Jurnal Pendidikan Administrasi Perkantoran (JPAP)
Journal homepage: https://journal.unesa.ac.id/index.php/jpap

Jurnal Pendidikan Administrasi Perkantoran (JPAP)
Volume 13, Nomor 2, 2025
E-ISSN: 23389621

# Integration of e-Markel and Digital Literacy in Improving Learning Outcomes Through Student Motivation

**Fega Yoanisyah Putria, Andy Prasetyo Watib, Dede Rusmanac, Jefry Aulia Marthadd, Aryati Binti Abd Rahmane**
[a]Faculty of Economics and Business, Universitas Negeri Malang, Malang, Indonesia
[b1]Faculty of Economics and Business, Universitas Negeri Malang, Malang, Indonesia
[c]Faculty of Economics and Business, Universitas Negeri Malang, Malang, Indonesia
[d]Faculty of Economics and Business, Universitas Negeri Malang, Malang, Indonesia
[e]Ministry of Education, Putrajaya, Malaysia

**ARTICLE INFO**

**Keywords:**
Digital Literacy; E-Markel; Generation Z; Learning Motivation; Learning Outcomes

**Article History:**
Received , 16 May 2025
Accepted 6 June, 2025
Available online 20 August 2025

https://doi.org/10.26740/jpap.v13n2.p540-551

**ABSTRACT**

**Phenomenon/Issue:** *The problem in this study discusses how E-Markel, which is one of the e-modules, and digital literacy skills and learning motivation in improving student learning outcomes.*
**Purpose:** *The purpose of our research is to emphasize efforts to understand how learning using e-modules such as E-Markel combined with their digital literacy skills can affect motivation in learning and mastery of e-modules, so that it will have an impact on their learning outcomes.*
**Novelty:** *The main innovation emphasized in this study is to reveal the relationship between technology-based learning media, digital literacy and learning motivation in improving learning outcomes.*
**Research Methods:** *The approach used is quantitative with the type of explanatory descriptive research, with a research sample of 106 respondents. Data collection using a google form with a questionnaire using a 7-point likert scale, and data analysis using Structural Equation Modeling (SEM) using the Partial Least Squares (PLS) method.*
**Results:** *The outer model shows that each statement has a good validity value [factor loading > 0.70] and a good reliability value [Cronbach's alpha and composite reliability appear to have a value of > 0.70], in addition to the discriminant validity value also shows a significant difference between constructs [HTMT < 0.90]. Furthermore, the inner value of the model is known to be that all regression pathways are also significant [p-value < 0.05], and the mediating effect has a complementary effect.*
**Research Contributions: Research Contributions:** *The implication of this research is more to provide a more comprehensive understanding of the importance of collaboration between e-modules, digital literacy and learning motivation to student learning outcomes.*

## INTRODUCTION

The rapid development of technology has a very significant impact on all aspects, both in the economic field (Irtyshcheva, 2021), gaya hidup (Neumeyer et al., 2021), Government Policy (Dwivedi et al., 2021) even to the field of education (Szymkowiak et al., 2021). Especially in the aspect of education,

[1] **Correspondence:**
Fega Yoanisyah Putri, Faculty of Economics and Business, Universitas Negeri Malang, Malang, Indonesia
fega.putri@um.ac.id

which is the focus of this study, it is also seen that technological developments are very influential in improving the quality and quality of educational output itself (Timotheou et al., 2023), such as the use of technology-based media in the learning process (Wiyono et al., 2021). E-Module or Electronic Module is a learning media that is an innovation of learning media with technology (Logan et al., 2021), where this media uses digital devices as a means of delivering learning materials, and the impact is a more interactive and flexible learning process.

On the other hand, several things that need to be emphasized in the use of e-modules in addition to the various conveniences offered, we also need to pay attention to the impact that arises due to the frequency of its use (Delita et al., 2022). One of them is the decline in affective and social aspects in learning due to the lack of direct interaction between teachers and students (Wang et al., 2022), the impact of this action is the weakening of students' ability to comprehend more comprehensive material, communication skills in the classroom and cooperation in teams (Deep et al., 2024). Therefore, learning media innovation is very necessary, especially when it comes to subject matter that requires visualization. In addition, there is a determining factor for the implementation of learning that uses digital media to run optimally, namely the ability of teachers and students to master digital aspects (Revuelta-Domínguez et al., 2022).

Therefore, digital literacy skills in learning in the modern era emphasize the ability to access, understand and utilize digital information (Spante et al., 2018), and enable them to explore critically and selectively the source of knowledge (Ilomäki et al., 2023). It is hoped that this ability can increase their interest in adapting to technology-based learning media. However, many research results state that the digital literacy skills of teachers and students who are very diverse will cause confusion in learning time so that the understanding of the material is not optimal (Qulub & Budiyono, 2022; Zulkarnain et al., 2024; Mardiana, 2024), which will ultimately have an impact on the process of achieving learning objectives and widen the differences between students in achieving learning quality (Lei et al., 2021). Therefore, for the use of e-modules to be optimal in learning, it is necessary to have good digital literacy skills by teachers and students.

There are many variations of e-modules that are tailored to the learning material, therefore in this study the e-module that will be used is Electronic Marketing Learning or E-Markel, which is one of the technology-based teaching materials that has been developed and adapted to the needs of students, where this E-Markel contains materials related to digital onboarding phase F and is accompanied by interactive images or videos in supporting student understanding. The learning process with technology teaching materials such as E-MarkeL can increase students' activeness along with a combination of digital literacy skills. The combination of E-MarkeL and Digital Literacy capabilities is expected to encourage students' motivation to learn. Learning motivation itself is a person's mental support that functions in driving and directing a person's behavior to learn and achieve the goals they want to achieve (Datu et al., 2022).

Many efforts can be made to improve digital literacy skills so that they are able to use e-modules in learning optimally. One of them is to provide the right learning motivation to students (Lilian, 2022), this will give rise to the desire in students to comprehensively understand the need for digital mastery in learning in the 4.0 era (Bujang et al., 2020), so that it will have an impact on the mastery of material that uses technology-based learning media (Pala & Başıbüyük, 2021), which will ultimately have an impact on increasing student learning engagement, strengthening concept understanding, and preparing students to face the challenges of an increasingly digitized world of work (DeWitt & Alias, 2023). However, some studies have shown that there are other factors that are more dominant in influencing

students related to the implementation of technology in the learning process (Songkram et al., 2023; Al-Adwan et al., 2024).

From some of the studies above that discuss the role of digital literacy, learning motivation and the use of technology in improving learning outcomes have been carried out, but there has been no research that reveals the relationship between technology-based learning media, digital literacy and learning motivation in improving learning outcomes. Therefore, the problem in this study discusses how E-Markel, which is one of the e-modules, digital literacy skills and learning motivation in improving student learning outcomes. Thus, the purpose of our research emphasizes more on efforts to understand how learning using e-modules such as E-Markel combined with their digital literacy skills can affect motivation in learning and mastery of e-modules, so that it will have an impact on their learning outcomes. Furthermore, the results obtained can provide relevant implications related to a comprehensive understanding of the importance of collaboration between e-modules, digital literacy and learning motivation on student learning outcomes.

The introduction presents the background of the theme or title, novelty, and the systematic role of the chosen issue. the article is written with 11 Times New Roman letters, justify aligned, and spaced 1. The introduction to the bibliography is written in one column with a distance between columns of 1 cm. A4 paper size with normal margins. For the sake of convenience, the article writing pattern should follow the instructions presented in this template. The number of article pages is a minimum of 7 pages and a maximum of 17 pages.

## LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

1. E-Module

E-modules are a form of digital learning modules designed to support independent learning processes or integrated learning processes using technology (Logan et al., 2021). Unlike conventional print-based modules, e-modules are equipped with interactive elements such as text, images, audio, video, and animation, which can enrich the learning experience of students (Alyusfitri et al., 2024). Flexible accessibility through various devices, such as computers, tablets, and smartphones, makes e-modules an adaptive learning tool suited to the needs of the modern era. Additionally, e-modules can be dynamically developed to align with curriculum requirements and learner characteristics (Delita et al., 2022). In the era of digital learning, e-modules emerge as an innovation that supports effectiveness and enhances active student engagement. Furthermore, this theory provides strong support for the implementation of e-modules in learning, thereby emphasizing that the use of e-modules is not only theoretically relevant but also effective in practice. This is further reinforced by research showing that e-modules can enhance students' learning independence, provide richer interaction with learning materials, and improve the efficiency of information delivery, thereby supporting the optimal achievement of learning objectives (Dermawan et al., 2025).

2. Digital Literacy

Digital literacy is the ability of individuals to understand, use, evaluate, and create information through digital media effectively and responsibly (Falloon, 2020). This literacy not only includes technical skills in operating digital devices but also includes a critical understanding of information spread on the internet, including the ability to sort out valid sources, be ethical in communicating online, and maintain the security of personal data (Pangrazio et al., 2020). In the context of education, digital literacy is an important competency for educators and students to face the challenges of the digital era, support technology-based learning, and form a smart and wise generation in using digital media *(Alakrash & Abdul Razak, 2021)*. Therefore, strengthening digital literacy must be an integral part of the education development strategy in the modern era. This can be done through the integration of digital literacy materials in the curriculum, the use of interactive learning media, and increasing the capacity of teachers

E-ISSN: 23389621

in using and directing technology pedagogically. With the right approach, digital literacy is not only a technical skill, but also an important foundation in shaping the character and critical mindset of the generation of learners.

3. Learning Motivation

Learning motivation is an internal or external drive that encourages someone to actively engage in the learning process to achieve certain goals (Wardani et al., 2020). This motivation plays an important role in determining the extent to which a student has interest, consistency, and effort in understanding and mastering learning material (Herpratiwi & Tohir, 2022). Generally, learning motivation can stem from intrinsic factors, such as the desire to achieve or curiosity, or extrinsic factors, such as rewards, grades, or encouragement from the surrounding environment (Seven, 2020). In an educational context, strong learning motivation significantly influences students' participation levels, independence, and learning outcomes (Eriyanto et al., 2021). Therefore, it is important for educators to create a learning environment that is enjoyable, challenging, and relevant in order to maintain and enhance students' learning motivation sustainably. This can be achieved through the implementation of varied teaching methods, the use of interactive learning media, and the provision of constructive feedback. Additionally, understanding the characteristics and individual needs of students is key to designing learning strategies that foster self-confidence, curiosity, and the enthusiasm to continue learning (Zacarian & Silverstone, 2020). Thus, learning motivation is not merely a supporting factor but the primary foundation for achieving optimal.

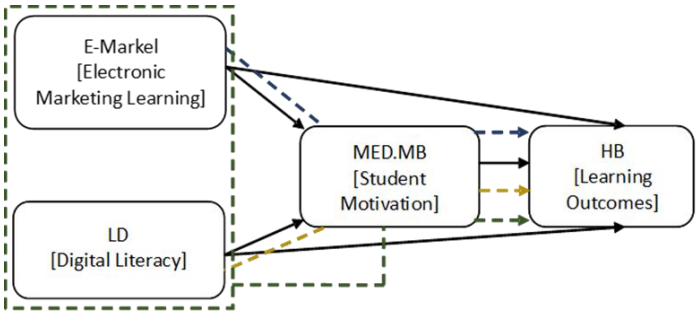
4. Learning Outcomes

Learning outcomes are the achievements obtained by students after undergoing the learning process, both in the cognitive, affective, and psychomotor domains (Noor et al., 2020). These outcomes reflect the level of understanding, mastery of material, attitudes, and skills that have been successfully developed during the learning process. Learning outcomes can be evaluated through various methods, such as tests, observations, assignments, or portfolio assessments (Maki, 2023). Factors influencing learning outcomes are diverse, including motivation, learning strategies used, the role of educators, the learning environment, and the availability of supportive learning media or resources (Cayubit, 2022). Therefore, learning outcomes are not only an indicator of student success but also a reflection of the overall effectiveness of the learning process. Some research findings also indicate that learning strategies tailored to students' needs, appropriately presented instructional materials, and a supportive learning environment contribute to the creation of active and meaningful learning processes. Conversely, low learning outcomes may signal the need for evaluation of the learning approach, teaching methods, and student engagement in the learning process (Xu et al., 2023). Thus, analysis of learning outcomes can serve as an important foundation for educators and educational institutions to design sustainable improvements and innovations in the learning system.

## METHOD

This study uses a quantitative approach with the type of explanatory descriptive research. Because this study will verify the hypothesis that has been determined, then analyze the data by describing the information that has been done and explaining the relationship between variables that affect the research hypothesis (Sugiyono, 2019). The location of this research is in Sekolah Menengah Kejuruan Negeri (SMKN) 1 Turen with the research subject of students of grade XII Digital Business. The research sample totaled 106 respondents with non-probability sampling and saturated sampling techniques. The use of saturated sampling in sampling from the population is due to the limited and relatively small number of populations studied (Loughran et al., n.d.). We will use Google form to obtain research data with a time range from February to June 2024, with a questionnaire using a 7-point likert scale.

In the data analysis technique, we use Structural Equation Modeling (SEM) with the Partial Least Squares (PLS) method. The use of SEM-PLS is because we want to see the relationship between the existing factors and see how strong the relationship between these factors is (J. F. Hair et al., 2010). The evaluation of the PLS model used was (1) Outer model consisting of convergent validity, discriminant validity and reliability test, (2) Inner model consisting of R-Square, Model Fit (SRMR), Path Coefficient and Mediation Effect Test (J. Hair et al., 2017). Furthermore, the relationship between constructs in this study can be seen in Figure 1.




Source: Researchers, 2025
Picture 1. RESEARCH CONCEPTUAL FRAMEWORK

## RESULTS AND DISCUSSIONS

### *Respondent Characteristics*

The results of the study showed that 106 respondents responded to the study, with the characteristics of male respondents as much as 11% and women as much as 89%. This shows that students at SMK Negeri 1 Turen with a concentration in Digital Business are dominated by women. In addition, the distribution of the number of respondents in the three classes used as research samples has a frequency range that is not very different, namely in classes XII BD 1 and XII BD 2 as much as 33% each and class XII BD 3 as much as 34%. Meanwhile, from the age range, it is known that only two age ranges are determined, namely the age of 17 years with a frequency of 45% and the age of 18 years with a frequency of 55%.

### *Measurement Evaluation Model (Outer Model)*

The results of the outer model test (Table 1) show that convergent validity (loading factor and AVE values) and reliability (Cronbach's alpha and composite reliability) have values according to the standard for determining data acceptance, namely having a loading factor value of > 0.70 and an AVE value of > 0.50 on each statement item, then the item is declared valid. As for the results of Cronbach's alpha and composite reliability, it is seen to have a value of > 0.70, then all items in this study are declared reliable. This means that each item in each indicator has a good convergent validity, so it can be interpreted that each statement on the instrument used in the data measurement is able to measure the construct accurately.

**Table 1.**
**CONVERGENT VALIDITY AND RELIABILITY TESTING SUMMARY**

| Item | | Convergent Validity | | Reliability | |
|---|---|---|---|---|---|
| | | Outer Loading | Average Variance Extracted (AVE) | Composite Realibility | Cronbach's Alpha |
| Learning Outcomes | HB | 1.000 | 1.000 | 1.000 | 1.000 |
| E-Markel | EM1 | 0.976 | 0.952 | 0.975 | 0.949 |
| | EM2 | 0.975 | | | |
| Digital Literacy | LD1 | 0.972 | 0.945 | 0.972 | 0.942 |
| | LD2 | 0.972 | | | |
| Learning Motivation | MED.MB1 | 0.963 | 0.931 | 0.964 | 0.926 |
| | MED.MB2 | 0.967 | | | |

Source: Primary Data Processing Results, 2025

On the other hand, the assessment of discriminant validity data using the Heterotrait-Monotrait Ratio/HTMT value (Table 2) is also seen to have a value according to the standard of determination of data acceptance, namely the HTMT value < 0.90, meaning that each construct in the model that has been built in this study, empirically has significant differences between constructs, so it can be explained that the construct in this study has a discriminant validity value that Adequate.

**Table 2.**
**RESULTS OF DISCRIMINANT VALIDITY TESTING USING HTMT**

| | HB | EM | LD |
|---|---|---|---|
| **Learning Outcomes** | | | |
| **E-MarkeL** | 0.648 | | |
| **Digital Literacy** | 0.597 | 0.016 | |
| **Learning Motivation** | 0.832 | 0.587 | 0.602 |

Source: Primary Data Processing Results, 2025

From the results of the outer model test which shows that each item and construct has results in accordance with the criteria that have been set, the statement items that have been tested for validity and reliability can be used as a collection instrument in the collection of further research data.

***Structural Evaluation Model (Inner Model)***

The results of the test at this stage are known that the R-Square value (Table 3) shows that the learning outcomes in this model are able to predict the variability of e-markel constructs, digital literacy and learning motivation by 78%, which means that this model has a high level of accuracy in predicting or explaining data, while the rest, which is 22%, is explained by other factors that are not included in the discussion of this study. In addition, it can also be seen that the SRMR value (Table 3) in this study has a value below 0.10, which is 0.022. This means that the distribution of the sample used has followed a certain theoretical distribution, so it can be said that the model has a good fit level for the data and is able to interpret the matching of the sample data distribution consistently, so that it can be declared appropriate and valid for use in further analysis.

**Table 3.**
**R-SQUARE AND SRMR TEST RESULTS**

| | R-Square | SRMR |
|---|---|---|
| **Learning Outcomes** | 0.780 | 0.022 |

Source: Primary Data Processing Results, 2025

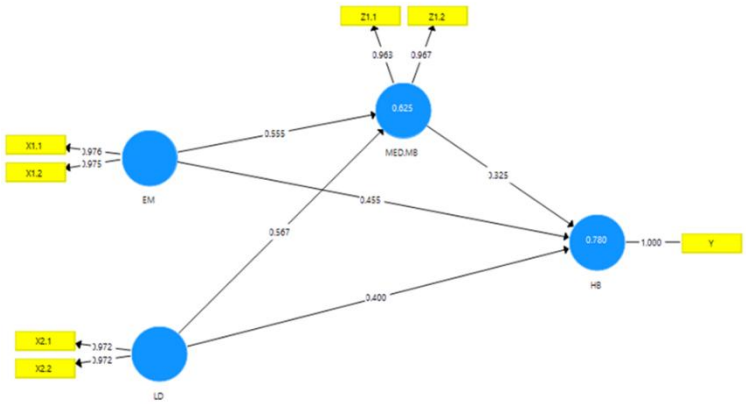
Furthermore, the path analysis test also showed that the significant values in all regression paths had a value of ≤ 0.05 and a t-statistical value of > 1.96 (Table 4), so it can be concluded that the relationship between variables has a significant influence, and the hypothesis is set to be accepted.

**Table 4.**
**PATH COEFFICIENTS TEST RESULTS**

| | Coefficient Value | T Statistics | *P Values* | Description |
|---|---|---|---|---|
| EM -> HB | 0.455 | 6.524 | 0.000 | Accepted |
| LD -> HB | 0.400 | 6.391 | 0.000 | Accepted |
| MED.MB -> HB | 0.325 | 3.904 | 0.000 | Accepted |
| EM -> MED.MB | 0.555 | 9.831 | 0.000 | Accepted |
| LD -> MED.MB | 0.567 | 8.996 | 0.000 | Accepted |

Source: Primary Data Processing Results, 2025

Based on Table 4, it can be seen that the value of the EM coefficient → HB is 0.455, P-Value 0.000 ≤ 0.05 with a T-Statistic value of 6.524 >1.96, through this value it can be stated that EM has a significant positive effect on HB and is acceptable, the second is by looking at the value of the LD coefficient → HB which is 0.400, P-Value 0.000 ≤ 0.05 and the T-Statistic value of 6.391 >1.96 so that it can be stated that LD has a significant positive effect on HB and is acceptable, third, namely by looking at the value of the MED coefficient. MB → HB is 0.325, P-Value 0.000 ≤ 0.05 with a T-Statistic value of 3.904 >1.96, based on this value it can be stated that MED. MB has a significant positive effect on HB and is acceptable, then fourth by looking at the value of the EM coefficient → MED. MB is 0.555 with a P-Value of 0.000 ≤ 0.05 and a T-Statistical value of 9.831 >1.96, so it can be said that EM has a significant positive effect on MED. MB and acceptable, the last is looking at the value of the LD coefficient → MED. MB is 0.567, P-Value 0.000 ≤ 0.05 and T-Statistical value is 8.996 >1.96 so it can be said that LD has a significant positive effect on MED. MB and acceptable. The results on the path coefficient can also be seen in figure 2.




Source: Results of researcher data processing on SmartPLS 3, 2025
**Picture 2. TESTING OUTER AND INNER MODEL**

Furthermore, the results of the internal model testing in the mediation test showed that learning motivation can intervene in the relationship between e-markel and digital literacy on learning outcomes (Table 5). This

can be seen from the value of the EM → MED coefficient. MB → HB is 0.181, P-Value 0.001 ≤ 0.05 with a T-Statistical value of 3.353 >1.96, then it can be said that the MED variable. MB plays a role in mediating EM against HB in a positively significant and acceptable manner. Then the value of the LD coefficient → MED can also be known. MB → HB is 0.184, P-Value 0.001 ≤ 0.05 with T-Statistics is 3.455 > 1.96, so it can be said that the MED variable. MB plays a role in mediating LD against HB in a positively significant and acceptable manner.

**Table 5.**
**PATH COEFFICIENTS TEST RESULTS (MEDIATION ROLE)**

| | Coefficient Value | T Statistics | *P values* | Description |
|---|---|---|---|---|
| EM -> MED.MB -> HB | 0.181 | 3.353 | 0.001 | Accepted |
| LD -> MED.MB -> HB | 0.184 | 3.455 | 0.001 | Accepted |

Source: Primary Data Processing Results, 2025

The results also show that the mediating effect of the learning motivation variable on the influence of the relationship between e-markel and digital literacy on learning outcomes is partial (Table 6). This is because there is a change in the original value of the sample on each pathway, but the p value still shows a significant value, and this is in accordance with the mediation analysis procedure (J. F. Hair et al., 2010). This means that the learning motivation variable does not completely mediate the relationship between e-markel or digital literacy on student learning outcomes but strengthens the direct relationship that you already have between variable dependent and independent.

**Table 6.**
**SUMMARY OF DIRECT EFFECT, INDIRECT EFFECT AND TOTAL EFFECT TESTING**

| | Direct Effect | | Indirect Effect | | Total Effect | |
|---|---|---|---|---|---|---|
| | Original Sample | P Values | Original Sample | P Values | Original Sample | P Values |
| EM -> HB | 0.455 | 0.000 | 0.181 | 0.001 | 0.636 | 0.000 |
| EM -> MED.MB | 0.555 | 0.000 | - | - | 0.555 | 0.000 |
| LD -> HB | 0.400 | 0.000 | 0.184 | 0.001 | 0.585 | 0.000 |
| LD -> MED.MB | 0.567 | 0.000 | - | - | 0.567 | 0.000 |
| MED.MB -> HB | 0.325 | 0.000 | - | - | 0.325 | 0.000 |

Source: Primary Data Processing Results, 2025

Meanwhile, the type of partial mediation in this study was found to be complementary partial mediation. This can be seen from the value of the total effect X1, Y of 0.636 with a significance of < 0.05 and X2, Y of 0.585 with a significance of < 0.05, it can be interpreted that the variable relationship between these variables, both directly and indirectly, has the power not only to be an intermediary of the influence between e-markel and digital literacy on learning outcomes, but it can also strengthen the direct relationship that already exists between the two. This means that the complementary power of

this learning motivation variable emphasizes more on completing the direct relationship, so that the total influence that occurs becomes stronger.

***Discussion***

From the results of the analysis above, it is known that e-markel has a significant effect on student learning outcomes, this means that by using e-markel which is one of the technology-based learning media, it allows for an improvement in the quality of student learning, so that this technology-based learning media can be used as one of the strategies to increase student participation in the learning process. This is in line with the results of the study which revealed that learning that uses electronic-based interactive teaching materials will improve students' critical thinking skills, when compared to students who use teaching materials in the form of textbooks (Sinaga et al., 2022). Moreover, the use of electronic modules is also known to provide an interactive, interesting learning experience and in accordance with technological developments and the needs of the learning process in the classroom (Ramadhan et al., 2023). This emphasizes that e-markel which is one part of electronic-based interactive teaching materials is indispensable in the learning process so that it will improve student learning outcomes, especially with the encouragement of development and mastery of current technology.

These results also support the answer to our next research objective, namely that digital literacy has a positive and significant influence on learning outcomes. This shows that students' ability to use digital technology effectively is essential to improving their academic understanding and skills. The results of other studies also show the same thing, where students with better learning outcomes have good digital literacy skills as well, such as the ability to collect information, understand the information collected, combine or rearrange the information they get using their own angle and the ability to see the credibility of the information (Tran-Duong, 2023). Therefore, improving students' digital literacy skills needs to be continuously developed (Arima et al., 2022; Winarno & Ashari, 2022), so that it can make it easier for students to process the information needed to support their learning process without being constrained by time and place (Mariani et al., 2022). So that the expected impact of the mastery of digital literacy by students is more on their ability to access learning-related information so that they can improve their insights and learning outcomes.

Furthermore, this study also found that learning motivation can significantly mediate both the influence of e-markel on learning outcomes, and the influence of digital literacy on learning outcomes. This shows that students who have a high motivation to learn will tend to be more active in using learning technology and more motivated in finding relevant information related to the topic being studied, meaning that digital literacy skills will also increase gradually. This is in line with the results of a study that found that learning using digital-based media can make a significant contribution to improving learning outcomes with the motivation of students formed from a more interactive and engaging learning experience (Adilah et al., 2025). On the other hand, learning motivation not only has a direct influence on learning outcomes, but also has an indirect influence [Lo, 2022], terutama dalam hal peningkatan literasi digital (Soraya et al., 2023). This can be seen from the results of the study which revealed that learning motivation is also able to have a strong influence on improving digital literacy skills to improve learning outcomes (Arpizal & Puji Rahayu, 2022; Murni & Fachrurrozie, 2022). These results show that the learning motivation in this study is not only able to influence the relationship between e-markel and digital literacy with learning outcomes but also can strengthen these relationships.

## CONCLUSION

The results of this study emphasize three things, namely electronic-based interactive teaching materials are indeed very supportive of the learning process during the rapid development and mastery of technology. Furthermore, this study also emphasizes that it is necessary to improve students' ability to effectively master technology to improve their understanding and skills in the academic field. Finally, the emphasis of the results of this study provides an understanding that students who have a high motivation to learn will tend to be more active in using learning technology and more motivated in finding relevant information related

to the topic being studied, meaning that digital literacy skills will also increase gradually. With these results, the purpose of the research has been answered. So that the overall implications are more focused on the role of educational institutions or schools and educators can mobilize the role of technology-based learning media and be able to strengthen students' learning motivation, especially in mastering and understanding technology that can be used for their educational success.

## REFERENCES

Adilah, G. P., Utaya, S., & Suharto, Y. (2025). Pengaruh Model Resource Based Learning Berbantuan Microsite Terhadap Hasil Belajar Ditinjau Dari Motivasi Belajar Siswa. *Cetta: Jurnal Ilmu Pendidikan*, *8*(1), 195–210. https://doi.org/10.37329/cetta.v8i1.3859

Al-Adwan, A. S., Alsoud, M., Li, N., Majali, T., Smedley, J., & Habibi, A. (2024). Unlocking future learning: Exploring higher education students' intention to adopt meta-education. *Heliyon*, *10*(9), e29544. https://doi.org/10.1016/j.heliyon.2024.e29544

Alakrash, H. M., & Abdul Razak, N. (2021). Technology-Based Language Learning: Investigation of Digital Technology and Digital Literacy. *Sustainability*, *13*(21), 12304. https://doi.org/10.3390/su132112304

Alyusfitri, R., Gistituati, N., & Fauzan, A. (2024). The Effectiveness and Relationship of Student Responses toward Learning Outcomes Using Interactive Multimedia-Based E-Modules in Elementary Schools. *Lnternational Electronic Journal of Elementary Education*. https://doi.org/10.26822/iejee.2024.354

Arima, M., Amaliyah, N., Abustang, P., & Alam, S. (2022). Pengaruh Literasi Digitasl Terhadap Hasil Belajar Siswa Sekolah Dasar Kota Makassar. *Pendas Mahakam : Jurnal Pendidikan Dan Pembelajaran Sekolah Dasar*, *6*(2), 105–110. https://doi.org/10.24903/pm.v6i2.818

Arpizal, A., & Puji Rahayu, S. (2022). Peran Motivasi Belajar dalam Memediasi Komunikasi Guru Terhadap Hasil Belajar Siswa/I pada Mata Pelajaran Ekonomi Sekolah Menengah Atas Negeri (SMAN) 1 Kota Jambi. *JURNAL MANAJEMEN PENDIDIKAN DAN ILMU SOSIAL*, *4*(1), 10–21. https://doi.org/10.38035/jmpis.v4i1.1274

Bujang, S. D. A., Selamat, A., Krejcar, O., Maresova, P., & Nguyen, N. T. (2020). Digital Learning Demand for Future Education 4.0—Case Studies at Malaysia Education Institutions. *Informatics*, *7*(2), 13. https://doi.org/10.3390/informatics7020013

Cayubit, R. F. O. (2022). Why learning environment matters? An analysis on how the learning environment influences the academic motivation, learning strategies and engagement of college students. *Learning Environments Research*, *25*(2), 581–599. https://doi.org/10.1007/s10984-021-09382-x

Datu, A. R., Tumurang, H. J., & Sumilat, J. M. (2022). Pengaruh Motivasi Belajar Terhadap Hasil Belajar Siswa di Tengah Pandemi Covid-19. *Jurnal Basicedu*, *6*(2), 1959–1965. https://doi.org/10.31004/basicedu.v6i2.2285

Deep, P. Das, Chen, Y., Ghosh, N., & Rahaman, Md. S. (2024). The Influence of Student–Instructor Communication Methods on Student Engagement and Motivation in Higher Education Online Courses During and After the COVID-19 Pandemic. *Education Sciences*, *15*(1), 33. https://doi.org/10.3390/educsci15010033

Delita, F., Berutu, N., & Nofrion, N. (2022). Online Learning: The Effects of Using E-Modules on Self-Efficacy, Motivation and Learning Aoutcomes. *Turkish Online Journal of Distance Education*, *23*(4), 93–107. https://doi.org/10.17718/tojde.1182760

Dermawan, D. D., Wuryandani, W., Herwin, H., Eliza, F., Nurzaman, I., Giwangsa, S. F., Nurdiansah, N., Fadli, R., Sari, S., Jannah, M., & Munawarah, M. (2025). Improving critical thinking ability in elementary schools with interactive e-modules. *Online Journal of Communication and Media Technologies*, *15*(2), e202513. https://doi.org/10.30935/ojcmt/16051

DeWitt, D., & Alias, N. (2023). Creative Digital Pedagogies for Student Engagement. In *Digitalization and Development* (pp. 112–132). Routledge. https://doi.org/10.4324/9781003367093-7

Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., Duan, Y., Dwivedi, R., Edwards, J., Eirug, A., Galanos, V., Ilavarasan, P. V., Janssen, M., Jones, P., Kar, A. K., Kizgin, H., Kronemann, B., Lal, B., Lucini, B., … Williams, M. D. (2021). Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, *57*, 101994. https://doi.org/10.1016/j.ijinfomgt.2019.08.002

Eriyanto, M. G., Roesminingsih, M. V., Soedjarwo, & Soeherman, I. K. (2021). The Effect of Learning Motivation on Learning Independence and Learning Outcomes of Students in the Package C Equivalence Program. *IJORER : International Journal of Recent Educational Research*, *2*(4), 455–467. https://doi.org/10.46245/ijorer.v2i4.122

Falloon, G. (2020). From digital literacy to digital competence: the teacher digital competency (TDC) framework. *Educational Technology Research and Development*, *68*(5), 2449–2472. https://doi.org/10.1007/s11423-020-09767-4

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis* (7th Editio). Pearson.

Hair, J., Sarstedt, M., Ringle, C. M., & Gudergan, S. P. (2017). *Advanced Issues in Partial Least Squares Structural Equation Modeling*. Sage Publishing.

Herpratiwi, H., & Tohir, A. (2022). Learning Interest and Discipline on Learning Motivation. *International Journal of Education in Mathematics, Science and Technology*, *10*(2), 424–435. https://doi.org/10.46328/ijemst.2290

Ilomäki, L., Lakkala, M., Kallunki, V., Mundy, D., Romero, M., Romeu, T., & Gouseti, A. (2023). Critical digital literacies at school level: A systematic review. *Review of Education*, *11*(3). https://doi.org/10.1002/rev3.3425

Irtyshcheva, I. (2021). The effect of digital technology development on economic growth. *International Journal of Data and Network Science*, 25–36. https://doi.org/10.5267/j.ijdns.2020.11.006

Lei, H., Xiong, Y., Chiu, M. M., Zhang, J., & Cai, Z. (2021). The relationship between ICT literacy and academic achievement among students: A meta-analysis. *Children and Youth Services Review*, *127*, 106123. https://doi.org/10.1016/j.childyouth.2021.106123

Lilian, A. (2022). Motivational beliefs, an important contrivance in elevating digital literacy among university students. *Heliyon*, *8*(12), e11913. https://doi.org/10.1016/j.heliyon.2022.e11913

Logan, R. M., Johnson, C. E., & Worsham, J. W. (2021). Development of an e-learning module to facilitate student learning and outcomes. *Teaching and Learning in Nursing*, *16*(2), 139–142. https://doi.org/10.1016/j.teln.2020.10.007

Loughran, R. J., Wallbrink, P. J., Walling, D. E., & Appleby, P. G. (n.d.). Sampling Methods. In *Handbook for the Assessment of Soil Erosion and Sedimentation Using Environmental Radionuclides* (pp. 41–57). Kluwer Academic Publishers. https://doi.org/10.1007/0-306-48054-9_3

Maki, P. L. (2023). *Assessing for Learning*. Routledge. https://doi.org/10.4324/9781003443056

Mardiana, H. (2024). Perceived Impact of Lecturers' Digital Literacy Skills in Higher Education Institutions. *Sage Open*, *14*(3). https://doi.org/10.1177/21582440241256937

Mariani, M., Butarbutar, M., Siahaan, Y., Silalahi, M., & Herman, H. (2022). The Influence of Digital Literature, Creativity, and Learning Motivation Era Society 5.0 on Student Learning Outcomes Kalam Kudul SD Christian SD Pematang Siantar Review From a Parent's Perspective (Case Study of Science Class V SD). *SULTANIST: Jurnal Manajemen Dan Keuangan*, *10*(2), 177–186. https://doi.org/10.37403/sultanist.v10i2.443

Murni, M., & Fachrurrozie, F. (2022). Motivasi Belajar dalam Memediasi Pengaruh Lingkungan Teman Sebaya, Kondisi Ekonomi Orangtua terhadap Prestasi Belajar. *Business and Accounting Education Journal*, *3*(1), 9–19. https://doi.org/10.15294/baej.v3i1.59274

Neumeyer, X., Santos, S. C., & Morris, M. H. (2021). Overcoming Barriers to Technology Adoption When Fostering Entrepreneurship Among the Poor: The Role of Technology and Digital Literacy. *IEEE Transactions on Engineering Management*, *68*(6), 1605–1618. https://doi.org/10.1109/TEM.2020.2989740

Noor, N. A. M., Saim, N. M., Alias, R., & Rosli, S. H. (2020). Students' Performance on Cognitive, Psychomotor and Affective Domain in the Course Outcome for Embedded Course. *Universal Journal of Educational Research*, *8*(8), 3469–3474. https://doi.org/10.13189/ujer.2020.080821

Pala, Ş. M., & Başıbüyük, A. (2021). The Predictive Effect of Digital Literacy, Self-Control and Motivation on the Academic Achievement in the Science, Technology and Society Learning Area. *Technology, Knowledge and Learning*. https://doi.org/10.1007/s10758-021-09538-x

Pangrazio, L., Godhe, A.-L., & Ledesma, A. G. L. (2020). What is digital literacy? A comparative review of publications across three language contexts. *E-Learning and Digital Media*, *17*(6), 442–459. https://doi.org/10.1177/2042753020946291

Qulub, R. T., & Budiyono, B. (2022). The Effect of Teacher's Digital Literacy Level on the Quality of Online Learning at Adiwerna Vocational School, Tegal. *Indonesian Journal of Curriculum and Educational Technology Studies*, *9*(1), 43–52. https://doi.org/10.15294/ijcets.v9i1.50665

Ramadhan, W., Meisya, R., Jannah, R., & Putro, K. Z. (2023). E-modul Pendidikan Pancasila Berbasis Canva Berbantuan Flip PDF Profesional untuk Meningkatkan Hasil Belajar Siswa Sekolah Dasar. *Jurnal Pemikiran Dan Pengembangan Sekolah Dasar (JP2SD)*, *11*(2). https://doi.org/10.22219/jp2sd.v11i2.27262

Revuelta-Domínguez, F.-I., Guerra-Antequera, J., González-Pérez, A., Pedrera-Rodríguez, M.-I., & González-Fernández, A. (2022). Digital Teaching Competence: A Systematic Review. *Sustainability*, *14*(11), 6428. https://doi.org/10.3390/su14116428

Seven, M. A. (2020). Motivation in Language Learning and Teaching. *African Educational Research Journal*, *8*(2), 62–71. https://doi.org/10.30918/AERJ.8S2.20.033

Sinaga, P., Setiawan, W., & liana, M. (2022). The impact of electronic interactive teaching materials (EITMs) in e-learning on junior high school students' critical thinking skills. *Thinking Skills and Creativity*, *46*, 101066. https://doi.org/10.1016/j.tsc.2022.101066

Songkram, N., Chootongchai, S., Osuwan, H., Chuppunnarat, Y., & Songkram, N. (2023). Students' adoption towards behavioral intention of digital learning platform. *Education and Information Technologies*, *28*(9), 11655–11677. https://doi.org/10.1007/s10639-023-11637-4

Soraya, S. M., Kurjono, K., & Purnamasari, I. (2023). Pengaruh Literasi Digital Siswa Terhadap Hasil Belajar Siswa Dengan Motivasi Belajar sebagai Variabel Moderator. *Jurnal Educatio FKIP UNMA*, *9*(2), 681–687. https://doi.org/10.31949/educatio.v9i2.4537

Spante, M., Hashemi, S. S., Lundin, M., & Algers, A. (2018). Digital competence and digital literacy in higher education research: Systematic review of concept use. *Cogent Education*, *5*(1), 1519143. https://doi.org/10.1080/2331186X.2018.1519143

Sugiyono. (2019). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Alfabeta.

Szymkowiak, A., Melović, B., Dabić, M., Jeganathan, K., & Kundi, G. S. (2021). Information technology and Gen Z: The role of teachers, the internet, and technology in the education of young people. *Technology in Society*, *65*, 101565. https://doi.org/10.1016/j.techsoc.2021.101565

Timotheou, S., Miliou, O., Dimitriadis, Y., Sobrino, S. V., Giannoutsou, N., Cachia, R., Monés, A. M., & Ioannou, A. (2023). Impacts of digital technologies on education and factors influencing schools' digital capacity and transformation: A literature review. *Education and Information Technologies*, *28*(6), 6695–6726. https://doi.org/10.1007/s10639-022-11431-8

Tran-Duong, Q. H. (2023). The effect of media literacy on effective learning outcomes in online learning. *Education and Information Technologies*, *28*(3), 3605–3624. https://doi.org/10.1007/s10639-022-11313-z

Wang, Y., Cao, Y., Gong, S., Wang, Z., Li, N., & Ai, L. (2022). Interaction and learning engagement in online learning: The mediating roles of online learning self-efficacy and academic emotions. *Learning and Individual Differences*, *94*, 102128. https://doi.org/10.1016/j.lindif.2022.102128

Wiyono, B. B., Indreswari, H., & Prestiadi, D. (2021). The Use of Technology-Based Communication Media in The Teaching-Learning Interaction of Educational Study Programs in The Pandemic of Covid 19. *2021 IEEE 11th International Conference on Electronics Information and Emergency Communication (ICEIEC)2021 IEEE 11th International Conference on Electronics Information and Emergency Communication (ICEIEC)*, 1–5. https://doi.org/10.1109/ICEIEC51955.2021.9463846

Xu, X., Shi, Z., Bos, N. A., & Wu, H. (2023). Student engagement and learning outcomes: an empirical study applying a four-dimensional framework. *Medical Education Online*, *28*(1). https://doi.org/10.1080/10872981.2023.2268347

Zacarian, D., & Silverstone, M. (2020). *Teaching to Empower: Taking Action to Foster Student Agency, Self-Confidence, and Collaboration*. ASCD.

Zulkarnain, I., Sitepu, Y. S., Sutatminingsih, R., & Rajagukguk, M. (2024). Student's digital literacy competence and its implications for the learning process. *International Journal of Evaluation and Research in Education (IJERE)*, *13*(2), 997. https://doi.org/10.11591/ijere.v13i2.25767