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Decision analysis on the use of figma to improve learning effectiveness at Saengsattha School Thailand using the AHP Method

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ABSTRACT

The development of digital media-based learning requires the selection of platforms that are not only easy to use, but also capable of supporting interactivity, collaboration, and providing a real impact on learning outcomes. However, the selection of digital learning media in schools is often not based on systematic and measurable decision analysis. This condition creates a need for objective evaluation of the effectiveness of digital media used in the learning process. This study aims to analyze the effectiveness of using Figma as a digital learning medium at Saengsattha School in Thailand. This study uses a descriptive quantitative approach with data collection through a five-point Likert scale questionnaire involving 100 respondents, consisting of 10 teachers and 90 students. Data analysis was performed using the Analytical Hierarchy Process (AHP) method to determine the weight of importance of four main criteria, namely ease of use, interactivity, collaboration, and impact on learning outcomes and user satisfaction. The results showed that Figma obtained a final score of 4.06 and was categorized as effective, with the criteria of impact and user satisfaction as the most dominant factors. These findings indicate that Figma is suitable for use as a digital learning medium and that AHP can be a systematic method to support decision-making in selecting digital learning media in schools.

INTRODUCTION

The development of digital technology has brought fundamental changes to the teaching and learning process, from conventional learning to interactive, collaborative, and flexible digital media-based learning. Various studies show that the use of educational technology and digital platforms contributes positively to learning effectiveness, increased student engagement, and learning outcomes (Alshammary & Alhalafawy, 2023; Dr. Shahid Rafiq et al., 2024; Granić, 2022). However, the effectiveness of digital learning is greatly influenced by the suitability of the media used to the learning needs and characteristics of the students (Afzal Sayed Munna, 2021; Zafeer et al., 2025).

The COVID-19 pandemic has accelerated the adoption of online learning, blended learning, and cloud-based platforms in various educational institutions. A number of studies report that technology-based learning provides high flexibility and accessibility, but also poses challenges in maintaining learning effectiveness if the digital media used does not support optimal interaction and collaboration (Lapitan et al., 2021; Utami et al., 2022; Wu & Plakhtii, 2021). This condition emphasizes that the selection of appropriate digital media is a crucial factor in supporting the quality of the teaching and learning process, especially in schools with a collaborative and project-based learning approach.

One digital platform that has begun to be utilized in the context of education is Figma, a cloud-based design tool that supports real-time collaboration and is accessible across platforms. Several studies show that Figma is effective as an interactive learning medium at various levels of education, Hariyadi et al. (2023) and Wijaya et al. (2024) proving that Figma can improve students' conceptual understanding and design thinking skills. In addition, Rohmah et al. (2024) it demonstrates Figma's effectiveness in science learning, while Zikri & Imilda (2024) emphasizing Figma's flexibility in the context of secondary schools.

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However, most research related to Figma still focuses on aspects of media development, UI/UX design, or improving learning outcomes in certain subjects. Research that comprehensively evaluates the decision to choose Figma as a learning medium based on multiple criteria is still limited. In addition, studies on the use of Figma in international schools, especially in Thailand, are still rare, even though Thailand is one of the countries in Southeast Asia that is actively developing technology-based education and 21st-century skills (Pearce, 2023; Songkram et al., 2021).

Based on initial observations at Saengsattha School in Thailand, digital media is being used in the learning process, but the selection of learning platforms has not been based on systematic decision analysis. The selection of media tends to depend on the individual preferences of teachers, without a structured evaluation of ease of use, interactivity, collaboration, and its impact on the effectiveness of teaching and learning. This condition shows a gap between the potential of digital media and its application in the field.

To address this issue, an evaluation method is needed that can assess the effectiveness of learning media based on various criteria objectively. The Analytical Hierarchy Process (AHP) is a multi-criteria decision-making method that is widely used in the evaluation of education systems and media (Azhar et al., 2021; Malik et al., 2021; Munier & Hontoria, 2021; Tavana et al., 2023). AHP enables systematic assessment through the weighting of criteria, thereby supporting rational and measurable decision-making.

Based on the above description, this study aims to analyze the effectiveness of using Figma as a digital medium in improving the effectiveness of teaching and learning activities at Saengsattha School Thailand using the Analytical Hierarchy Process (AHP) method. This study is expected to contribute theoretically to the development of digital learning media studies and practically to international schools in determining and optimizing effective digital learning platforms.

RESEARCH METHODS

This study uses a descriptive quantitative approach to analyze the effectiveness of using the Figma application as a digital medium in the teaching and learning process at Saengsattha School, Thailand. Data were collected through a Google Form-based questionnaire distributed to teachers and students who had used Figma in their learning. The sampling technique used purposive sampling, so that only relevant respondents were involved. There were 100 respondents in this study, consisting of 10 teachers and 90 students.

The research instrument was a questionnaire with a five-point Likert scale that measured four main criteria, namely ease of use (C1), interactivity (C2), collaboration (C3), and impact on learning outcomes (C4). The questionnaire data was converted into numerical form and the average value of each criterion was calculated as the basis for assessing the effectiveness of digital learning media.

Data analysis was conducted using the Analytical Hierarchy Process (AHP) method to determine the level of effectiveness of Figma utilization based on the weight of each criterion. The analysis stages included calculating the average score, determining and normalizing the criteria weights, calculating the contribution of each criterion, and determining the final score and category of learning media effectiveness. Details of the analysis stages are presented in Table 1, while the AHP calculation formula is explained in the AHP Calculation subsection.

Table 1. Steps for Analyzing the Effectiveness of Figma Utilization

Step	Explanation	Example/Calculation
1.	Determining research criteria (C1–C4)	C1 : Ease of use C2 : Understanding of material C3 : Interactivity & Collaboration C4 : Impact & Satisfaction.
2.	Calculate the average score for each criterion based on the questionnaire results.	C1=3,85. C2=3,86. C3=4,06. C4=4,18.
3.	Determine the initial weight based on the relative importance of each criterion.	C1=1, C2=2, C3=4, C4=5 →Total Weight = 12

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Step	Explanation	Example/Calculation
4.	Normalize the weights by dividing each weight by the total weight.	$C1 = 1/12 = 0{,}083$. $C2 = 2/12 = 0{,}167$. $C3 = 4/12 = 0{,}333$. $C4 = 5/12 = 0{,}417$.
5.	Calculate the contribution of each criterion by multiplying the average by the normalized weight.	$C1 = 3{,}85 \times 0{,}083 = 0{,}321$. $C2 = 3{,}86 \times 0{,}167 = 0{,}643$. $C3 = 4{,}06 \times 0{,}333 = 1{,}353$. $C4 = 4{,}18 \times 0{,}417 = 1{,}742$.
6.	Add up all contribution values to obtain the final effectiveness score.	Final Score = 4,06
7.	Determining effectiveness categories based on final scores.	If the score $\geq 4 \rightarrow$ Effective, $3 \leq x > 4 \rightarrow$ Quite Effective, $< 3 \rightarrow$ Less Effective. Result: Effective.

AHP Analysis Calculation

1. The average score for each criterion was calculated using the following equation.

$$R_i = \frac{\sum_{j=1}^{n} x_{ij}}{n}$$

Where:

R_i is the average score for criterion i;

x_{ij} is the value of respondent j's answer for criterion i;

n and is the number of respondents.

2. The weighting of criteria is determined based on relative importance, namely C1 = 1, C2 = 2, C3 = 4, and C4 = 5, then normalized using the following equation:

$$W_i = \frac{B_i}{\sum_{i=1}^{m} B_i}$$

3. The contribution of each criterion is calculated by multiplying the average value and the normalized weight.

$$K_i = R_i \times W_i$$

4. The final effectiveness score is obtained by adding up all contribution values.

$$S = \sum_{i=1}^{m} K_i$$

The final score is used to determine the effectiveness category of the learning media, namely effective (S ≥ 4.00), sufficiently effective (3.00 ≤ S < 4.00), and less effective (S < 3.00). The calculation results and contribution of each criterion are presented in the form of tables and diagram visualizations to clarify the interpretation of the results.

RESULTS AND DISCUSSION

Result

Based on the questionnaire data processed using the Analytical Hierarchy Process (AHP), the average score, initial weight, normalized weight, and contribution of each criterion are presented in Table 2. The final effectiveness score (S) of Figma as a digital learning medium is 4.06, which falls into the effective category (S ≥ 4.00).

The AHP method enables the transformation of subjective perception data into a structured multi-criteria evaluation model. Unlike simple averaging techniques, AHP assigns proportional

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influence to each criterion based on its relative importance. Therefore, the final score represents not only user perception but also the weighted priority of each evaluation dimension.

Table 2. Average Scores, Weights, and Contributions of Criteria

Criteria	Average (1-5)	Weight	Normalized Weight	Contribution
C1 (Ease of use)	3,85	1	0,08	0,32
C2 (Understanding of material)	3,86	2	0,17	0,64
C3 (Interactivity & Collaboration)	4,06	4	0,33	1,35
C4 (Impact & Satisfaction)	4,18	5	0,42	1,74
Final Score (S)				**4,06**

From Table 2, it can be observed that although Ease of Use (C1) and Understanding of Material (C2) obtained relatively similar average scores, their overall contribution differs significantly due to weight allocation. The highest contribution is generated by Impact & Satisfaction (C4) with a value of 1.74, followed by Interactivity & Collaboration (C3) with 1.35. This indicates that the perceived educational impact of Figma plays a more decisive role in determining overall effectiveness than usability factors alone.

A visualization of the comparison of average scores between criteria is shown in Figure 1, which indicates that the Impact & Satisfaction (C4) criterion received the highest score, followed by Interactivity & Collaboration (C3). This pattern is in line with the findings of a meta-analysis which states that learning impact and student engagement are the main indicators of the success of digital learning media.

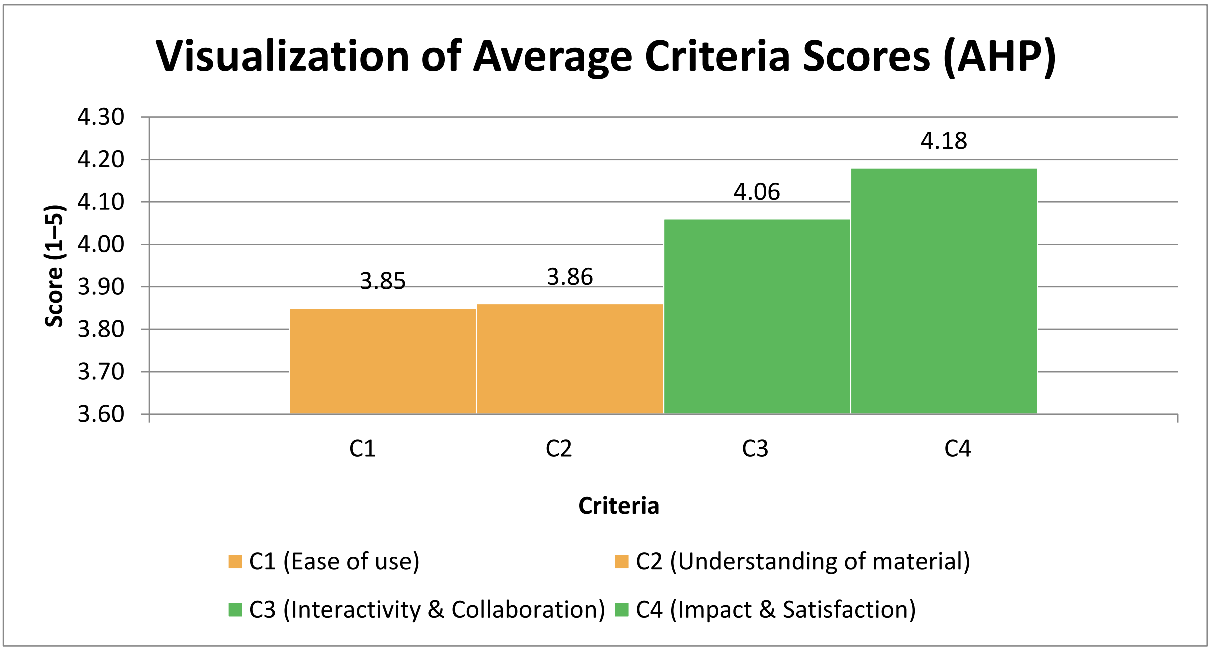

Figure 1. Visualization of Average Criteria Scores (AHP)

Discussion

Ease of Use Aspect (C1)

The Ease of Use criterion obtained an average score of 3.85, indicating that Figma is generally considered accessible by both teachers and students. As a cloud-based platform, Figma does not require installation and can be accessed through a web browser, which simplifies adoption in school environments.

This finding is consistent with Utami et al. (2022), who argue that ease of access significantly influences teachers' acceptance of cloud-based learning technologies. Similarly, Wu & Plakhtii (2021) emphasize that usability and accessibility are essential factors in successful e-learning implementation.

However, although ease of use supports initial adoption, its contribution (0.32) was relatively lower compared to other criteria. This suggests that usability alone does not guarantee effectiveness. Advanced features still require adaptation, indicating that training and instructional design play important roles in maximizing platform benefits.

Aspects of Material Comprehension (C2)

The Understanding of Material criterion obtained an average score of 3.86, showing that Figma contributes positively to conceptual comprehension. Digital visualization, diagram creation, and structured interface design allow students to represent abstract ideas visually.

This finding aligns with Alshammary & Alhalafawy (2023), who highlight the role of digital platforms in enhancing learning outcomes through visual and interactive elements. Likewise, Zafeer et al. (2025) report that digital learning tools significantly improve engagement and academic achievement in middle school contexts.

In practical implementation, students at Saengsattha School used Figma to create process diagrams and project-based visual outputs. Such activities reflect active learning principles described by Afzal Sayed Munna (2021) and Lapitan et al. (2021), where learners construct knowledge through participation and collaboration.

Although the contribution of C2 (0.64) is moderate, it demonstrates that visualization-based learning strengthens understanding when properly integrated into pedagogical strategies.

Interactivity and Collaboration Aspects (C3)

The Interactivity & Collaboration criterion achieved a high average score of 4.06, with a contribution value of 1.35. This indicates that Figma's real-time collaboration feature significantly enhances student engagement.

This result supports Singh et al. (2021), who found that digital collaboration platforms positively influence engagement and group performance in online learning environments. The collaborative editing, commenting, and simultaneous design features in Figma create a dynamic learning atmosphere.

In classroom practice, students worked together on shared design projects, exchanged feedback, and revised work collectively. Such practices are consistent with findings by Hariyadi et al. (2023), who emphasize the importance of collaborative environments in developing 21st-century skills.

The strong performance of this criterion demonstrates that collaborative interaction is a critical driver of digital learning effectiveness, especially in project-based learning contexts.

Impact on Learning Outcomes and Satisfaction (C4)

The highest average score (4.18) and contribution (1.74) were recorded for Impact & Satisfaction. This indicates that students and teachers perceive Figma as providing meaningful learning experiences and positive outcomes.

This finding is consistent with Kabilovnan (2024), who reports that interactive digital tools increase motivation and engagement in classroom settings. Additionally, Azhar et al. (2021) argue that outcome impact is a primary consideration in multi-criteria educational decision-making.

The dominance of C4 suggests that effectiveness is primarily determined by perceived educational value rather than technical features alone. Increased participation, higher assignment quality, and enthusiasm for collaborative design tasks demonstrate that Figma supports both cognitive and affective dimensions of learning.

Integrated Interpretation of AHP Results

The weighted structure of AHP reveals a hierarchical pattern of influence:

1. Impact & Satisfaction (dominant factor)
2. Interactivity & Collaboration
3. Understanding of Material

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4. Ease of Use

This pattern demonstrates that digital learning effectiveness is multidimensional but primarily outcome-driven. The system does not rely solely on user-friendliness but prioritizes meaningful learning experiences and collaborative engagement.

Such findings reinforce the argument that educational technology evaluation should emphasize pedagogical contribution over purely technical considerations.

Robustness Reflection

A proportional review of the weighting structure indicates that moderate variations in Ease of Use or Understanding of Material would not significantly alter the final effectiveness category. However, a substantial decrease in Impact & Satisfaction would directly reduce the overall score below the effectiveness threshold.

This confirms that the AHP structure appropriately reflects educational priorities, where learning outcomes remain the central evaluation dimension.

Comparative Analysis with Previous Studies

The findings of this study are consistent with previous research emphasizing the importance of collaborative and interactive digital platforms in improving learning effectiveness. For example, Singh et al. (2021) found that digital collaboration tools significantly enhance student engagement and group performance in online learning environments. Similarly, Alshammary et al. (2023) demonstrated through meta-analysis that digital platforms positively influence learning outcomes when they facilitate active participation and visual interaction.

In addition, Lapitan et al. (2021) highlighted that blended and technology-supported learning strategies are effective when digital media promote structured interaction and meaningful learning experiences. These findings align with the present study, where the Interactivity & Collaboration (C3) and Impact & Satisfaction (C4) criteria contributed most significantly to the overall effectiveness score.

However, unlike previous studies that primarily rely on descriptive statistics or experimental comparisons, this study applies the Analytical Hierarchy Process (AHP) as a structured multi-criteria decision-making framework. According to Tavana et al. (2023) and Malik et al. (2021), AHP enables systematic prioritization of evaluation criteria, ensuring that decision outcomes reflect relative importance rather than equal-weight assumptions.

Furthermore, while studies such as Rohmah et al. (2024) and Wijaya et al. (2024) focus on the development and implementation of Figma-based learning media, the present research contributes by analyzing Figma from a decision-analysis perspective. This methodological distinction strengthens the novelty of the study, particularly in the context of international schools in Thailand, where structured evaluation of digital platforms is still limited (Pearce, 2023; Songkram et al., 2021).

Thus, this study not only confirms previous empirical findings regarding digital media effectiveness but also extends the literature by integrating a multi-criteria decision-making approach into educational technology evaluation.

Theoretical Implications

From a theoretical perspective, this study reinforces the importance of multi-dimensional evaluation frameworks in educational technology research. The dominance of Impact & Satisfaction (C4) and Interactivity & Collaboration (C3) demonstrates that learning effectiveness is primarily outcome-driven rather than purely usability-driven.

This finding aligns with constructivist learning theory, which emphasizes active engagement, collaboration, and learner-centered interaction (Afzal Sayed Munna, 2021). Digital tools such as Figma facilitate knowledge construction through visualization and shared design processes, supporting meaningful learning experiences.

Moreover, the use of the Analytical Hierarchy Process (AHP) supports the argument that educational decision-making should incorporate structured weighting of criteria (Munier & Hontoria, 2021; Tavana et al., 2023). Traditional evaluation methods often treat all indicators equally, potentially oversimplifying complex educational contexts. By applying AHP, this study demonstrates that not all criteria contribute equally to effectiveness; rather, learning impact carries greater strategic importance.

Theoretically, this research contributes to the integration of Multi-Criteria Decision Making (MCDM) approaches in education, as suggested by Malik et al. (2021), by providing empirical evidence of AHP application in digital learning evaluation.

Practical Implications for International Schools

Practically, the findings provide important implications for school administrators and policymakers, particularly in international school environments. As noted by Pearce (2023), international schools operate within diverse cultural and pedagogical contexts, requiring flexible and collaborative digital platforms.

The results indicate that Figma can be effectively integrated into project-based and collaborative learning models to enhance student participation and creativity. Its cloud-based nature aligns with research by Wu & Plakhtii (2021) and Utami et al. (2022), which emphasize accessibility and cloud computing as critical factors in technology adoption.

Moreover, the use of AHP offers a structured framework for evaluating and selecting digital learning platforms. Instead of relying solely on teacher preference or technological trends, schools can adopt systematic multi-criteria evaluation models to ensure alignment between digital tools and pedagogical goals.

For Saengsattha School Thailand, the findings suggest that Figma should be maintained and further optimized within collaborative learning activities. Schools may also consider providing structured training to maximize pedagogical impact, ensuring that technological potential translates into measurable learning outcomes.

Methodological Reflection on AHP Application

Although the Analytical Hierarchy Process (AHP) proved useful in structuring the evaluation of Figma as a digital learning medium, it is important to reflect on its methodological characteristics. AHP is widely recognized as a robust multi-criteria decision-making method because it allows hierarchical structuring of complex problems and proportional weighting of criteria (Munier & Hontoria, 2021; Tavana et al., 2023). In the context of educational evaluation, this approach reduces subjectivity by transforming qualitative perceptions into quantitative priority values.

However, in this study, the weighting structure was determined based on assumed relative importance rather than full pairwise comparison matrices. According to Malik et al. (2021), the strength of AHP lies in its consistency testing through the Consistency Index (CI) and Consistency Ratio (CR). The absence of CR validation in this study represents a methodological limitation that should be addressed in future research.

Despite this limitation, the proportional dominance of Impact & Satisfaction (C4) and Interactivity & Collaboration (C3) demonstrates a logically consistent hierarchy aligned with educational theory and empirical findings in digital learning research. Therefore, while methodological refinement is recommended, the overall decision structure remains theoretically grounded and empirically reasonable.

The reflection on AHP implementation strengthens the academic rigor of this research by transparently acknowledging both its strengths and constraints.

Sensitivity and Decision Stability Analysis

Although full computational sensitivity testing was not performed, an analytical review of the weighting structure provides insight into the stability of the decision model. In multi-criteria decision-making (MCDM), sensitivity analysis plays an important role in determining whether minor variations in criteria weights significantly affect the final decision outcome.

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In the present model, the normalized weights demonstrate a clear hierarchical distribution, with Impact & Satisfaction (0.42) and Interactivity & Collaboration (0.33) dominating the structure. If the weight of Ease of Use or Understanding of Material were moderately increased, the overall effectiveness classification would likely remain within the "effective" category due to their comparatively lower proportional influence. However, a substantial decrease in the weight assigned to Impact & Satisfaction would directly reduce the final score below the threshold value of 4.00.

This structural sensitivity confirms that the model is outcome-oriented rather than usability-oriented. Such prioritization aligns with outcome-based education frameworks, which emphasize measurable learning impact as the primary indicator of instructional effectiveness. Therefore, the AHP hierarchy reflects a pedagogically coherent evaluation logic rather than arbitrary weighting assumptions.

Future studies are encouraged to implement formal sensitivity simulations, including Consistency Ratio (CR) validation and scenario-based weight adjustment analysis. Incorporating Monte Carlo simulation or comparative weighting scenarios would further enhance the robustness and external validity of the evaluation framework.

CONCLUSION

Based on the application of the Analytical Hierarchy Process (AHP), this study concludes that the use of Figma as a digital learning medium at Saengsattha School, Thailand, is categorized as effective, with a final score of 4.06. Among the four evaluated criteria, Impact on Learning Outcomes and User Satisfaction emerged as the most influential factor, followed by Interactivity and Collaboration, Understanding of Material, and Ease of Use. This hierarchical structure indicates that digital learning effectiveness is predominantly driven by perceived educational value and meaningful engagement rather than technical usability alone.

The findings demonstrate that Figma effectively supports collaborative and project-based learning aligned with 21st-century educational principles, particularly in international school contexts that prioritize creativity, digital literacy, and teamwork. The strong contribution of impact and collaboration criteria confirms that cloud-based platforms achieve optimal effectiveness when they facilitate active participation and shared knowledge construction.

Methodologically, this study underscores the relevance of AHP as a structured multi-criteria decision-making (MCDM) framework for educational technology evaluation. By incorporating proportional weighting, AHP enables a more strategic and evidence-based assessment compared to equal-weight descriptive approaches. This contributes to the growing integration of decision-support methodologies in educational research and institutional planning.

Nevertheless, the study is limited by its single-school context, limited respondent scope, and the absence of full pairwise comparison matrices with Consistency Ratio (CR) validation. Future research should incorporate comprehensive AHP consistency testing, sensitivity analysis, cross-institutional samples, and complementary qualitative approaches to enhance methodological robustness and generalizability.

From an international perspective, this research offers a transferable evaluation model for schools seeking systematic, priority-based frameworks in digital technology adoption. By operationalizing effectiveness through hierarchical weighting of pedagogical criteria, the study moves beyond descriptive evaluation and contributes a replicable analytical approach applicable across diverse cultural and educational environments.

Ultimately, this study demonstrates that structured multi-criteria evaluation methods such as AHP can serve as a strategic bridge between pedagogical theory, empirical evidence, and policy-level decision-making, supporting rational and data-driven digital transformation in global education systems.

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