



## The Influence of Educational Technology on the Effectiveness of Learning in Christian Religious Education in Schools

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### ARTICLE INFO

*Keywords:* Educational Technology, Learning Effectiveness, Christian Values, Linear Regression

*Received* : 20, September

*Revised* : 22, October

*Accepted* : 24, November

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### ABSTRACT

This study aims to examine the effect of educational technology on the effectiveness of learning and Christian values understanding among students in Christian secondary schools. A quantitative method was used with simple linear regression analysis, preceded by construct validity, internal reliability, and data normality tests. The validity test results showed that the cluster structure of the instruments was consistently and strongly correlated, especially between the use of technology (X1), interactive media (X3), and understanding of Christian values (Y2). Reliability showed that most clusters were in the good category, except for Y1, which was less stable. Regression showed that X1 and X3 were dominant predictors of Y2, with Beta values of 0.817 and 0.828, respectively. These results indicate the importance of technology integration in value-based learning.

## INTRODUCTION

In today's digital era, technology has become an inseparable part of almost every aspect of human life, including in the field of education. The rapid digital transformation demands adjustments in learning methods in order to meet the needs of a generation growing up in an entirely digital environment (Butar-butur et al., 2023). Christian Religious Education, which has long been identified with conventional approaches and scripture-based learning, is now faced with both a challenge and a great opportunity to integrate educational technology into its learning process. Christian Religious Education, which has long been associated with conventional methods such as lectures, verse memorization, and face-to-face discussions, is now confronted with the challenge and opportunity to integrate educational technology into its learning process (Silitonga, 2025). Various studies show that technology-based religious learning can improve students' cognitive and affective understanding, especially when presented creatively through videos, simulations, interactive Bible applications, and the use of Learning Management Systems (LMS) based on Christian values (Sihotang, 2020). Therefore, the integration of technology in Christian Religious Education is both a challenge and an opportunity. Digital approaches such as videos, interactive applications, and Christian-based LMS can enhance students' cognitive and affective understanding. With proper adaptation, religious education can remain relevant and continue to support faith development in the digital era.

The background of the problem arises from the fact that traditional learning methods are often unable to address the dynamic learning styles of today's students. Low learning motivation, lack of active student engagement, and limited media used in religious instruction can lead to a shallow understanding of Christian values that are less relevant to their life context (Danugroho, 2022). On the other hand, advances in educational technology offer a variety of interactive tools and approaches that have the potential to enhance learning effectiveness in terms of content understanding,

student engagement, and the application of values in daily life (Amrullah et al., 2024).

Educational technology provides new approaches such as Bible-based narrative video learning, gamification of theological content, the use of Augmented Reality (AR) to introduce biblical culture, and online discussions through digital platforms that facilitate collective spiritual reflection (Stella Mulalinda, 2024). When applied appropriately, these technologies can improve learning effectiveness in cognitive, affective, and psychomotor aspects. Furthermore, digital media allows for a more inclusive and contextual approach to students from diverse social and cultural backgrounds (Hartika et al., 2025).

However, the implementation of technology in Christian Religious Education must not be done carelessly. A thorough study is needed to understand how technology affects the learning process and outcomes, particularly in the formation of students' character and spirituality. Therefore, this research is important to explore the extent to which educational technology influences learning effectiveness in Christian Religious Education in schools. The findings of this study are expected to make a significant contribution to the development of relevant, contextual, and impactful religious learning strategies for nurturing students' faith and character growth (Butar-butur et al., 2023).

Hence, traditional approaches in Christian Religious Education are becoming less effective in reaching the digital generation. Technology offers solutions through videos, gamification, AR, and online platforms that enhance students' understanding and engagement. However, its implementation must be carried out wisely to ensure that it continues to support character and spiritual formation. Research is therefore needed to design learning strategies that are both relevant and impactful.

A similar theme has also been explored by Anton Napitupulu and Rezeki Putra Gulo in their study titled *Artificial Intelligence and the Transformation of Christian Education: Integrating Intelligent Technology into Learning*. Their research states that Artificial Intelligence (AI) has the potential to revolutionize Christian education by enhancing accessibility, learning personalization, and teaching efficiency. The integration of AI allows Christian value-based curricula to become more adaptive and interactive, supporting educators in delivering content in a contextual and inspiring manner. Intelligent technology also strengthens spiritual reflection through deeper learning experiences. The study concludes that the integration of Artificial Intelligence into Christian education brings significant transformation by improving accessibility, learning effectiveness, and spiritual reflection. AI enables more personalized and value-based teaching, helping educators present materials contextually and assisting students in understanding faith more deeply through adaptive and interactive technologies (Napitupulu & Gulo, 2024).

A related topic was also examined by Gerbin Tamba in his research titled *The Integration of Christian Religious Education in the Era of AI and Digital Technology: Challenges and Opportunities*. Tamba explains that the era of AI and digital technology presents both challenges and opportunities for Christian Religious Education. Digitalization enables more interactive and personalized learning, while AI supports deeper spiritual understanding. However, challenges such as technological ethics and the preservation of faith values must be carefully considered to ensure that education remains relevant and deeply rooted in Christian principles. The study concludes that the integration of AI and digital technology into Christian Religious Education creates opportunities to enhance interactivity and personalization in learning while maintaining faith-based values. Although challenges like technological ethics and responsible use persist, Christian education can continue to grow through wise adaptation, ensuring its relevance in the digital age (Tamba, 2025).

Based on the findings above, there remain aspects that have not yet been thoroughly investigated, namely the influence of educational technology on learning effectiveness in Christian Religious Education in schools. This includes exploring how AI can support spiritual reflection, how gamification affects theological understanding, and how to maintain a balance between digital technology and traditional faith experiences in shaping students' Christian character and values.

## **METHODS**

This research employs a quantitative descriptive-correlational approach with the following objectives: (1) to describe students' perceptions of educational technology and learning effectiveness, and (2) to examine the relationship between variable X (Educational Technology) and variable Y (Learning Effectiveness).

### ***Population and Sample***

The population consists of junior and senior high school students who take Christian Religious Education classes. The sample is selected using a purposive sampling technique, involving 35 students from several Christian schools in the Salatiga area. The inclusion criteria include students who actively participate in Christian Religious Education classes and are familiar with the use of technology in learning.

### ***Research Instrument***

The study uses a closed-ended questionnaire consisting of 25 items measured on a 5-point Likert scale (from *Strongly Disagree* to *Strongly Agree*). Each item is coded and categorized according to the dimensions of variables X and Y, as follows:

1. X1: Use and Availability of Technology.
2. X2: Teacher and School Support.
3. X3: Interactive Media and Methods.
4. Y1: Learning Effectiveness.
5. Y2: Understanding of Christian Values.

### Data Analysis

Statistical analysis is conducted using SPSS version 24, including construct validity testing (inter-cluster correlations), reliability testing (Cronbach's Alpha), normality testing (Shapiro–Wilk), Spearman correlation, and simple linear regression.

## RESULTS AND DISCUSSION

### Validity Test

The cluster X1 (Use of Technology) shows a very high correlation with X3 (Interactive Media) and Y2 (Understanding of Christian Values), with correlation coefficients of 0.836 and 0.817 respectively ( $p < 0.01$ ). This indicates a strong interconnection between the use of technology, media interactivity, and the depth of students' spiritual understanding. In addition, the relationship between X3 and Y2 is also very strong ( $r = 0.828$ ,  $p < 0.01$ ), reinforcing the argument that interactive learning media effectively support the internalization of Christian values.

The relationship between X2 (Teacher and School Support) and other clusters falls within a moderate to strong correlation range (for example,  $X2-X3 = 0.539$  and  $X2-Y2 = 0.635$ , both significant), indicating that institutional support plays an important role in technology-based learning processes. However, the correlation between X2 and Y1 (Learning Effectiveness) is only 0.327 and not significant at the 0.01 level ( $p = 0.055$ ), which deserves special attention. This suggests that while school support contributes to the understanding of Christian values, it does not directly enhance learning effectiveness.

Overall, the cluster structure in this instrument is considered constructively valid, supported by consistently high correlations between aspects of educational technology and learning outcomes.

**Table 1. Validity Test**

		Correlations				
		X1	X2	X3	Y1	Y2
X1	Pearson Correlation	1	.536**	.836**	.704**	.817**
	Sig. (2-tailed)		.001	.000	.000	.000
	N	35	35	35	35	35
X2	Pearson Correlation	.536**	1	.539**	.327	.635**
	Sig. (2-tailed)	.001		.001	.055	.000
	N	35	35	35	35	35
X3	Pearson Correlation	.836**	.539**	1	.685**	.828**
	Sig. (2-tailed)	.000	.001		.000	.000
	N	35	35	35	35	35
Y1	Pearson Correlation	.704**	.327	.685**	1	.681**
	Sig. (2-tailed)	.000	.055	.000		.000
	N	35	35	35	35	35
Y2	Pearson Correlation	.817**	.635**	.828**	.681**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	35	35	35	35	35

\*\* . Correlation is significant at the 0.01 level (2-tailed).

### Results of the Research Instrument Reliability Test

Based on the measurement of internal consistency among items using the Cronbach's Alpha index, it was found that the instrument in cluster X1 (Use and Availability of Technology) has an Alpha value of 0.840, indicating high reliability. For cluster X2 (Teacher and School Support), the Cronbach's Alpha value is 0.600, which indicates that the instrument's reliability is at a moderate level. This cluster is still acceptable for exploratory studies or the initial stage of scale development, although revisions to item formulations are recommended to improve reliability in future research.

**Table 2. Reliability of X1**

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
X1.1	28.34	20.467	.797	.794
X1.2	28.94	21.291	.700	.807
X1.3	28.54	24.903	.387	.839
X1.4	28.60	23.365	.508	.828
X1.5	28.51	22.551	.569	.822
X1.6	28.71	23.387	.504	.829
X1.7	28.66	22.114	.613	.817
X1.8	28.57	20.840	.698	.806
X1.9	28.49	26.081	.175	.860

**Table 3. Reliability of X2**

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
X2.1	13.97	5.087	.419	.510
X2.2	13.71	5.504	.266	.597
X2.3	13.71	5.857	.296	.575
X2.4	14.23	5.240	.439	.503
X2.5	13.86	5.244	.371	.537

The X3 cluster (Interactive Media and Methods) obtained a Cronbach's Alpha value of 0.789, which falls into the good category. This means that the cluster is fairly consistent and reliable for academic quantitative analysis. Meanwhile, the Y1 cluster (Learning Effectiveness) shows an Alpha value of 0.534, which is considered low. The low internal consistency of this cluster indicates the need for revision of the instrument items or the addition of more representative indicators.

**Table 4. Reliability of X3**

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
X3.1	20.26	11.231	.437	.778
X3.2	20.47	11.287	.454	.774
X3.3	20.53	10.923	.632	.745
X3.4	20.26	10.443	.602	.746
X3.5	20.68	9.801	.638	.737
X3.6	20.97	10.514	.508	.765
X3.7	20.12	11.865	.367	.788

### Normality Test

Based on the results of the normality test using the Shapiro Wilk method, it was found that the data in clusters X2 and X3 have significance values of 0.547 and 0.608 respectively ( $p > 0.05$ ), indicating that they are normally distributed. Conversely, clusters X1, Y1, and Y2 show significance values of 0.018, 0.000, and 0.004 respectively ( $p \leq 0.05$ ), which means the data in these clusters are not normally distributed. Therefore, subsequent statistical analyses involving X1, Y1, and Y2 were

conducted using a non-parametric approach to maintain the accuracy of interpretation.

**Table 5. Normality**

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
X1	.103	35	.200*	.923	35	.018
X2	.125	35	.185	.974	35	.547
X3	.128	35	.156	.975	35	.608
Y1	.176	35	.008	.843	35	.000
Y2	.189	35	.003	.901	35	.004

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

### Results of Inter-Cluster Correlation Test (Spearman Rank)

Based on the results of the Spearman correlation test, most of the relationships between clusters show strong and significant correlations. The X1 cluster (Use and Availability of Technology) has a very high correlation with the X3 cluster (Interactive Media and Methods) ( $r = 0.831, p < 0.01$ ), as well as with Y2 (Understanding of Christian Values) ( $r = 0.770, p < 0.01$ ). These findings indicate that the use of technology is closely related to the utilization of interactive media in strengthening students' understanding of spiritual values.

In addition, the X3 cluster also shows a strong correlation with Y2 ( $r = 0.746, p < 0.01$ ) and a moderately strong correlation with Y1 (Learning Effectiveness) ( $r = 0.532, p < 0.01$ ), highlighting the role of interactive learning media as a key supporting factor in the success of value-based learning activities.

The relationship between X2 (Teacher and School Support) and other clusters falls within the moderate-to-strong and significant range, particularly with X1 ( $r = 0.510$ ) and Y2 ( $r = 0.651$ ). However, the correlation between X2 and Y1 is  $r = 0.224$ , which is statistically insignificant ( $p = 0.196$ ). This suggests that institutional support does not directly affect learning effectiveness.

Meanwhile, the correlation between *Y1* and *Y2* ( $r = 0.418, p < 0.05$ ) indicates a fairly strong relationship between learning effectiveness and the internalization of Christian values, although not as high as the correlation with technological clusters.

**Table 6. Correlation**

Model	Coefficients <sup>a</sup>						
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
B	Std. Error	Beta	Lower Bound			Upper Bound	
1 (Constant)	1.040	1.168		.891	.380	-1.336	3.417
X1	.292	.036	.817	8.142	.000	.219	.365

a. Dependent Variable: Y2

### Simple Linear Regression

Based on a series of simple linear regression analyses, it was found that most independent variables have a significant influence on the dependent variables. The variable *X1* (*Use of Technology*) has a very strong effect on *Y2* (*Understanding of Christian Values*), with a regression coefficient of 0.292 and a Beta value of 0.817 ( $p < 0.001$ ), as well as on *Y1* (*Learning Effectiveness*) with a coefficient of 0.299 (Beta 0.704,  $p < 0.001$ ). Meanwhile, *X3* (*Interactive Media and Methods*) shows the most dominant influence on *Y2*, with a Beta value of 0.828 (coefficient 0.422,  $p < 0.001$ ), and also has a strong effect on *Y1* (Beta 0.685,  $p < 0.001$ ).

**Table 7. Simple Linear Regression X1–Y2**

Model	Coefficients <sup>a</sup>						
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
B	Std. Error	Beta	Lower Bound			Upper Bound	
1 (Constant)	2.855	1.623		1.759	.088	-.446	6.157
X2	.436	.092	.635	4.724	.000	.248	.624

a. Dependent Variable: Y2

The variable *X2* (Teacher and School Support) also shows a significant influence on *Y2*, with a coefficient value of 0.436 and a Beta of 0.635 ( $p < 0.001$ ). However, with respect to *Y1*, *X2* does not exhibit a statistically significant effect (coefficient = 0.267,  $p = 0.055$ ), indicating that the direct influence of institutional support on learning effectiveness requires further investigation.

**Table 8. Simple Linear Regression X2–Y2**

		Correlations					
		X1	X2	X3	Y1	Y2	
Spearman's rho	X1	Correlation Coefficient	1.000	.510*	.831*	.521*	.770*
		Sig. (2-tailed)		.002	.000	.001	.000
		N	35	35	35	35	35
X2		Correlation Coefficient	.510*	1.000	.478*	.224	.651*
		Sig. (2-tailed)	.002		.004	.196	.000
		N	35	35	35	35	35
X3		Correlation Coefficient	.831*	.478*	1.000	.532*	.746*
		Sig. (2-tailed)	.000	.004		.001	.000
		N	35	35	35	35	35
Y1		Correlation Coefficient	.521*	.224	.532*	1.000	.418*
		Sig. (2-tailed)	.001	.196	.001		.013
		N	35	35	35	35	35
Y2		Correlation Coefficient	.770*	.651*	.746*	.418*	1.000
		Sig. (2-tailed)	.000	.000	.000	.013	
		N	35	35	35	35	35

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

**Table 9. Simple Linear Regression X3 → Y2**

Model	Coefficients <sup>a</sup>						
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
B	Std. Error	Beta	Lower Bound			Upper Bound	
1 (Constant)	.347	1.203		.289	.775	-2.100	2.795
X3	.422	.050	.828	8.479	.000	.320	.523

a. Dependent Variable: Y2

These findings indicate that the use of technology and interactive media plays an important role in enhancing both learning effectiveness and the understanding of Christian values, whereas institutional support contributes more significantly to the spiritual aspect than to the performative aspect of learning.

## CONCLUSION

Educational technology plays an increasingly significant role in enhancing learning effectiveness, including within Christian Religious Education in schools. The integration of technology allows broader access to learning resources, increases interactivity, and facilitates a deeper understanding of Christian faith principles. Through the use of digital media such as videos, interactive presentations, and learning applications, students can understand biblical teachings in a more contextual and applicable way. Moreover, technology assists teachers in delivering material more engagingly and efficiently. E-learning platforms, for instance, enable self-directed learning and increase student engagement. Interaction through online forums also opens wider opportunities for discussion, allowing students to explore their faith perspectives more reflectively. However, challenges remain, such as ensuring that technology is used wisely and remains aligned with Christian values. Proper guidance is needed so that technology does not replace the spiritual essence of learning. With a balanced approach, technology can serve as a tool that strengthens both the understanding and internalization of Christian values, while simultaneously enhancing learning effectiveness in schools.

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