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The Correlation between E-Book Utilization and Students' Self-Directed Learning at MAN 2 Pekanbaru

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Abstract

The implementation of digital learning requires effective learning resources that can support students' autonomy and engagement in the learning process. However, empirical evidence regarding the relationship between e-book utilization and self-directed learning among secondary school students remains limited. This study examined the relationship between e-book utilization and students' self-directed learning at MAN 2 Kota Pekanbaru. A quantitative approach with a correlational survey design was employed, involving 88 students selected through proportional random sampling. Data were collected using questionnaires and analyzed through descriptive statistics, Pearson correlation, and the coefficient of determination. The findings showed that both e-book utilization and students' self-directed learning were categorized as good. A strong positive relationship was identified between e-book utilization and self-directed learning ($r = 0.769$), with e-book utilization accounting for 59.1% of the variance in students' self-directed learning. These findings indicate that greater utilization of e-books is associated with higher levels of student autonomy in learning. The study concludes that optimizing e-book use can support the development of self-directed learning and strengthen the

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implementation of digital learning in schools. This study provides practical implications for schools and educators in designing digital learning strategies that promote students' independence, responsibility, and active engagement in learning.

Keywords: Digital Learning; E-Book Utilization; Learning Autonomy; Secondary Education; Self-Directed Learning

INTRODUCTION

The rapid advancement of information and communication technology has fundamentally transformed educational practices by expanding learning opportunities beyond conventional classroom settings. In the digital era, education is no longer limited to the transmission of knowledge but also emphasizes the development of competencies that enable learners to become independent, critical, and lifelong learners capable of adapting to continuous technological change (Afriantoni et al., 2022). Consequently, educational institutions are expected to integrate digital technologies into learning environments to improve both the quality of instruction and students' learning outcomes (Ghassani et al., 2023).

One of the essential competencies promoted in twenty-first-century education is self-directed learning, which refers to students' ability to regulate, manage, and evaluate their own learning processes independently. Self-directed learners demonstrate initiative in identifying learning needs, selecting appropriate learning resources, monitoring learning progress, and evaluating learning outcomes without excessive dependence on teachers or external assistance (Candy, 1991). This competence has become increasingly important because modern learning environments require students to actively construct knowledge rather than passively receive information (Celestin, 2025).

The importance of self-directed learning is further strengthened by empirical evidence indicating its contribution to academic achievement, learning persistence, and students' adaptability to technological changes. Students with high levels of learning independence tend to possess stronger intrinsic motivation, better learning management skills, and greater responsibility for achieving educational goals (Boleng, 2023). Similarly, self-directed learning encourages students to develop critical thinking and problem-solving abilities that are essential for lifelong learning in the digital age (Fahyuni et al., 2023).

Despite its recognized importance, numerous studies have reported that many students continue to demonstrate relatively low levels of learning independence. Rather than exploring learning resources autonomously, students often remain dependent on teachers' explanations when completing assignments or understanding difficult concepts (Qorimah & Laksono, 2023). Such dependency indicates that many learners have not yet developed sufficient initiative, responsibility, and confidence to manage their own learning activities effectively (Rahayu & Suyatno, 2023).

In response to these challenges, educational technology has emerged as an important instrument for fostering more independent learning environments. Digital learning enables students to access educational materials anytime and anywhere, thereby providing greater flexibility in determining learning pace, strategies, and study schedules (Gurky & Manurung, 2023). Technology-supported learning environments also encourage students to become more actively involved in constructing knowledge through various digital resources rather than relying exclusively on classroom instruction (Tesalonika & Susanti, 2023).

Among the various forms of digital learning resources, electronic books (e-books) have become increasingly popular due to their accessibility, portability, and interactive features. Unlike conventional printed books, e-books provide searchable content, multimedia integration, bookmarking systems, and flexible reading interfaces that potentially enhance students' learning experiences (Armstrong, 2008). These characteristics enable learners to retrieve information more efficiently while supporting personalized learning according to individual preferences and learning needs (Lupita & Armono, 2023).

The educational benefits of e-books extend beyond merely replacing printed textbooks. Previous studies have demonstrated that e-books facilitate active learning by providing students with flexible access to instructional materials through smartphones, tablets, and laptops. Such flexibility enables learners to review lessons repeatedly, search for supplementary information independently, and organize learning activities according to their own pace (Amalia & Fajar, 2021). Consequently, e-books are increasingly recognized as valuable digital learning resources capable of supporting learner-centered education (Almaida et al., 2023).

Recent empirical findings further indicate that the effectiveness of e-book utilization depends not only on technological availability but also on students' willingness and ability to use digital resources independently. Students who actively utilize e-books generally

demonstrate stronger learning motivation, greater engagement in academic activities, and better learning autonomy than those who merely use e-books as substitutes for printed textbooks (Amrina & Rahmi, 2024). Likewise, e-books have been reported to strengthen self-directed learning when students actively employ their interactive features to explore learning materials beyond classroom requirements (Annajah et al., 2025).

Furthermore, digital literacy plays a substantial role in maximizing the educational value of e-books. Students possessing higher levels of digital literacy are more capable of evaluating information sources, selecting relevant learning materials, and effectively integrating digital resources into their learning processes (Fathoni et al., 2022). Therefore, the successful implementation of e-books requires not only technological infrastructure but also students' readiness to utilize digital learning resources responsibly and strategically (Crompton & Hebebci, 2023).

Although numerous studies have confirmed the educational advantages of e-books, several researchers argue that digital learning media alone cannot automatically improve students' learning independence. The contribution of e-books largely depends on how learners utilize their features, integrate them into daily learning activities, and develop consistent self-learning habits (Febria et al., 2024). Consequently, understanding students' utilization patterns is essential for evaluating whether e-books genuinely contribute to the development of self-directed learning rather than functioning merely as digital substitutes for conventional textbooks.

Previous studies have consistently demonstrated the educational potential of e-books in improving learning quality across different educational contexts. Research by Almaida et al. (2023) revealed that e-book-based learning media significantly enhanced students' learning effectiveness because digital materials provided flexible access to instructional content regardless of time and location. Similarly, Amalia and Fajar (2021) emphasized that interactive e-books encourage students to learn independently by allowing them to revisit learning materials repeatedly according to individual learning needs. These findings suggest that digital learning resources provide opportunities for more autonomous and personalized learning experiences.

Other studies have examined the relationship between e-books and students' independent learning behaviors. Amrina and Rahmi (2024) found that systematic implementation of e-book systems positively supported students' literacy development and

independent learning because learners became more accustomed to accessing educational resources autonomously. Likewise, Annajah et al. (2025) reported that e-books functioned as effective learning media for promoting self-directed learning, particularly when students actively explored digital learning materials beyond classroom requirements. These studies indicate that technological resources can facilitate the development of independent learning habits when accompanied by active student participation.

Research focusing on self-directed learning also supports the importance of technology integration in contemporary education. Fahyuni et al. (2023) argued that technology-assisted learning environments encourage students to regulate their own learning processes through personalized learning experiences. Furthermore, Boleng (2023) highlighted that self-regulated learning contributes substantially to students' academic achievement because independent learners demonstrate stronger motivation, better learning management, and higher responsibility toward academic success. These findings reinforce the argument that independent learning is not merely an individual characteristic but also an outcome influenced by supportive learning environments and appropriate educational technologies.

Several investigations have also explored the relationship between digital literacy and learning independence. Fathoni et al. (2022) concluded that students possessing stronger digital literacy competencies tend to exhibit higher levels of self-directed learning because they are more capable of identifying, evaluating, and utilizing digital information effectively. Similarly, Crompton and Hebebci (2023) emphasized that technological competence enables learners to maximize digital learning resources for independent knowledge acquisition. These studies imply that successful digital learning requires both technological accessibility and students' readiness to utilize technology productively.

Although previous research has provided valuable insights regarding e-books and independent learning, important limitations remain. Most existing studies primarily focus on the effectiveness of e-books as instructional media, the development of interactive e-books, or students' digital literacy without comprehensively examining how different dimensions of e-book utilization relate to students' self-directed learning behaviors (Sihombing et al., 2024). Consequently, the mechanism through which students' utilization patterns influence learning independence remains insufficiently explored.

Based on the previous literature, a significant research gap can be identified. Existing studies generally investigate the effectiveness of e-books, the development of digital learning media, or students' digital literacy independently, while relatively limited attention has been given to examining the relationship between multidimensional e-book utilization and students' self-directed learning in secondary education settings. Moreover, previous studies rarely evaluate e-book utilization through multiple dimensions, including usage behavior, technology feature use, usability, and learning purpose, as predictors of learning independence. In addition, empirical evidence regarding this relationship within Indonesian Islamic senior high schools implementing comprehensive digital learning programs remains scarce.

The present study addresses this gap by investigating students at MAN 2 Kota Pekanbaru, a school that has implemented digital learning through the MyErlangga platform supported by Samsung tablets as part of its educational innovation program. The implementation of this program provides an appropriate educational context for examining whether students' actual utilization of e-books is associated with the development of independent learning behaviors. The preliminary observations conducted during this research indicated considerable variation in students' learning practices, suggesting that the availability of digital learning resources alone does not necessarily guarantee the development of self-directed learning. Some students actively utilize e-books to enrich their understanding beyond classroom instruction, whereas others continue to depend primarily on teachers despite having equal access to identical digital resources. These differences indicate that students' utilization patterns deserve further empirical investigation.

The novelty of this study lies in its comprehensive analysis of the relationship between e-book utilization and students' self-directed learning by integrating four dimensions of e-book utilization—usage behavior, technology feature use, usability, and learning purpose—with five dimensions of self-directed learning, namely initiative in learning, responsibility for learning, discipline, motivation and confidence, and learning management. Unlike previous studies that mainly evaluated e-books as instructional media, this research examines how students' actual utilization behaviors contribute to the development of learning independence within a real digital learning ecosystem. Furthermore, this study contributes empirical evidence from an educational institution that has systematically implemented digital learning through institutional collaboration with educational technology providers. Such a context remains relatively underrepresented in previous studies, particularly

within Indonesian secondary education. Therefore, the findings are expected to enrich the existing literature concerning digital learning, educational technology, and self-directed learning while providing practical implications for schools seeking to optimize digital learning resources.

The theoretical framework of this study is primarily grounded in the concept of self-directed learning proposed by Candy (1991), which emphasizes learners' responsibility for planning, implementing, and evaluating their own learning activities. This perspective is complemented by theories regarding digital learning resources and e-book utilization, which argue that educational technology can facilitate learner autonomy by providing flexible access to knowledge and supporting personalized learning experiences (Armstrong, 2008). Integrating these theoretical perspectives enables a more comprehensive understanding of how technological resources may influence students' independent learning behaviors in contemporary educational environments. Based on the aforementioned issues, previous findings, identified research gap, and theoretical considerations, this study aims to analyze the relationship between e-book utilization and students' self-directed learning at MAN 2 Kota Pekanbaru. The findings are expected to contribute to the advancement of educational technology research by providing empirical evidence regarding the role of digital learning resources in fostering students' independent learning while offering practical recommendations for schools implementing digital transformation in education.

METHODS

This study employed a quantitative approach with a correlational survey design to examine the relationship between e-book utilization and students' self-directed learning at MAN 2 Kota Pekanbaru. The quantitative approach was selected because the study aimed to analyze the relationship between two measurable variables using statistical analysis. The research was conducted from May to June 2026, including instrument preparation, questionnaire distribution, data collection, and statistical analysis.

The study investigated two variables. E-book utilization served as the independent variable and was measured through four indicators: usage behavior, technology feature use, usability, and learning purpose. Students' self-directed learning was treated as the dependent variable and consisted of five indicators: initiative in learning, responsibility for learning,

discipline, motivation and confidence, and learning management. These indicators were operationalized into questionnaire items to measure each research variable.

The population consisted of 700 tenth- and eleventh-grade students at MAN 2 Kota Pekanbaru during the 2025/2026 academic year. A sample of 88 students was determined using the Slovin formula with a 10% margin of error and selected through proportional random sampling to ensure proportional representation of each grade level. Data were collected using a structured questionnaire distributed through Google Forms. The instrument contained 45 statements, including 20 items measuring e-book utilization and 25 items measuring students' self-directed learning, using a four-point Likert scale ranging from strongly disagree to strongly agree. Instrument validity was assessed using the Pearson Product-Moment correlation, and all items met the validity criteria. Reliability testing using Cronbach's Alpha produced coefficients of 0.897 for e-book utilization and 0.916 for self-directed learning, indicating high internal consistency.

Data analysis was performed using IBM SPSS Statistics version 32. Descriptive statistics were first used to summarize respondents' characteristics and research variables. Assumption testing included the Kolmogorov–Smirnov normality test and the linearity test. The relationship between variables was examined using the Pearson Product-Moment correlation, followed by the t-test and coefficient of determination (R^2) to evaluate the strength of the relationship and the contribution of e-book utilization to students' self-directed learning.

RESULTS

a. Analysis Results for E-Book Utilization Variable

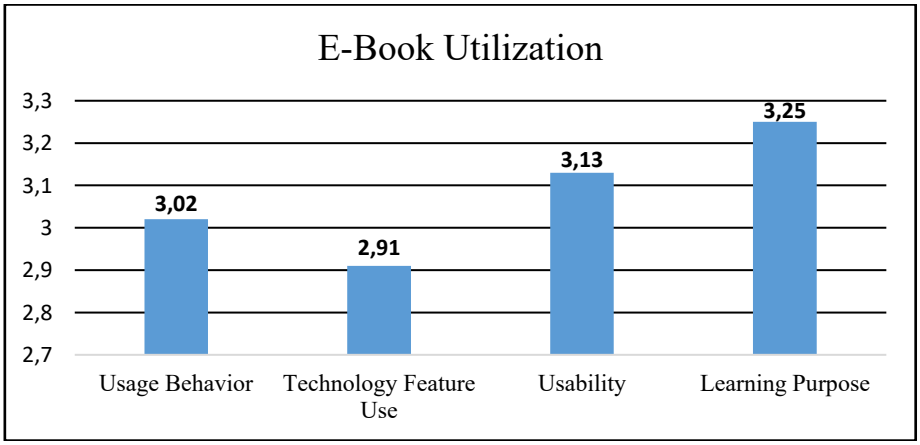


Figure 1. E-Book Utilization Variable (Variable X)

Figure 1. E-Book Utilization Variable (X) presents the mean scores of each indicator of e-book utilization. Learning Purpose obtained the highest mean score (M = 3.25), followed by Usability (M = 3.13), Usage Behavior (M = 3.02), and Technology Feature Use (M = 2.91). These findings indicate that students primarily used e-books for learning purposes, while the utilization of technological features was relatively lower. Overall, all indicators were categorized as good, reflecting positive e-book utilization among students.

b. Analysis Results for Students' Self-Directed Learning Variable

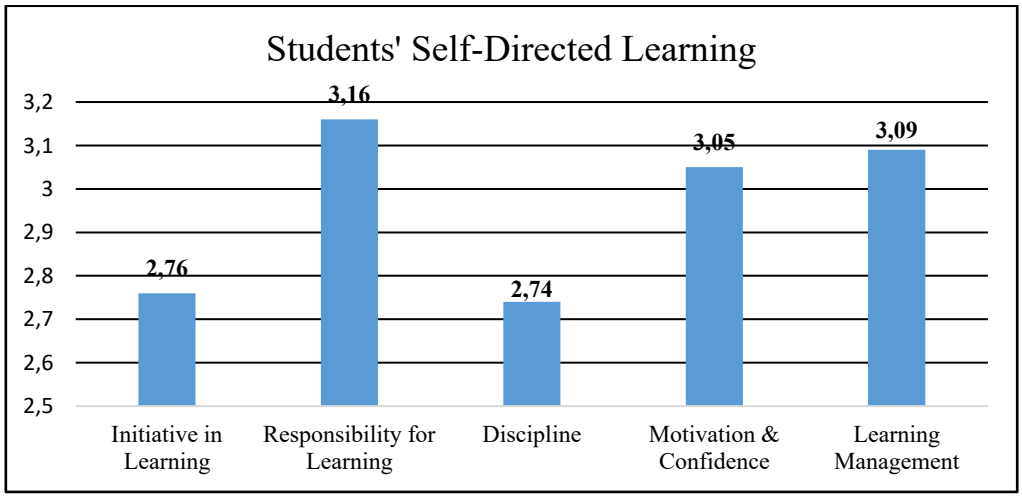


Figure 2. Students' Self-Directed Learning Variable (Variable Y)

Figure 2. Students' Self-Directed Learning Variable (Y) presents the mean scores of each indicator of students' self-directed learning. Responsibility for Learning obtained the highest mean score (M = 3.16), followed by Learning Management (M = 3.09) and Motivation and Confidence (M = 3.05). Initiative in Learning (M = 2.76) and Discipline (M = 2.74) recorded the lowest mean scores. Overall, all indicators were categorized as good, indicating a positive level of self-directed learning, although Initiative in Learning and Discipline require further improvement.

c. Normality Test

Table 1. Normality Test Results

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
VarX	.092	88	.062	.967	88	.024
VarY	.066	88	.200*	.980	88	.206

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

a. Lilliefors Significance Correction

Table 1. Normality Test Results shows that the significance (Sig.) values are 0.062 for the e-book utilization (X) variable and 0.200 for the students' self-regulated learning (Y) variable. Since both values exceed 0.05, the data are normally distributed and satisfy the normality assumption.

d. Linearity Test

Table 2. Linearity Test Results

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
VarY * VarX	Between Groups	(Combined)	6635.430	31	214.046	4.922	.000
		Linearity	5359.018	1	5359.018	123.224	.000
		Deviation from Linearity	1276.413	30	42.547	.978	.514
	Within Groups		2435.433	56	43.490		
	Total		9070.864	87			

source: Compiled by the researcher (2026)

Table 2. Linearity Test Results shows that the Sig. Deviation from Linearity value is 0.514, which exceeds 0.05, indicating that the data satisfy the linearity assumption.

e. Correlation Test

Table 3. Correlation Test Results

		VarX	VarY
VarX	Pearson Correlation	1	.769 **
	Sig. (2- tailed)		.000
	N	88	88
VarY	Pearson Correlation	.769 **	1
	Sig. (2- tailed)	.000	
	N	88	88

source: Compiled by the researcher (2026)

Table 3. Correlation Test Results shows a Pearson correlation coefficient (r) of 0.769 with a significance value of 0.000 ($p < 0.01$), indicating a strong, positive, and statistically significant correlation between e-book utilization (X) and students' self-regulated learning (Y).

f. Hypothesis Test

Table 4. Hypothesis Test Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5359.018	1	5359.018	124,163	.000 b
	Residual	3711.846	86	43,161		
	Total	9070.864	87			

source: Compiled by the researcher (2026)

Table 4. Hypothesis Test Results shows an F value of 124.163 with a significance value of 0.000 ($p < 0.05$), indicating that the regression model is statistically significant. These results confirm that e-book utilization (X) has a significant positive effect on students' self-regulated learning (Y).

g. Coefficient of Determination Test

Table 5. Coefficient of Determination Test Results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.769 [a]	.591	.586	6,570

source: Compiled by the researcher (2026)

Table 5. Coefficient of Determination Test Results shows an R Square value of 0.591, indicating that e-book utilization (X) explains 59.1% of the variance in students' self-regulated learning (Y), while the remaining 40.9% is explained by other factors not included in this study.

DISCUSSION

The findings of this study demonstrate that e-book utilization has a significant and strong positive correlation with students' self-directed learning at MAN 2 Kota Pekanbaru. The Pearson correlation coefficient of 0.769 indicates a strong association between the two variables, while the coefficient of determination ($R^2 = 0.591$) suggests that e-book utilization explains 59.1% of the variance in students' self-directed learning. These findings imply that students who utilize e-books more effectively are more likely to demonstrate higher levels of initiative, responsibility, learning discipline, motivation, confidence, and learning management. Conversely, students with limited engagement in e-book utilization tend to exhibit lower levels of learning independence. Therefore, e-books should not merely be regarded as digital substitutes for printed textbooks but as learning resources capable of facilitating autonomous learning through flexible access to educational content.

The positive correlation identified in this study can be understood through the characteristics of digital learning resources. Students who frequently accessed e-books reported that they used digital materials to review lessons, search for additional information, complete assignments, and prepare for examinations. These learning behaviors indicate that e-books support independent knowledge acquisition by enabling students to determine what,

when, and how they learn according to their individual needs. Such flexibility encourages learners to become more responsible for managing their own learning activities rather than relying exclusively on teacher-centered instruction. The findings therefore reinforce the view that technology-supported learning environments contribute to the development of learner autonomy when students actively engage with available learning resources.

Among the dimensions of e-book utilization, learning purpose and usability emerged as particularly important components. Students generally perceived e-books as accessible learning resources that could be used anytime and anywhere through their personal digital devices. Easy accessibility reduced barriers to obtaining learning materials and enabled students to revisit instructional content whenever necessary. Moreover, students primarily utilized e-books to understand lessons, complete school assignments, seek additional references, and prepare for assessments. These findings indicate that students did not perceive e-books solely as repositories of information but as practical learning tools integrated into their daily academic activities. Such utilization patterns are consistent with learner-centered education, in which students actively regulate their own learning processes through continuous interaction with educational resources.

However, the findings also reveal several aspects requiring further improvement. Although overall e-book utilization was categorized as good, some digital features were not fully optimized. In particular, the bookmark function received the lowest score among the technology feature use indicators, suggesting that many students still preferred reading sequentially without organizing important learning materials for future review. Similarly, several students reported that they did not consistently allocate specific time for reading e-books outside classroom activities. These findings imply that the educational benefits of e-books depend not only on technological availability but also on students' digital learning strategies. Simply providing digital learning resources is insufficient if learners are not guided to utilize available features that facilitate more effective knowledge organization and long-term learning habits.

The present findings are consistent with previous studies reporting that e-books improve learning flexibility and promote independent learning behaviors. Amrina and Rahmi (2024) argued that systematic implementation of e-book systems positively influences students' literacy and learning independence because digital learning resources encourage learners to explore information autonomously. Similarly, Putri (2024) found that students

primarily utilize e-books to obtain learning materials efficiently and support various academic activities, including assignment completion and examination preparation. The current study extends these findings by demonstrating that e-book utilization is associated not only with learning convenience but also with measurable improvements in students' self-directed learning within a digital school environment.

The findings also support previous research emphasizing the importance of technological features and usability in encouraging students to adopt digital learning resources. Saptono (2023) reported that e-books provide a more effective learning experience than conventional printed materials because interactive features improve students' engagement with learning content. Likewise, Hermita et al. (2023) concluded that students are more likely to utilize e-books when they perceive them as useful and easy to operate. Similar evidence was presented by Nahotko and Deja (2024), who found that perceived ease of use is a key determinant of users' acceptance of e-books in educational settings. The present study confirms these findings by showing that students considered the accessibility and practicality of e-books as important factors supporting independent learning. Nevertheless, the relatively low utilization of certain features, particularly the bookmark function, indicates that students have not fully exploited the pedagogical potential of digital learning resources. Consequently, improving students' digital learning strategies remains as important as providing access to educational technology.

From a theoretical perspective, the findings reinforce the concept of self-directed learning proposed by Candy (1991), which emphasizes learners' ability to take responsibility for planning, implementing, and evaluating their own learning activities. The positive correlation identified in this study suggests that digital learning resources can facilitate this process by providing students with flexible access to information and greater opportunities to regulate their learning according to individual needs. Rather than functioning merely as information repositories, e-books appear to support essential components of self-directed learning, including learning initiative, responsibility, motivation, and learning management. Therefore, this study contributes empirical evidence supporting the integration of educational technology with theories of learner autonomy in contemporary learning environments.

This study also provides several practical implications. For schools, the findings indicate that digital learning programs should be accompanied by systematic efforts to

cultivate students' independent learning habits. Educational institutions should not only provide digital devices and e-book platforms but also encourage students to utilize digital resources consistently throughout the learning process. Teachers play an equally important role by integrating e-books into classroom instruction and guiding students to maximize available features, such as search functions, bookmarks, and note-taking tools, to enhance learning effectiveness. Meanwhile, school libraries may strengthen their contribution by expanding digital collections, improving access to quality e-books, and promoting digital information literacy programs that encourage students to become more independent learners. Such initiatives may increase the educational value of digital resources while supporting the broader implementation of technology-enhanced learning.

The present study contributes to the existing literature by examining e-book utilization through multiple dimensions, including usage behavior, technology feature use, usability, and learning purpose, and relating these dimensions to various aspects of students' self-directed learning. Unlike previous studies that primarily evaluated e-books as instructional media or focused on digital literacy, this research demonstrates that students' utilization patterns are closely associated with the development of learning independence within an authentic digital learning environment. Consequently, the findings broaden current understanding of how educational technology contributes to students' academic development beyond improving learning achievement alone.

Despite these contributions, several limitations should be acknowledged. First, the study was conducted at a single Islamic senior high school with a sample of 88 students, limiting the generalizability of the findings to other educational contexts. Second, data were collected using self-reported questionnaires, making the results dependent on students' perceptions and responses rather than direct observations of learning behavior. Third, although e-book utilization explained 59.1% of the variance in students' self-directed learning, the remaining 40.9% indicates that other factors, such as learning motivation, parental support, teachers' instructional strategies, digital literacy, and the broader learning environment, may also influence students' learning independence.

Future studies are therefore encouraged to include larger and more diverse samples from different educational institutions, apply mixed-methods or longitudinal designs, and examine additional variables that may contribute to self-directed learning. Such investigations would provide a more comprehensive understanding of the mechanisms through which

digital learning resources foster students' independent learning and support the continuous development of technology-enhanced education.

CONCLUSION

This study concludes that e-book utilization has a significant and positive correlation with students' self-directed learning at MAN 2 Kota Pekanbaru. Students demonstrated good levels of e-book utilization and learning independence, indicating that more effective use of e-books is associated with greater initiative, responsibility, motivation, and learning management. These findings address the research objective by confirming the important role of e-books in supporting independent learning within a digital learning environment.

This study contributes to the literature by demonstrating that e-book utilization, viewed through multiple dimensions, supports the development of students' self-directed learning. Practically, the findings suggest that schools, teachers, and libraries should optimize the integration of e-books into teaching and learning activities while encouraging students to develop consistent independent learning habits. Future research is recommended to involve larger and more diverse samples, investigate additional factors influencing self-directed learning, and employ mixed-methods or longitudinal designs to provide a more comprehensive understanding of the role of digital learning resources in education.

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