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Development of a Digital-Preneurship Measurement Instrument: Alignment Approach Through Project-Based Learning

Isnaini Sholihan Abdurrahman
Universitas Ahmad Dahlan, INDONESIA

Fitri Nur Mahmudah*
Universitas Ahmad Dahlan, INDONESIA

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Abstract: The purposes of this research are (a) to make an instrument to measure the achievement of project-based digitalpreneurship learning in students; (b) to describe the quality of the project-based digitalpreneurship learning achievement assessment instrument for vocational high school students; (c) to measure the competence and skills. This study employed to research and development as its methodology, using a combination procedure between Oriondo and Antonio and, Mardapi. The development procedure includes three stages: instrument design, instrument testing, and measurement. A total of 795 students who participated in the study at 5 vocational high schools in Yogyakarta's special region served as responders. Data analysis in this development uses the content validity of the formula Aiken V Index, confirmatory factor analysis establishes the construct's validity, and construct reliability. Measurement instrument development. Research findings that (a) the instrument is ready to be used in the measurement; (b) the quality of the project-based digitalpreneruship learning achievement assessment instrument for vocational high school students is well tested. This is evidenced by the validity test which has a high score >.8; The proof of construct validity in this study using CFA > .5; GOF chi-square value with a critical value of df = 289, X2 = 323, p-value with a critical value of .079, RMSEA with a critical value of RMSEA .019 (≤ .08), SMRM with a critical value of SRMR 0.030 (≤ .05), CFI with a critical value of CFI .990 (> .97), and an NFI with a critical value of NFI .989 (> .90); (c) the measurement results are identified in the process that needs to be improved again regarding the digitalpreneurship skills of vocational high school students.

Keywords: *Approach, digitalpreneurship, instrument development, PjBL, vocational student.*

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Introduction

A briefing on the skills, competencies, and knowledge needed for the workplace is given to pupils during the learning process of vocational high school. Vocational education graduates are working in accordance with competence, continuing to college, and/or being able to build a business. Independently, the development of new and innovative businesses is a skill that must be possessed by graduates (Nofrida et al., 2022). In this regard, of course, it requires qualified competent vocational education teachers (Cahyono et al., 2021). Teachers as facilitators in providing knowledge related to entrepreneurship (Asunka et al., 2017). Likewise, the involvement of industry as part of a partner institution of vocational education. And the ability of adaptive students in the era's development (Qiao & Hua, 2019). Industries that have partnerships with vocational high schools are the basis for determining whether teachers are able to develop students' skills through project-based learning (Mahmudah et al., 2022). Of course, this process requires alignment continuity (Kolvereid & Moen, 1997).

Entrepreneurship of vocational high school students is based on the mindset (Ahmadi, 2022). Students who have an independent mindset will find it easier to develop skills (Vasiliadis & Poulios, 2007). This is one benefit of teacher-led instruction that takes place. Product-based learning is an important part of learning to improve student entrepreneurship skills (Basri et al., 2019). Creativity is also a potential that can be owned by students (Tariq et al., 2015). This is due to the influence of critical thinking. The goal is for students to demonstrate that starting a business is simple and full of opportunities for millennials to use their skills (Genoveva et al., 2019).

Project-based learning in the context of alignment between vocational high schools and industry requires instruments used in measurement and assessment that can be used by both parties. Measurement of learning in the classroom aims

* **Corresponding author:**
Fitri Nur Mahmudah, Universitas Ahmad Dahlan, Kota Yogyakarta, Daerah Istimewa Yogyakarta 55166, Indonesia. ✉ fitri.mahmudah@mp.uad.ac.id

to be able to determine the skills and abilities of students (Lysaght et al., 2017). Several factors should be taken into account to guarantee that the assessment for learning is successful (Mahlambi, 2021).

The development of this instrument does not yet exist. Previous research is more on the development of entrepreneurship in elementary school students (Sontay et al., 2019). Previous studies were restricted to looking into the idea of entrepreneurship. The utilization of technology in the learning process and the process of enhancing abilities through entrepreneurial learning are the main foci of this study's attention. This study aims to provide high-quality project-based digitalpreneurship learning that will lead to the creation of alignment measurement tools.

Digitalpreneruship is an understanding that is developed through digital and entrepreneurship. Digital entrepreneurship is a technological advancement in infrastructure that creates varied prospects for entrepreneurs (Baig et al., 2022 ; Martinez Dy et al., 2018). Entrepreneurship online has an impact on socioeconomic systems and inevitably impacts how business is conducted and how people communicate in the context of entrepreneurship (Satalkina & Steiner, 2020). As more digital competencies are needed to innovate, there is an increasing need for digital entrepreneurship education (Young et al., 2020). Digital entrepreneurship is a modern, highly relevant sub-specialty of entrepreneurship that offers a growing number of platforms for pursuing entrepreneurial career alternatives (Mir et al., 2022; Nambisan, 2017). The usage of digital devices in education and is learning process needs to be used as a policy regulation (Dong, 2019). Digital-technologies feature prominently in digital entrepreneurship (Giones & Brem, 2017; Recker & von Briel, 2019).

Considering what the aforementioned authorities have said, it may be said that digital-preneurship is the development and use of technology for vocational high school student projects that are in line with industry needs. This alignment is related to increasing students' competencies and skills in facing the development of the era. Digital as part of the use of technology in skill development. The purposes of this research are (a) to make an instrument to measure the achievement of project-based digitalpreneurship learning in students; (b) to describe the quality of the project-based digitalpreneurship learning achievement assessment instrument for vocational high school students; (c) to measure the competence and skills. The things that are of concern in developing these competencies and skills are teachpreneurship, student products, entrepreneur plans, edu-digital preneurship, and E-digitalpreneurship. This idea is in line with the demands of the Indonesian job market to raise the standard of graduates from vocational high schools. At the micro level at the vocational school level, digitalpreneurship is an implementation developed by schools to produce quality graduates. Meanwhile, at the macro level, digital entrepreneurship is a policy and the Indonesian government can become a manifestation of technological advances, changes in educational regulations, especially on entrepreneurship-based learning, demographic trends, and socio-cultural changes in line with the development of the era. In detail, this conceptualization framework can be seen in Figure 1.

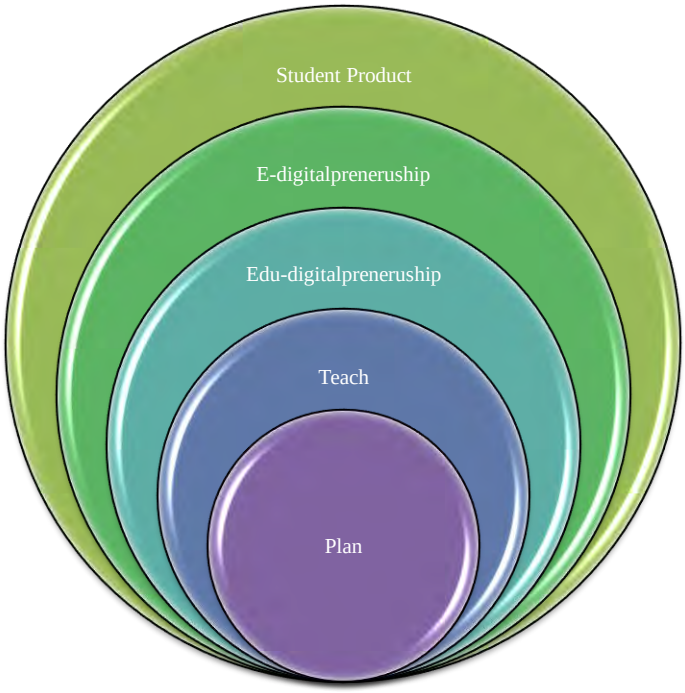

Figure 1. Digitalpreneurship Conceptualization Framework
(Source: Compiled by Author)

Methodology

Research Design

This Research and Development uses a combined approach of Oriondo and Dallo-Antonio (1984) dan Mardapi and Kartowagiran (2011) which includes 3 (three) stages, namely (a) the design and preparation of the assessment instrument; (b) testing the instrument; and (c) measuring the skills. The setting for this study is in the Special Region of Yogyakarta, especially in vocational high school which get the title of center of excellence (CoE) in 2021 and 2022, respectively, namely 5 (five) vocational high school representing each district and city. The purpose of this research and development is to make it easier for teachers who are in charge of entrepreneurship subjects to assess project-based digital entrepreneurial learning outcomes.

Sample, Data Collection, and Instrument

The sample of this research involved 795 students. The characteristics of the respondents in this study were vocational high school students, especially those selected from the center of excellence. The reason for using vocational high school students is to be able to measure entrepreneurial competencies and skills as a fundamental part of self-development that must be possessed by vocational high school graduates. Collecting data using a questionnaire. A Likert scale was used to create the questionnaire. This instrument was developed from relevant theories related to digitalpreneurship. These in-depth studies on digital entrepreneurship were then synthesized and used as a reference in preparing the instrument. So that the development of this instrument was carried out by the researchers themselves based on various relevant understandings. Instrument development consists of 5 (five) components.

The first component is teachpreneurship which is related to the digitalpreneurship learning process given by teachers to vocational high school students. The second component is a student product which focuses on measuring students' skills and competencies so that they have both innovative products for the development and new products that have not been sold. The third component is related to the entrepreneur plan which refers to the readiness of teachers and students in developing entrepreneurship. The fourth component is edu-digital preneurship which focuses on digital content and development used in the entrepreneurial process. The last component is e-digitalpreneruship management, which is a management process to optimize electronics and digital use in the entrepreneurship education. Instruments were given to students through g-forms to test validity and reliability as well as measurements. Table 1 lists the test devices employed in research and development.

Table 1. Instruments Development

No.	Components	Indicator	Items	Total
1	Teachpreneurship	Mindset	1, 2	2
		Project-based learning	3, 4	2
		New product	5, 6	2
		Interaction and Collaboration	7, 8	2
2	Student Product	Problem-solving skill	9	1
		Innovation of existing the product	10	1
3	Enterpreneur Plan	Market research	11, 12	2
		Self-management	13, 14	2
4	Edu-digital Preneurship	Content-based preneur	15, 16	2
		Promotion	17, 18	2
		Technological development	19, 20	2
		Application Utilization	21, 22	2
5	E-digitalpreneruship Management	Self-Affirmation Motives	23, 24	2
		Individual Sustainability Competencies	25, 26	2
	Total			**26**

Data Analysis

This analysis is used to produce quality instruments. This aims to be used in measuring the alignment of vocational education through the development of learning in entrepreneurship education. The quality of the instruments is produced through various stages. The following is an analysis of the study's data:

Content Validity

By consulting expert opinion, content validity is carried out to evaluate the test items as a whole. According to Mardapi (2008) validity is defined as a test conducted to test the test items as a whole. Validation is done by proving between the grids that have been prepared and the items that have been prepared. The assessment is done by giving a mark on

the validator's assessment. The results of this validation aim to be evidence that the content of the test is in accordance with the material to be measured and tested. The validity formula used is the Aiken V Index (Aiken, 1985).

Construct Validity

Construct validity in this study aims to test measurable indicators and or measure certain constructs. The construct validity used the confirmatory factor analysis (CFA) technique using the LISREL version 8.80 program. The purpose of the CFA in this study was to evaluate the applicability of the constructed model for assessing vocational students' entrepreneurial skills. The chi-square, which gauges model fit, displays the results of the model fit test. The chi-square, which gauges model fit, displays the outcomes of the model fit test. The model has a perfect fit when the chi-square value is 0, which is .0 at a .05 p-value, the chi-square probability is anticipated to be significant (Toit & Toit, 1939). In this CFA analysis, it can also be seen the results related to the criteria. In particular, the deviation of parameter values in a model with a population covariance matrix is measured by the Root Mean Square Error of Approximation (RMSEA) value. The RSMEA value of 0.08 denotes a model that fits, while 0.08 denotes a model that does not fit (Toit & Toit, 1939).

Construct Reliability

Construct Dependability is employed, as well as Average Variance Extracted (AVE). in this study to assess the instrument's reliability. In order to validate a measurement model, construct validity is crucial. Convergent validity, discriminatory validity, face validity, and nomological validity are only a few examples of construct validity's various components. Convergent validity can be established using construct reliability and variance-extracted estimates. When the average variance recovered for a construct is greater than the common variance between constructs, discriminant validity is supported (Hair et al., 2016). Construct reliability, a measurement of the internal consistency of the variable's indicators, reveals how built a variable is. The entire variance of the indicators that the created variables have retrieved is measured by the variance extracted. Construct reliability and variance extraction tests for each latent variable are 2 methods for evaluating the measurement model's dependability. the sum of the squared values of the standard loading divided by the sum of the squared values of the sum error plus the standard loading yields the construct dependability value. The construct reliability formula is as follows:

$$Construct\ Reliability = \frac{(\Sigma Std.\ Loading)^2}{(\Sigma Std.\ Loading)^2 + \Sigma \varepsilon_j}$$

The standardized loading value for each indication is used to calculate the standard loading value. While each indicator's measurement mistake causes an error (e) (1- Loading2). If the value is greater than .70, the construct reliability test cut-off value is accepted; nevertheless, if the study is still explanatory, a number less than .7 is still acceptable.

Measurement

The test of practicality in this study was conducted to make it easy for vocational students to measure digitalpreneruship skills. Criteria meet practicality, among others, the instrument has been validated by an expert, the user can use the instrument, and the user can use it easily (Plop & Nieveen, 2007). The practicality test in this study assessed the digitalenterpreneruship skills of vocational students whose questionnaires were distributed via google form to all vocational students. The practicality of this instrument can be assessed if 60%.

Table 2. Practical Analysis of College Student

Questionnaire score	Criteria
$X \geq 48$	Very High
$48 > X \geq 36$	High
$36 > X \geq 24$	Moderate
$24 > X \geq 12$	Low
$X < 12$	Very Low

Results

Instrument Content Validity

Seven (seven) expert judgments were used to test the instrument. A Likert scale is used to evaluate candidates. The Aiken V index algorithm is used to calculate the assessment's outcomes. Table 1 displays the findings of the calculation of content validity.

Table 3. A score of Content Validation Test Results

No	Rater							S_1	S_2	S_3	S_4	S_5	S_6	S_7	Σs	n(c-1)	V	Category
	1	2	3	4	5	6	7											
1	4	4	4	5	5	4	5	3	3	3	4	4	3	4	24	28	.857	High
2	4	5	5	4	5	3	5	3	4	4	3	4	2	4	24	28	.857	High
3	4	5	5	5	5	4	4	3	4	4	4	4	3	3	25	28	.893	High
4	3	5	5	4	3	5	5	2	4	4	3	2	4	4	23	28	.821	High
5	4	4	4	5	4	5	5	3	3	3	4	3	4	4	24	28	.857	High
6	4	5	5	5	4	4	5	3	4	4	4	3	3	4	25	28	.893	High
7	3	5	5	4	5	5	3	2	4	4	3	4	4	2	23	28	.821	High
8	3	5	5	5	4	5	5	2	4	4	4	3	4	4	25	28	.893	High
9	3	5	5	4	5	4	4	2	4	4	3	4	3	3	23	28	.821	High
10	4	3	5	3	5	5	5	3	2	4	2	4	4	4	23	28	.821	High
11	4	5	5	3	4	5	3	3	4	4	2	3	4	2	22	28	.786	Medium
12	3	4	5	5	4	4	5	2	3	4	4	3	3	4	23	28	.821	High
13	4	5	5	4	3	4	5	3	4	4	3	2	3	4	23	28	.821	High
14	3	5	5	5	5	3	5	2	4	4	4	4	2	4	24	28	.857	High
15	5	3	5	5	4	5	3	4	2	4	4	3	4	2	23	28	.821	High
16	5	5	3	4	4	4	5	4	4	2	3	3	3	4	23	28	.821	High
17	5	5	5	3	5	4	4	4	4	4	2	4	3	3	24	28	.857	High
18	3	5	5	5	5	5	5	2	4	4	4	4	4	4	26	28	.929	High
19	5	5	3	5	5	5	2	4	4	2	4	4	4	1	23	28	.821	High
20	3	5	5	5	4	4	5	2	4	4	4	3	3	4	24	28	.857	High
21	5	5	5	3	4	5	4	4	4	4	2	3	4	3	24	28	.857	High
22	5	4	3	5	5	4	5	4	3	2	4	4	3	4	24	28	.857	High
23	3	4	5	5	4	5	5	2	3	4	4	3	4	4	24	28	.857	High
24	3	5	5	5	4	4	5	2	4	4	4	3	3	4	24	28	.857	High
25	5	3	5	5	5	5	3	4	2	4	4	4	4	2	24	28	.857	High
26	3	3	5	4	5	5	5	2	2	4	3	4	4	4	23	28	.821	High
Average																	**.848**	**High**

Confirmatory Factor Analysis (CFA)

The proof of construct validity is part of factor analysis used to test the extent to which each indicator reflects the dimensions of a construct (Kerlinger & Pedhazur, 1987). CFA is different from EFA (Exploratory Factor Analysis) which is used to determine how many components there are to be measured and determine the grouping of items that measure certain factors. In CFA, researchers first form a model, determine the number of factors (latent variables) and determine items (observable variables) that measure certain factors. Hair et al. (2016) the value of the standardized loading factor must be between 0.5 and 0.7, ideally. The uniform loading factor value for this study is more than 0.5. The following table shows the findings from the construct validity proof.

Table 4. Results of CFA Analysis

Indicator	Item	Loading Factor	Critical Value	Decision
Teachpreneruship	T1	.855	.5	Valid
	T2	.634	.5	Valid
	T3	.92	.5	Valid
	T4	.872	.5	Valid
	T5	.76	.5	Valid
	T6	.931	.5	Valid
Student Product	S1	.678	.5	Valid
	S2	.709	.5	Valid
	S3	1.1	.5	Valid
	S4	.834	.5	Valid
Enterprenur Plan	E1	.733	.5	Valid
	E2	.806	.5	Valid
	E3	.729	.5	Valid
	E4	.699	.5	Valid
Edu-digital Preneurship	Ed1	.773	.5	Valid
	Ed2	.688	.5	Valid

Table 4. Continued

Indicator	Item	Loading Factor	Critical Value	Decision
E-digitalprenenurship Management	Ed3	.811	.5	Valid
	Ed4	.655	.5	Valid
	Ed5	.718	.5	Valid
	Ed6	.748	.5	Valid
	EdM1	.688	.5	Valid
	EdM2	.783	.5	Valid
	EdM3	.815	.5	Valid
	EdM4	.908	.5	Valid
	EdM5	.645	.5	Valid
	EdM6	.652	.5	Valid

Table 4 is a table of CFA analysis results. Table 4 analyzes 5 indicators which are divided into 26 items. Table 4 shows the loading factor on all items for each indicator that exceeds the critical value. Based on these results, the 26 items that have been compiled are proven to be valid. Other results can also be seen through the CFA Path-diagram image. Figure 2 below shows these outcomes in more detail.

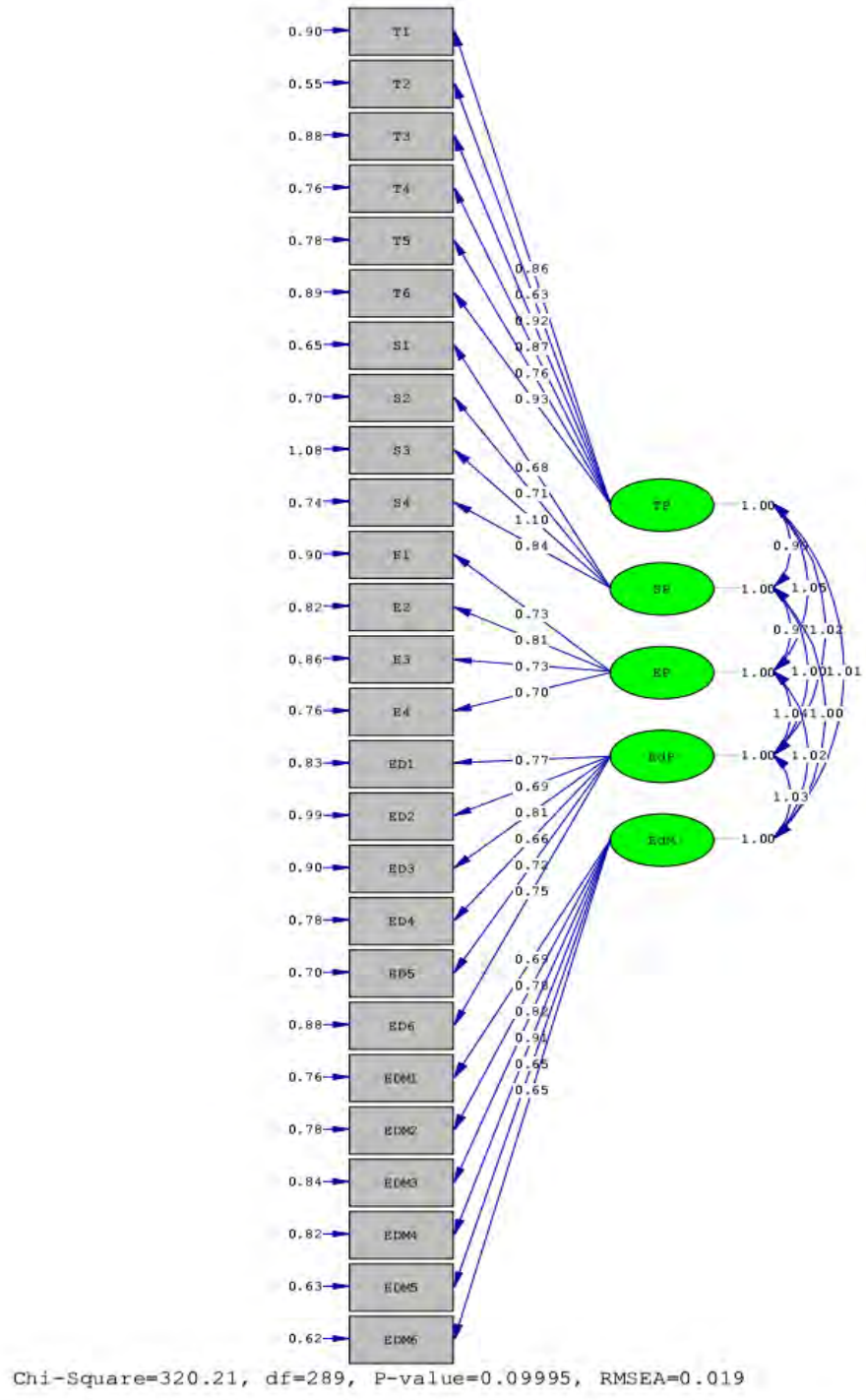

Figure 2. CFA Path Diagram

Figure 2 shows the same results as the loading factor in Table 4. Figure 2 also shows that there is no red loading factor score. As for this matter, it shows that all of the items compiled are proven to be valid.

The Goodness of Fit (GoF)

The GOF chi-square measure was used in this study with a critical value of 0 X2 2df, a p-value with a critical value of .05 X2 1.00, a standardized root mean residual (SMRM) with a critical value of SRMR .05, A normed fit index (NFI) with a critical value of NFI and a comparative fit index (CFI) with a critical value of CFI > 0.97 were used (Hair et al., 2016). Table 2 below is the result of the GOF that has been carried out.

Table 5. Goodness of Fit

GOF	Critical value	Result	Decision
Statistics X^2	$0 \leq X^2 \leq 2df$	df = 289 X^2 = 323	Fit
p-Value	$0{,}05 \leq X^2 \leq 1.00$	.079	Fit
RMSEA	RMSEA ≤ .08	.019	Fit
SRMR	SRMR ≤ .05	.030	Fit
CFI	CFI > .97	.990	Fit
NFI	NFI > .90	.989	Fit
TLI	TLI ≥ .91	.977	Fit
NFI	NFI ≥ .91	.991	Fit
AGFI	AGFI ≥ .91	.989	Fit

The result of the GOF size is shown in Table 5. The findings in table 5 demonstrate that the GOF chi-square, P-value, RMSEA, SRMR, CFI, and NFI measures of happiness fit within the results of the CFA instrument. According to the aforementioned results, the device assembled displays all GOF fit sizes. As a result, it may be claimed that the instrument developed matches the model utilized because this demonstrates that the overall sample covariance matrix in each sample is not significantly different from the estimated covariance matrix.

Construct Reliability

Construct Dependability in this study to assess the instrument's reliability. Measures to evaluate an instrument's construction reliability include construct reliability (CR) and mean extraction of variance. According to Heir et al, the accepted CR and AVE values are 0.5 and ideally 0.7. In this study, the CR and AVE values used as critical values are 0.5. The following are the results of the estimation of the reliability of the constructs that have been carried out.

Table 6. Estimation Results of Construct Reliability

Indicator	Item	Loading Factor	CR	AVE	Critical Value	Decision
Teachpreneruship	T1	.855	.932	.697	.5	Reliable
	T2	.634				
	T3	.92				
	T4	.872				
	T5	.76				
	T6	.931				
Student Product	S1	.678	.907	.717	.5	Reliable
	S2	.709				
	S3	1.1				
	S4	.834				
Enterprenur Plan	E1	.733	.831	.552	.5	Reliable
	E2	.806				
	E3	.729				
	E4	.699				
Edu-digital Preneurship	Ed1	.773	.875	.539	.5	Reliable
	Ed2	.688				
	Ed3	.811				
	Ed4	.655				
	Ed5	.718				
	Ed6	.748				
E-digitalprenenurship Management	EdM1	.688	.886	.569	.5	Reliable
	EdM2	.783				
	EdM3	.815				
	EdM4	.908				
	EdM5	.645				
	EdM6	.652				

The results of dependability estimation are shown in Table 6 above. According to the table above, the combined value of CR and AVE is higher than the crucial value. This demonstrates that the loading factor for the instrument components as a whole has been deemed reliable.

Measurement

The next step is to use this instrument to assess entrepreneurial skills as project-based learning outcomes for students in vocational high schools when it has been deemed valid and reliable. The students who were sampled were then given the instrument.

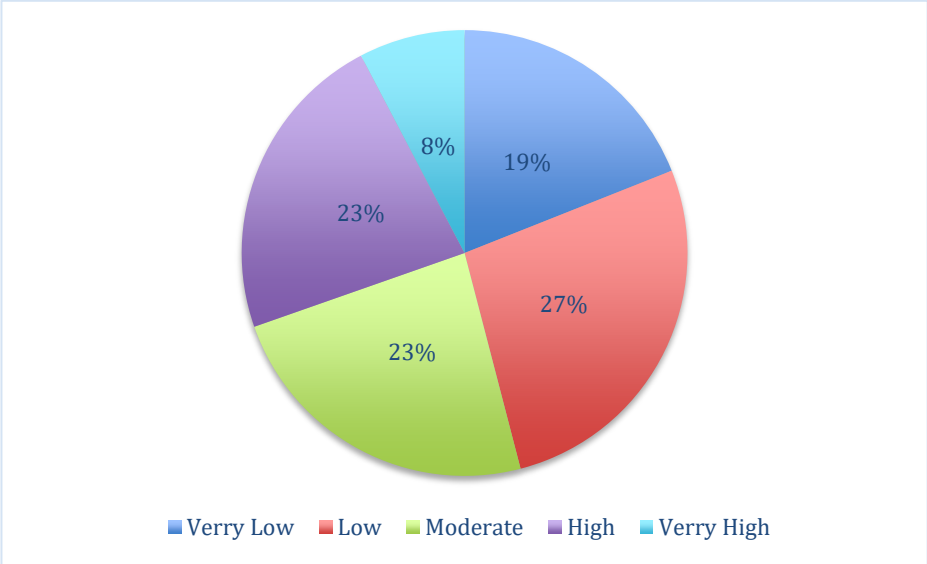

Figure 4. Percentage of Measurement Results

In Figure 4 it can be explained that the image is the result of measuring instruments developed in entrepreneurship learning at vocational high schools using digital and understanding digital operations. Vocational high school students still need increased skills in digitalpreneurship. It can be seen that the value of the instrument measurement is the highest with a score of 81, which means that the student's skills are still low. The value of the categorization used in this study can be seen in Figure 5.

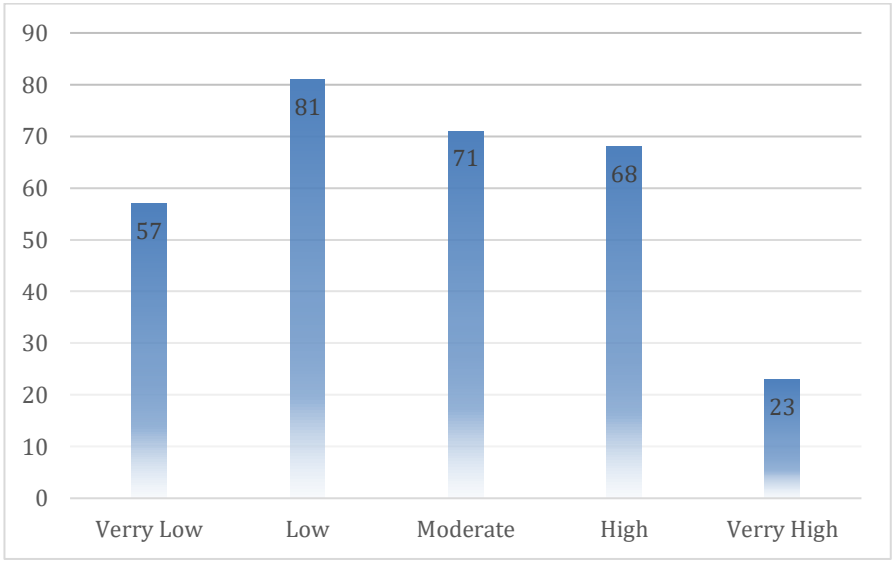

Figure 5. Score of Measurement Results

Discussion

According to the findings of the study above, it can be said that the development of instruments that are ready to be used for measuring and assessing is based on the validity and reliability of the research construct. The analysis of local dependency, which establishes dependent items based on the standardized residual correlation value, was performed to determine the correlation value for the items used (Abdul Raof & Musta'amal, 2021). We used three different types of factor analysis: confirmatory and reliability (Li & Li, 2021). There are many tools available to gauge purpose, whether in the overall population or specifically among college students (Anghel et al., 2021). A custom-created test can be used to gauge pupils' abilities in accordance with the established grid (Susantini et al., 2022). The generated instrument has a model that fits the concept developed using CFA (Subarkah et al., 2022).

The alignment instrument development construct consists of five indicators, namely teachpreneurship, entrepreneur plan, student product, edu-digital preneurship, and E-digitalpreneurship Management. In *teachpreneurship***,** vocational high school teachers emphasize instilling a mindset that the potential in students is developed by the teacher through a project-based learning approach. So that students will produce new products related to entrepreneurship which are carried out by way of interaction and collaborations. This is in line with the results of research which says that collaboration in learning is a form of alignment in order to improve quality through the development of teaching materials from vocational high schools to industry (Abdurrahman et al., 2023). The second indicator is related to the *entrepreneur plan* which is a basic part of students developing digital preneurship skills. The planning that needs to be done is by means of market research and self-management. So that it will produce products from student (*student product*) abilities in the form of soft skills, namely problem solving skills and hard skills in the form of innovation of the existing product. In relation to this, it is important for teachers and students to learn from each other through learning in the classroom and outside the classroom (*Edu-digital preneurship*) which will produce skills in promotion and technological development through various market places and applications that can be used to market products and services. obtained through learning in vocational high school. In the end, *E-digitalpreneurship management* is needed by all elements of entrepreneurship education developers (teachers) and paravocational high schools (students/graduates) in application utilization, self-affirmation motives, and individual sustainability competencies. Instrument development is used to measure the achievement of learning quality (Bodzin et al., 2020). On an ongoing basis, the development of this instrument can be used as a basis for teachers in vocational high school to develop instructional software. Development of technology programs for students in project-based learning skills using digitalpreneruship. It is possible that the design of instructional design development can be utilized by all students not only in Indonesia but also in vocational high school throughout the world. The aim is to create an instructional design for gifted and talented kids that is learner-centered and uses tool-focused programming pedagogies, and to research how this design affects the teaching process (Avcu & Er, 2020).

Conclusion

The study's findings and the discussion above can be used to deduce that (1) the instrument for measuring project-based digitalpreneurship learning outcomes for students is ready to be used. This is evidenced by the step-by-step testing that makes the instrument good; (2) the quality of the project-based digitalpreneruship learning achievement assessment instrument for vocational high school students is well tested. This is evidenced by the validity test which has a high score of >.8; The proof of construct validity in this study using CFA has a standardized loading factor value > .5; GOF chi-square value with a critical value of df = 289, X2 = 323, p-value with a critical value of .079, Root Mean Square Error of Approximation (RMSEA) with a critical value of RMSEA .019 (≤ .08), standardized Root Mean Residual (SMRM) with a critical value of SRMR .030 (≤ .05), Comparative Fit Index (CFI) with a critical value of CFI 0.990 (> .97), and a Normed Fit Index (NFI) with a critical value of NFI .989 (> 90); (3) measuring the competence and skills of vocational high school students with the result that digitalpreneurship skills still need development. The results of this study indicate that the development instrument is ready to be used to take measurements in vocational school students wherever they are. This instrument has been tested and has high validity, so it can be used to measure graduates' competencies in developing themselves through entrepreneurship. The contribution of this research is part of improving the quality of graduate students through entrepreneurial competence.

Recommendations

The results of this study are recommended for all vocational high schools, namely for (a) teachers who have businesses and who teach entrepreneurship learning. Teachers are at the forefront of developing students' skills and competencies, so this instrument needs to be used in measuring and assessing; (b) students who are ready in self-development to work independently with entrepreneurship and utilize technology to support the business that is being run. Digitalpreneruship is a necessity for vocational high school graduates. So this instrument becomes the right basis for self-evaluation in digital readership. Recommendations for further research are to evaluate entrepreneurship programs developed through learning in vocational high schools. Likewise with regard to research and development to obtain the right digital preneurship learning model in order to provide the best learning for students so as to produce graduates who are qualified, highly competitive, have independence, and collectively can minimize the occurrence of open unemployment in Indonesia.

Limitations

Basically, this instrument is arranged systematically according to the objectives to be achieved. This also includes respondents and research sites. However, these results cannot be generalized to project-based learning for all subjects in vocational high school. Because the results of this study are only to measure and assess project-based learning on digitalpreneurship learning outcomes.

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Contribution Statement of Authorship

Abdurrahman: Paper concept and collecting the data; Mahmudah: Critical revision of manuscript, supervision, analysis, writing the article, and final approval.

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