Development of Tpack-Based in Creative Products and Entrepreneurship to Improve the Learning Outcomes of Office Automation Governance at SMK Al-Ma'sum Stabat

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Abstract. Learning resources are an important component in the learning process and greatly affect the quality of the process and student learning outcomes. Based on the results of field observations, it was found that there were problems with the limited learning resources available in schools, especially the unavailability of textbooks for students, so teachers could only use the teacher's handbook in the learning process which led to low student learning outcomes. The purpose of this research is to develop and implement learning resources in the form of TPACK-based E-books on creative products and entrepreneurship subjects to improve learning outcomes for class XII students majoring in office management automation at SMK Al-Ma'sum Stabat. This research is a research and development with the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). This research was conducted at SMK Al-Ma'sum Stabat, with a population in class XII majoring in office management automation. The results of this study are based on assessments carried out by validation experts and user responses obtained an average percentage of 88,38% in the "very feasible" category so it is concluded that the developed TPACK-based E-book meets the eligibility requirements (valid) to be used as a learning resource creative product and entrepreneurship subjects in class XII marketing promotion media materials majoring in office management automation. The average learning outcomes of the experimental class was 85.00 and that of the control class was 71.35, obtained by the independent t-test with sig. 0,00 < 0,05 and the media can help students understand the material presented. So it can be concluded that the TPACK-based E-book on creative products and entrepreneurship subjects that was developed is effectively used to help improve the learning outcomes of class XII students majoring in office management automation at SMK Al-Ma'sum Stabat.

Keywords: Creative Product and Entrepreneurship Subject E-Book, TPACK, Learning Outcomes.

1 Introduction

Anything or any combination of materials that students can use alone or in groups to enhance instruction and study in order to meet learning objectives more effectively and efficiently is referred to as a learning resource [1]. The quality of students' learning processes and results is significantly influenced by their learning resources [2]. It is anticipated that the utilization and provision of learning materials in schools will provide knowledge to raise the caliber of

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student learning outcomes and processes. Based on initial observations, researchers found problems with the learning outcomes of students at AL-Ma'sum Stabat Vocational School class This can be seen from the results of the report cards in the recapitulation table of learning outcomes for class XI students majoring in Office Management Automation at SMK Al-Ma'sum Stabat below:

Table 1. Report Card Scores for Creative Products and Entrepreneurship Subjects in Class XI Office Management Automation Department TA. 2022/2023

Class	The Number of Students	KKM	Not Pass	Percentage	Passed	Percentage
XII OTKP-1	28		15	54%	13	46%
XII OTKP-2	26	75	15	58%	11	42%
Amount	54		30	56%	24	44%

Table 1 shows that just 44% of pupils in class XI achieved higher scores than the KKM in the subjects of entrepreneurship and creative products. This demonstrates the poor learning outcomes of the pupils and suggests that the learning process in that class is flawed. According to an interview with the SMK Al-Ma'sum Stabat subject teacher for creative products and entrepreneurship, the issue with the educational process that results in low student learning outcomes is the limited learning resources available at school, particularly the lack of student textbooks, which leaves teachers with no choice but to use the teacher's handbook. The learning method used by teachers at school is the traditional learning method by recording material on the blackboard or dictating the material to students, then students record it in their respective books. This method can take a long time and slow down the learning process. These conditions can have an impact on students' ability to gain an adequate understanding of the material being taught.

In order to address the issue of low learning results, academics were forced to think creatively and create e-books as a kind of learning resource. Using e-books is one method of leveraging technology-based learning materials to try to enhance student learning outcomes, according to Parawansa [3]. E-books are a kind of electronic book that can be read on tablets and smartphones, among other electronic devices [4]. Researchers developed E-books with the most appropriate approach, namely the TPACK (Technological Pedagogical Content Knowledge) approach that students can access through their smartphones. Jilah Safitri and Rizky Sugiharta contend that the TPACK approach is the best strategy for enhancing learning outcomes with technology [5]. Thanks to Koehler and Mishra's usage of Shulman's (1986, 1987) conceptual framework for Pedagogical Content Knowledge (PCK) [6], TPACK gained widespread recognition in 2006. The phrase "technology-pedagogy-content knowledge," or "TPACK," is used in the workplace to describe how well teachers integrate ICT-based learning [7]. TPACK is the result of the combination of three distinct types of fundamental knowledge: technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK). technical content knowledge (TCK), technical pedagogical knowledge (TPK), pedagogical content knowledge (PCK), and technological pedagogical content knowledge (TPACK) are the products of the combination of these three fundamental types of information [8].

The success of earlier researchers in creating e-books served as the foundation for this advancement. Baihaqi et al.'s research revealed that the use of TPACK-based e-books in

physics classes was deemed legitimate, with an average score of 3,88 [9]. With an average score of 3,26, Siregar, Kairuddin, and Mansyur's other study demonstrated that the use of TPACK-based E-books was deemed legitimate [10]. Additionally, Putri, Usman, and Sakmal conducted research in which the validator deemed the results of TPACK-based E-book research on science education valid, And a very good category average of 85,50% [8].
The creation of TPACK-based e-books is intended to serve as a learning resource for instructors and students throughout the educational process, because the TPACK-based E-books developed by researchers use the Canva application which makes it easier for teachers to design learning resources with attractive designs that can increase participant interest. students in learning activities and Anyflip makes it easier for teachers to create and publish e-books and is easy for students to access. TPACK-Based E-Book Development in Creative Products and Entrepreneurship Subjects to Improve Learning Outcomes for Class XII Students Department of Office Management Automation at SMK Al-Ma'sum Stabat is therefore a development research project that interests scholars.

2 Research Method

Given that it utilizes the ADDIE model created by Reiser and Mollenda, this project qualifies as research and development (R&D). The analysis, design, development, implementation, and evaluation phases comprise the five primary phases of this methodology. Interviews are conducted in order to analyze the problem, needs, and student characteristics during the analysis process. Then, in the design step, activities are carried out, namely formulating the material and determining the media design to design an e-book packaged with the Canva and Anyflip applications. Using the Canva program, a draft of the e-book is created throughout the creation stage and uploaded to the Anyflip application. From there, it is validated by media, design, and material specialists until it is deemed viable and valid. The following phases in the implementation process involve testing students to determine whether the e-book is feasible and reviewing the e-book up until the point at which a product suitable for educational use is produced.
The research was conducted at SMK Al-Ma'sum Stabat which is located at Jln. Sei Batang Panggang No.4 Stabat, Langkat Regency, North Sumatra, Postal Code 20814. The odd semester of the school year 2023–2024 was used for this investigation. The participants in this study were Class A TPACK-based e-book on topics related to entrepreneurship and creative products serves as the research object in the interim. Three different ability levels—low, medium, and high—of students in class XII OTKP-2 were selected to serve as individual test participants. In the small group trial, nine students with three different ability levels—high, medium, and low—were involved. Twenty-eight students from class XII OTKP-1 with varying abilities—high, medium, and low—as well as teachers' assessments of creative product and entrepreneurship subjects were included in the field trial. The evaluation of subject teachers, validation results from specialists in media, design, and content, and usage trials including field, small-group, and individual testing were used to determine the viability of the e-book under development. The Likert scale, which had a range of 1 to 5, was utilized to analyze the e-book assessment tool in this study descriptively. The scores assigned to each response on the scale were as follows [11]:

Table 2. Likert Scale Guidelines

No	Score	Information
1.	Score 5	Totally agree/always/very positive
2.	Score 4	Agree/good/often/positive
3.	Score 3	Undecided/ sometimes/ neutral
4.	Score 2	Disagree/almost/never/negative
5.	Score 1	Strongly disagree/never

The average method used in the score analysis above is to divide the entire data value by the total number of data points [12].

$$\bar{X} = \frac{\Sigma X}{n} \quad (1)$$

Information :
$\bar{X}$ = Average value
X = Number of validator assessment answers
n = Number of validators

Table 3 below lists the variety of e-book eligibility requirements utilized in study validity [13]:

Table 3. E-Book Eligibility Criteria

No	Achievement Level	Qualification	Information
1.	81-100%	Very good	Excellent; need no adjustment
2.	61-80%	Good	Good, no need for editing
3.	41-60%	Pretty good	Unsuitable; it should be changed
4.	21-40%	Not good	Unsuitable; it should be changed
5.	<20%	Very Not Good	Extremely improper; has to be changed

Testing the effectiveness of the ebook is carried out by:

1) Normality Test

Finding the data distribution in a single variable that will be used in the study is the goal of the data normality test. Normal distribution data is a good and relevant type of data to support these research methods. The Kolmogorov-Smirnov test is the one used to determine normalcy. The following is the Kolmogorov-Smirnov formula [14]:

$$KD = 1{,}36\ \frac{\sqrt{n1+n2}}{n1\ n2} \quad (2)$$

Information :
KD = Number of Kolmogorov-Smirnov sought
$n1$ = Number of samples obtained
$n2$ = Expected sample size

If the significant value of the data is greater than 0.05, it is considered normal. On the other hand, the data is considered abnormal if the significant value is less than 0.05.

2) Homogeneity Test

To ascertain the degree of variance similarity between two groups, the data homogeneity test is employed. Levene's test method and SPSS software were used to conduct the data homogeneity test. In case the sig value is more than 0.05, the data are deemed homogenous, meaning they have the same variance. Finding out if a group of data—categorical data—has the same variance, or homogeneity, is the goal of the homogeneity test. While the variances are not the same, it is said that heterogeneity occurs. Equality of variance is tested with the following hypothesis [14]:

$$F = \frac{Largest\ variance}{Smallest\ variance}\ ,\quad (3)$$

The test criterion is if $F_{count} < F_{table}$, then the two sample groups are from a homogeneous population at the level of significance $\alpha = 0{,}05$.

3) Hypothesis Testing

The mean difference test, also known as the independent sample t test, was utilized in this study to evaluate the second hypothesis since the data were independent, homogenous, and normally distributed. The t-test, a mean difference test, is performed at a significance level of 0.05 using SPSS software to determine if the means of the experimental class and the control class differ significantly.

The hypothesis formulated is:

Ho : $\mu 1 = \mu 2$ (There was no difference in the average score between the control class group and the experimental class group)

Ha : $\mu 1 \neq \mu 2$ (There is a difference in the average value between the control class group and the experimental class group)

In decision making, Ho is accepted if the significance value is >0,05, while Ha is accepted if the significance value is <0,05. The t-test calculation uses a test of the difference between two population means [15].

$$t = \frac{\bar{X}1 - \bar{X}2}{s\sqrt{\frac{1}{n1} + \frac{1}{n2}}} \quad (4)$$

Information :

$\bar{X}1$ = experimentasl class sample average

$\bar{X}2$ = control class sample average

s = standard deviation

3 Result and Discussion

An explanation of the research findings

The present study outlines the research and development (R&D) outputs in the following manner: analysis, design, development, implementation, and evaluation. The ADDIE model is used to do this.

1) Analysis Stage

The problem analysis, needs analysis, and student characteristics analysis are the steps that make up the analysis stage of the ADDIE development paradigm. This preliminary analysis step was conducted to gather data regarding the manner in which the Creative Products and Entrepreneurship learning process was implemented at the research site, which is SMK Al-Ma'sum Stabat. At this point, researchers interviewed students and instructors of courses related to creative products and entrepreneurship to learn more about how these subjects were taught in the classroom. Researchers can use this interview to help them build the items they will develop.

2) Design Stage

The ADDIE methodology's second stage is called planning. The planning stage is building a TPACK-based e-book in the Creative Products and Entrepreneurship Subjects using Canva, drawing inspiration from the analysis phases that preceded it. This stage is carried out to guarantee that the e-book in development attains the best possible results by use of several preparations, specifically:

a. Read various literary sources regarding the process and procedures for creating e-books.
b. Establish the learning objectives for the content that the e-book will generate.
c. Prepare the materials needed to compile an e-book, such as design, cover, material content, images and other relevant supporting sources.
d. Preparing the application in e-book design, namely the Canva application.
e. Form a work display for creating an e-book using the Canva application.
f. Enter every component that has been prepared previously for the preparation of the e-book to the next stage.
g. Insert the supporting images that have been prepared into the Canva application.

3) Development Stage

The development stage is the following phase in the ADDIE paradigm. This is the next phase of the planned and developed design that will eventually become a product. In order for a manufactured good to be considered fit for use, it must first undergo validation. Validators with expertise in materials, media, and design conduct the validation process. The assessment takes the form of suggestions and improvements to serve as a guide for researchers to carry out the process of improving TPACK-based E-books.

The following is a display of the TPACK-based E-book which will be developed in marketing promotional media materials:

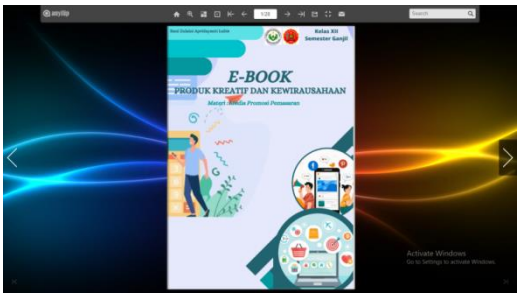

Fig.1 E-book Cover Display

Fig.2 View of the E-book Drafting Team and Foreword

Fig.3 Display of Material in E-books

Fig.4 TPACK Component Display in E-book

In order to verify the e-book's suitability, professionals in the fields of material, media, design, and subject matter were involved in its validation.

a. Presentation of Data from Material Expert Validation Results

Aspects of media, language, and content appropriateness with the RPP are included in the material expert assessment form. The following table displays the average percentage findings for each component from the material expert team:

Table 4. Material Expert Assessment

No	Aspects of Material Expert Assessment	Assessment Score	Criteria
1	Content Eligibility	87,69%	Very Worth It
2	Language	93,33%	Very Worth It
3	Media suitability with RPP	100%	Very Worth It
	Total Percentage	**90,83%**	**Very Worth It**

b. Data from Media Expert Validation Results Are Presented

The media expert assessment questionnaire consists of aspects of software engineering, graphic appropriateness, language and visual communication. The following table displays the media expert team's average percentage results for each component:

Table 5. Media Expert Assessment

No	Aspects of Media Expert Assessment	Assessment Score	Criteria
1.	Software Engineering	85,00%	Very Worth It
2.	Graphic Eligibility	90,90%	Very Worth It
3.	Language	80,00%	Worthy
4.	Visual Communication	80,00%	Worthy
	Total Percentage	**82,00%**	**Very Worth It**

c. Presentation of Data from Design Expert Validation Results

The learning design expert assessment questionnaire consists of material, media and learning aspects. The following table displays the learning design expert team's average percentage findings for each component:

Table 6. Design Expert Assessment

No	Aspects of Design Expert Assessment	Assessment Score	Criteria
1.	Material	62,85%	Worthy
2.	Media	80,00%	Worthy
3.	Learning	80,00%	Worthy
	Total Percentage	**77,33%**	**Worthy**

d. Teacher Assessment of Creative Products and Entrepreneurship Subjects

In an effort to improve the E-book's efficacy, an assessment was conducted to gather data about the shortcomings present in the version that was being created. The table below displays the findings from the teacher's evaluation of the creative product and entrepreneurship courses. The evaluation covers material factors, media aspects, attractiveness, and practicality of use in the classroom.

Table 7. Teacher Assessment of Creative Products and Entrepreneurship Subjects

No	Aspects of Teacher Assessment for Creative Product and Entrepreneurship Subjects	Assessment Score	Criteria
1.	Material	95,55%	Very Worth It
2.	Media	100%	Very Worth It
3.	Use	91,42%	Very Worth It
	Total Percentage	**95,00%**	**Very Worth It**

4) Implementation Stage

The next stage in the ADDIE model is the implementation stage. Implementation is a stage carried out after the TPACK-based E-book that has been developed has been properly revised. Implementation is carried out in class XII OTKP SMK Al-Ma'sum Stabat, At this stage, individual trials are carried out in class XII OTKP-2 consisting of 3 students, small group trials in class XII OTKP-2 consisting of 9 students and field trials in class XII OTKP-1

consisting of 28 students. The purpose of this step is to distribute assessment questionnaires to students in order to gather their feedback on how practical the built TPACK-based E-book is. Five rating scales were included in the disseminated questionnaire: five for very good, four for good, three for reasonably good, two for not good, and one for really poor.

a. Individual Trial

The aim of this individual testing is to identify the shortcomings of the TPACK-based E-book that was built. This individual trial was conducted on three students from class XII OTKP-2—one with high achievement, one with medium achievement, and one with low achievement—at the research location, XII OTKP SMK Al-Ma'sum Stabat. Two factors are taken into consideration while evaluating particular trials: their utility and their appeal, as shown in the table below:

Table 8 (TPACK Individual Trial Responses to TPACK-based E-books)

No	Aspect	Total score	Percentage	Criteria
1	Usefulness	88	83,80%	Very good
2	Interest	67	89,33%	Very good
	Amount	**155**	**86,11%**	**Very good**

b. Small Group Trials

Finding the shortcomings of the built TPACK-based E-book is the aim of this small group testing. This small-group trial was conducted against nine students from class XII OTKP-2, comprising three high achievers, three medium achievers, and three low achievers, at the research location, XII OTKP SMK Al-Ma'sum Stabat. Two factors are taken into consideration while evaluating particular trials: their utility and their appeal, as shown in the table below:

Table 9. Small Group Trial Response to TPACK-based E-book

No	Aspect	Total Score	Percentage	Criteria
1	Usefulness	270	85,71%	Very good
2	Interest	207	92,00%	Very good
	Amount	**477**	**88,33%**	**Very good**

c. Field Trials

This field trial was conducted in SMK Al-Ma'sum Stabat, the research location. A total of 28 students from class XII OTKP-1 participated in the field trials. This field experiment aims to gather information that will be used to gauge the future efficacy of the product under development. Two factors are taken into consideration while evaluating particular trials: their utility and their appeal, as shown in the table below:

Table 10. Field Trial Response to TPACK-based E-book

No	Aspect	Total Score	Percentage	Criteria
1	Usefulness	966	98,57%	Very good
2	Interest	699	99,85%	Very good
	Amount	**1.665**	**99,10%**	**Sangat Baik**

5) Evaluation Stage

The evaluation step, which is the last in the ADDIE approach, is completed by researchers at every level in the creation of an e-book. Evaluation is carried out to obtain responses as well

as suggestions and input which are then revised to the e-book being developed. The outcomes of the TPACK-based E-book trial, which was created in class XII OTKP SMK Al-Ma'sum Stabat, were evaluated at the preceding implementation stage. This evaluation stage was carried out to obtain student responses and learning outcomes after using the TPACK-based E-book which was developed with the aim of obtaining practicality and effectiveness scores for the TPACK-based E-book.

Analysis of Student Learning Outcome Data Using TPACK-based E-Books

In the research and development model, it is necessary to have research in the form of an experiment, where the class that is the experiment is the class XII OTKP-1 with a total of 28 students and classes XII OTKP-2 as a control group comprising all 26 pupils. While control class received instructional materials that were used as normal, the experimental class received a treatment, which involved using a TPACK-based E-Book that had been built.

1) Data Pretest

A pretest consisting of fifteen multiple-choice questions about marketing promotional media materials was administered. The pretest results for the students in the experimental class and the control class are shown in the table below:

Table 11. Student Pretest Score Data

Class	Average	Standard Deviation	The Highest Score	Lowest Value
Experimental Class (XII OTKP-1)	52,67	9,76	70	35
Control Class (XII OTKP-2)	50,96	12,00	70	30

2) Data Posttest

The posttest was carried out by giving 15 multiple choice questions. The posttest was carried out together with the creative products and entrepreneurship subject teacher. The questions given relate to marketing promotional media materials. The posttest results for the experimental and control groups of students are shown in the table below:

Table 12. Student Posttest Score Data

Class	**Average**	**Standard Deviation**	**The Highest Score**	**Lowest Value**
Experimental Class (XII OTKP-1)	85,00	6,93	95	75
Control Class (XII OTKP-2)	71,34	7,94	85	60

3) Normality test

The purpose of the normality test is to determine whether the data is normally distributed. The Kolmogorov-Smirnov Test method and SPSS were used to perform the normalcy test in this investigation. The data is deemed normal if the significant value, or sig > 0.05, is more than 0.05. The results of the data normality test for the students in the experimental and control groups are displayed in the table below:

Table 13. Normality Test Results for Experimental Class and Control Class

Class	Data Type	Sig.	Sig.α	Information
Experimental Class	Pretest	0,144	0,05	Normally Distributed Data
(XII OTKP-1)	Posttest	0,074	0,05	Normally Distributed Data
Control Class	Pretest	0,051	0,05	Normally Distributed Data
(XII OTKP-2)	Posttest	0,174	0,05	Normally Distributed Data

The above table shows that the pretest and posttest results data for the experimental class and control class have a probability value of > α 0,05. The experimental class's pretest results are 0,144 > 0,05, its posttest results are 0,074 > 0,05, while the control class's results are 0,051 > 0,05 and 0,174 > 0,05. Based on the information gathered, the pretest and posttest results for both classes are dispersed consistently.

4) Homogeneity Test

To determine how comparable the variances between two groups are is the aim of the homogeneity test in this study. The data homogeneity test was performed utilizing SPSS software and Levene's test method. A data set is said to have homogeneous variance if its sig value is higher than 0.05. The findings of the pretest and posttest for the experimental class and control class, as shown in the table below, demonstrated that the homogeneity test results in this investigation were significantly more than 0,05.

Table 14. Tabulation of Homogeneity Test Calculation Results

		Levene Statistic	df1	df2	Sig.
Pretest Value	Based on Mean	1.992	1	52	.164
	Based on Median	1.200	1	52	.278
	Based on Median and with adjusted df	1.200	1	50.195	.279
	Based on trimmed mean	1.971	1	52	.166
Posttest Value	Based on Mean	.583	1	52	.449
	Based on Median	.290	1	52	.592
	Based on Median and with adjusted df	.290	1	49.211	.592
	Based on trimmed mean	.551	1	52	.461

The tabulation table of the pretest and posttest homogeneity test for the experimental class and control class above shows that both the experimental and control classes are homogeneous. For the pretest, the significant value based on mean is 0,164 > 0,05, and for the posttest, the significant value based on mean is 0,449 > 0,05.

5) Hypothesis Testing

The study utilized the mean difference test, which is sometimes referred to as the independent sample t test, for the second hypothesis test because the data was independent, homogenous, and normally distributed. The t-test finds mean differences between the means of the experimental and control classes at a significance threshold of 0.05 using SPSS software.

The hypothesis formulated is:

Ho : $\mu 1 = \mu 2$ (The control class group and the experimental class group did not have different average scores)

Ha : $\mu 1 \neq \mu 2$ (The control class group and the experimental class group's average values differ from one another)

When reaching a judgment, a significance value of greater than or equal to 0.05 accepts Ho, whereas a significance value of less than or equal to 0.05 accepts Ha. The table below displays the test results obtained using the t-test:

Table 15. Results of t-Test For Experimental Class and Control Class

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Student Learning Outcomes	Equal variances assumed	.583	.449	6.739	52	.000	13.654	2.026	9.588	17.720
	Equal variances not assumed			6.705	49.817	.000	13.654	2.036	9.563	17.745

The following outcomes were obtained from the aforementioned table: It is 0,00 < 0,05 for sig.2-tailed. Since the Sig.2-tailed value is less than^= 0,05, which indicates that there is a difference in the learning outcomes before and after utilizing TPACK-based E-books, Ho is rejected and Ha is accepted. To support these findings, descriptive statistical computations were made to ascertain the size of the difference in student learning outcomes between the experimental class and the control class. The results about the size of the difference are shown in the table below:

Table 16. Group Statistics

	Class	N	Mean	Std. Deviation	Std. Error Mean
Student Learning Outcomes	Experimental Class	28	85.00	6.939	1.311
	Control Class	26	71.35	7.945	1.558

As can be seen from the statistical group calculations above, the average learning results for the experimental class are 85.00, while those for the control class are 71.35. This explains why classrooms using the created TPACK-based E-books have higher average learning outcomes than classes using the teacher's teaching materials. Therefore, it can be said that the

TPACK-based electronic book that was created enhances student learning outcomes and is useful for use in the teaching and learning process.

4 Conclusion

Based on the results of the analysis and discussion carried out in this research, the following conclusions can be drawn; 1) The development of TPACK-based E-books on marketing promotional media materials is suitable for use based on material expert validation assessments, media expert validation, design expert validation, subject teacher assessments, individual trials, small group trials and field trials with a score of 88,38% with the criteria "very feasible". This means that the TPACK-based E-book on Creative Products and Entrepreneurship Subjects that was developed is proven to be suitable for use in the learning of Class XII students majoring in Office Management Automation at SMK Al-Ma'sum Stabat; 2) The results of the t-test analysis stated that Sig.2-tailed was 0,00<0,05. Because the Sig.2-tailed value is less than $\alpha = 0,05$, Ho is rejected and Ha is accepted, that is, there is a difference in learning outcomes before and after being treated using TPACK-based E-books with the control class using teacher-guided teaching materials. Where the average class posttest score was 85.00 while the control class posttest score averaged 71.35. This means that the TPACK-based E-book that was developed has proven to be effective in improving learning outcomes in Creative Products and Entrepreneurship Subjects for Class XII students majoring in Office Management Automation at SMK Al-Ma'sum Stabat.

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