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The Role of Digital Literacy and Entrepreneurship Literacy Mediated by Entrepreneurship Education on Digital Business Skills of Vocational Students in Malang Regency

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A B S T R A C T

This study aims to analyze the impact of digital knowledge and business knowledge on students' digital business skills and determine the role of business education Copying as a compromise. This study uses various methods and research through emotional assessment. The sample of this study includes 234 students working in Malang district. Data analysis was done using structural equation-partial least squares (SEM-PLS) method. Digital literacy and entrepreneurial skills are valuable and important for business education. Digital literacy and entrepreneurial skills are still very useful and beneficial for the digital entrepreneurship of working students in Malang district. Likewise, entrepreneurship education is also very valuable and beneficial for the digital marketing skills of students. This study also conducted a discussion project on entrepreneurship education among working students in Malang district about the relationship between digital knowledge and digital entrepreneurial skills, as well as the relationship between knowledge economy and digital economy. The significance of this study can help SMK schools improve business skills education and ensure that the courses are in line with the needs of the business world and the goals of the current economic world.

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INTRODUCTION

The world of digital entrepreneurship has progressed from time to time along with the development of digital technology (Kraus et al., 2023). The progress of the digital entrepreneurship world encourages SMK (Vocational High School) students to have the ability to adapt to the digital business environment (Raghunath et al., 2020). SMK students must have digitalization skills in addition to entrepreneurial abilities. The ability to digitize encourages business growth and is able to compete competitively (Avelar et al., 2024). According to Bernardus et al. (2020), the skills that vocational students have now consist of leadership, creativity, communication, risk-taking and marketing skills. All of these skills are needed to respond to changes in the industrial environment, new technologies, and changes in human behavior (Imjai et al., 2024).

SMK students in Malang district are also encouraged to improve their digital skills to adapt to the entrepreneurial environment. Digital skills are a solution in improving students' quality of life after graduating from school (Junaidi et al., 2023). Students are able to create their own jobs and reduce the unemployment rate in the community. According to Muhammad A.D. Hidayat, et al (2024) there are 38.76% of vocational students in Malang district who have good digital literacy and 61.21% who are classified as low and have not met the standards. Low digital skills do not mean that schools do not provide learning tools for vocational students. According to statistical data, the open unemployment rate (TPT) in Malang Regency has increased from 2021 to 2023 (Badan Pusat Statistik, 2023). The following table shows the open unemployment rate in Malang Regency.

Table 1. Open Unemployment Rate (OUR) in Malang District

The District Name	Tingkat Pengangguran Terbuka (TPT)		
	2021	2022	2023
Malang District	5,40%	6,57%	5,70%

Source: (Central Bureau of Statistics, 2023)

From the table above, the percentage of TPT from 2021 to 2023 has not decreased in the last three years. Malang Regency ranks 8th with a high percentage of TPT graduates out of 38 districts and cities in East Java (Badan Pusat Statistik, 2023).

Entrepreneurship education encourages increased resources, increased physical limitations, and increased skills from SMK students (Effendy & Sunarsi, 2020). Entrepreneurial skills can be encouraged through improving digital literacy and entrepreneurial literacy (Imjai et al., 2024). Digital literacy is the ability of SMK students to utilize digital technology to access, manage and evaluate information for business purposes (Suryani & Chaniago, 2023). Vocational students are taught to utilize e-books, online journals, video tutorials, and online courses to improve digital literacy. Enhancing entrepreneurial literacy helps SMK students understand basic concepts related to entrepreneurship. Entrepreneurial literacy will teach how to start a business, manage finances, find business opportunities and proper management in running a business (Ballesteros-Sola & Magomedova, 2023).

The role of digital literacy and entrepreneurial literacy in improving the skills of vocational students through entrepreneurship education is supported by the resource-based view (RBV) theory which explains the improvement of student skills to achieve competitive advantage and maximize the potential for profit (Imjai et al., 2024). RBV theory offers different ways of working for students to gain profits, and survive risks and competitors (Greve, 2020). The basic assumption of RBV is that students are always able to compete with other competitors by managing their resources to achieve competitiveness (Greve, 2020). With that, RBV theory is actually very important for improving digital literacy skills and entrepreneurial literacy in entrepreneurship education.

The urgency of this research encourages students to realize three important things in running a business now; (1) Modern businesses are now highly dependent on digital technology. Digital literacy and entrepreneurial literacy enable vocational students to utilize digital technology to be skilled in the business world. (2) Entrepreneurship education provides a competitive advantage for vocational students to be skilled in the digital business world. (3) Digital literacy and entrepreneurship literacy encourage vocational students to have digital business skills in creating jobs, increasing creativity and economic growth. With that, the purpose of this study is to determine the effect of digital literacy and entrepreneurial literacy on digital business skills through entrepreneurship education.

LITERATURE REVIEW

Digital Literacy

Gilster (1997) defines digital literacy as the ability to understand and use information presented by computers (Spires et al., 2017). Digital literacy involves reading and writing digitally in a variety of media, such as text, text, visual images, photographs, audio, video, and other formats. Individuals with good digital literacy are more able to understand information presented in technology (Chen et al., 2021). Therefore, digital literacy is important for increasing productivity, decision-making, and management success in many areas, especially in the business world (Reddy et al., 2020). Developing countries such as the United States, China, and Japan are currently experiencing the effects of digital literacy. According to Cunningham (2019), developing countries have larger economies and more technology per capita than developing countries (Spires et al., 2017). Pires and Bartlett (2012) divided the cognitive development processes associated with digital literacy into three categories: (a) finding and using digital content, (b) creating digital content, and (c) communicating digital content (Reddy et al., 2020).

Entrepreneurial Literacy

Perez-Bustamante (2014) defines entrepreneurial skills as the provision of attitudes, skills, and knowledge that enable people to identify opportunities and exploit them (Mutanda and Moyo, 2021). Rauch and Slack define entrepreneurial skills as the knowledge to create and sustain a business through ethical values, innovative ideas, responsibility, and setting business goals (Purwati et al., 2023). Digital literacy is the ability to define, understand,

describe, create, and manage business (Yusuf Iskandar and Heliani, 2023). Business management should be included in time analysis, strategy development, and performance management (Pérez-Bustamante, 2014).

Entrepreneurship Education

Entrepreneurship education is a learning process that develops and improves entrepreneurial abilities that manifest themselves in innovation, creativity, initiative and risk taking (Farny et al., 2016). Students who receive business education will be exposed to successful business planning and interact with successful professionals (Boldureanu et al., 2020). Learning outcomes provide new ideas to solve recurring business problems and provide confidence to succeed in business life. Therefore, business education is an educational process that provides students with business skills and practices to develop business (Lee and Yun, 2020). Gibson (2024) defines business education as education, motivation and inspiration that help students succeed in business life (Fan et al., 2024).

Digital Business Skills

Digital marketing is considered the most important job for companies today (Guitert et al., 2020). Entrepreneurs need digital skills to make their companies competitive. Ce Wang and Moon Hong Kim (2023) believe that students who receive entrepreneurship education must have important abilities, including knowledge, skills, and attitudes, to handle business and adapt to the development of technology. In order for students to compete in today's digital world, they need to have three digital skills: (a) digital skills, (b) the ability to use modern technologies, continuous education, and the ability to use them daily (Alkalah, 2016), and (c) the ability to evaluate new technologies (Varenyk and Piskova, 2024).

METHODOLOGY

This study uses a multivariate SEM-PLS analysis to investigate the effects of digital literacy (X1) and entrepreneurship (X2) on entrepreneurial skills (Y) and business education (Z) (see figure 1). The advantage of SEM-PLS is that it can differentiate between variables and estimate data according to the length of the sample (Hair et al., 2019).

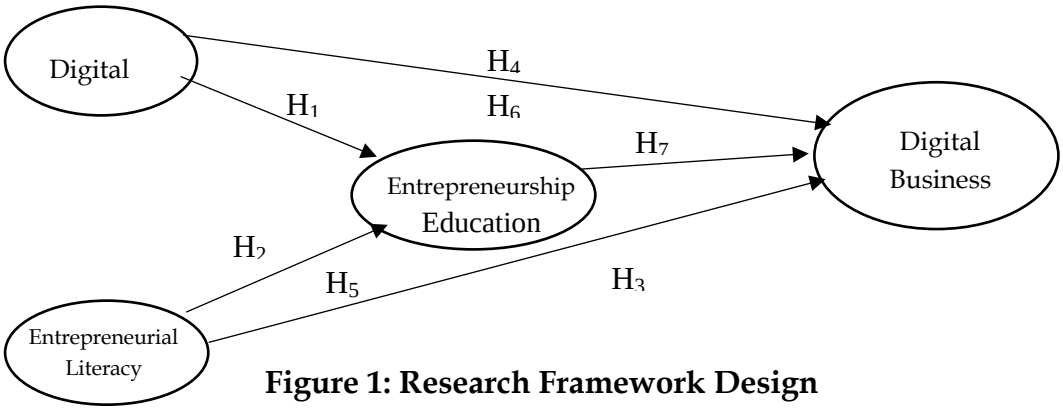

Figure 1: Research Framework Design

Respondents and Data Collection Techniques

This study involved students from Malang district. This study used 20 working schools as research objects. A total of 234 participants were surveyed by sending a 30-question Google form via WhatsApp. The subjects of this study were students who received business education (students who received business theory and practice). The study was conducted from September to November 2024. The variables in this study are digital literacy (X1), entrepreneurship literacy (X2), entrepreneurship education (Z) and digital business skills (Y).

Table 2: Characteristics of Respondents Based on Parents' Occupation

No.	Student Parents' Job	Total	Percentage
1	Entrepreneur	54	25,6%
2	Civil Servant/Police/Military	2	0,7%
3	Private Employee	67	28,5%
4	Other	110	45,2%
	Total	234	100%

Source: Primary Data Processed by Researchers, 2024

Through the table above, it can be described that the other occupations of parents of students outside of work as traders, entrepreneurs, civil servants / police / TNI, and private employees are 110 respondents (45.2%), followed by the number of parents working as private employees as many as 67 respondents (28.5%), parents of students who work as entrepreneurs or entrepreneurs are 54 respondents (25.6%), and parents of students who work as civil servants / police / TNI are 2 respondents (0.7%). From this research data, it can be seen that the number of parents of SMK students in Malang district working as entrepreneurs or entrepreneurs is in third place.

Instrument Development and Data Analysis

The research instrument was adapted from previous research and literature review. The questionnaire was translated from English to Indonesian and adapted to the Indonesian context. The questionnaire was translated from English to Indonesian and adapted to the local context. Digital literacy (Imjai et al., 2024) was measured by four factors. Entrepreneurial knowledge (Setiawati et al., 2022) was measured by three items. Entrepreneurship education is measured by four factors (Wardana et al., 2020). Digital marketing skills are measured by three items (Jardim, 2021). In the survey, participants were asked to rate each statement from 1 (disagree) to 5 (agree). This study used Smart PLS 3.0 for partial least squares structural equation modeling (PLS-SEM).

RESEARCH RESULT

External Model Evaluation

PLS external standards were set to ensure reliable equipment. A model with stability is considered reliable when reliability (CR) and Cronbach's alpha > 0.05 (Hair et al., 2019). The results of this study showed that the CR value of each design ranged from 0.882 to 0.91. Significant average variance (AVE) was extracted as > 0.50, indicating good utility (Hair et al., 2019). This study achieved good validity with all

items above 0.50 and AVEs for all constructs ranging from 0.511 to 0.655. A cross-loading procedure was used to evaluate separation and association. The competitive value of all digital knowledge (X1), business knowledge (X2), business education (Z) and digital business skills ranged from 0.843 to 0.895 > 0.70, indicating discrimination.

Hypothesis Testing

Hypothetical modeling using structural equation modeling (SEM-PLS). The researchers used 234 bootstrap samples to display all t-statistics. As can be seen from Table 3, all seven hypotheses of this study met the criteria, with the t-value ranging from 2.523 to 7.018 out of 1.96.

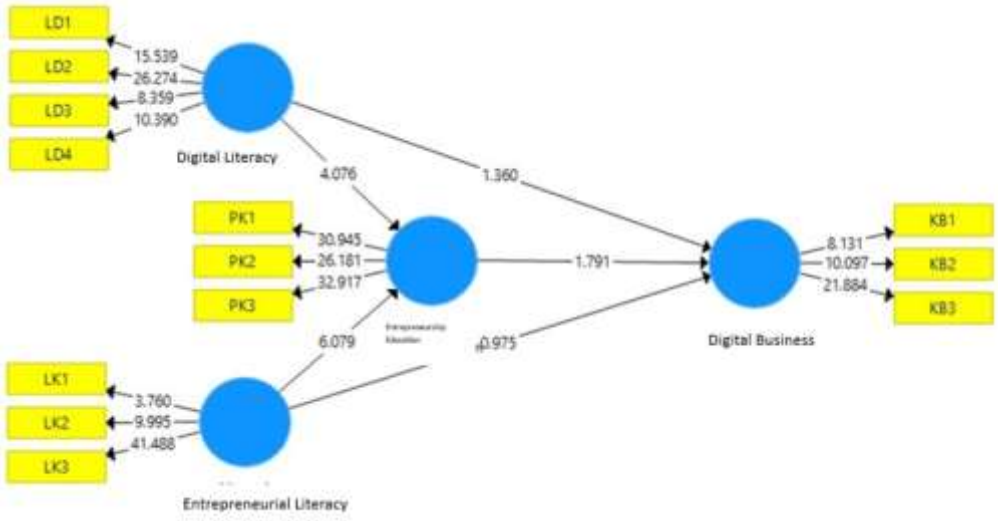

Figure 2. SEM-PLS Calculation Results

This study uses the R-Square (R2) model to show the accuracy of the prediction model. The coefficient of determination is used to determine the accuracy of the prediction and to show the effect of exogenous variables on endogenous variables. If the model covers 100% of the data and the value is close to 1, it can be said that the model explains the changes in endogenous variables (Fisher et al., 1995). The coefficient of determination obtained after processing the data using SmartPLS is as follows.

Table 3. R-Square Analysis Results

Variables	*R-Square*
Entrepreneurship Education	0.644
Digital Business Skills	0.620

Source: Primary Data Processed by Researchers, 2024

According to Table 3, the R-squared value of the business education variable (Z) is 0.644. In other words, 64.4% of the change in entrepreneurship education can be explained by digital literacy variables (X1) and entrepreneurial literacy variables (X2), while the remaining 35.6% is affected by other changes outside the standard. The R-squared value of the digital marketing skills variable (Y) is 0.620. This means that 62% of the variance in entrepreneurship skills can be explained by the digital literacy variable (X1), entrepreneurial literacy variable (X2) and entrepreneurship education variable (Z), while the remaining 38% can be explained by digital information knowledge (Z). The effect of knowledge on market knowledge (X1), market

knowledge (X2) and market knowledge (Z). Therefore, the higher the R-squared value, the greater the ability of the independent variables to explain the variance and therefore the better the model equation.

Table 4. Outer Model Estimation

Construct	Item	Outer Loading	α	CR	AVE
Digital Literacy	LD1.1	0.741	0.862	0.893	0.511
	LD1.2	0.726			
	LD2.1	0.729			
	LD2.2	0.700			
	LD3.1	0.770			
	LD3.2	0.726			
	LD4.1	0.616			
	LD4.2	0.699			
Entrepreneurial Literacy	LK1.1	0.725	0.852	0.885	0.563
	LK1.2	0.571			
	LK1.3	0.609			
	LK2.1	0.590			
	LK2.2	0.634			
	LK2.3	0.668			
	LK3.1	0.782			
	LK3.2	0.760			
	LK3.3	0.747			
Entrepreneurship Education	PK1.1	0.793	0.895	0.919	0.655
	PK1.2	0.763			
	PK2.1	0.826			
	PK2.2	0.798			
	PK3.1	0.839			
	PK3.2	0.833			
Digital Business Skills	KB1.1	0.665	0.843	0.882	0.521
	KB1.2	0.750			
	KB2.1	0.731			
	KB2.2	0.754			
	KB3.1	0.595			
	KB3.2	0.806			
	KB3.3	0.804			

Source: Primary Data Processed by Researchers, 2024

Table 5. Discriminant Validity

Variables	Digital Literacy (X1)	Entrepreneurship Literacy (X2)	Entrepreneurship Education (Z)	Digital Business Skills (Y)
Digital Literacy (X1)	0.715			
Entrepreneurship Literacy (X2)	0.798	0.780		

Entrepreneurship Education (Z)	0.731	0.783	0.809	
Digital Business Skills (Y)	0.718	0.730	0.725	0.722

Source: Primary Data Processed by Researchers, 2024

Table 6. Direct Effect Test

	Variable	Original Sample	T-*Statistics*	P-*Values*	Description
H_1	Digital literacy > entrepreneurship education	0.291	3.334	0.001	Accepted
H_2	Entrepreneurial literacy > entrepreneurship education	0.551	7.018	0.000	Accepted
H_3	Entrepreneurship education > digital business skills	0.320	3.019	0.002	Accepted
H_4	Digital literacy > digital business skills	0.280	2.523	0.012	Accepted
H_5	Entrepreneurial literacy > digital business skills	0.256	2.965	0.003	Accepted

Source: Primary Data Processed by Researchers, 2024

Table 7. Test of Indirect Effect

	Variable	Specific Indirect Effect	Description
H_6	Digital literacy > Entrepreneurship education > Digital business skills	0.093	Accepted
H_7	Entrepreneurial literacy > Entrepreneurship education > Digital business skills	0.176	Accepted

Source: Primary Data Processed by Researchers, 2024

DISCUSSION

Digital literacy is very useful and beneficial for business education. Digital literacy can improve students' ability to access various business-related information, business trends, and business ideas, and this information is easier and cheaper (Suryani and Chaniago, 2023). Prabawati (2019) Research studies on entrepreneurship education can improve entrepreneurial behavior in terms of identifying business opportunities, creating new ideas, and developing business copy (Prabawati, 2019). Yanti's (2019) findings also show something similar: digital literacy helps students create better business models that are

relevant to today's needs using social media, mobile applications, and e-commerce platforms (Yanti, 2019). As suggested by the Resource (RBV) theoretical framework, digital literacy is seen as an important resource that is not easy to obtain and therefore can provide competitive advantage to individuals and schools alike (Anggresta, Maya, and Septariani, 2022). Education is beneficial. Entrepreneurial literacy uses three indicators: business education, entrepreneurship, and business management to assess students' entrepreneurial abilities. The truth is that these three indicators have proven to be very useful and beneficial to the economic knowledge of students in Malang City. Another study by Mulyati (2023) showed that students with good business knowledge can more easily understand business knowledge and apply it to real practice. It also helps them develop good thinking and creativity, which is important in today's business world (Mulyati, 2023). Entrepreneurial knowledge can increase the effectiveness of business education and create people who are capable, innovative, and ready to compete in the business world (Cahayaningrum and Susanti, 2021).

Business education is very valuable and has great value in terms of digital business skills. These results show that students know that the business education they have received so far can improve digital business. Rahayu et al. (2023) stated that through business education, students are taught to use digital tools such as e-commerce platforms, social media, and business management to increase business efficiency and reach a wider market. Another study by Rusmana (2020) explains that business education can also help students understand the use of technology to find new opportunities, manage digital risks, and innovate business models. These results show that digital literacy is beneficial and useful for digital marketing. This is according to a study by Wono et al. (2023) showed the role of digital knowledge in developing digital business skills because this literacy provides a foundation for people to understand and use technology in business. Digital literacy includes the ability to use technology tools such as mobile applications, e-commerce platforms, social media, and digital tools to support business decisions (Wono et al., 2023). Similarly, Prabawati (2019) said that with good digital knowledge, people can more easily identify business opportunities, increase productivity, and develop better businesses. This enables companies to better respond to the needs of the dynamic market and innovate when competition intensifies (Prabawati, 2019).

Digital literacy has a significant impact on the development of digital business skills, making it an important element in gaining competitive advantage. Within the theoretical framework of the service-based view (RBV), digital literacy is an important part of the consulting strategy and is difficult to replicate because it involves the ability to understand, access and use technologies. Digital literacy is not only the use of technology, but also a deep understanding of how to integrate digital tools such as social media, mobile and e-commerce platforms into the business process (Firmansyah and Dede, 2022). With strong digital literacy, people can find new paths, increase business efficiency and create innovations related to business needs (Firmansyah et al., 2022). Therefore, digital literacy is an important foundation for digital business

skills that enable entrepreneurs to compete in a market increasingly driven by technological advances. Therefore, it can be said that the fifth hypothesis of this study is possible. This shows that information marketing is quite useful and beneficial for digital marketing. The results of this study are consistent with previous researchers who explained the impact of entrepreneurial knowledge on digital marketing. Hidayati et al. (2023) explain that business literacy is associated with the development of digital business skills because this literacy includes an in-depth understanding of business strategies, ideas, and practices in today's world. People with good business knowledge can identify business trends in the digital age, create new business ideas, and use technology to manage the business effectively (Hidayati et al., 2023).

Entrepreneurship education can be a mediating activity that affects digital business knowledge and business skills. Business education as a tool does not strengthen the effect of digital literacy on digital business skills, but reduces the effect of digital literacy on students' digital marketing skills. This is because there are no creative projects for students in business education. Students do not seem to have many opportunities to do digital business in school. Previous research by Zhang and Zhang (2024) indicated that digital knowledge requires business education to develop digital business to be competitive in the broader market. In general, digital literacy helps to lay the foundation for digital business development through business education. Through business education, students can develop the ability to innovate, create, be productive, and compete in the global market (Wang et al., 2023). . This shows that business education plays a role in developing students' digital business skills. Business education follows the trends of the time and emphasizes digital business studies. The results of this study are consistent with Kang et al. (2024) who believe that developing business knowledge through business education can help students gain knowledge of the digital economy affecting today. Business knowledge provides a basic understanding of business strategies such as business planning, risk management, innovation, and creativity in today’s digital age (Ballesteros-Sola and Magomedova, 2023). This understanding is important for developing students’ digital marketing skills. The skills that students need to develop include digital marketing, data analysis, and e-commerce (Mawson et al., 2023), while business education teaches girls how to use digital platforms to market products and services (Purwati et al., 2023).

CONCLUSIONS AND RECOMMENDATIONS

The result of this study shows that digital knowledge and business knowledge are useful and important for business education. Digital literacy and entrepreneurial skills are still very useful and beneficial for the digital entrepreneurship of working students in Malang district. Likewise, entrepreneurship education is also very valuable and beneficial for students' digital marketing skills. This study also conducted a discussion project on entrepreneurship education among working students in Malang district about the relationship between digital knowledge and digital entrepreneurial skills, as

well as the relationship between knowledge economy and digital economy. Therefore, all the views of SMK students in Malang district on the exam have a great and positive impact. Digital and business knowledge have a clear role to play in the development of business education and encourage students to acquire digital business skills. This indicates a need to develop students' desire to set up independent businesses. Students have the opportunity to share their ideas, experiences and skills in business through training programmers, workshops and opportunities to share their ideas, knowledge and skills in business.

ADVANCED RESEARCH

Future researchers can analyze the factors that influence digital business skills with other variables such as e-commerce education and other digital technologies. Future researchers can analyze the correlation of technological knowledge in improving students' entrepreneurial business skills. In addition, e-commerce education is very important in encouraging students to be enthusiastic in entrepreneurship lessons at school.

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