Analysis of Elementary Teachers' Acceptance of Deep Learning Media for Natural and Social Sciences Materials on Google Sites Using UTAUT

Timtim Siti Mariam[1*]; Yunus Abidin[2]; Dede Trie Kurniawan[3]

[1,2,3]*Primary Education, Universitas Pendidikan Indonesia, Indonesia*
[1*]*Corresponding Email: timtimsitimariam@upi.edu*

Article History:
Received: Jun 08, 2025
Revised: Aug 10, 2025
Accepted: Dec 13, 2025
Online First: Jan 02, 2026

Keywords:
Deep Learning,
Google Sites,
Learning Media,
Teacher Acceptance,
UTAUT.

Kata Kunci:
Pembelajaran Mendalam,
Media Pembelajaran,
Google Sites,
Penerimaan Guru,
UTAUT.

How to cite:
Mariam, T. S., Abidin, Y., & Kurniawan, D. T. (2025). Analysis of Elementary Teachers' Acceptance of Deep Learning Media for Natural and Social Sciences Materials on Google Sites Using UTAUT. *Edunesia : Jurnal Ilmiah Pendidikan, 7*(1), 60-79.

Abstract: The purpose of this study is to examine the perceptions and acceptances of elementary school teachers of deep learning-based learning media for Natural and Social Sciences (IPAS), which was developed using Google Sites. The framework utilized is the Unified Theory of Acceptance and Use of Technology (UTAUT), which provides a foundation to examine the acceptance of technology through the technology user's perspective. A total of 100 elementary school teachers in Bandung Regency became respondents by filling out an online questionnaire via Google Forms. Data analysis was carried out using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach. The results of the study indicated that teachers' affective attachment to learning media had a positive and significant influence on the intention to use the media. In contrast, other factors such as performance expectations, social influences, and supporting conditions showed weak or even negative influences. These findings confirm that the adoption of learning technology at the elementary school level requires a more humanistic approach, with an emphasis on the emotional experience of users as the key to increasing effective acceptance of technology.

Abstrak: Tujuan penelitian ini adalah untuk mengkaji persepsi dan penerimaan guru SD terhadap media pembelajaran berbasis Deep Learning untuk mata kuliah IPAS (*Natural and Social Sciences*) yang dikembangkan menggunakan Google Sites. Kerangka kerja yang digunakan adalah Unified Theory of Acceptance and Use of Technology (UTAUT) yang memberikan landasan untuk mengkaji penerimaan teknologi melalui perspektif pengguna teknologi. Sebanyak 100 guru SD di Kabupaten Bandung menjadi responden dengan mengisi kuesioner online melalui Google Forms. Analisis data dilakukan dengan pendekatan Partial Least Squares Structural Equation Modeling (PLS-SEM). Hasil penelitian menunjukkan bahwa keterikatan afektif guru terhadap media pembelajaran memiliki pengaruh positif dan signifikan terhadap niat penggunaan media. Sebaliknya, faktor lain seperti ekspektasi kinerja, pengaruh sosial, dan kondisi pendukung menunjukkan pengaruh yang lemah atau bahkan negatif. Temuan ini menegaskan bahwa adopsi teknologi pembelajaran di tingkat sekolah dasar memerlukan pendekatan yang lebih humanis, dengan penekanan pada pengalaman emosional pengguna sebagai kunci untuk meningkatkan penerimaan teknologi yang efektif.

https://doi.org/10.51276/edu.v7i1.1352

A. Introduction

The educational transformation associated with the Industrial Revolution 4.0, particularly under the paradigm of Education 4.0, demands the systemic integration of Information and Communication Technology (ICT) into pedagogical practices. This paradigm shift positions ICT not only as an instructional aid but as a catalyst for transforming learning ecosystems, fostering learner autonomy, adaptive instruction, and digitally mediated knowledge construction.

However, Indonesia continues to use ICT-based teaching tools sparingly, especially in basic education. This limitation is confirmed by the findings of Novianti (2019), who highlights the low intensity of ICT utilization in elementary schools, and the study by Ratna et al (2023), which identified significant disparities in digital infrastructure and capabilities across regions. Collectively, these two studies confirm a substantial gap in ICT implementation in Indonesian basic education, establishing the primary background for the need for innovative learning media.

Several issues have been identified in the field, including limited technological infrastructure, low digital literacy among teachers, and a strong adherence to traditional teaching methods (Akmal et al., 2025; Shara & Widodo, 2018). Furthermore, Hidayat (2025) highlights that the lack of readiness in both human resources and supporting facilities remains a critical barrier to effectively implementing deep learning frameworks in primary education. These constraints hinder the utilization of innovative technologies.

Within the context of this broad ICT implementation gap, this study specifically focuses on the potential of Deep Learning (DL)-based learning media. Deep Learning, as a branch of Artificial Intelligence (AI), holds enormous potential for creating adaptive, personalized, and interactive learning experiences (Chai et al., 2019). Recent studies support this potential; for instance, Ali (2025) found that AI-based educational management can successfully support deep learning curricula in elementary schools by ensuring the sustainability of learning outcomes. Thus, the adoption of innovative DL technology can bridge the gap between the urgent need for ICT integration and the existing infrastructure/capability constraints.

Mandailina et al (2019) observed that Android-based media increases engagement with learners in educational institutions. Nonetheless, a substantial number of teachers continue to lack the assurance of actively utilizing digital technologies in their teaching. This study, therefore, suggests the application of Google Sites as a medium for delivering instructional DL-based teaching materials. The platform is easily available, simple to navigate, promotes cooperation, and even allows educators from regions termed as "digitally poor" to utilize it (Christopher & Waworuntu, 2021).

Research done by Amelia et al (2024) implied that the use of proprietary educational technology platforms (which can be managed independently, like Google Sites) fosters teachers' willingness to embrace new technologies, therefore enhancing the achievement levels of students. Based on this premise, using DL media through Google Sites will improve students' participation and provide mechanisms for interactive, adaptable learning. This

https://doi.org/10.51276/edu.v7i1.1352

moves further to strengthen the attainment of 21st-century skills such as critical thinking, collaboration, and creativity (Liu & Hwang, 2023; Alghazi et al., 2021).

This research gap is significant because it receives little attention. The attempts made in this direction focus on general technology acceptance and do not narrow down to the domain of elementary school teachers' acceptance of deep learning media (Sipayung et al., 2020; Hidayat et al., 2020). Moreover, there is a lack of research that looks into the combination of affective factors and the UTAUT model in the context of primary education in Indonesia (Majapahit, 2025; Susilawati et al., 2023). This gap is fulfilled by analyzing elementary teachers' acceptance of DL-based educational media through the lens of UTAUT by Venkatesh et al (2012) while depicting affective attachment as one of the main drivers of educational technology acceptance (Peechapol et al., 2018; Davis, 1989).

The authors suggest that this is the first attempt to study the acceptance of deep learning media through Google Sites by elementary school teachers using the UTAUT model integrated with affective components of attachment. This study emphasizes the role of emotional attachments in technology acceptance, rather than focusing on conventional parameters such as performance expectancy and facilitating conditions (Chen & Zhou, 2016; Maryono, 2017).

This study offers a distinct novelty by extending the Unified Theory of Acceptance and Use of Technology (UTAUT) through the explicit integration of affective need as a central explanatory construct in examining elementary school teachers' acceptance of deep learning–based learning media delivered via Google Sites. While prior UTAUT-based studies in educational contexts have predominantly emphasized utilitarian and structural determinants such as performance expectancy, effort expectancy, social influence, and facilitating conditions, this research demonstrates that, within the context of Indonesian primary education, emotional engagement plays a substantially more decisive role in shaping teachers' attitudes toward technology adoption. The novelty of this study is further strengthened by its empirical findings showing that conventional UTAUT predictors exhibit weak or even negative effects on behavioral intention, whereas affective need emerges as the strongest and most significant determinant of attitude. By foregrounding emotional readiness rather than instrumental rationality, this study contributes a human-centered reconceptualization of technology acceptance that is particularly relevant for complex instructional innovations such as deep learning–based learning media in elementary education.

Grounded in the identified research gap, the proposed novelty, and the objectives of the study, this research is guided by two central research questions. The first question seeks to examine the extent to which elementary school teachers accept deep learning–based learning media developed through Google Sites, as reflected in their attitudes and behavioral intentions to use the media in instructional practices. The second question aims to investigate how UTAUT-related factors, including affective need, attitude, performance expectancy, effort expectancy, social influence, facilitating conditions, ICT usage habits, perceived learning opportunities, and self-efficacy, interact in influencing teachers'

https://doi.org/10.51276/edu.v7i1.1352

behavioral intention to adopt deep learning–based learning media. These research questions are explicitly aligned with the quantitative PLS-SEM analysis and the subsequent discussion, enabling a coherent explanation of why affective need dominates the acceptance process while traditional UTAUT predictors demonstrate limited explanatory power within the institutional and cultural context of Indonesian primary education.

B. Method

This study employed a quantitative research approach using a survey design to examine elementary school teachers' intention to adopt deep learning–based learning media developed through Google Sites within the framework of the Unified Theory of Acceptance and Use of Technology (UTAUT). The quantitative design was selected to allow for the systematic measurement of relationships among latent variables and to provide empirical evidence on the factors influencing teachers' technology acceptance in primary education contexts.

The overall research flow consisted of sampling, instrument development, data collection, data screening, and data analysis. This sequential flow ensures that the study maintains methodological rigor from determining participants and preparing the instrument to collecting valid data and conducting both measurement and structural analysis using SEM.

The research was conducted across several elementary schools in Bandung Regency, Indonesia, specifically targeting teachers who have varying levels of experience with digital media. Initially, a total of 130 teachers participated in the study. After a meticulous data screening process, 100 responses were considered in the final analysis.

The 30 omitted responses were excluded primarily due to incomplete data (missing values) across several key variables or a failure to meet the eligibility criteria (e.g., not currently teaching at the elementary level). While this data reduction (approximately 23%) is necessary to maintain the integrity of the analysis, the remaining sample size ($n=100$) remains statistically adequate for the planned structural equation modeling (SEM) analysis. The research acknowledges the potential for a minor selection bias; however, the strict criteria ensured the quality and completeness of the dataset used to test the model.

The data collection utilized a self-administered structured questionnaire containing 35 questions measured on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), which was disseminated via Google Forms. The questionnaire was developed from validated instruments based on the UTAUT model and related works (Venkatesh et al., 2012).

The use of a self-administered questionnaire may inherently lead to social desirability bias, where respondents tend to answer in a manner they perceive as favorable or socially acceptable (e.g., exaggerating their intention to use new technology). To minimize this limitation, two steps were taken: (1) Ensuring Anonymity: Respondents were assured of complete anonymity and confidentiality before filling out the form, encouraging honest responses; and (2) Clear Instructions: The questionnaire provided neutral, non-leading

https://doi.org/10.51276/edu.v7i1.1352

phrasing and clear instructions, emphasizing that the focus was on actual perceptions and intentions rather than 'correct' answers.

The instrument of this study was developed to assess 10 latent variables in relation to the Unified Theory of Acceptance and Use of Technology (UTAUT) with a focus on the acceptance of immersive learning media in elementary education, developed through the lens of UTAUT. The variables are listed in table 1.

Table 1. Variables in Relation to the Unified Theory of Acceptance and Use of Technology (UTAUT)

No.	Latent Variable	Acronym	Operational Definition
1.	Affective Need	AN	There is a strong emotional or affective motivation to focus on the media.
2.	Attitude	ATT	There is a general evaluation of the use of immersive learning-based media, either positive or negative.
3.	Behavioral Intention	BI	There are plans to integrate the media into future teaching practices.
4.	Effort Expectancy	EE	The degree of perceived ease of using the technology is a significant factor.
5.	Facilitating Conditions	FC	The degree to which the school infrastructure allows for the use of technology is a significant factor.
6.	ICT Use Habits	IUH	Teachers habitually integrate computers and other digital devices during learning activities.
7.	Perceived Learning Opportunities	PLO	This statement evaluates how much people believe the media enhances student learning.
8.	Performance Expectancy	PE	The media's value in increasing the effectiveness of teaching is well-established.
9.	Self-Efficacy	SE	The expectation that one can successfully apply the media indicates the level of self-confidence.
10.	Social Influence	SI	The level of social motivation is related to the acceptance and use of the media.

Adapted measures from prior UTAUT-related studies (Venkatesh et al., 2012; Alghazi et al., 2021; Amelia et al., 2024) were used for each variable and tailored specifically for primary education. The entire questionnaire was rated using a 5-point Likert scale, where 1 represented "strongly disagree" and 5, "strongly agree." Administered through Google Forms, the questionnaire was completed by 100 primary school teachers in Bandung Regency. The instrument underwent a content validity examination by three experts in educational technology prior to complete distribution and was modified based on their feedback.

Construct validity and reliability were evaluated using Confirmatory Factor Analysis (CFA), followed by relational analysis among the latent variables using Partial Least Squares Structural Equation Modelling (PLS-SEM).

https://doi.org/10.51276/edu.v7i1.1352

Table 2. Likert Scale Score

No	Answer	Rate
1	Strongly Agree	5
2	Agree	4
3	Undecided	3
4	Disagree	2
5	Strongly Disagree	1

Source: (Sugiono, 2013)

Following the completion of data screening, the research flow proceeded to the analysis stage, which involved assessing the measurement model for validity and reliability, followed by examining the structural relationships among variables using PLS-SEM.

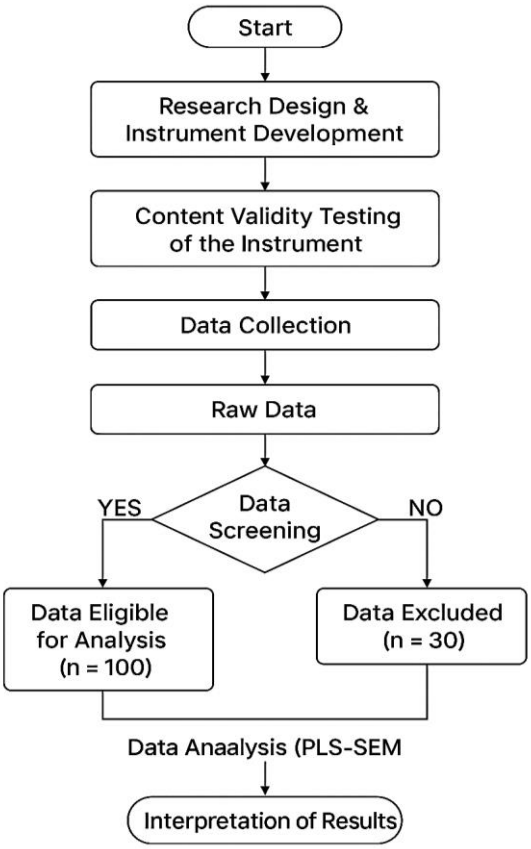

Figure 1. Research Flow

This study employed a quantitative research design using a PLS-SEM approach. The research began with the development of a measurement instrument adapted from the UTAUT model, with the inclusion of the Affective Need construct. The instrument was then validated through content validity testing by three educational technology experts.

Data were collected through an online questionnaire distributed via Google Forms to elementary school teachers in Bandung Regency, resulting in 130 initial responses. After data screening for completeness and eligibility, 100 valid responses were retained for

https://doi.org/10.51276/edu.v7i1.1352

analysis. The data were analyzed using PLS-SEM, including measurement model and structural model evaluations. The study concluded with the interpretation of results, focusing on the comparative influence of affective need and performance expectancy on technology acceptance.

C. Result

Measurement Model Evaluation

The measurement model evaluation aims to ensure that the constructs used in the study have met the threshold for reliability and validity. This assessment is based on four key parameters: Cronbach's Alpha, rho_A, Composite Reliability (CR), and Average Variance Extracted (AVE). These factors together determine the degree of internal consistency of the indicators (reliability) and the extent to which they actually measure the underlying latent construct (validity). The analysis of reliability and construct validity is presented in Table 3.

Table 3. Construct Reliability and Validity:

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Affective Need	0.909	0.913	0.936	0.787
Attitude	0.865	0.867	0.908	0.713
Behavior Intention	0.676	0.710	0.824	0.615
Effort Expectance	0.794	0.967	0.872	0.706
Facilitating Condition	0.735	0.824	0.840	0.638
ICT Usage Habits (IUH)	0.882	0.888	0.927	0.809
Perceived Learning Opportunities	0.922	0.925	0.945	0.811
Performance Expectancy	0.912	0.913	0.945	0.850
Self-efficacy	0.878	0.924	0.916	0.733
Social Influences	0.869	0.895	0.909	0.715

Most constructs demonstrated adequate internal consistency, generally meeting the Cronbach's alpha threshold of 0.70. The Behavioral Intention (BI) construct recorded a Cronbach's alpha of 0.676, slightly below the conventional 0.70 cutoff for high reliability. However, within the Partial Least Squares–Structural Equation Modeling (PLS-SEM) framework, emphasis is typically placed on rho_A (0.710) and Composite Reliability (CR) (0.824), both of which exceed the ≥0.70 criterion. Thus, although BI's Cronbach's alpha is marginally low, the construct can still be considered reliable when evaluated with PLS-SEM's preferred estimators. This partial weakness in BI's internal consistency suggests its predictive role in the structural model should be interpreted with caution, while the model's overall fit and explanatory power remain robust for the other constructs.

All variables provided acceptable composite reliability of ≥ 0.70 corresponding to their measurement items under each latent variable. Perceived Learning Opportunities,

https://doi.org/10.51276/edu.v7i1.1352

Performance Expectancy, and ICT Usage Habits (IUH) had even higher supposed reliability, as their CR passed 0.90, which meant that these indicators strongly measure the constructs.

The lowest score adequate to achieve convergent validity by Average Variance Extracted (AVE) is 0.50, which is fulfilled by the Behavior Intention (0.615) and Performance Expectancy (0.850). These findings verify that the latent variables sufficiently account for the variance found in the provided indicators.

In conclusion, all constructs prove that the measurement model has reasonably good reliability and validity in terms of convergence. Even with a slight variation in Cronbach's Alpha for behavior intention, the measurement quality remains reasonable, and the constructs are suitable for deeper exploration in the structural model analysis.

In addition, validity is determined based on the loading factor value, which exceeds 0.70. This value can be found in Table 3, which has been added. The SmartPLS software provides detailed explanations of the loading factors of each construct. Overall, there are 33 item descriptors that are declared valid.

Table 4. Convergent Validity Test Result with Outer Loadings

Construct	Item	Outer Loadings
Attitude	A1	0.863
Attitude	A2	0.873
Attitude	A3	0.774
Attitude	A4	0.864
Affective Need	AN1	0.892
Affective Need	AN2	0.843
Affective Need	AN3	0.873
Affective Need	AN4	0.937
Behavior Intention	BI1	0.840
Behavior Intention	BI2	0.613
Behavior Intention	BI3	0.874
Effort Expectance	EE1	0.955
Effort Expectance	EE2	0.958
Effort Expectance	EE3	0.536
Facilitating Condition	FC1	0.868
Facilitating Condition	FC2	0.726
Facilitating Condition	FC3	0.795
ICT Usage Habits (IUH)	ICT1	0.871
ICT Usage Habits (IUH)	ICT2	0.919
ICT Usage Habits (IUH)	ICT3	0.907
Performance Expectancy	PE1	0.943
Performance Expectancy	PE2	0.906
Performance Expectancy	PE3	0.917
Perceived Learning Opportunities	PLO1	0.865
Perceived Learning Opportunities	PLO2	0.912
Perceived Learning Opportunities	PLO3	0.909
Perceived Learning Opportunities	PLO4	0.915
Self-Efficacy	SE1	0.927
Self-Efficacy	SE2	0.898

https://doi.org/10.51276/edu.v7i1.1352

Construct	Item	Outer Loadings
Self-Efficacy	SE3	0.877
Self-Efficacy	SE4	0.703
Social Influences	SI1	0.783
Social Influences	SI2	0.892
Social Influences	SI3	0.858
Social Influences	SI4	0.845

The next step is to carry out the discriminant validity test, based on the value of the square root of AVE. Discriminant validity is conducted to ensure that each concept of every latent construct is empirically distinct from other constructs in the model. According to Ghozali (2016), validity testing aims to determine how accurately a measurement instrument performs its function in measuring the intended variable. The square root of AVE for each construct must be greater than the correlation coefficients between that construct and other constructs within the model. This assessment is performed by comparing the diagonal values (square root of AVE) with the off-diagonal correlation values in the matrix.

Referring to the results presented in Table 4, it can be seen that all constructs—such as Performance Expectancy (0.922), Perceived Learning Opportunities (0.900), ICT Usage Habits (0.899), Self-efficacy (0.856), and Social Influences (0.846)—have square root AVE values greater than their corresponding inter-construct correlations. These results confirm that the constructs possess good discriminant validity. Therefore, the measurement model fulfills the requirement of discriminant validity, as presented in Table 4.

Table 5. Discriminant Validity Test Results

Construct	AN	A	BI	EE	FC	ICT	PLO	PE	SE	SI
Affective Need	0.887									
Attitude	0.813	0.844								
Behavior Intention	0.661	0.529	0.784							
Effort Expectance	0.679	0.563	0.652	0.840						
Facilitating Condition	0.595	0.469	0.761	0.689	0.799					
ICT Usage Habits (IUH)	0.639	0.497	0.684	0.672	0.609	0.899				
Perceived Learning Opportunities	0.733	0.618	0.504	0.587	0.515	0.477	900			
Performance Expectancy	0.776	0.612	0.679	0.653	0.598	0.630	0.736	0.922		
Self-efficacy	0.740	600	0.775	0.728	0.676	0.629	0.693	0.768	0.856	
Social Influences	0.673	0.538	0.774	0.686	0.699	0.620	0.523	0.699	0.719	0.846

https://doi.org/10.51276/edu.v7i1.1352

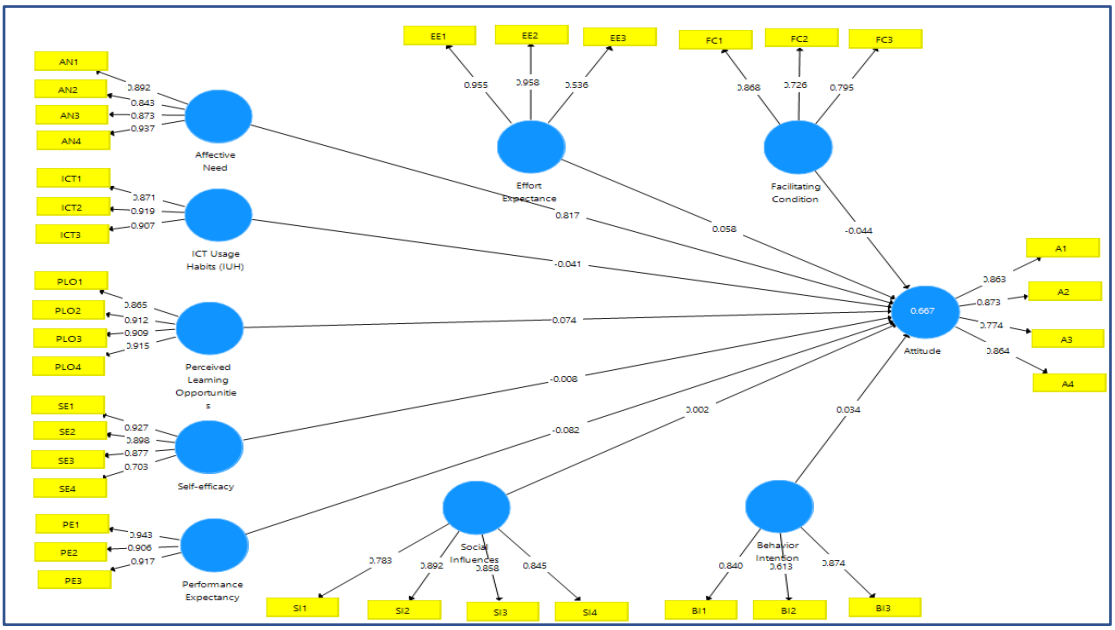

Figure 2. Model Conformity Test

This figure shows the UTAUT (Unified Theory of Acceptance and Use of Technology) model that has been tested using Partial Least Square-Structural Equation Modeling (PLS-SEM) through the SmartPLS application. This model is used to analyze elementary school teachers' acceptance of deep learning-based learning media developed through Google Sites.

Components and Constructs

The model used in this study consists of several components that represent key factors influencing teachers' acceptance of digital learning media. The construct Attitude (A) reflects teachers' overall evaluation of using learning media. Affective Need (AN) captures the emotional or affective motivations that shape users' perceptions when interacting with technology. ICT Usage Habits (IUH) describe teachers' habitual use of digital tools and devices during their instructional activities.

Perceived Learning Opportunities (PLO) represent teachers' perceptions of the learning benefits that technology can provide, whereas Self-Efficacy (SE) indicates their confidence in being able to use the technology effectively. Performance Expectancy (PE) refers to teachers' expectations of the technology's ability to improve teaching effectiveness, while Effort Expectancy (EE) represents their perceptions regarding the ease of use of the digital media.

Additionally, Social Influence (SI) reflects the degree to which teachers feel encouraged or motivated by their social environment to adopt the technology. Facilitating Conditions (FC) describe the availability of resources, infrastructure, and support that enable teachers to use the technology. Finally, Behavioral Intention (BI) measures the

https://doi.org/10.51276/edu.v7i1.1352

teachers' intention to adopt and use the Google Sites–based digital media in the future (Nurlani & Permana, 2017).

Outer Loadings

Each construct was assessed using multiple indicators, and the outer loading values demonstrate how strongly these indicators contribute to their respective latent variables. The indicators for Affective Need (AN) display consistently high loading values (ranging from 0.843 to 0.937), indicating strong internal consistency. Similarly, the indicators for ICT Usage Habits (0.871–0.919) and Perceived Learning Opportunities (0.865–0.915) also show excellent convergent reliability.

For the self-efficacy construct, most indicators exhibit high loading values above 0.87, although one item (SE4 = 0.703) shows a comparatively weaker contribution. A similar pattern appears in Effort Expectancy, where two indicators demonstrate excellent loadings (0.955 and 0.958) while one (EE3 = 0.536) performs weaker. The constructs Facilitating Conditions, Social Influence, Behavioral Intention, and Attitude also show generally strong indicator contributions, though a few items present moderate loading values.

Path Coefficients

The structural paths describe the influence of each construct on either attitude or behavioral intention. In this model, affective need emerges as the strongest predictor of attitude, with a coefficient of 0.817, suggesting that emotional motivation plays a central role in shaping teachers' perceptions toward digital learning media. In contrast, other constructs—such as performance expectancy, effort expectancy, facilitating conditions, ICT usage habits, and perceived learning opportunities—exert minimal and mostly negative effects on attitude, with coefficients ranging from −0.082 to −0.008.

Regarding behavioral intention, both attitude and social influence show fragile predictive effects, with coefficients of 0.034 and 0.002, respectively. This suggests that neither personal attitude nor social encouragement strongly shapes teachers' intentions to use the media in this dataset.

Coefficient of Determination (R^2)

The R2 value for attitude is 0.667, showing that 66.7% of the variance in teachers' attitudes can be explained by the predictor variables included in the model. Meanwhile, behavioral intention is explained only minimally by attitude and social influence, reflecting the minimal path coefficients found in the structural model.

Table 6. Result Interpretation

Construct	Interpretation
Affective Need	Very good: all reliability values and AVE are high (α = 0.909, AVE = 0.787).

https://doi.org/10.51276/edu.v7i1.1352

Construct	Interpretation
Attitude	Good: all values are > 0.70, valid, and reliable (CR = 0.908, AVE = 0.713).
Behavior Intention	Needs attention: Cronbach's Alpha = 0.676 (< 0.70), but CR (0.824) and AVE (0.615) still meet the threshold, meaning fairly reliable but not optimal.
Effort Expectance	Good: rho_A is very high (0.967), and reliability is acceptable.
Facilitating Condition	Meets minimum criteria (α = 0.735, AVE = 0.638)
ICT Usage Habits (IUH)	Very good: all indicators are very strong (CR = 0.927, AVE = 0.809).
Perceived Learning Opportunities	Very good: reliability and validity are very high (AVE = 0.811).
Performance Expectancy	Excellent (AVE = 0.850, the highest among all constructs)
Self-Efficacy	Valid and reliable (CR = 0.916, AVE = 0.733)
Social Influences	Very good: α = 0.869, AVE = 0.715

Path Analysis Results (Path Coefficients)

Path analysis was conducted to determine the extent of direct influence between latent constructs in the model being studied. The path coefficient value indicates the strength and direction of the relationship between constructs, where positive values indicate a unidirectional relationship and negative values indicate an opposite relationship.

Based on the test results in Table X, several important findings were obtained:

1. Affective Need, Attitude The results indicate that affective needs have a forceful and positive influence on attitudes with a coefficient of 0.817. This shows that the higher the teacher's affective needs, the more positive the teacher's attitude towards the use of deep learning-based learning media. This finding supports the importance of emotion in shaping attitude readiness toward new learning technologies.
2. Attitude, Behavior Intention Attitude towards the use of learning media shows a positive but weak influence on behavioral intentions, with a coefficient value of 0.034. This minimal value indicates that attitudes have been unable to significantly encourage teachers' behavioral intentions to use the media.
3. Effort Expectance, Behavior Intention Expectation of ease of use has a positive effect of 0.058 on behavioral intention, but this effect is also relatively weak. This indicates that the perception of ease is not yet a major factor in forming the intention to use it.
4. Facilitating Condition, Behavior Intention Supporting facilities even show a negative effect on behavioral intention, with a coefficient of -0.044. This means that the availability of infrastructure or technical support does not necessarily encourage teachers' intention to use learning media, perhaps because of the mismatch between infrastructure and practical needs.
5. ICT Usage Habits (IUH), Behavior Intention: Habits in using ICT have a negative effect on behavioral intention (-0.041). This shows that even though teachers are accustomed to using ICT, this does not necessarily increase interest in using deep learning-based

https://doi.org/10.51276/edu.v7i1.1352

learning media, possibly due to differences in characteristics or different technical demands.

6. Perceived Learning Opportunities, Behavior Intention Perception of learning opportunities has a positive effect of 0.074. Although the influence is still low, it can be interpreted that if teachers see added value in learning, they are more likely to intend to use this media.
7. Performance Expectancy, Behavior Intention Performance expectancy actually has the highest negative influence of -0.082 on behavioral intention. This indicates that teachers' belief in the system's performance did not influence their intention to use it; in fact, it reduced their interest because the system did not meet their expectations.
8. Self-efficacy, Behavior Intention Self-efficacy shows a weak negative influence (-0.008) on behavioral intention, indicating that teachers' belief in their abilities is not a determining factor in their intention to use the media.
9. Social Influences, Behavior Intention Social influence on behavioral intention is at 0.002, minimal and almost neutral. This means that social pressure or support from the work environment, colleagues, or leaders is not strong enough to influence teachers' behavioral intention in using the media.

Temporary Conclusion

The Coefficient of Determination (R^2 = 0.667) for Attitude indicates that the predictor variables (especially Affective Need) explain 66.7% of the variance in teacher Attitude, demonstrating excellent predictive power. The structural model confirms that affective need is the single strongest and most significant determinant of attitude. However, the weak paths leading to behavioral intention and the anomalous negative influence of performance expectancy highlight that emotional readiness is present, but practical and behavioral barriers prevent this positive feeling from translating into a strong intention to adopt the DL media.

D. Discussion

The results of the coefficient analysis reveal several important relationships among the latent variables examined in this study and provide insights into the factors influencing teachers' behavioral intentions to adopt immersive learning media using Google Sites. The primary focus of this analysis is to understand how various predictors within the UTAUT framework operate in the context of elementary education, particularly when deep learning–based media are introduced.

Among all the analyzed relationships, teachers' attitudes demonstrate a very strong and significant association with affective need, as indicated by the high coefficient value of 0.817. This finding suggests a close and meaningful relationship between teachers' positive attitudes toward the learning media and their emotional involvement or affective commitment. Such a result supports the theoretical assumptions underlying the UTAUT model and related acceptance theories, which acknowledge that affective components play

https://doi.org/10.51276/edu.v7i1.1352

a critical role in shaping attitudes toward technology use. In this context, the dominance of affective need indicates that emotional connection and personal valuation of the technology exert a greater influence on attitude formation than purely rational or functional considerations.

In contrast, the predictors of behavioral intention exhibit generally weak direct effects. Attitude shows only a minimal influence on behavioral intention, with a coefficient of 0.034, indicating that a positive attitude alone is insufficient to strongly motivate teachers to adopt the media in practice. Similarly, effort expectancy demonstrates a weak positive effect on behavioral intention, reflected by a coefficient of 0.058, suggesting that perceived ease of use does not substantially encourage adoption. ICT usage habits also display a weak negative influence on behavioral intention, with a coefficient of −0.041, implying that habitual use of digital technologies does not necessarily translate into willingness to adopt more complex deep learning–based media. Social influence shows an almost negligible effect on behavioral intention, with a coefficient of 0.002, indicating that encouragement or pressure from colleagues, leaders, or the surrounding professional environment plays a very limited role in shaping teachers' intentions in this context. These findings deviate from the original assumptions of the UTAUT model, which generally posit that effort expectancy and social influence are significant predictors of behavioral intention.

A particularly noteworthy and anomalous result emerges from the relationship between performance expectancy and behavioral intention. Performance expectancy exhibits a negative coefficient of −0.082, indicating that higher expectations regarding the performance benefits of the media are associated with lower intention to use it. This finding is inconsistent with the core propositions of UTAUT and contradicts previous studies that consistently report a positive relationship between performance expectancy and behavioral intention (Venkatesh et al., 2012). One possible explanation for this counterintuitive result is a complexity–aversion trade-off, in which teachers recognize the high potential benefits of deep learning media but simultaneously perceive the complexity and steep learning curve required to realize those benefits. This cognitive tension may lead teachers to view the expected performance gains as outweighed by the effort required, ultimately reducing their intention to adopt the technology. Another plausible explanation relates to curricular pressures in Indonesian primary education, where teachers are often required to prioritize content coverage and standardized assessments. Under such conditions, the time and effort needed to master and implement high-performance deep learning media may be perceived as incompatible with immediate instructional demands, even when the technology is believed to be effective.

Further insights emerge when examining facilitating conditions and self-efficacy, both of which display very weak negative effects on behavioral intention, with coefficients of −0.044 and −0.008, respectively. Although prior research has frequently identified these variables as important determinants of technology acceptance (Davis, 1989), their limited influence in this study suggests that contextual factors play a critical role. The minimal effect of social influence may reflect a reliance on top-down mandates within the Indonesian

https://doi.org/10.51276/edu.v7i1.1352

educational system, where technology adoption is driven more by formal policy directives than by peer norms or informal professional encouragement. Similarly, the weak and negative influence of facilitating conditions indicates that the mere availability of infrastructure, such as internet access or digital devices, is insufficient to promote adoption. Teachers may have access to technological resources but lack the pedagogical confidence, institutional support, or dedicated technical assistance necessary to integrate complex deep learning media effectively, leading to frustration rather than motivation.

The overall pattern of results highlights a broader cultural and institutional dynamic in which technology acceptance is highly personal and emotionally driven. The strong dominance of affective need, coupled with the weak influence of rational and social predictors, suggests that teachers' decisions to adopt innovative learning media are shaped less by utilitarian evaluations and external pressures and more by internal emotional readiness. In educational environments characterized by a culture of compliance and risk avoidance, teachers may require a strong positive emotional connection to the technology to overcome systemic inertia, as rational benefits or social encouragement alone are insufficient motivators (Syarifah et al., 2023).

Taken together, the findings of this path coefficient analysis demonstrate a significant deviation from the original predictions of the UTAUT model and underscore the contextualized nature of technology acceptance in education. The prominent role of affective need and the limited explanatory power of traditional UTAUT constructs, such as performance expectancy, effort expectancy, and social influence, indicate that the adoption of novel and cognitively demanding technologies like deep learning–based media is driven primarily by emotional engagement and perceived effort–reward balance within a specific institutional climate. These results suggest the need for future studies to incorporate moderating variables, including digital literacy, availability of technical support, and school culture, in order to further explain and refine technology acceptance models in primary education contexts.

E. Implication

The outcomes derived from this research affect numerous aspects of practice, theory, and sociology, suggesting significant takeaways for various stakeholders in educational technology adoption. With regard to the UTAUT model framework itself, expanding the scope to include affective need, ICT usage habits, perceived learning opportunities, and self-efficacy has indeed contributed to the construction of technology acceptance models. The noted differences in the coefficients, especially the rather low-bounding impacts of traditional predictors like performance expectancy and social influence, suggest that acceptance models meant for educational purposes undergo some recalibrations when applied in more pedagogically stimulating environments. Those results justify the assumption that many important factors (especially emotional and experiential ones like affective engagement) will dominate the landscape a lot more than previously presumed, highlighting the contextual necessity of integrating non-traditional predictors.

https://doi.org/10.51276/edu.v7i1.1352

Concerning Google Sites and other emerging digital learning platforms, the findings corroborate the need to attend to the emotional or subjective readiness of the teachers themselves. Since affective needs influence attitudes, which in turn affect behavioral intentions, training designers must give equal attention to non-technical motivational and experiential components as they do to the technical components of the training. Moreover, the low influence of facilitating conditions and self-efficacy on the outcome explains the limited scope of their influence, painting a stark image that adequate technical provision alone is not enough to drive adoption; engagement must be fostered through personalized or emotionally relevant material and platforms.

On a broader social scale, this study draws attention to the increasing emotional and psychological factors associated with teachers' interactions with educational technology. Policymakers and school leaders should integrate these factors into strategies related to digital transformation in education. The success of initiatives to adopt ICT is likely to be enhanced if a culture of emotional and collegial support, together with the opportunity for teachers' self-direction, is fostered for effective ICT integration.

Further investigation is warranted concerning the moderating factors, including digital literacy, sociological support, and school culture, due to discrepancies observed when comparing these findings with other UTAUT-based research. The need for considerable and continuous access to or use of digital tools designed to alter behavior could justify longitudinal studies capturing these aspects over time. Finally, exploring this model with other educational stages and geographic areas might show other trends that enhance its overall applicability and generalizability.

F. Limitation and Suggestion for Further Research

Note the limitations that affect the conclusions and interpretation of the findings in this study. For one, the study is a cross-sectional survey, which, by nature, did not take into account any changes in behavior or intentions over time. Also, their sample was taken from one location and institution, limiting the educational scope of generalization. Third, the use of self-administered questionnaires as a unique method of data collection has major limitations because the responses are open to subjective interpretations and may be contaminated by social desirability bias. Furthermore, the absence of moderation or mediation analysis creates a direct view of understanding the relationships between variables and ignores the complexity of elements that may influence the acceptance of digital learning media.

Drawing on the limitations and contextual complexities identified in this study, it is recommended that future research studies employ several strategies to deepen the understanding of technology acceptance in educational settings. To capture and document genuine, sustained changes in teachers' intentions and attitudes toward technology following initial training or strategic shifts, it is essential to implement longitudinal studies that follow participants over extended periods. Furthermore, to increase the generalizability and robustness of the results, it is necessary to expand the reach of participants by including

https://doi.org/10.51276/edu.v7i1.1352

different geographic regions, educational levels (beyond elementary school), and institutions with varying technological readiness levels. To explore the broader emotional and sociocultural influences on technology acceptance that quantitative methods may have missed, researchers should incorporate qualitative methods such as in-depth interviews or extensive case studies. Analytically, future investigations should include model measurements to assess moderation or mediation effects—examining how factors such as prior technology use, digital literacy, and institutional support might impact the relationships among the variables identified in the extended UTAUT model. Finally, the scope of inquiry should be expanded to examine additional learning resources beyond Google Sites to evaluate their efficacy and relative usefulness when compared to other immersive media platforms in similar contexts.

By attempting to bridge these gaps, it is intended that a more sophisticated understanding of technology acceptance in relation to education will be achieved, aiding in more informed decisions regarding the implementation of innovations in digital learning.

G. Conclusion

This study aimed to examine the perceptions and acceptance of elementary school teachers toward a deep learning-based instructional media for the Natural and Social Sciences (IPAS) subject, developed through the Google Sites platform. Guided by the Unified Theory of Acceptance and Use of Technology (UTAUT), the study concludes that teachers' behavioral intention to adopt immersive learning media is primarily influenced by their affective engagement with the media.

The results substantiate that emotional engagement coupled with personal investment is instrumental in cultivating intention. This indicates that, for primary education, system acceptance cannot be based solely on the functionality of the system or institutional backing. There needs to be a stronger empathetic framework. Hence, effective integration of educational technologies requires emphatic user experiences at the design and implementation levels.

References

Akmal, A. N., Maelasari, N., Ilmu, T., & Islam, P. (2025). Pemahaman Deep Learning dalam Pendidikan: Analisis Literatur Melalui Metode Systematic Literature Review (SLR). *Jurnal Ilmiah Ilmu Pendidikan*, *8*(1), 1–10.jiip.stkipyapisdompu

Alghazi, S. S., Kamsin, A., Almaiah, M. A., Wong, S. Y., & Shuib, L. (2021). For Sustainable Application of Mobile Learning: An Extended UTAUT Model to Examine the Effect of Technical Factors on the Usage of Mobile Devices as a Learning Tool. *Sustainability*, *13*(4), 1856. https://doi.org/10.3390/su13041856mdpi

Ali, E. Y. (2025). The Effectiveness of AI-Based Education Management in Implementing Deep Learning Curricula in Elementary Schools. *Journal of Integrated Elementary Education, 8*(1), 45-58.

https://doi.org/10.51276/edu.v7i1.1352

Amelia, R., Zamzani, Mustadi, A., Suriansyah, A., & Aslamiah. (2024). Student's Acceptance of the Nearpod Application: An Investigation in Elementary School. *International Journal of Evaluation and Research in Education (IJERE)*, *13*(2), 682–692. https://doi.org/10.11591/ijere.v13i2.26619ijere.iaescore

Chai, C. S., Koh, J. H. L., & Teo, Y. H. (2019). Enhancing and Modeling Teachers' Design Beliefs and Efficacy of Technological Pedagogical Content Knowledge for 21st Century Quality Learning. *Journal of Educational Computing Research*, *57*(2), 360–384. https://doi.org/10.1177/0735633117752453journals.sagepub

Chen, Q. L., & Zhou, Z. H. (2016). Unusual Formations of Superoxo Heptaoxomolybdates from Peroxo Molybdates. *Inorganic Chemistry Communications*, *67*, 95–98. https://doi.org/10.1016/j.inoche.2016.03.015sciencedirect

Christopher, L., & Waworuntu, A. (2021). Java Programming Language Learning Application Based on Octalysis Gamification Framework. *International Journal of New Media Technology (IJNMT)*, *8*(1), 65–69. https://doi.org/10.31937/ijnmt.v8i1.2049ejournals.umn

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, *13*(3), 319–339. https://doi.org/10.2307/249008jipp.unram

Ghozali, I. (2016). *Desain Penelitian Kuantitatif & Kualitatif untuk Akuntansi, Bisnis, dan Ilmu Sosial Lainnya*. Semarang: Yoga Pratama

Hidayat, A. G. (2025). Effectiveness and Readiness of Deep Learning Approach in Elementary Schools. *Kurikula: Jurnal Pendidikan, 9*(1), 12-24.

Hidayat, M. T., Aini, Q., & Fetrina, E. (2020). Penerimaan Pengguna E-Wallet Menggunakan UTAUT 2 (Studi Kasus). *Jurnal Nasional Teknik Elektro dan Teknologi Informasi (JNTETI)*, *9*(3), 239–247. https://doi.org/10.22146/jnteti.v9i3.227repository.uhamka

Liu, C., & Hwang, G. J. (2023). Roles and Research Trends of Touchscreen Mobile Devices in Early Childhood Education: Review of Journal Publications from 2010 to 2019 Based on the Technology-Enhanced Learning Model. *Interactive Learning Environments*, *31*(3), 1683–1702. https://doi.org/10.1080/10494820.2020.1855210colab

Majapahit, S. A. (2025). Model UTAUT untuk Pendekatan Evaluasi Penerimaan E-Learning di Perguruan Tinggi: Kajian Literatur. *Pasundan Journal of Informatics (PasInformatik)*.journal.unpas

Mandailina, V., Saddam, S., Ibrahim, M., & Syaharuddin, S. (2019). UTAUT: Analysis of Usage Level of Android Applications as Learning Media in Indonesian Educational Institutions. *International Journal of Education and Curriculum Application (IJECA)*, *2*(3), 16–24. https://doi.org/10.31764/ijeca.v2i3.2080journal.ipw

https://doi.org/10.51276/edu.v7i1.1352

Maryono, M. (2017). Atmosfer Sekolah Dasar dan Implikasinya bagi Pendidikan Guru Sekolah Dasar. *Jurnal Ilmiah Universitas Batanghari Jambi*, *17*(1), 103–113.ipv6.bajangjournal

Novianti, K. D. P. (2019). Analisis Evaluasi E-Learning Menggunakan Integrasi Model D&M dan UTAUT. *Techno.Com*, *18*(2), 122–133. https://doi.org/10.33633/tc.v18i2.2217publikasi.dinus

Nurlani, L., & Permana, B. (2017). Analisa Kesuksesan Sistem Informasi Akademik Menggunakan Model Terintegrasi. *Jurnal Teknologi Rekayasa*, *2*(2), 105–116. https://doi.org/10.31544/jtera.v2.i2.2017.105-116repository.unj

Peechapol, C., Na-Songkhla, J., Sujiva, S., & Luangsodsai, A. (2018). An Exploration of Factors Influencing Self-Efficacy in Online Learning: A Systematic Review. *International Journal of Emerging Technologies in Learning (iJET)*, *13*(9), 64–86. https://doi.org/10.3991/ijet.v13i09.8351core

Ratna, R. A. K., Abidin, Y., & Kurniawan, D. T. (2023). Keberterimaan Media Multimodalitas Berbasis Website dalam Perspektif Guru: Tinjauan the UTAUT Model. *Jurnal Review Pendidikan Dasar: Jurnal Kajian Pendidikan dan Hasil Penelitian*, *9*(2), 104–116. https://doi.org/10.26740/jrpd.v9n2.p104-116journal.uiad

Shara, P. V., & Widodo, T. (2018). Penerapan Model Unified Theory of Acceptance and Use of Technology (UTAUT) dalam Menganalisis Penggunaan E-Learning. *Sosiohumanitas*, *20*(1), 70–83.journal.uiad

Sipayung, M. S., Wati, N., Sari, W., & Mulia, U. (2020). Use of the Unified Theory of Acceptance and Use of the Technology (UTAUT) II Model to Analyze the Acceptance and Use of the Quizizz Application in Teaching Enterprise System Courses. *Literatus*, *2*(1), 75–86. https://doi.org/10.37010/lit.v2i1.63journal.unpas

Sugiono. (2013). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Susilawati, E., Abidin, Y., & Herlambang, Y. T. (2023). Use of the UTAUT 2 Model to Find Out Acceptance of Multimodality Learning Media Web-Based Elementary School Teachers in West Java. *PrimaryEdu: Journal of Primary Education*, *7*(2), 199–209. https://doi.org/10.22460/pej.v7i2.p199-209e-journal.stkipsiliwangi

Syarifah, M., Suryadi, D., & Prabawanto, S. (2023). Elementary School Teachers' Conception of Ethnomathematics. *Attadib: Journal of Elementary Education*, *7*(1), 1–12. https://doi.org/10.32507/attadib.v7i1.1396sinta.kemdiktisaintek

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly*, *36*(1), 157–178. https://doi.org/10.2307/41410412library.likmi

https://doi.org/10.51276/edu.v7i1.1352

.

Author's Biography

	**Timtim Siti Mariam, S.Pd.** Was born in Bandung on June 8, 1979. He is a postgraduate student at Universitas Pendidikan Indonesia and is currently completing his studies at the UPI Cibiru Campus, Bandung, West Java. He also completed the in-service Teacher Professional Education (PPG) program at the UPI Cibiru Campus in 2019. Email: timtimsitimariam@upi.edu
	**Dr. Yunus Abidin, M.Pd.** Was born in Cilacap, August 17, 1979. Obtained a Doctorate in language Education from the Indonesian Education University in 2013. Lecturer in Elementary School Teacher Education, Indonesian Education University, Cibiru Campus. Also teaches in the Open University Teacher Professional Education Study Program. Expertise in the fields of language education, elementary education and media and learning technology. Email: yunusabidin@upi.edu
	**Dr. Dede Trie Kurniawan, S.Si., M.Pd.** Was born in Cirebon, January 13, 1987. Obtained a Bachelor of Science in Physics from FMIPA, Padjadjaran University in 2008, a Master of Science Education Concentration in Physics Education from the Indonesian Education University in 2012, and a Doctorate in Science Education from the Indonesian Education University in 2018. Lecturer in Elementary School Teacher Education, Indonesian Education University, Cibiru Campus. Also teaches in the Open University Teacher Professional Education Study Program. Expertise in the fields of science education, Physics Education, elementary education and media and learning technology. Email: dedetriekurniawan@upi.edu