this approach in Indonesian language instruction at the primary level remains limited (Aryana et al., 2022; Syihabudin & Ratnasari, 2020).

C. JEMPITA Model as an Educational Innovation

JEMPITA is an acronym for "joyful, experiential, meaningful, personalized, integrated technology, and sustainability-oriented." This model seeks to bridge the gap between the demands of 21st-century education and the principles of deep learning through a holistic contextual approach. The joyful component underscores the importance of creating an enjoyable and engaging learning environment (Brophy, 2004), the experiential aspect encourages pupils' active and direct participation in the learning process (Akella, 2010), and the meaningful factor focuses on connecting learning content to pupils' real-life experiences (Reber, 2019; Ausubel, 1968, as cited in Bryce & Blown, 2024). The personalized component tailors instruction to individual learners' needs and characteristics (Tomlinson et al., 2003; Essa et al., 2023), integrated technology supports the use of digital tools to enhance learning effectiveness (Mishra & Koehler, 2006), and the sustainability-oriented approach fosters awareness of global issues and the importance of sustainability (Sterling, 2024).

III. METHODOLOGY

This research employed a research and development (R&D) methodology based on the 4D Model proposed by Sugiyono (2019), consisting of the stages of Define (problem identification, literature review, and information gathering), Design (product design, expert validation, and revision), Develop (product creation, limited and main field testing, revisions, and operational testing), and Disseminate (implementation of the final product). However, this study is mainly confined to the Define and Design stages, with a particular focus on the expert validation of the JEMPITA model, followed by the early phase of the Develop stage.

The research involved both primary and secondary data, with participants comprising Elementary School teachers in Indonesia. The nation boasts 441,379 Elementary Schools, 173,506 of which are public and 267,873 private, across its 38

provinces and 514 regencies or municipalities (<https://dapo.dikdasmen.go.id/sp/1/020000>). The research sample was drawn from West Java Province, which has 63,361 Elementary Schools (20,063 public and 43,298 private) spread throughout 27 regencies or municipalities. Through a multistage sampling technique, four representative regions were selected to reflect geographical distribution and school governance types: Cimahi City with 118 schools divided into 91 public schools and 27 private ones; West Bandung Regency with 705 schools (634 public, 71 private); Purwakarta Regency with 421 schools (378 public, 43 private); and Sumedang Regency with 613 schools (582 public, 31 private). The study was conducted over a period of seven months from January 1 to July 31, 2025.

Data were collected through a needs analysis survey using a Google Form questionnaire that contained 30 closed-ended questions with scaled responses and open-ended questions, in-depth interviews, and focus group discussions (FGDs). The validity of the acquired data was tested using the Pearson product-moment correlation, where all items scored above 0.382, confirming their validity. The reliability of the data was established using KR-20 and Cronbach's alpha, which yielded an *r-value* of 0.879, thus exceeding the minimum threshold of 0.6. The data were then analyzed using Spradley's model, which consists of domain analysis (categorization), taxonomic analysis (elaboration of categories), and componential analysis (identification of distinctions). In line with its roadmap, this research progressed through three stages: defining (exploratory research through literature review and identification of West Java teachers' needs), designing (initial JEMPITA model development, expert validation, and revision), and developing (prototype refinement based on expert recommendations and validation results).

IV. RESULTS AND DISCUSSION

The scope of this research and development was restricted to identifying needs and designing the JEMPITA model, which was subsequently validated by experts and aligned with the requirements of Elementary School teachers in Indonesia. Among the selected representatives of Elementary School teachers in three regencies and one city in West Java, Indonesia, it was found that not all of them completed the questionnaire due to limitations in information dissemination. Eventually, a total of 1,875 respondents participated in the survey for the needs analysis by giving their answers to the 30 question items in the questionnaire concerning JEMPITA in Indonesia. The collected data were processed by using Microsoft Excel, resulting in findings related to the needs of Elementary School teachers and the design of the JEMPITA learning model as presented in the following section.

1) Elementary School Teachers' Needs in West Java for the Development of the JEMPITA Learning Model Based on Deep Learning Theory and 21st-Century Competencies

The following bar charts illustrate the responses of the participants to statements 1 to 30 in the questionnaire designed to assess the needs of Elementary School teachers regarding the JEMPITA learning model.

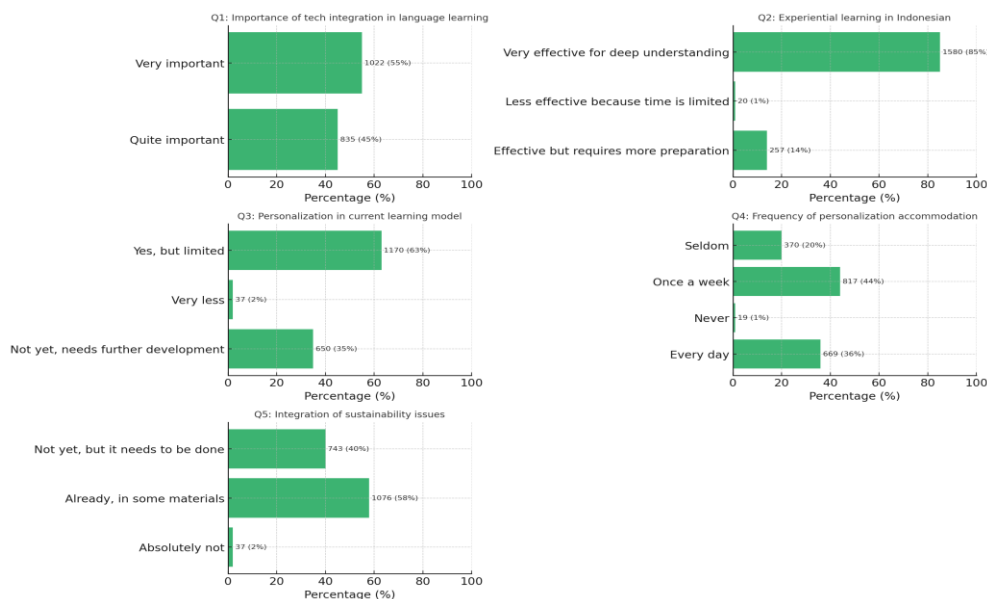


Figure 1. Bar Charts Illustrating Responses to Questions 1 Through 5 From the Needs Analysis Questionnaire on the JEMPITA Learning Model

Figure 1 shows that the integration of technology in Elementary School learning (Q1) is regarded as very important by over half the respondents, while the other 45% rate it as fairly important, demonstrating strong teacher awareness of the role of technology in 21st-century education. Meanwhile, a large majority of 85% consider the experiential learning approach (Q2) highly effective in promoting in-depth understanding, reflecting the perceived benefits of hands-on experience in language learning. In regard to current learning models, approximately 63% of the teachers acknowledge the presence of personalization (Q3), yet only about 36% reported implementing it on a daily basis (Q4), indicating that existing models had not fully addressed individual learner needs. In the meantime, sustainability issues (Q5) were

identified by 58% of the participants in a number of learning materials, while around 40% stated that such issues were yet to be included but necessary, highlighting the importance of reinforcing sustainability within the curriculum.

According to Aryana et al. (2022), 21st-century learning requires not only cognitive development but also contextual and reflective engagement, and technology integration and experiential approaches must form the core of every instructional model. Similarly, Syihabudin and Ratnasari (2020), along with Bawamenewi and Waruwu (2023), stress that learning in schools, as a space for critical thinking, must align with global dynamics, including sustainability issues and digitalization, and that the curriculum should provide space for personalization and contextual approaches.

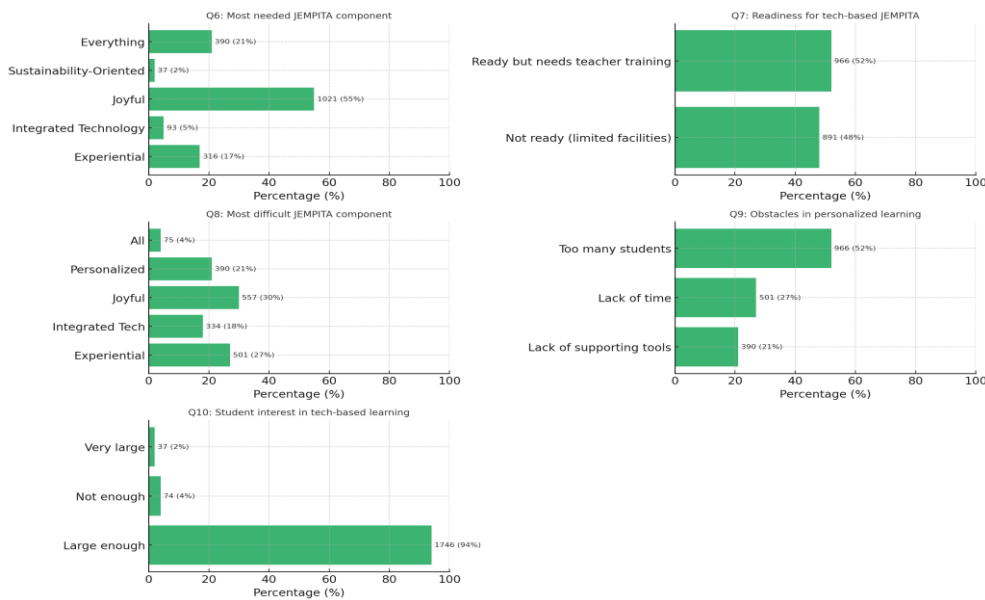


Figure 2. Bar Charts of Responses to Questions 6–10 From the Needs Analysis Questionnaire for the JEMPITA Learning Model

Figure 2 indicates that joyful and meaningful learning are seen as the most essential attributes (Q6), as cited by approximately 55% and 17% of the respondents, respectively, reflecting high expectations for engaging learning experiences. Concurrently, most of the participating teachers (about 30%) believe that these two aspects pose the greatest challenge (Q8). In accordance with these findings, Reber (2019) notes that meaningful and enjoyable learning experiences are vital for motivation and engagement.

Concerning teachers’ readiness for the technology-based JEMPITA (Q7), it is revealed that slightly more than half the participants are prepared to implement the model despite requiring teacher training beforehand, contrary to the remaining 48% who were restricted by a lack of facilities, thus underlining both competence and infrastructure as critical factors in this respect. Meanwhile, roughly 52% of the respondents consider large class size as the principal barrier to personalized learning (Q9), followed by limited time (27%) and inadequate learning aids (21%), signifying that classroom and systemic factors still constrain personalization. These responses hold great significance when considering that in regard to expectations for innovation (Q10), nearly all of the teachers observe that their students express considerable interest in technology-based language learning, with less than 5% insinuating a lack thereof. These findings corroborate the notion that teachers’ capacity to personalize learning through technology depends on both infrastructure and digital pedagogy skills (Garcia & Yao, 2019; Bryce & Blown, 2024).

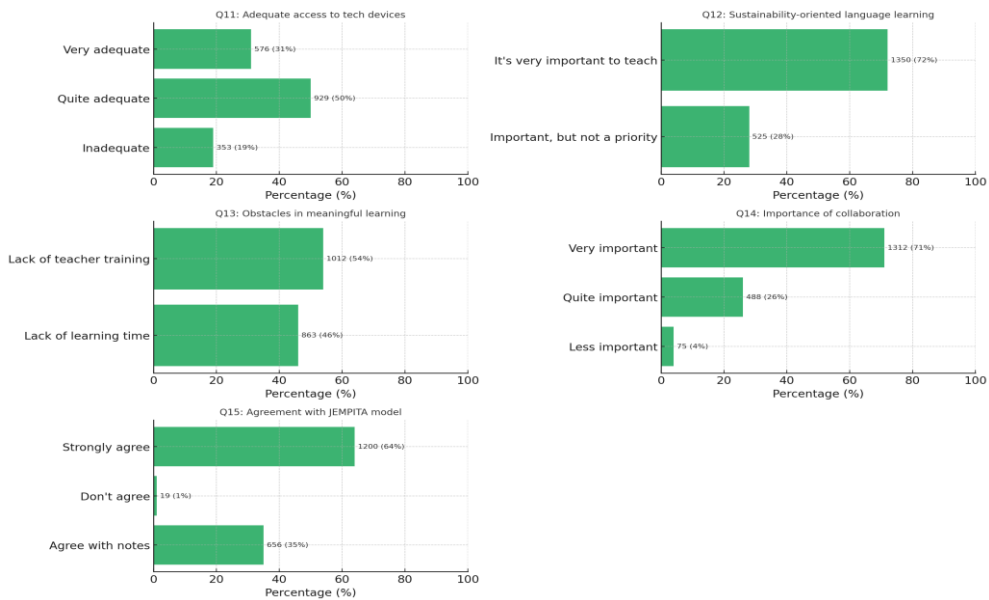


Figure 3. Bar Charts of Responses to Questions 11–15 From the JEMPITA Model Needs Analysis Questionnaire

As displayed in Figure 3, just above 80% of the respondents think that access to technological devices (Q11) is at least adequate, implying that the main challenge lies in effective utilization rather than availability of the devices. A significant majority of 72% also view sustainability-oriented learning (Q12) as highly important, indicating sound cognizance of education’s role in raising environmental and social responsibility. Similarly, Wang et al. (2022) argue that integrating sustainability into education fosters critical consciousness, civic participation, and environmental responsibility.

In terms of hurdles to meaningful learning (Q13), only two were identified by the participants, namely insufficient teacher training (54%) and instructional time (46%), underscoring the need to strengthen teacher capacity and adopt flexible scheduling for classes. In the meantime, virtually all of them recognize the importance of collaboration (Q14), in line with the views of Kirst and Lang (2019), El-Sabagh (2021), and Sterling (2024) that collaborative learning environments enhance engagement and deepen understanding especially when integrated with digital tools, thereby affirming its vital role within the JEMPITA framework for holistic, contextualized learning. Accordingly, the teachers’ approval of the JEMPITA model (Q15) is high, with approximately 64% voicing strong support and about 30% accepting the model with caveats related to contextual adaptation.



Figure 4. Bar Charts of Responses to Questions 16–20 From the JEMPITA Model Needs Analysis Questionnaire

It can be observed from Figure 4 that collaborative projects and portfolios are viewed as the most appropriate assessment methods (Q16) by almost half and two-fifths of the participants. This suggests a considerable inclination towards authentic assessment which enables students to exhibit their skills and knowledge in real-world contexts, making it particularly effective for 21st-century education (Duda et al., 2019; Aryana et al., 2024). As for their development (Q17), around 70% of the teachers select teacher training as their top priority in order to reinforce their capacity for innovative

pedagogy. In the meantime, nearly three-quarters of the respondents consider deep learning closely relevant to primary education (Q18), underlining its feasibility and significance in promoting deeper cognitive engagement.

Conversely, about 58% of the teachers claim that schools still lacked policies that endorse innovation (Q19), while the other 42% believe that such school policies were under development, revealing a significant institutional gap that requires strong leadership and possible government intervention. As stated by Chong et al. (2019), without supportive policies and leadership, even well-designed instructional models encounter implementation barriers. Innovation must hence be institutionalized, not merely practiced individually. Meanwhile, the participants' expectations of the JEMPITA model (Q20) are dominated by the hope that it will enhance student motivation (76%), implying that its success will be gauged largely based on how it creates engaging and meaningful learning experiences.

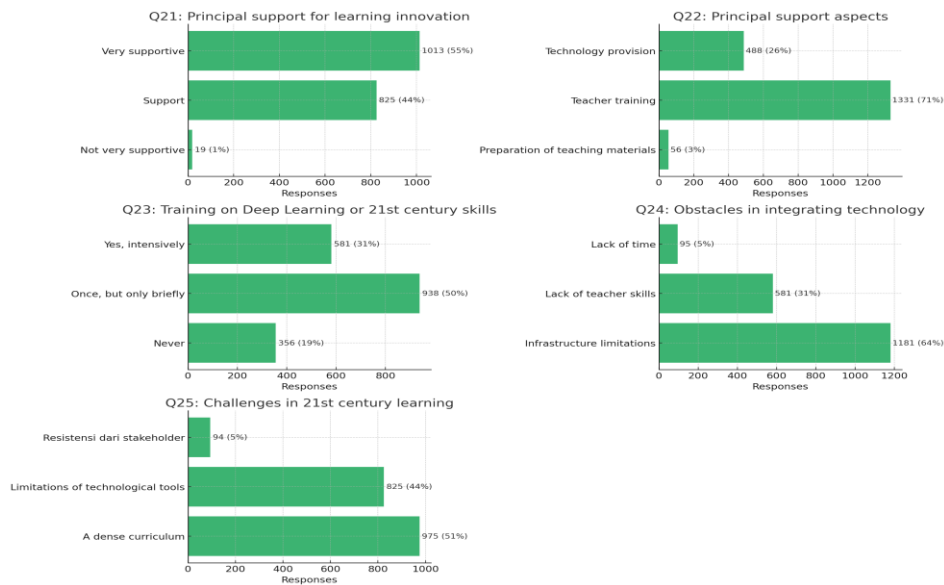


Figure 5. Bar Charts of Responses to Questions 21–25 of the JEMPITA Model Needs Analysis Questionnaire

As shown in Figure 5, school headmasters' support for instructional innovation (Q21) has been overwhelmingly positive, with virtually all the respondents attesting to their principals' backing, which plays a key role in implementing the JEMPITA program and promoting 21st-century pedagogy. This stems from the position of school leadership as a critical driver in sustaining instructional innovation: When principals actively support teacher development and instructional reform, it has a direct impact on the successful implementation of 21st-century learning (Peñafiel & Tomàs, 2015). In particular, a majority of 71% cite teacher training as the focus area (Q22) most favored by headmasters, sharing the teachers' belief that upgrading their competencies is central to innovation. However, trainings on deep learning or 21st-century skills (Q23) have stayed scarce, as half of the teachers admitted to having participated only once in such programs for a short period, highlighting the need for sustained professional development to achieve meaningful instructional transformation. In fact, Sumaryanta et al. (2018) contend that short-term professional development has restricted effects on teachers' instructional practices, and that sustainable innovation demands long-term, ongoing, and collaborative training structures.

Concerning impediment to technology integration (Q24), over 60% and 30% point out limited infrastructure and insufficient teacher skills, respectively, as the most severe, indicating that facility improvements must be accompanied by human resource development. Furthermore, most of the teachers raise the issues of an overloaded curriculum (51%) and technological constraints (44%) as the greatest challenges they face in implementing 21st-century learning (Q25), reflecting their hopes for curriculum streamlining and infrastructure enhancement.

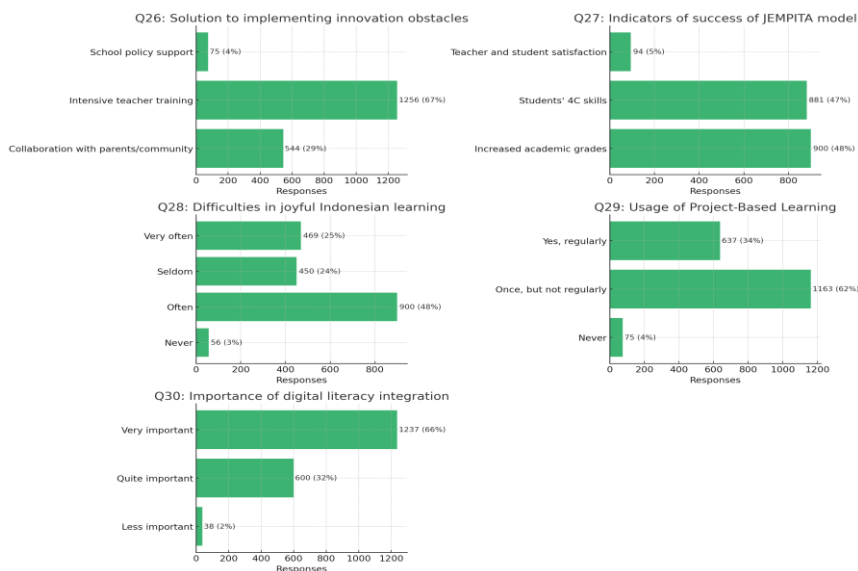


Figure 6. Bar Charts for Responses to Questions 26–30 of the Needs Analysis Questionnaire of the JEMPITA Model

According to Figure 6, approximately two-thirds of the respondents regard intensive teacher training as the primary solution to overcome barriers to innovation (Q26), reaffirming that increasing teacher capacity is more crucial than policy reforms or external collaboration. In terms of how the participants perceive JEMPITA's success (Q27), nearly 50% mention improvements in academic performance as the chief indicator, followed tightly by the development of 4C skills, therefore demonstrating the comparable importance of cognitive outcomes and soft skills in evaluating effectiveness. On the other hand, challenges faced by the teachers in implementing joyful language learning (Q28) are evident, with a total of just under 75% reporting that they have frequently struggled in creating such an atmosphere. This implies that although pedagogically valuable, such approach requires clearer strategies and institutional support.

In view of the aforementioned limitations, even though roughly a third of the teachers have been able to use project-based learning (Q29) on a regular basis, in excess of 60% had merely applied it at some point or inconsistently, alluding to enthusiasm without sustained integration. This can be explained by the close link between teachers' perceptions of project-based learning (PjBL) and the way they implement it in practice through problem identification, project definition, and contextual application (Tilahun et al., 2017), despite the finding that most teachers view PjBL positively, associating it with increased motivation and authentic learning outcomes (Nayak et al., 2023).

In contrast, the urgency of digital literacy integration (Q30) is strongly put forward by 98% of the respondents, who rate it as "important" or "very important". In line with Georgiou et al. (2020), these results highlight the urgent need for strategically designed professional development programs that prioritize the cultivation of higher-order cognitive digital skills. Whilst many teachers possess basic competencies, significant gaps remain in advanced digital cognition such as evaluating credibility and analytical processing, underlining the necessity of structured and intensive training.

In summary, the respondents acknowledge the transformative potential of the JEMPITA model through project-based learning and digital literacy, underlining that its success hinges on sustained professional development and systemic support. It can thus be concluded that teachers in Indonesia, particularly in West Java Province, express a strong demand for an instructional model such as JEMPITA that is grounded in deep learning, nurtures 21st-century skills, and promotes meaningful, enjoyable, personalized and technology-integrated learning.

2) The Design and Scenario of the JEMPITA Learning Model Grounded in Deep Learning Theory and 21st-Century Competencies in Elementary School Education

Informed by results of the needs analysis of Elementary School teachers in West Java Province, Indonesia, as well as various sources such as Trilling and Fadel (2009), Marton and Säljö (1976), Mishra and Koehler (2006), and Ryan and Deci (2000), the JEMPITA learning model is designed as follows.

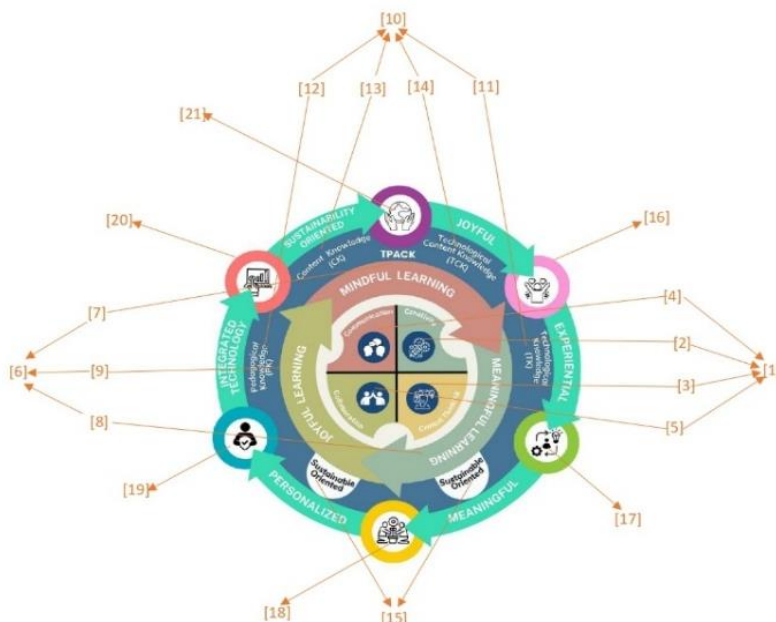


Figure 7. Design of the JEMPITA Learning Model

As can be seen in the diagram, the first element of JEMPITA at its core illustrates the concept of 21st-century competencies, particularly the component of learning and innovation skills, which includes: [1] the 4Cs, namely critical thinking and problem solving, communication, collaboration, and creativity and innovation; [2] creativity and innovation, symbolized by a pencil and mechanical gears that represent individual capacity for creative reasoning and innovative action; [3] critical thinking and problem solving, symbolized by an individual, an exclamation mark, arrows, and a lit bulb that signify students' ability to analyze and resolve problems within learning processes; [4] communication, referring to students' capability to convey information clearly; and [5] collaboration, depicted by two children supporting one another as a reflection of mutual respect and teamwork. As asserted by Trilling and Fadel (2009), schools must nurture creativity, critical thinking, communication, and collaboration to prepare students for the complex demands of 21st-century environments.

The second element, a circular diagram with clockwise arrows in red, blue and green, portrays [6] the deep learning process as a continuous cycle of [7] mindful or reflective learning, [8] meaningful learning, and [9] joyful learning, in accordance with Kemendikdasmen (2025) as well as Buczkowski et al. (2018), Chen et al. (2022), and Rahmawati et al. (2024). The blue segment surrounding this cycle represents the integration of [10] technological, pedagogical, and content knowledge (TPACK) (Mishra & Koehler, 2006) that encompasses [11] technological knowledge, [12] pedagogical knowledge, [13] content knowledge, and [14] technological content knowledge, thus promoting balanced and effective use of technology in teaching. In this respect, Davies and West (2014), Aryana et al. (2022), and Zulaikha et al. (2025) point out that TPACK is critical for delivering meaningful, technology-enhanced content while maintaining pedagogical integrity. The beige segments, depicted by downward facing leaves, denotes [15] the sustainability-oriented dimension that aligns with sustainable development goals (SDGs) (Prihantini et al., 2024), embodied by the cultivation of knowledge and skills that empower learners to contribute meaningfully in the long term.

The third element of the JEMPITA learning model is represented by a circular diagram with six clockwise arrows, each pointing to coloured segments that illustrate the joyful phase in pink, the experiential phase in green, the meaningful phase in orange, the personalized phase in blue, the integrated technology phase in red, and the sustainability-oriented phase in purple. [16] The joyful phase, visualized as an icon of a student raising arms with hearts above them, promotes a positive classroom climate that reduces anxiety and fosters intrinsic motivation (Jensen, as cited in Bridges et al., 2014). [17] The experiential phase, marked by an icon of an interchange between a gear and a lightbulb, draws on the experiential learning theory of constructing knowledge through direct experience (Kolb, 1984). [18] The meaningful phase, symbolized by two individuals planting a tree, reflects Ausubel's (1968, as cited in Bryce & Blown, 2024) assertion that learning is most effective when new knowledge is linked to prior understanding.

The remaining phases reinforce the model's holistic orientation. [19] Personalized learning, depicted in blue with a shield and check mark, adapts instruction to individual needs, concurring with Essa et al. (2023) on tailoring learning to students' strengths, interests, and pace. [20] Integrated technology, pictured as a laptop and a hand, is inspired by Couros' perspective (as cited in Davies & West, 2014) that technology in the hands of skilled teachers can be transformative. Finally, [21] the sustainability-oriented segment, with an Earth icon therein, embeds environmental, social and economic values into education, adhering to UNESCO (2017) in encouraging learners to take responsible action in tackling global challenges. As a whole, the six stages of JEMPITA present a comprehensive model that integrates emotional, experiential, cognitive, technological and sustainability dimensions into 21st-century education.

Compared to global frameworks such as P21 or those of UNESCO and the Organisation for Economic Co-operation and Development (OECD), JEMPITA contextualises 21st-century competencies and deep learning for Indonesian schools, addressing such challenges as large class sizes, limited teacher training, and resource constraints. Its novelty lies in the systematic integration of critical thinking, creativity, collaboration, communication, digital literacy, and character development within a framework oriented toward sustainability. Unlike previous models that focus on isolated dimensions, JEMPITA offers a holistic, context-driven innovation specifically tailored to elementary language learning in Indonesia, as delineated in Figure 8.

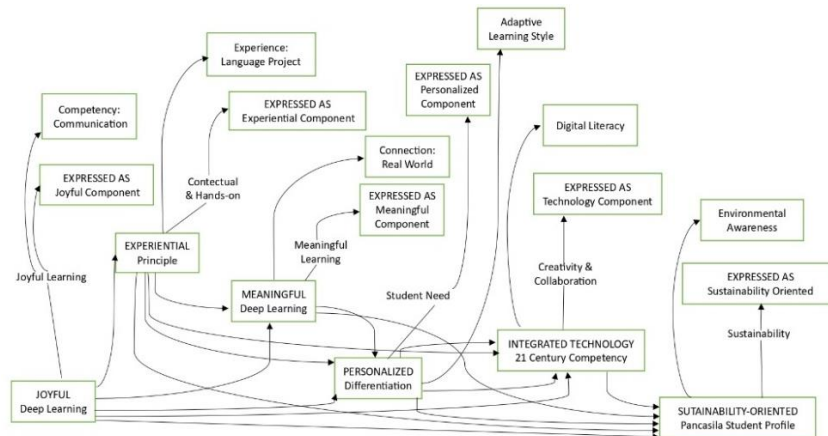


Figure 8. Scenario I of the JEMPITA Learning Model

The JEMPITA model was developed based on the results of a needs analysis with Elementary School teachers. The acronym JEMPITA stands for “joyful, experiential, meaningful, personalized, integrated technology, and sustainability-oriented”, introducing its role as a comprehensive pedagogical framework designed to address 21st-century educational challenges in Indonesia. It integrates progressive pedagogy, 21st-century competencies and deep learning principles. The joyful component initiates the learning process by raising enthusiasm through enjoyable and contextually meaningful activities to cultivate students’ joy, confidence, and curiosity. This aligns with Fredrickson (2001), who argues that positive emotions broaden cognitive and social capacities, thereby motivating active participation. The experiential component draws on Kolb’s (1984) experiential learning theory, which posits that knowledge is constructed through the transformation of experience. Within the JEMPITA framework, this is operationalized through authentic, project-based activities, such as the “experience language project” which encourages communication, collaboration, and in-depth comprehension. Similarly, the meaningful component highlights the relevance of learning by connecting subject matters to real-life contexts to foster in-depth reflection rather than rote memorization, in accordance with Ausubel (1968, as cited in Bryce & Blown, 2024) who states that meaningful learning occurs when new material is anchored to prior knowledge.

Meanwhile, the personalized component recognizes learners’ diversity by adapting instruction to individual needs, preferences, and learning pace. According to Rickabaugh (2016), this student-centered approach provides pupils with agency over what, how, and why they learn instead of focusing solely on pacing or technology, and enables differentiated instruction and assessment that respond to classroom heterogeneity. To complement this, the integrated technology component involves digital literacy and technology-enhanced pedagogy through Mishra and Koehler’s (2006) TPACK framework, which conceptualizes technology as a catalyst for reshaping pedagogy and nurturing creativity. Lastly, the sustainability component raises environmental awareness and social responsibility, directing learners to engage with sustainable practices and Pancasila values. This conforms with the principles of education for sustainable development (Prihantini et al., 2024) in empowering learners to make informed decisions and take responsible action towards a sustainable future. Together, these six components constitute the foundation of the JEMPITA model, situating it as a pedagogical framework that integrates joy, experience, meaning, personalization, technology, and sustainability.

Upon its completion, this first iteration of the JEMPITA model was introduced to Indonesian education experts and practitioners via a focus group discussion (FGD) aiming to explore their perspectives on the model’s implementation (see Figure 9). During this discussion, the researchers emphasized that JEMPITA was developed as a holistic, contextual approach that encompasses cognitive, affective, and 21st-century skills. Applicable across educational levels, it promotes student well-being, authentic learning, in-depth understanding, personalization, technology integration, and sustainability.



Figure 9. Focus Group Discussion (FGD) Between Educators and the Researchers

The FGD yielded a revised model as presented in Figure 10.

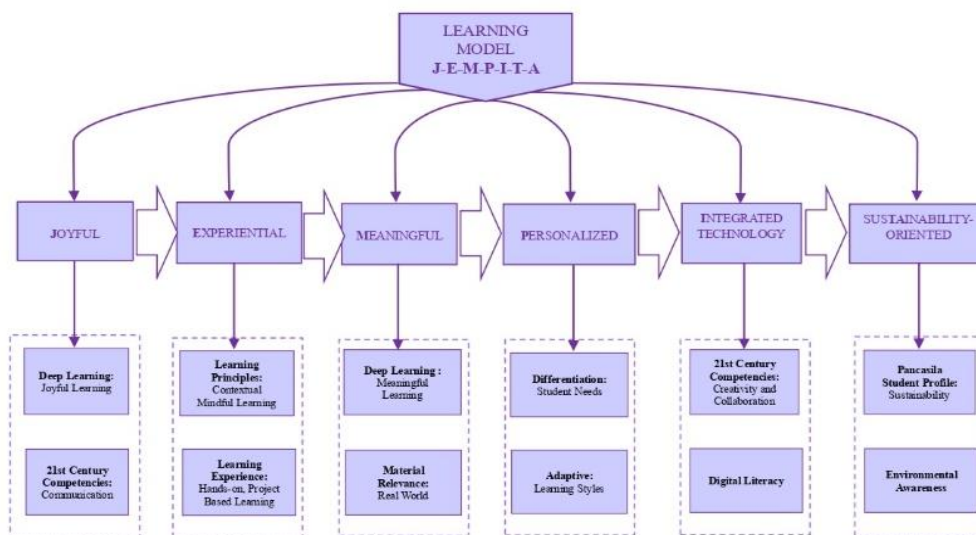


Figure 10. Scenario 2 of the JEMPITA Learning Model

This second scenario presents a more structured and visually organized version of the JEMPITA model than the initial representation in Figure 8, which had been devised prior to discussions with experts and practitioners, but the core principles and components remain the same. Comparative explanations are provided in the tables below.

TABLE 1
CORE SIMILARITIES (IDENTICAL SUBSTANCES)

Component	General Description
J – Joyful	Enjoyable learning based on joyful deep learning and meaningful communication
E – Experiential	Learning grounded in real-life experiences (hands-on learning) and contextual principles
M – Meaningful	Deep learning that connects to real-world contexts and relevant subject matters
P – Personalized	Differentiated learning tailored to students’ needs and learning styles
I – Integrated Technology	Utilization of technology to support creativity, collaboration, and digital literacy
TA – Sustainability-Oriented	Learning oriented towards environmental awareness and the values of the Pancasila Student Profile

TABLE 2
DIFFERENCES IN VISUAL PRESENTATION

First Scenario Diagram	Second Scenario Diagram
More complex, with numerous inter-component relationships	More organized and presented in a linear structure
Includes relational labels such as “Contextual & Hands-On”, “Adaptive Learning Style”, “Sustainability”, etc.	More concise and easier to interpret, with a single path per component
Features interconnected components through additional branches	Each component standing independently in a simplified hierarchical structure

The second scenario diagram is considered more suitable for teaching modules for its clarity, sequential structure, and ease of understanding. Even so, the first diagram remains useful for showing the interconnections between elements and illustrating the practical implementation of the JEMPITA model. Scenario 2 was then subject to evaluation and validation by five experts in learning, assessment, information and communication technology (ICT), and language, the outcomes of which are presented in Figure 11.

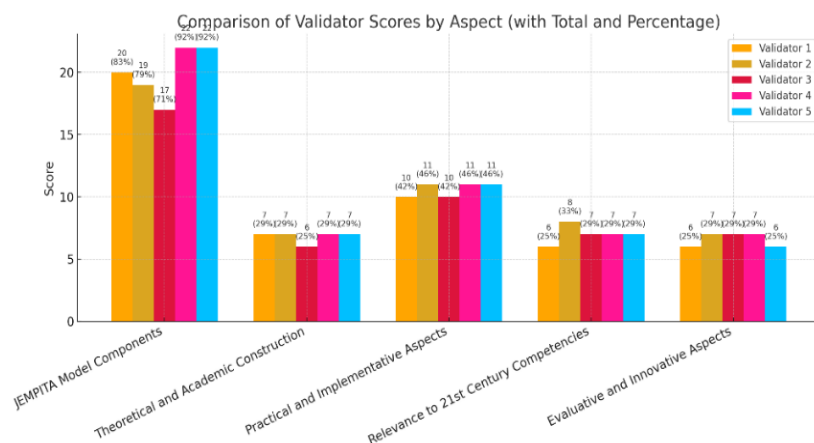


Figure 11. Bar Chart of Validator Scores for the JEMPITA Model Design

The JEMPITA learning model received validation ratings ranging from 78% to 90% with an average of 85%, which is categorized as highly feasible for implementation without major revisions. As displayed in the figure above, the JEMPITA components achieved the highest scores (17–22), whilst the theoretical and academic construction, practical and implementative aspects, relevance to 21st-century competencies, and evaluative and innovative aspects scored between 6 and 11. These results indicate that the model's structure is robust, its scientific foundation academically sound, its implementation practical, its alignment with 21st-century skills adequate, and its evaluative and innovative features well accommodated, confirming the JEMPITA model's feasibility for further development as an innovative 21st-century instructional approach in Indonesia.

V. CONCLUSIONS

This research successfully analyzed Elementary School teachers' needs and designed the structure and scenario of the JEMPITA learning model to meet the demands of 21st-century primary education. The needs analysis involving 1,875 teachers in West Java, Indonesia, revealed that current learning practices are perceived as insufficiently joyful, lacking meaningful engagement, and nonoptimal in technology integration or personalization. The most critical components identified are joyful and meaningful learning, underscoring the importance of emotional engagement and contextual relevance in the students' learning process.

The JEMPITA model was conceived by integrating deep learning theory to create learning experiences that are deep, enjoyable, and transformative. Expert validation and teacher feedback indicate that the model is both feasible and highly relevant for further development. In essence, JEMPITA provides an innovative approach to instructional design that combines emotional, cognitive and social dimensions with technology and sustainability. The model has significant potential to improve the quality of primary education and warrants wider implementation, supported by comprehensive teacher training and adaptive school policies.

Holistically, the JEMPITA model embodies a humanistic and transformative approach to 21st-century learning by encompassing emotional (joyful), practical (experiential), cognitive (meaningful), individual (personalized), digital (integrated technology), and global (sustainability-oriented) dimensions. These six interdependent stages form a cohesive learning ecosystem aligned with the needs of future generations.

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REFERENCES

- [1] Akella, D. (2010). Learning together: Kolb's experiential theory and its application. *Journal of Management & Organization*, 16(1), 100–112. <https://doi.org/10.1017/S1833367200002297>
- [2] Albantani, A. M., & Madkur, A. (2018). Think globally, act locally: The strategy of incorporating local wisdom in foreign language teaching in Indonesia. *International Journal of Applied Linguistics and English Literature*, 7(2), 1-8. <https://doi.org/10.7575/aiac.ijalel.v.7n.2p.1>

- [3] Aryana, S., & Salsabila, R. (2024). *Lectora 17: Mengembangkan bahan ajar interaktif, inovatif, dan kolaboratif* [Lectora 17: Developing interactive, innovative, and collaborative teaching materials]. Nawa Utama.
- [4] Aryana, S., Haryanto, M., Armariena, D. N., Suntoro, Masri, A. S., Herawati, L., Nesi, A., Sumirah, Burhanudin, M., Wijayanti, A. Y., Indrayatti, W., Munawwar, Uswati, T. S., Muthia, R., Nuryanto, T. & Alfiah. (2022). *Filsafat bahasa: Menerobos struktur, menguak makna di balik kata* [The philosophy of language: Breaking through structure, revealing the meaning behind words]. Nawa Utama.
- [5] Aryana, S., Ramadhanti, N. C., Hadiansyah, U. A. A. S., Febiyanti, F., Syiar, M. M., Sulastri, I., ... & Jaelani, A. S. (2024). Analysis of teachers' difficulties in designing 21st century competency and HOTS based learning materials. *eProsiding – SIPB LEICon*, 4(1), 215–224.
- [6] Aryana, S., Sobari, T., San Fauziya, D., Permana, I. (2025). *Teori belajar bahasa dan implementasi pembelajarannya* [Language learning theory and its implementation in learning]. Simbiosis Rekatama Media.
- [7] Aryana, S., Subyantoro, S., & Pristiwati, R. (2022). Tuntutan kompetensi guru profesional Bahasa Indonesia dalam menghadapi abad 21 [Competency requirements for professional Indonesian language teachers in facing the 21st century]. *Semantik*, 11(1), 71–86. <https://doi.org/10.22460/semantik.v11i1.p71-86>
- [8] Aryana, S., Zulaeha, I., Pristiwati, R., & Haryadi. (2024). *Model penilaian keterampilan menulis berbasis kompetensi abad ke-21 dan HOTS dalam pembelajaran Bahasa Indonesia* [21st century competency and HOTS-based writing skills assessment model in Indonesian language learning]. Nawa Utama.
- [9] Aryana, S., Zulaeha, I., Pristiwati, R., & Haryadi. (2024). Writing assessment model: Demands of Indonesian teachers in the 21st century. *Journal of Language Teaching and Research*, 15(3), 763–771. <https://doi.org/10.17507/jltr.1503.09>
- [10] Bamalli, H. S. (2014). Competencies and strategies for the teaching of 21st century learners in vocational home economics education. *Journal of Educational and Social Research*, 3(9), 105. <https://doi.org/10.5901/jesr.2013.v3n9p105>
- [11] Bawamenewi, A., & Waruwu, Y. (2023). Pengembangan media pembelajaran bahasa melalui transformasi digital berbasis e-learning [Developing language learning media through e-learning-based digital transformation]. *GHANCARAN: Jurnal Pendidikan Bahasa dan Sastra Indonesia, Special Edition: Lalonget IV*, 58–66. <https://doi.org/10.19105/ghancaran.vi.11739>
- [12] Bridges, S. M., Parthasarathy, D. S., Au, T. K. F., Wong, H. M., Yiu, C. K. Y., & McGrath, C. P. (2014). Development of functional oral health literacy assessment instruments: Application of literacy and cognitive theories. *Journal of Public Health Dentistry*, 74(2), 110–119. <https://doi.org/10.1111/jphd.12033>
- [13] Brophy, J. (2004). *Motivating students to learn* (2nd ed.). Lawrence Erlbaum Associates Publishers.
- [14] Bryce, T. G. K., & Blown, E. J. (2024). Ausubel's *meaningful learning* re-visited. *Current Psychology*, 43(5), 4579–4598. <https://doi.org/10.1007/s12144-023-04440-4>
- [15] Buczkowski, P., Sobkowicz, A., & Kozłowski, M. (2018). Deep learning approaches towards book covers classification. *Proceedings of the 7th International Conference on Pattern Recognition Applications and Methods*, 1, 309–316. <https://doi.org/10.5220/0006556103090316>
- [16] Chen, J., Li, D., & Xu, J. (2022). Sustainable development of EFL teachers' Technological Pedagogical Content Knowledge (TPACK) situated in multiple learning activity systems. *Sustainability*, 14(14), 8934. <https://doi.org/10.3390/su14148934>
- [17] Chong, M. S. F., Shahrill, M., & Li, H. C. (2019). The integration of a problem-solving framework for Brunei high school mathematics curriculum in increasing student's affective competency. *Journal on Mathematics Education*, 10(2), 215–228.
- [18] Davies, R. S., & West, R. E. (2014). Technology integration in schools. In J. M. Spector, M. D. Merrill, J. Elen, & M. J. Bishop (Eds.), *Handbook of research on educational communications and technology* (4th ed., pp. 841–853). Springer New York. https://doi.org/10.1007/978-1-4614-3185-5_68
- [19] Dingli, A., & Fournier, K. S. (2017). Financial time series forecasting – A deep learning approach. *International Journal of Machine Learning and Computing*, 7(5), 118–122. <https://doi.org/10.18178/ijmlc.2017.7.5.632>
- [20] Duda, H. J., Susilo, H., & Newcombe, P. (2019). Enhancing different ethnicity science process skills: Problem-based learning through practicum and authentic assessment. *International Journal of Instruction*, 12(1), 1207–1222. <https://doi.org/10.29333/iji.2019.12177a>
- [21] El-Sabagh, H. A. (2021). Adaptive e-learning environment based on learning styles and its impact on development students' engagement. *International Journal of Educational Technology in Higher Education*, 18, 53. <https://doi.org/10.1186/s41239-021-00289-4>
- [22] Erdoğan, V. (2019). Integrating 4C skills of 21st century into 4 language skills in EFL classes. *International Journal of Education and Research*, 7(11), 113–124.
- [23] Essa, S. G., Celik, T., & Human-Hendricks, N. E. (2023). Personalized adaptive learning technologies based on machine learning techniques to identify learning styles: A systematic literature review. *IEEE Access*, 11, 48392–48409. <https://doi.org/10.1109/ACCESS.2023.3276439>
- [24] Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, 56(3), 218–226. <https://doi.org/10.1037/0003-066X.56.3.218>
- [25] Garcia, C. E., & Yao, C. W. (2019). The role of an online first-year seminar in higher education doctoral students' scholarly development. *The Internet and Higher Education*, 42, 44–52. <https://doi.org/10.1016/j.iheduc.2019.04.002>
- [26] Georgiou, T., Liu, Y., Chen, W., & Lew, M. (2020). A survey of traditional and deep learning-based feature descriptors for high dimensional data in computer vision. *International Journal of Multimedia Information Retrieval*, 9, 135–170. <https://doi.org/10.1007/s13735-019-00183-w>
- [27] Gonçalves, S., Cortez, P., & Moro, S. (2018). A deep learning approach for sentence classification of scientific abstracts. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 11141 LNCS, 479–488. https://doi.org/10.1007/978-3-030-01424-7_47
- [28] Ghavifekr, S., & Rosdy, W. A. W. (2015). Teaching and learning with technology effectiveness of ICT integration in schools. *International Journal of Research in Education and Science*, 1(2), 175–191.
- [29] Kaufman, K. J. (2013). 21 ways to 21st century skills: Why students need them and ideas for practical implementation. *Kappa Delta Pi Record*, 49(2), 78–83. <https://doi.org/10.1080/00228958.2013.786594>

- [30] Kirst, E., & Lang, D. J. (2019). Perspectives on comprehensive sustainability orientation in municipalities: Structuring existing approaches. *Sustainability*, 11(4), 1040. <https://doi.org/10.3390/su11041040>
- [31] Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. FT Press.
- [32] Lamb, M. (2004). 'It depends on the students themselves': Independent language learning at an Indonesian state school. *Language, Culture and Curriculum*, 17(3), 229–245. <https://doi.org/10.1080/07908310408666695>
- [33] Marton, F., & Säljö, R. (1976). On qualitative differences in learning: I—Outcome and process. *British Journal of Educational Psychology*, 46(1), 4–11. <https://doi.org/10.1111/j.2044-8279.1976.tb02980.x>
- [34] Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A framework for teacher knowledge. *Teachers College Record: The Voice of Scholarship in Education*, 108(6), 1017–1054. <https://doi.org/10.1111/j.1467-9620.2006.00684.x>
- [35] Nayak, H., Kukreja, S., & Seema, S. A. (2023). *Innovative Educational Approaches: Charting a Path Ahead*. Indonesia: Parab Publications.
- [36] Peñafiel, L. D., & Tomás, R. B. (2015). What can be learned from Spanish rural schools? Conclusions from an international project. *International Journal of Educational Research*, 74, 114–126. <https://doi.org/10.1016/j.ijer.2015.11.002>
- [37] Prihantini, P., Sutarto, S., Punggeti, R. N., Rukmini, A., & Intes, A. (2024). The Use of ICT as a Resource and Media for Modern 21st Century Learning in Primary Schools. *Journal International of Lingua and Technology*, 3(1), 13–28. <https://doi.org/10.55849/jiltech.v3i1.509>
- [38] Rahmawati, I. Y., Wulansari, B. Y., Rusdiana, N. I., Pujiati, A., & Bariyah, S. K. (2024). Joyful learning approach in increasing motivation to learn English in middle school students of San Fabian, Philippines. *ELITE: English and Literature Journal*, 11(1), 63–73. <https://doi.org/10.24252/elite.v11i1.46175>
- [39] Reber, R. (2019). Making school meaningful: Linking psychology of education to meaning in life. *Educational Review*, 71(4), 445–465. <https://doi.org/10.1080/00131911.2018.1428177>
- [40] Rickabaugh, J. (2016). *Tapping the power of personalized learning: A roadmap for school leaders*. ASCD.
- [41] Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037/0003-066X.55.1.68>
- [42] Sterling, S. (2024). Transformative learning and sustainability: Sketching the conceptual ground (2011). In S. Sterling, *Learning and sustainability in dangerous times: The Stephen Sterling reader* (pp. 149–162). Agenda Publishing. <https://doi.org/10.2307/jj.13473649.14>
- [43] Sugiyono. (2019). *Metode penelitian kuantitatif, kualitatif dan R&D* [Quantitative, qualitative and R&D research methods] (2nd ed.). Alfabeta.
- [44] Sumaryanta, Mardapi, D., Sugiman, & Herawan, T. (2018). Assessing teacher competence and its follow-up to support professional development sustainability. *Journal of Teacher Education for Sustainability*, 20(1), 106–123. <https://doi.org/10.2478/jtes-2018-0007>
- [45] Syihabudin, S. A., & Ratnasari, T. (2020). Model pembelajaran Bahasa Indonesia yang efektif pada anak usia sekolah dasar [Effective Indonesian language learning models for elementary school-aged children]. *Jurnal Belaindika: Pembelajaran dan Inovasi Pendidikan*, 2(1), 21–31. <https://doi.org/10.52005/belaindika.v2i1.26>
- [46] Tilahun, B., Awono, C., & Batchakui, B. (2017). Deep learning methods on recommender system: A survey of state-of-the-art. *International Journal of Computer Applications*, 162(10), 17–22. <https://doi.org/10.5120/ijca2017913361>
- [47] Tomlinson, C. A., Brighton, C., Hertberg, H., Callahan, C. M., Moon, T. R., Brimjoin, K., Conover, L. A., & Reynolds, T. (2003). Differentiating instruction in response to student readiness, interest, and learning profile in academically diverse classrooms: A review of literature. *Journal for the Education of the Gifted*, 27(2–3), 119–145. <https://doi.org/10.1177/016235320302700203>
- [48] Trilling, B., & Fadel, C. (2009). *21st century skills: Learning for life in our times*. Jossey-Bass.
- [49] United Nations Educational, Scientific and Cultural Organization. (2017). *Education for sustainable development goals: Learning objectives*. <https://doi.org/10.54675/CGBA9153>
- [50] Wang, X., Yang, M., Park, K., Um, K. H., & Kang, M. (2022). Social sustainability of a firm: Orientation, practices, and performances. *International Journal of Environmental Research and Public Health*, 19(20), 13391. <https://doi.org/10.3390/ijerph192013391>
- [51] Wekke, I. S., & Hamid, S. (2013). Technology on language teaching and learning: A research on Indonesian pesantren. *Procedia - Social and Behavioral Sciences*, 83, 585–589. <https://doi.org/10.1016/j.sbspro.2013.06.111>
- [52] Zulaikha, S., Fadholi, M., Sururi, S., Syahril, S., Jamil, S. N., & Ariyanti, P. N. (2025). "Bridging the digital divide": Assessing and advancing teachers' digital literacy across Indonesian provinces. *Journal of Educational Management and Instruction (JEMIN)*, 5(1), 195–212. <https://doi.org/10.22515/jemin.v5i1.11586>
- [53] Zulfikar, T. (2018). The making of Indonesian education: An overview on empowering Indonesian teachers. *Journal of Indonesian Social Sciences and Humanities*, 2, 13–39.



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