



Analysis of Factors Influencing Teachers' Acceptance of Web-Based Learning Media in The Context of Multimodal Learning Implementation

Dwinda Shofa Gusdini¹, Yunus Abidin², Dede Trie Kurniawan³

¹²³Elementary School Teacher Education Study Program, Universitas Pendidikan Indonesia Kampus Cibiru

Correspondence: E-mail: dwindashofagusdini@upi.edu

ABSTRACT

The current development of science and technology has resulted in various transformations and benefits for the world of education. One of them is in learning. The extent to which educational content is influenced by student learning outcomes is determined by the effectiveness and efficiency of instructional media. In order to achieve a student center, good learning media can encourage students to study independently through web-based learning. However, the intention of the main actors in education, namely the teacher, is the main element in using this web-based learning media. The purpose of this study was to investigate the predictive factors of the acceptance of elementary school teachers towards web-based learning media on analog clock reading materials. The method used in this study is a correlational survey involving variables in the UTAUT 2 model. The results of this study are that the SI and IUH variables are factors that have a positive and significant effect on BI and are a factor in elementary school teachers' acceptance of web-based learning media.

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ARTICLE INFO

Article History:

Submitted/Received 20 Dec 2024

First Revised 3 January 2025

Accepted 15 January 2025

First Available online 31 January 2025

Publication Date 31 January 2025

Keyword:

Predictive Factors of Teacher Acceptance, Web-Based Learning Media, UTAUT 2.

1. INTRODUCTION

The COVID-19 pandemic has brought awareness to the education sector in Indonesia regarding the limited utilization of digital technology in learning activities. Research indicates that the use of digital technology is a crucial element in 21st-century education, predicted to optimize knowledge acquisition for students at both middle and elementary school levels (Henderson et al., 2017; Khoirunnisa & Habibah, 2020; Komara, 2018) With technological advancements, modern life increasingly relies on meeting the expectations of the times. Present technology is integrated with real-world situations to create an intelligent society (Salgues, 2018).

Learning procedures and mastery in the context of the 21st century are enhanced with technology as an aid in training. Through the utilization of digital media, instructional materials can be easily accessed by students anytime, anywhere, without constraints of time and place, as they can be accessed easily by students. The ease of acquiring knowledge unrestricted by space and time, accessible at any time, contributes to the expansion of education. In the 21st century, people live in an environment filled with technological usage, easy access to a wealth of statistics, and new styles of communication and collaboration (Prayogi, Rayinda Dwi; Estetika, 2019).

One strategy for developing instructional media to stimulate students' interest in learning is through the implementation of multimodal media. Multimodality refers to the study of the reciprocal relationship and interdependence between various modes of communication, complementing, expanding, and/or contradicting each other (Yunus Abidin, 2022). The multimodal approach emphasizes the differences in students' learning experiences, where the use of web-based learning media can simultaneously present various media such as audio, video, e-books, and gaming applications. In the 1990s, multimodal discourse analysis emerged, highlighting that multimodality involves various elements such as language, technology, images, colors, music, actions, gestures, body language, and facial expressions in multidimensional interactions and cognitive frameworks. However, the implementation of multimodal or mixed learning in developing countries faces several challenges that need attention.

Despite the numerous benefits educators can gain from using multimodal media, they tend to be reluctant to adopt multimodality without encouragement or requirements from the government. The suboptimal utilization of websites and the strict adherence to the obligation of using web-based learning media reflect this attitude. The significance of media use in the current learning process is associated with the effort to introduce students to the use of technology.

Based on these explanations, this research aims to design and develop web-based multimodal instructional media to be implemented at the middle or elementary school level. After understanding the use of web-based multimodal instructional media, the author hopes that the development of instructional media with the application of web-based multimodality can be adopted in the teaching process by teachers. This research will focus on developing web-based multimodal instructional media with the goal of enhancing the critical and creative

skills of teachers. Furthermore, it is expected that the developed web-based multimodal media will serve as a resource for teachers planning to create instructional materials.

2. METHODS

Evaluating the factors influencing behavioral intentions and actions in the use of technology systems involves various methods and models. One such method is the Unified Theory of Acceptance and Use of Technology (UTAUT). UTAUT, developed by Venkatesh et al. as mentioned in (Rahmadhani, 2021), is a model of technology acceptance and usage that combines the best features from eight other technology acceptance theories. The UTAUT2 model indicates that behavioral intention is influenced by technology usage behavior, performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit.

Based on the objectives, research issues, and the applied data collection method, this type of research can be classified as a correlational survey. The research was conducted in the city of Cimahi. The population focused on in this study is 100 teachers from various schools in the Cimahi Regency. In the context of determining the research sample, Hair et al., as stated by (Putri, Ni Komang R D; Suardhika, 2020), explain that the adequate sample size in research should be at least ten times the number of variables involved. Given that this research involves eight variables, the minimum required sample size is 80.

The research method applied in this study is path analysis using the structural equation modeling (SEM) framework. Data collection involving student responses was conducted using a questionnaire as the instrument. Information about the ability to use web-based learning media was collected using a questionnaire form presented in digital format (Google Form).

The questionnaire used was designed with a focus on eight measured variables. Behavioral intention is assessed through the creation of web-based multimodal media (performance expectancy), ease of use of web-based multimodal media (effort expectancy), perception of social influence (social influence), satisfaction in using web-based multimodal media (hedonic motivation), and perceived benefits of using web-based multimodal media (price value). The instrument used to measure the behavioral intention to use web-based multimodal media involves these factors. Meanwhile, the behavior of using web-based multimodal media is evaluated through the comfort of media usage (facilitating condition) and the habit of using web-based multimodal media (habit) as instruments to measure usage actions. To test the proposed hypotheses, research data is processed using path analysis. Partial Least Squares (PLS) software is applied to test the reflective and formative models proposed in this study.

3. RESULTS AND DISCUSSION

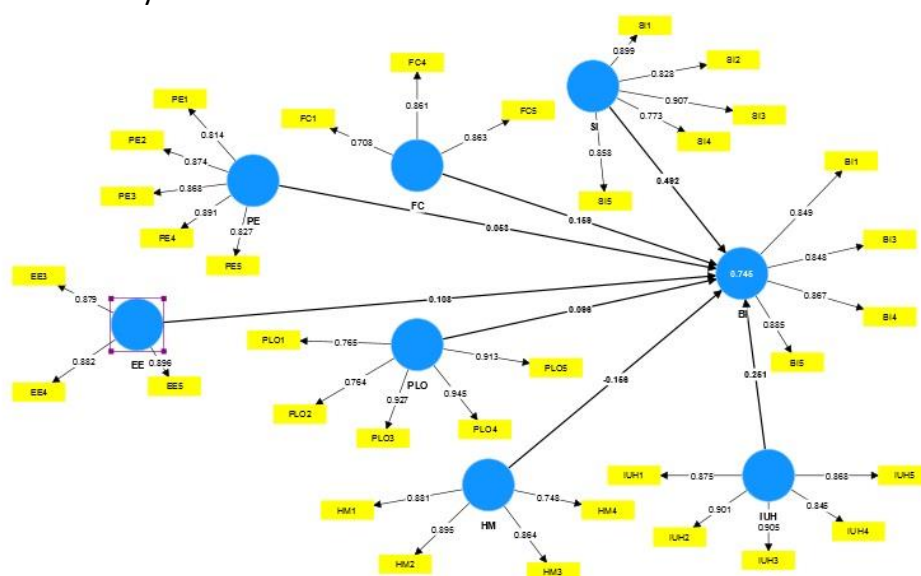
This study aims to identify factors contributing to the acceptance of web-based analog clock reading learning media by elementary school teachers. To determine this, confirmatory factor analysis needs to be conducted. One way to measure indicators (Outer Model) is by examining convergent validity. Convergent validity is used to determine whether a specific item is well-designed to measure the construct it should measure. To assess convergent validity, Average Variance Extracted (AVE), Composite Reliability (CR) of each variable, and the reliability of each item are used. If the AVE value is above 0.50, it indicates that the item is adequate and represents 50% of the measured construct, demonstrating good convergent validity. Table 1 on Crossloading shows that the values fall in the range of 0.7 - 0.9, exceeding the recommended minimum threshold of 0.5. Table 1 also reveals that the CR values for all variables are higher than the recommended value of 0.7, indicating the validity of the variables used.

Table 1. Convergent Validity Measurement Results

Variable	Indicator	Loaded	AVE	CR
<i>Behavior Intentions (BI)</i>	BI1	0.849	0.744	0.887
	BI3	0.848		
	BI4	0.867		
	BI5	0.885		
<i>Effort Expectancy (EE)</i>	EE3	0.879	0.785	0.864
	EE4	0.882		
	EE5	0.896		
<i>Facilitating Conditions (FC)</i>	FC1	0.708	0.662	0.795
	FC4	0.861		
	FC5	0.863		
<i>Hedonic Motivation (HM)</i>	HM1	0.881	0.721	0.908
	HM2	0.895		
	HM3	0.864		
	HM4	0.748		
<i>ICT Usage Habit (IUH)</i>	IUH1	0.875	0.773	0.936
	IUH2	0.901		
	IUH3	0.905		
	IUH4	0.845		
	IUH5	0.868		
<i>Performance Expectancy (PE)</i>	PE1	0.814	0.732	0.917
	PE2	0.874		
	PE3	0.868		
	PE4	0.891		
	PE5	0.827		
<i>Perceived Learning Opportunities (PLO)</i>	PLO1	0.765	0.751	0.921
	PLO2	0.764		
	PLO3	0.927		
	PLO4	0.945		

	PLO5	0.913		
Social Influence (SI)	SI1	0.899	0.730	0.912
	SI2	0.828		
	SI3	0.907		
	SI4	0.773		
	SI5	0.858		

Here are the results of the indicator description of the relationships between latent variables in this study:



Picture 1. Analysis of Relationships Between Latent Variables

To assess discriminant validity, we examine the extent to which different constructs are related to each other. According to Fornell & Larcker (1981), to support discriminant validity, the square root of the Average Variance Extracted (AVE) for each construct should be greater than the intercorrelation between that construct and other constructs. Table 2 shows that the diagonal values or square roots of AVE are higher than the values off the diagonal. This indicates that the model used meets the Fornell-Larcker criteria, and discriminant validity is satisfied.

Table 2. Discriminant Validity Model Fornell-Larcker Criteria

	BI	EE	FC	HM	IUH	PE	PLO	SI
BI	0.862							
EE	0.638	0.886						
FC	0.733	0.536	0.814					
HM	0.600	0.480	0.638	0.849				
IUH	0.692	0.546	0.740	0.712	0.879			
PE	0.482	0.242	0.644	0.601	0.512	0.855		
PLO	0.648	0.493	0.671	0.817	0.711	0.588	0.866	
SI	0.796	0.654	0.673	0.638	0.569	0.426	0.628	0.854

To test the correlation between theoretical constructs in the research model, the structural model is employed. The structural model is evaluated using bootstrapping techniques. The structural model also includes the R2 values, indicating how much of the variance in the endogenous variable is explained by the exogenous variables. The BI variable is significantly determined by seven exogenous variables, namely PE, EE, SI, FC, IUH, PLO, and HM, resulting in an R2 of 0.745. This means that 74% of the variation in the BI variable can be influenced by the variables PE, EE, SI, FC, IUH, PLO, and HM. The remaining 26% is influenced by other factors and variables not examined in this study. The influence and interaction effects between constructs are evaluated using path coefficients. Path coefficients with T-statistic values ≥ 1.96 are considered significant, while path coefficients with T-statistic values ≤ 1.96 are considered not significant. In addition to analyzing T-statistics, the direction of the relationship is also analyzed using Path Coefficients. This helps determine whether the relationship between hypothesis variables has a positive direction (between 0 and 1) or a negative direction (between 0 and -1).

Table 3. Path Coefficients Analysis

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
EE -> BI	0.108	0.103	0.094	1.153	0.249
FC -> BI	0.159	0.166	0.113	1.399	0.162
HM -> BI	-0.156	-0.151	0.098	1.587	0.113
IUH -> BI	0.251	0.258	0.116	2.159	0.031
PE -> BI	0.053	0.055	0.084	0.631	0.528
PLO -> BI	0.096	0.089	0.104	0.925	0.352
SI -> BI	0.492	0.486	0.126	3.914	0.000

Hypothesis testing results regarding path coefficients and their significance are presented in Table 3. The paths consisting of Performance Expectancy (PE), Effort Expectancy (EE), Facilitating Conditions (FC), and Perceived Learning Opportunities (PLO) have T-statistic values ≤ 1.96 with $P \geq 0.05$. This indicates that these four paths have a positive but statistically insignificant influence. As for the Hedonic Motivation (HM) variable, it does not positively influence the Behavior Intentions (BI), as indicated by the path coefficients (O) with a value of -0.156.

The hypothesis testing results in this study are as follows:

1. EE has a positive influence on BI with a β value of 0.108 but is not significant because $t = 1.153$, $p \geq 0.05$.
2. FC has a positive influence on BI with a β value of 0.159 but is not significant because $t = 1.399$, $p \geq 0.05$.
3. HM has a negative and insignificant influence on BI with a β value of -0.156, $t = 1.587$, and $p \geq 0.05$.
4. IUH has a positive and significant influence on BI with a β value of 0.251, $t = 2.159$, $p \leq 0.05$.

5. PE has a positive influence on BI with a β value of 0.053 but is not significant because $t = 0.631$, $p \geq 0.05$.
6. PLO has a positive influence on BI with a β value of 0.096 but is not significant because $t = 0.925$, $p \geq 0.05$.
7. SI has a positive and significant influence on BI with a β value of 0.492, $t = 3.914$, and $p \leq 0.05$.

Based on the research findings, SI and IUH are predictive factors significantly influencing teachers' acceptance of web-based learning media on analog clock reading material. On the other hand, PE, EE, PLO, and FC are predictive factors influencing teachers' acceptance of web-based learning media on analog clock reading material but are not significant. Meanwhile, HM is not a factor in teachers' acceptance of web-based learning media; thus, the hypothesis is rejected.

Performance Expectancy (PE)

In this study, results indicate that the Performance Expectancy (PE) variable has a positive but not significant influence on Behavior Intention (BI), as indicated by β , T-statistic, and P values. The hypothesis linking PE with BI is accepted since PE positively influences BI, although not significantly. This result suggests that the use of web-based learning media does not significantly enhance teachers' performance. However, prior research in South Korea showed different results, indicating a significant relationship between performance expectancy and Behavior Intention in technology usage (Haengnam, Sung; Jae-Ik, 2017). The study stated that technology usage would impact performance improvement in work, linked to performance expectancy (Venkatesh, Viswanath; Thong, 2012).

Effort Expectancy (EE)

In this study, results show that the Effort Expectancy (EE) variable has a positive but not significant influence on Behavior Intention (BI), as seen from β , T-statistic, and P values. The hypothesis linking EE with BI is accepted because EE positively influences BI, although not significantly. This result indicates that most teachers face barriers in using web-based learning media and feel that it requires substantial effort. However, several empirical studies show that effort expectancy is a crucial factor in the acceptance and use of technology (Venkatesh, V.; Zhang, 2010). Effort expectancy refers to how easy technology can be used.

Social Influence (SI)

In a study conducted by (Fedorko et al., 2021), it is proven that the Social Influence (SI) factor is essential in technology usage in the learning context. The analysis results show that SI has a positive and significant influence on Behavior Intention (BI), demonstrated by β , T-statistic, and P values. Therefore, the hypothesis linking SI with BI is accepted. Social Influence refers to the extent to which the influence of people around can alter the behavior and attitudes of technology users. The findings in this study show that teachers accept the use of web-based learning media because of encouragement from their surroundings, such

as colleagues, leaders, and students. This finding is consistent with other research indicating that social influence has a positive impact on the behavioral intention of technology use (Pynoo, Bram; Devolder, Pieter; Tondeur, Jo; Braak, Johan van; Duyck, Wouter; Duyck, 2011).

Facilitating Conditions (FC)

In this study, results show that the Facilitating Conditions (FC) variable has a positive but not significant influence on Behavior Intention (BI), as indicated by β , T-statistic, and P values. The hypothesis linking FC with BI is accepted because FC positively influences BI, although not significantly. This aligns with the research conducted by (Haengnam, Sung; Jae-ik, 2017), indicating that facility conditions or the availability of facilities to access technology can influence user intention (Behavior Intention, BI). The Facilitating Condition (FC) construct refers to the availability of facilities that can be used for technology use. Findings from other researchers also show that FC has a positive and significant impact on BI. In the other article it found a significant impact when facilitating conditions on the behavioral intention of technology users (Akar & Mardikyan, 2014).

ICT Usage Habit (IUH)

The term "habit" has two different perspectives. First, habit can be interpreted as previous behavior, as described in the study by (AMBARWATI et al., 2020). Second, habit can be seen as automatic or direct behavior, as described in the study. In the context of using technology, the habit of using technology can be a driving factor for teachers to use technology. Findings in this study show that ICT Usage Habit (IUH) has a positive and significant influence on Behavior Intention (BI), as demonstrated by β , T-statistic, and P values. Therefore, the hypothesis linking IUH with BI is accepted, meaning that IUH has a positive and significant influence on BI. In the context of using web-based learning media, the habit of using technology becomes a determining factor in teachers' acceptance of this media.

Perceived Learning Opportunities (PLO)

Perceived learning refers to a set of beliefs and feelings related to the learning process. There are three main dimensions in perceived learning: cognitive (related to new knowledge acquired), emotional (related to feelings and experiences in acquiring new knowledge, especially in terms of complexity or ease), and social (related to satisfaction obtained through interaction with others when acquiring new knowledge). However, in the context of teachers' acceptance of web-based learning media, the Perceived Learning Opportunities (PLO) factor has a positive but not significantly influential effect. The analysis results involving β , T-statistic, and P values show that the hypothesis linking PLO with Behavior Intention (BI) is accepted, meaning that PLO has a positive but not significant influence on BI in the context of using web-based learning media by teachers.

Hedonic Motivation (HM)

Hedonic motivation is defined as pleasure and happiness derived from the use of technology. Happy feelings have an impact on a person's tendency to adopt new technology,

as explained in the study (Nikolopoulou et al., 2021). However, findings in this study show that teachers do not feel happiness and comfort when using web-based learning media. The analysis results involving β , T-statistic, and P values show that the Hedonic Motivation (HM) variable has a negative and not significantly influential effect on Behavior Intention (BI). Therefore, the hypothesis linking HM with BI is rejected. This indicates that in the context of teachers' use of web-based learning media, HM does not have a positive and significant influence on BI.

4. CONCLUSION

There are six variables that positively influence the acceptance of web-based learning media by elementary school teachers. ICT Usage Habit (IUH), Social Influence (SI), Performance Expectancy (PE), Effort Expectancy (EE), Facilitating Conditions (FC), and Perceived Learning Opportunities (PLO). However, the variables that positively and significantly influence the acceptance of web-based learning media (Behavior Intention (BI)) by teachers are the ICT Usage Habit (IUH) variable and the Social Influence (SI) variable. Teachers feel that their reasons for using web-based learning media are influenced by the social environment, such as colleagues, leaders, especially students. In addition, the habitual use of technology in daily activities is one of the factors that significantly contributes to the acceptance of web-based learning media. The availability of supporting equipment, training in the use of learning media, perceived effectiveness in work, and ease of using media-based learning make teachers accept this learning media.

As for the Hedonic Motivation (HM) variable, it is not a factor in teachers' acceptance of web-based learning media. For teachers, the use of web-based learning media requires a lot of preparation, involves complex technology, and experiences difficulties during use, leading to a lack of happiness and satisfaction when using web-based learning media.

The results obtained from this study may not represent the views of most elementary school teachers regarding the acceptance of web-based learning materials in the context of topics related to energy. This limitation arises from the small sample size and the narrow focus on the latent variable of behavioral intention (BI). Therefore, it is crucial to conduct further studies examining teachers' acceptance of web-based learning materials in various fields of study, involving a larger and more diverse group of respondents, while also considering additional influencing factors.

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