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Examining the Role of Digital Competence, Self-Efficacy, and Parental Support in Enhancing Students' Performance in Sport Education Programs

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ABSTRACT

Advancements in digital technology have reshaped learning across disciplines, including sport education. Yet, the success of digital integration depends not only on students' technological skills but also on psychological and social factors such as self-efficacy and parental support. This study examines how digital competence, self-efficacy, parental support, and information evaluation strategies jointly affect students' learning performance in sport education programs. A quantitative survey was conducted with 304 sport education students from Jambi University, Sriwijaya University, and Medan State University. Data were collected through a Likert-scale questionnaire and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4.0.9.9. Reliability and validity were tested using composite reliability, AVE, and discriminant validity, while model predictive power was assessed through R^2 and Q^2 values. All hypothesized relationships were significant. Parental support had the strongest effect on self-efficacy ($\beta = 0.756$, $p < 0.001$) and digital competence ($\beta = 0.746$, $p < 0.001$), which subsequently enhanced information evaluation and learning outcomes ($R^2 = 0.653$; $Q^2 > 0.30$). Self-efficacy and digital competence also positively affected information evaluation and academic performance, emphasizing that parental motivation fosters confidence and digital readiness essential for effective sport learning. Students' success in sport education depends on the synergy between technological proficiency, psychological empowerment, and family engagement. Strengthening digital competence alone is inadequate without developing self-efficacy and parental involvement. Hence, educators and policymakers should promote sport education programs that combine digital literacy, reflective thinking, and family collaboration to cultivate confident, adaptive, and high-performing learners in the digital era.

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INTRODUCTION

Advances in information and communication technology have had a broad impact, including on sports education. Research shows that appropriate technology integration in sports education can increase student engagement, motivation, and enthusiasm, thus positively impacting learning outcomes (Allen et al., 2018). Despite its positive benefits, the implementation of digital technology also faces challenges, such as unequal access, concerns about reduced physical activity, limited lecturer competency in digital-based pedagogy, and the absence of comprehensive policies (Hunt, 2021). Falloon (2020) emphasized that digital competency encompasses a deep understanding of the technical use of learning technology, and this is also necessary in sports education.

Despite the positive benefits of technology integration, some still cling to traditional learning, which is perceived as more impactful. Furthermore, a lack of lecturer support or difficulty adapting to new learning approaches impacts students' attitudes and readiness to participate in sports education (Akcil & Bastas, 2020; Bessette, 2020). Previous research has tended to focus more on the content and format of digital learning, while less attention has been paid to the psychological and behavioral aspects of students in sports education (Noskova et al., 2021), even though these factors are crucial for maintaining student participation in sports.

Self-efficacy is essentially an individual's belief in their ability to act to achieve specific goals. In the context of sports education, students with high self-efficacy are more likely to actively participate, overcome challenges, and achieve better performance. Furthermore, parental support has been shown to be a crucial factor in shaping student motivation and persistence. Research shows that parental encouragement contributes significantly to student achievement, including in sports education (Nababan et al., 2023; Sidabutar et al., 2023).

The transformation of digital technology has led to changes in how information is accessed and how it is delivered. This will undoubtedly be successful if individuals possess strong digital competencies. In this context, digital competency in higher education is necessary for students to access sports-related knowledge, analyze training programs, and evaluate health information that supports an active lifestyle (Colbert et al., 2016; Händel et al., 2020). However, this also raises concerns that excessive screen time can lead to reduced physical activity and even social and emotional health (Figueira et al., 2023; McNeill et al., 2019). Therefore, strengthening sports self-efficacy and ensuring balanced parental support are crucial for students' holistic growth in sports education at higher education.

Another important factor in sports education is the ability to critically evaluate information. In today's era, students are required to be able to analyze necessary and relevant information for sports education, both research data and information related to physical health (Purbaningrum, 2017; Rachmawati & Agustine, 2021). Unfortunately, some students still rarely assess the reliability of online sources or synthesize information effectively (List et al., 2020). This gap highlights the importance of equipping students with digital competencies and critical information evaluation skills to strengthen their performance in sports education.

Based on the aforementioned reasoning, this study was conducted to examine the influence of digital competencies, self-efficacy, parental support, and information evaluation strategies on the performance of students in sports education at universities in Sumatra. It is hoped that this research will make a positive contribution to the development and advancement of learning, specifically in sports education.

LITERATUR REVIEW

Digital Competence

Digital competence has become one of the essential competencies for students in today's digital era. Literally, digital competence encompasses the ability to operate technology confidently, think critically, responsibly, and be creative in everyday life (Vuorikari et al., 2022). In other words, digital competence is not merely a technical skill, but also an essential part of a constructive and creative learning process.

This competence encompasses the ability to use technology effectively to complete academic and non-academic tasks. In practice, digital competence also encompasses the ability to use the internet efficiently to obtain useful information and apply it to productive activities that support economic growth (Jayanthi & Dinaseviani, 2022). Furthermore, digital competence encompasses the ability to recognize media as a means of information retrieval, critically evaluate data obtained from the internet, and utilize digital tools to disseminate information (Larasshati & Priyastiwi, 2024).

Meanwhile, Kim, Hong, and Song (2018) emphasized that strong digital competencies can also enhance learning agility, which in turn contributes to sustained engagement in higher education. In the context of sports education, these digital competencies might include the use of sports apps, performance analysis software, or even technologies that support physical teaching and learning.

Self-Efficacy

In general, self-efficacy refers to the extent to which an individual believes they can take the necessary actions to achieve desired outcomes. Self-efficacy is viewed as an individual's belief in utilizing their resources, abilities, and skills to complete a task (Heryani et al., 2023; Nani and Melati, 2020). This ability is essential in learning, including in sports education in higher education.

Several findings indicate that self-efficacy has a positive impact. This ability has been shown to influence human behavior, from decision-making, intensity of effort, resilience in the face of challenges, to emotional responses to success and failure (Al-Qadasi et al., 2023). Individuals with high self-efficacy tend to be more resilient and persistent, while those with low self-efficacy tend to lack confidence and give up easily (Abdolrezapour et al., 2023). This belief also impacts thought patterns, creating a feedback loop on actions taken.

Fundamentally, each individual will exhibit different reactions depending on the situation they face (Damayanti and Savira, 2022). High levels of self-efficacy help individuals manage stress, use coping strategies, and feel more capable of facing academic demands (Hayat et al., 2020). Therefore, increased self-efficacy not only impacts learning outcomes but also academic satisfaction and career prospects (Achmawati & Anwar, 2022).

Parental Support

In the context of sports learning, parental support can be provided by providing comfort during students' learning process, especially within the family environment (Ayuni et al., 2023). This kind of support will lay a crucial foundation for their future development (Fauziddin et al., 2020). Research findings indicate that parental support influences

students' learning motivation (Amaliati et al., 2021), which in turn influences their academic outcomes (Zulfiana, 2020).

Ultimately, collaboration between parents and educational institutions plays a crucial role in student learning success. A strong partnership between these two factors creates a learning environment that supports children's interests, a key factor in achieving educational success (Sukomardojo, 2023). With parental support, students' chances of academic success are higher (Desta, 2024).

Strategies to Evaluate Information

Differentiated learning approaches emphasize the importance of adapting methods to each student's needs. Teachers no longer simply deliver uniform material but instead design learning activities that consider the varying abilities, interests, and learning styles of students. By providing flexibility in time, materials, and methods, students have a greater opportunity to achieve optimal learning outcomes (Himmah & Nugraheni, 2023). Previous research has shown that this strategy can increase student engagement and understanding, especially when assignments are tailored to their cognitive levels (Kamal, 2021; Kado et al., 2021).

Advances in information and communication technology have given students widespread access to a variety of digital learning resources. However, this convenience requires the ability to select, understand, and evaluate information wisely. Therefore, critical thinking skills are crucial, especially when searching for information online (Huda, 2020). Technological innovation has even facilitated various forms of learning activities (Puji Alfiansyah, 2023).

However, the success of technology-based learning still depends on the readiness of infrastructure and a conducive learning environment (Adisel & Prananosa, 2020). Students need training to utilize technology appropriately and responsibly. The role of teachers is crucial in creating a safe and supportive learning environment (Siregar & Marpaung, 2020). By implementing various relevant learning strategies, students can improve their ability to evaluate information, assess its relevance and credibility, and become reflective and responsible users of information.

E Educational Performance in Sport Learning

Students' academic performance has a significant impact, not only in their educational environment but also in their social and professional lives. Students with good academic performance tend to have greater opportunities in the workforce (Adane et al., 2023). Therefore, improving academic performance is not only beneficial for formal education but also contributes to long-term success after graduation.

One important factor in improving academic performance is students' ability to utilize various learning resources, both directly and indirectly. The learning process is considered successful when students are actively engaged, able to understand complex information, and develop diverse perspectives. The richer the learning experience, the stronger the student's chances of success (Hasran et al., 2024).

Academic achievement reflects student achievement (Mandasari, 2020), ranging from material comprehension, grades, the quality of academic work, to the achievement of learning targets. Internal factors such as ability and motivation, as well as external factors such as educational management, all influence these achievements (Mauliya et al., 2020). A supportive learning environment has been shown to help students achieve optimal results (Nilsook et al., 2021).

Furthermore, assessing academic performance is crucial for improving the quality of education (Saifudin et al., 2020). By understanding students' academic potential, teachers

can provide more appropriate support (Masangu et al., 2020). Conversely, students with low achievement tend to experience learning difficulties and are at risk of dropping out of school (Gusnina et al., 2022).

Reseacrh model and hypotheses

To analyze the elements that influence students' learning performance in the digital age, this study formulated a conceptual framework that links five main variables: family support, self-efficacy, digital ability, information evaluation methods, and learning outcomes. The proposed model consists of eight hypotheses that explain the relationships between variables, as shown in Figure 1.

First, it is believed that family support plays a significant role in shaping students' self-efficacy (H1) and digital ability (H2). This support includes parental participation in the child's education process, both emotionally, motivationally, and providing adequate learning facilities. Self-efficacy, which shows how much students believe in their ability to learn independently, is expected to influence information evaluation methods (H3) and learning outcomes (H5).

Furthermore, digital ability, which means students' ability to utilize information technology devices and applications efficiently, is predicted to have an impact on information evaluation methods (H4) and also affect learning outcomes (H6). Meanwhile, information evaluation methods, which refer to students' ability to assess how credible, relevant, and accurate digital information is, are expected to have a direct impact on improving learning outcomes (H7).

Finally, family support will also be tested directly against student learning outcomes (H8) to determine the extent to which this social factor can strengthen academic achievement. This model is designed to be analyzed using a quantitative approach through the Partial Least Squares Structural Equation Modeling (PLS-SEM) method, which allows testing the relationship between constructs simultaneously and comprehensively.

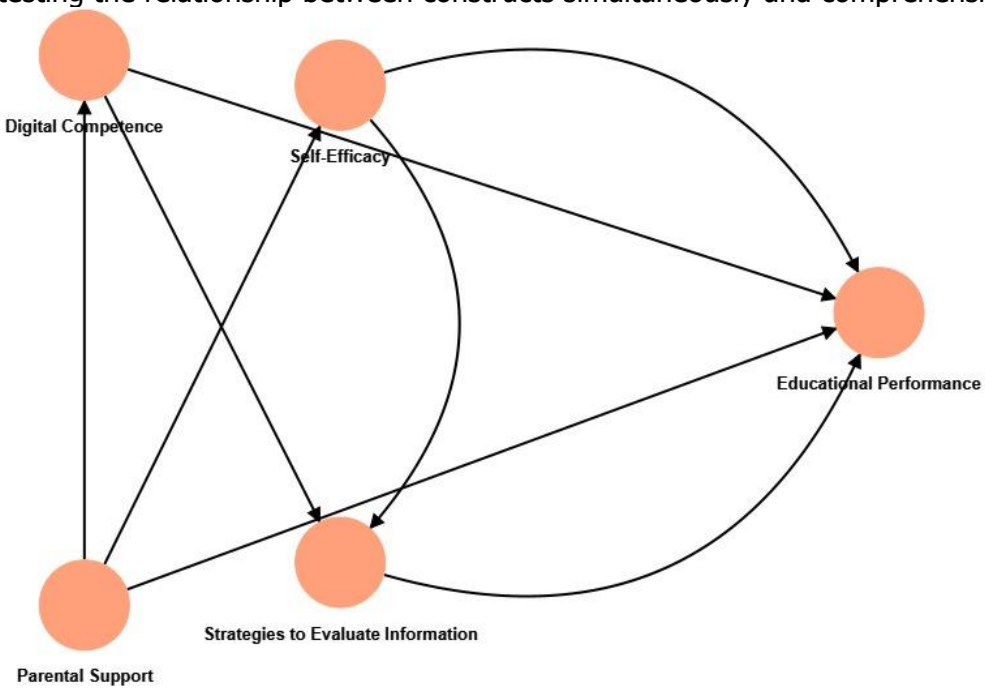

Figure 1. Proposed Model

METHODS

This study used quantitative methods and a survey approach. Quantitative research examines the relationship between variables (Hirose & Creswell, 2023). This study was conducted from March 2025 to May 2025 using a survey technique by distributing questionnaires to respondents to determine their characteristics, opinions, attitudes, and behaviors. Before collecting primary data, a survey instrument was used to determine the influence of digital competence, self-efficacy, parental support, and information assessment strategies on the learning achievement of sports education students. Model measurements and assessments were carried out through data calculations in SmartPLS 4.0.9.9, guided by the Partial Least Squares Structural Equation Modeling (PLS-SEM) procedure.

Instrumentation

The literature review in this study serves as a strong conceptual foundation in describing theories and concepts relevant to the research framework. The main focus of this study includes the topics of digital competence, self-efficacy, parental support, and strategies for evaluating information (Vuorikari et al., 2022; Nani & Melati, 2020; Syafruddin & Setyawan, 2025; Himmah & Nugraheni, 2023). In addition to being a theoretical reference, this review also plays a role in forming an objective approach in compiling research instruments.

The instruments used were developed from several previous studies, then adapted to be relevant to the context of learning in the digital era. Through this adaptation process, 21 indicators were obtained representing five main constructs. Each indicator is presented in the form of a statement and measured using a Likert scale. This instrument consists of two parts, namely respondent demographic data and statements that represent the constructs being studied.

The validity and reliability of the instrument were tested through the measurement model testing procedure using SmartPLS version 4.0.9.9 The evaluation results showed that all constructs had Cronbach's Alpha and Composite Reliability (CR) values above 0.70, and Average Variance Extracted (AVE) values above 0.50, indicating good reliability and convergent validity (Hair et al., 2019). To ensure discriminant validity, Fornell-Larcker and HTMT (Heterotrait-Monotrait Ratio) tests were carried out, as well as cross-loading analysis between indicators. This test shows that each construct is well distributed and has a higher correlation with its own indicators than other constructs.

In addition, the R^2 value in the structural model shows that exogenous variables are able to explain variations in endogenous constructs with moderate to strong categories, especially in the learning achievement construct which has an R^2 value of 0.653. All these results indicate that the research instrument is suitable for use in primary data collection in measuring the influence of digital competence, self-efficacy, parental support, and information evaluation strategies on student learning achievement in the digital era.

Data Collection

Data collection was conducted online using Google Forms. The information gathering phase lasted over a month and involved students from three universities: Jambi University, Medan State University, and Sriwijaya University. All collected information was then entered into Microsoft Excel before being analyzed in-depth using the SmartPLS application. This study employed a total sampling technique, meaning the entire population was sampled without exception. In this context, all 304 students from the three universities were fully involved in the study, so the sample size was proportional to the population size.

FINDINGS AND DISCUSSION

Findings

RESULTS

Measurement models

In this study, the measurement model is used to ensure that each construct analyzed has reliability and validity. There are three main things analyzed, namely: 1) the strength of the indicator and the consistency of internal reliability, 2) how effective the indicator is in measuring similar concepts (convergent validity), and 3) the ability of the construct to look different from each other (discriminant validity). This check is carried out based on the guidelines put forward by Hair et al., (2019).

Indicator loadings and internal consistency reliability

The indicator loading in this study was obtained through algorithm analysis using SmartPLS version 4.0.9.9 As shown in Table 1, most indicators showed loading values above the recommended limit of 0.708 (Muhaimin et al., 2020; Hair et al., 2019). No indicators were removed, so all 21 indicators from the five constructs were retained in the analysis. The results of the outer model test showed that most indicators had outer loading values above 0.70, which means that these indicators have met the convergent validity criteria.

However, there is one indicator that has a loading value below 0.70 and is marked in red in the SmartPLS output. This indicates that the indicator has a weak contribution in representing the latent construct it measures. However, this indicator is still retained in the model because the Average Variance Extracted (AVE) value of the construct in question remains above the minimum threshold of 0.50, and theoretically this indicator is considered relevant and significant in explaining the concept being studied. Therefore, the decision to retain this indicator is based on statistical considerations and theoretical justification.

To assess the consistency of internal reliability, the Cronbach's Alpha (α) and Composite Reliability (CR) values were calculated. The results of the evaluation showed that all constructs had α values ranging from 0.698 to 0.858, and CR values were in the range of 0.831 to 0.902, as shown in Table 1. These values indicate that all constructs have met good reliability standards.

Table 1. Reflective indicator loadings and internal consistency reliability.

	Item	Loading	α	CR	AVE
Digital Competence	DC1	0.763	0.832	0.881	0.598
	DC2	0.769			
	DC3	0.794			
	DC4	0.794			
	DC5	0.745			
Self Efficacy	SE1	0.793	0.815	0.871	0.576
	SE2	0.698			
	SE3	0.784			
	SE4	0.733			
	SE5	0.783			
Parental Support	PS1	0.751	0.775	0.856	0.597
	PS2	0.784			
	PS3	0.784			
	PS4	0.771			
Strategies to Evaluate Information	SEI1	0.765	0.700	0.831	0.620
	SEI2	0.795			
	SEI3	0.803			
Educational Performance in Sport Learning	EP1	0.831	0.856	0.902	0.698
	EP2	0.834			

EP3	0.817
EP4	0.858

Convergent validity

Convergent validity is related to how much indicators in one construct can relate to each other and consistently measure the same concept. In this study, convergent validity was tested using the Average Variance Extracted (AVE) value. The results of the analysis showed that all constructs obtained AVE values of more than 0.50. This indicates that more than half of the indicator variance can be explained by the construct being measured. These findings, as shown in Table 1, confirm that all constructs in the model have met the criteria for adequate convergent validity.

Table 2. Fornel larcker

	Digital Competence	Self Efficacy	Parental Support	Strategies to Evaluate Information	Educational Performance in Sport Learning
Digital Competence	.773				
Self Efficacy	.761	.759			
Parental Support	.746	.756	.773		
Strategies to Evaluate Information	.645	.695	.702	.788	
Educational Performance in Sport Learning	.719	.743	.727	.678	.835

Discriminant validity

Discriminant validity in this study was analyzed using three methods, namely the Fornell-Larcker criteria, cross-loading, and Heterotrait-Monotrait Ratio (HTMT). Referring to Table 2, the AVE square root value of each construct is higher than the correlation between other constructs. This indicates that discriminant validity has been met based on the Fornell-Larcker criteria.

Furthermore, the evaluation results through cross-loading in Table 3 indicate that each indicator shows the highest loading value on the relevant construct, compared to the loading on other constructs. This adds to the confidence that the indicator accurately describes the construct being measured.

In addition, the HTMT value for all pairs of constructs listed in Table 4 is below the 0.90 limit. This confirms that each construct has a clear discriminatory difference from each other. Thus, it can be concluded that discriminant validity in this research model has been carried out well through the three evaluation methods used.

Table 3. Cross loading

	Digital Competence	Self Efficacy	Parental Support	Strategies to Evaluate Information	Educational Performance in Sport Learning
DC1	.763	.558	.574	.514	.541
DC2	.769	.608	.628	.523	.585
DC3	.794	.623	.576	.563	.556
DC4	.794	.601	.561	.464	.518
DC5	.745	.549	.539	.422	.575
SE1	.629	.793	.565	.570	.594

	Digital Competence	Self Efficacy	Parental Support	Strategies to Evaluate Information	Educational Performance in Sport Learning
SE2	.473	.698	.511	.477	.567
SE3	.600	.784	.601	.529	.585
SE4	.595	.733	.581	.523	.505
SE5	.586	.783	.609	.536	.567
PS1	.553	.559	.751	.541	.535
PS2	.602	.598	.784	.522	.585
PS3	.588	.589	.784	.517	.531
PS4	.562	.591	.771	.591	.595
SEI1	.485	.513	.552	.765	.542
SEI2	.515	.542	.558	.795	.542
SEI3	.524	.587	.550	.803	.519
EP1	.646	.641	.622	.563	.831
EP2	.579	.630	.620	.591	.834
EP3	.575	.631	.563	.504	.817
EP4	.600	.582	.624	.604	.858

Structural model assessment

The assessment of the structural model is carried out through several stages according to the guidelines from Hair et al. (2019). The first step begins by testing the potential for collinearity problems between exogenous constructs, which is done by evaluating the Variance Inflation Factor (VIF) value. Furthermore, in the second step, the relationship between constructs is analyzed to determine the strength and direction of their influence.

The third step involves calculating the coefficient of determination (R^2) value, which aims to determine how much the exogenous construct is able to explain the variability of the endogenous construct. Then, in the fourth step, the effect size (f^2) is reported to assess how much each exogenous construct contributes to the relevant endogenous construct. The fifth and sixth steps include evaluating the R^2 value and the overall effectiveness of the model through the calculation of predictive relevance (Q^2), which is obtained using the blindfolding procedure in the PLS-SEM approach.

Table 4. HTMT

	Digital Competence	Self Efficacy	Parental Support	Strategies to Evaluate Information	Educational Performance
Digital Competence					
Self Efficacy	.922				
Parental Support	.926	.951			
Strategies to Evaluate Information	.846	.923	.985		
Educational Performance	.850	.890	.891	.879	

Collinearity issue

Before proceeding to test the relationship between variables, it is important to ensure that there is no significant overlap between the exogenous constructs in the model, known as collinearity. One method commonly used to detect this is by examining the Variance

Inflation Factor (VIF) value. Based on the guidelines from Hair et al. (2019), collinearity is considered problematic if the VIF value exceeds 3,000.

The analysis findings presented in Table 5 show that all constructs in this study have VIF values that are below this threshold. For example, Digital Competence shows VIF values of 2,380 and 2,874; Self-Efficacy is at 2,380 and 3,178; Parental Support is listed at 1,000 and 3,080; while Strategies to Evaluate Information is recorded at 2,282. Although there are some values that are close to the limit, all are still within the acceptable range.

Table 5. VIF values

	Digital Competence	Self Efficacy	Parental Support	Strategies to Evaluate Information	Educational Performance
Digital Competence				2.380	2.874
Self Efficacy				2.380	3.178
Parental Support	1.000	1.000			3.080
Strategies to Evaluate Information					2.282
Educational Performance					

Structural model relationship

To test the relationship between constructs in the structural model, bootstrapping technique was used with 5,000 sub-samples at a significance level of 5%. The test results presented in Table 6 show that all hypotheses in this study were proven significant. Some of the main findings that are worth highlighting include that parental support has a very strong influence on self-efficacy ($\beta = 0.756$, $t = 24.784$, $p < 0.001$) and digital competence ($\beta = 0.746$, $t = 28.203$, $p < 0.001$). Furthermore, self-efficacy has also been shown to play an important role in influencing students' ability to apply information evaluation strategies ($\beta = 0.485$, $t = 7.382$, $p < 0.001$). Meanwhile, both digital competence and information evaluation strategies contribute significantly to student learning achievement, with β values of 0.223 and 0.187, respectively.

Table 6. Final result

H		B	Mean	SD	t statistics	p values	Significance
1	Digital Competence → Strategies to Evaluate Information	.276	.279	.067	4.105	0.000	Yes
2	Digital Competence → Educational Performance	.223	.223	.065	3.444	0.001	Yes
3	Self Efficacy → Strategies to Evaluate Information	.485	.484	.066	7.382	0.000	Yes
4	Self Efficacy → Educational Performance	.276	.274	.080	3.446	0.001	Yes
5	Parental Support → Digital Competence	.746	.747	.026	28.203	0.000	Yes
6	Parental Support → Self Efficacy	.756	.757	.031	24.784	0.000	Yes
7	Parental Support → Educational Performance	.221	.217	.071	3.112	0.002	Yes

8	Strategies to Evaluate Information → Educational Performance	.187	.193	.065	2.880	0.004	Yes

Coefficient of Determination (R^2)

The coefficient of determination (R^2) is used to assess the extent to which the independent variables in the model can explain the variations that occur in the dependent variable. A higher R^2 value indicates that the model has better predictive ability. Based on the information in Table 7, it can be seen that the R^2 value for Digital Competence is 0.556, Self-Efficacy reaches 0.572, Strategies to Evaluate Information is 0.515, and Educational Performance reaches 0.653. These figures indicate that the model used is quite effective in explaining the interactions between variables, with a level of prediction accuracy that can be categorized as moderate to high. Thus, this model can provide a fairly clear and reliable understanding of how the variables in this study interact with each other.

Table 7. Coefficient of determination (R^2)

	R^2	Consideration
Digital Competence	.556	moderate
Self Efficacy	.572	moderate
Strategies to Evaluate Information	.515	moderate
Educational Performance	.653	strong

Effect size (F^2)

Effect size (f^2) is used to assess how big the role of each independent variable is on the dependent variable in a study. The f^2 value is divided into three categories: small (≥ 0.02), medium (≥ 0.15), and large (≥ 0.35). From the results presented in Table 8, it can be seen that parental support has a very significant impact on self-efficacy (f^2 = 1.337) and digital competence (f^2 = 1.253), both of which are included in the large effect category. On the other hand, self-efficacy has a moderate influence on information evaluation strategies (f^2 = 0.203). For other relationships, their contributions are included in the small category. These results indicate that not all variables have the same level of influence, but some of them have an important role in shaping the overall model.

Table 8. f^2 result

	f^2	Effect Size
Digital Competence -> Strategies to Evaluate Information	.066	Small
Digital Competence -> Educational Performance	.050	Small
Self Efficacy -> Strategies to Evaluate Information	.203	Medium
Self Efficacy -> Educational Performance	.069	Small
Parental Support -> Digital Competence	1.253	Large
Parental Support -> Self Efficacy	1.337	Large
Parental Support -> Educational Performance	.045	Small
Strategies to Evaluate Information -> Educational Performance	.044	Small

Predictive relevance (Q^2)

Predictive relevance (Q^2) is used to assess the extent to which the model can predict indicator values based on the available constructs. The Q^2 value is calculated using the blindfolding method and is divided into three categories: low (≥ 0.02), medium (≥ 0.15), and high (≥ 0.35). From the results listed in Table 9, it can be seen that all endogenous constructs in this study, namely Digital Competence (Q^2 = 0.327), Self-Efficacy (Q^2 = 0.326), Strategies to Evaluate Information (Q^2 = 0.312), and Educational Performance (Q^2 = 0.446) have relatively high Q^2 values. This finding indicates that the applied model has very good predictive ability in explaining and predicting the variables studied. Details of the Q2 values from this study are presented in Table 9.

Table 9. Predictive relevance (Q^2)

	Q^2	Predictive relevance
Digital Competence	.327	Large
Self Efficacy	.326	Large
Parental Support	.000	No relevance
Strategies to Evaluate Information	.312	Large
Educational Performance	.446	Large

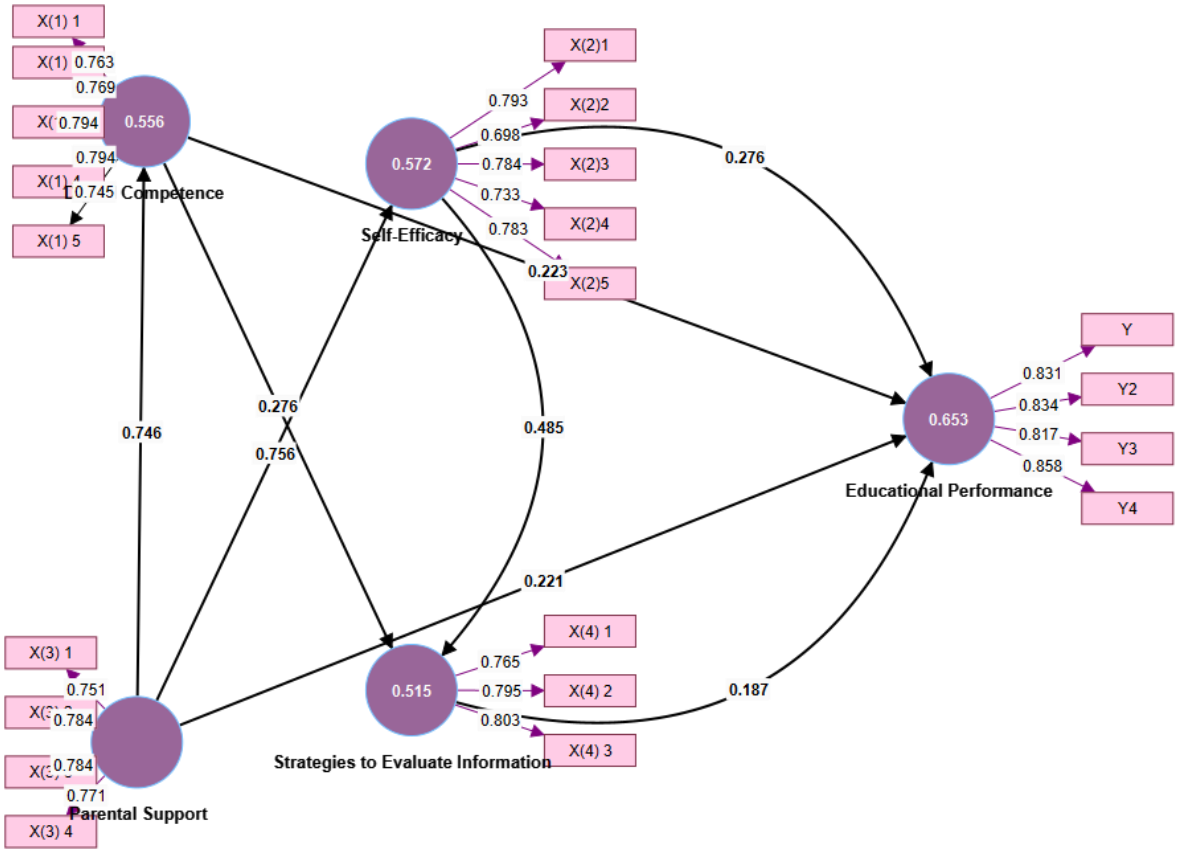

Figure 2. Final model

Discussion

The findings of this study provide a comprehensive picture of how parental support, digital competence, self-efficacy, and information evaluation strategies interact to shape students' learning outcomes in sport education programs. The statistical results show that the model has strong predictive power, as reflected by the R^2 value of 0.653 for educational performance and Q^2 values exceeding 0.30 for all endogenous constructs. These indicators confirm that the proposed framework effectively explains how the observed variables influence learning success in the digital era.

Among all predictors, parental support appeared to have the strongest role. It significantly influenced both digital competence ($\beta = 0.746$, $f^2 = 1.253$, $p < 0.001$) and self-efficacy ($\beta = 0.756$, $f^2 = 1.337$, $p < 0.001$). This result is consistent with previous findings by Syafruddin and Setyawan (2025) and Sidabutar et al. (2023), who highlight that family involvement can substantially shape students' motivation, confidence, and academic resilience. In sport education, parental support extends beyond emotional assistance—it includes encouragement, modeling of discipline, and provision of conducive learning conditions (Siedentop et al., 2019; Burke et a., 2024;). Such support helps students

maintain persistence and motivation throughout physically demanding and competitive learning activities (Ayuni et al., 2023; Fauziddin et al., 2020). This reinforces the idea that strong family engagement contributes to developing learning persistence and discipline—two key attributes in achieving success in sport-related studies.

The results also show that self-efficacy has a meaningful effect on both information evaluation ($\beta = 0.485$, $p < 0.001$) and learning performance ($\beta = 0.276$, $p < 0.001$). These findings support Hayat et al. (2020) and Damayanti and Savira (2022), who argue that individuals with higher self-belief are more capable of managing stress, sustaining effort, and adopting metacognitive learning strategies. In sport education, this psychological readiness translates into confidence to master motor skills, analyze training results, and respond constructively to feedback from coaches or lecturers (Nicholls, 2021; Moon, 2022). High self-efficacy enables students to reflect on their performance, plan improvements, and remain committed to continuous development—core aspects of successful learning and athletic performance. This result also echoes Bandura's theory of self-efficacy, emphasizing that belief in one's capability can drive achievement and persistence (Schunk, 1991; Achmawati & Anwar, 2022).

Digital competence was also found to have a significant impact on both information evaluation ($\beta = 0.276$, $p < 0.001$) and learning performance ($\beta = 0.223$, $p < 0.001$). This finding corresponds to the framework of Vuorikari et al. (2022) and the empirical work of Larasshati & Priyastiwi (2024), who define digital competence as the ability to use technology critically, creatively, and responsibly. In sport education, digital competence is increasingly vital, as students are expected to use fitness applications, performance analysis software, and digital video tools to monitor progress and evaluate movement accuracy (Cao et al., 2022; Zulkifli & Danis, 2022). According to Colbert et al. (2016) and Händel et al. (2020), these skills allow learners to integrate data-driven insights into their training routines. Digital competence includes not only technical skills but also pedagogical understanding—knowing how to use technology meaningfully to improve learning quality (Falloon, 2020; Li et al., 2022; Kudhair et al., 2024). Therefore, students with higher digital literacy are more capable of analyzing, interpreting, and applying sport science knowledge effectively.

The analysis also demonstrates that information evaluation strategies contribute significantly to educational performance ($\beta = 0.187$, $p < 0.01$). This implies that students who can critically assess the credibility, accuracy, and relevance of information tend to achieve better academic results. In the field of sport education, such evaluative ability is essential, as learners are frequently exposed to abundant, and sometimes unreliable, online content regarding health, exercise, and nutrition. Students who can distinguish between scientific evidence and anecdotal claims will make better training decisions and achieve more meaningful learning outcomes (Purbaningrum, 2017; Rachmawati & Agustine, 2021; Huda, 2020). This critical awareness also helps prevent misinformation and supports evidence-based practice in sports-related learning environments.

From a pedagogical perspective, the interconnected effects among parental support, self-efficacy, and digital competence highlight the need for a holistic approach to sport education. As Himmah & Nugraheni (2023) and Kado et al. (2021) note, effective instruction should adapt to students' varying abilities and motivations. Strengthening digital competence must therefore go hand-in-hand with fostering students' self-confidence and engaging families as partners in the learning process. This synergy will allow sport education students to apply digital and cognitive skills more effectively while maintaining motivation and well-being.

In summary, this study affirms that learning success in sport education depends on the interaction between technological readiness, psychological empowerment, and social support. Enhancing digital competence alone will not suffice without attention to students'

self-efficacy and parental involvement. Hence, universities and educators should design sport education programs that integrate digital literacy training, psychological skill development, and collaborative family engagement. Such an approach ensures that students are not only proficient in using technology but also capable of thinking critically, acting confidently, and sustaining motivation in both academic and athletic contexts.

CONCLUSION

This study demonstrates that students' learning performance in sport education is strongly influenced by the interconnected roles of parental support, self-efficacy, digital competence, and information evaluation strategies. The model tested through PLS-SEM shows strong predictive validity ($R^2 = 0.653$; $Q^2 > 0.30$), indicating that these four constructs collectively shape students' ability to learn effectively in technology-based environments. Parental support proved to be the most dominant factor, enhancing both digital competence and self-efficacy, which subsequently improved students' capacity to evaluate information and achieve better academic outcomes. This emphasizes that family involvement provides not only emotional and motivational reinforcement but also a foundation for persistence and discipline in sport learning, where physical effort and cognitive engagement are equally essential.

The results also highlight that high self-efficacy and strong digital competence enable students to critically assess sport-related information and apply it meaningfully in their learning and practice. Therefore, improving sport education quality requires more than technological access—it calls for an integrated approach that combines digital literacy, psychological readiness, and family participation. Educators and policymakers should design learning environments that foster confidence, critical thinking, and collaboration between home and institution. Such synergy ensures that sport education not only builds physical skills but also cultivates reflective, adaptive, and resilient learners prepared for future challenges in the digital era.

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