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APPLICATION OF TPACK APPROACH IN PANCASILA AND CIVICS EDUCATION MODULE FOR JUNIOR HIGH SCHOOL TO IMPROVE CONCEPT UNDERSTANDING

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Abstract

This research aims to develop a TPACK-based module (Technological Pedagogical and Content Knowledge) to support the development of students' concept knowledge in Pancasila and civics education (PPKn) online learning for grade 7th. The development of the module adopts the steps of the analysis, design, development, implementation and evaluation model (ADDIE). To test the feasibility level of the module, material experts, instructional design and media experts, teachers and students are involved. Questionnaire is used to collect data for feasibility test. After feasibility test proses, module is ready to be measured its effectiveness in learning activity. To measure effectiveness of PPKn module to develop students' concept knowledge, paired t-test is adopted. The results of data analysis show that the learning module developed has a very high level of feasibility, namely according to material experts 95.8%, instructional design and media experts 82.4%, teachers 97.2%, students in individual trials 90.8%, small group trial 92.6% and field trial 88.1%. Based on t-test result, the significance value is 0.000 which is smaller than 0.05. Therefore, it can be concluded that applying PPKn TPACK-based module can increase students' understanding of concepts.

Keywords: TPACK, PPKn Module, Online Learning, ADDIE model, Concept Understanding

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INTRODUCTION

During the COVID-19 emergency, PPKn learning at the junior high school level was carried out online. The implementation of online learning requires teachers to adapt to online learning (Alfiana et al., 2021). Moreover, the government urges teachers to be creative by using teaching materials such as independent learning modules during online implementation during the pandemic (Kemdikbud, 2020). This is reinforced by Wahyuni et al (2018) that the 2013 curriculum requires the provision of teaching materials, which the government currently cannot provide optimally. Therefore, module development is one form of innovation that is expected to support the implementation of online learning (Arini et al., 2021; Retnosari & Hakim, 2021).

In reality, teachers in schools have not yet developed a module for online learning (Mahadiraja & Syamsuarnis, 2020). Meanwhile, students feel the need for a module to support online learning which really requires students to study independently (Daroini & Alfiana, 2021; Drachman et al., 2020; Paramitha et al., 2021). Thus the development of the

module needs to be done because it is considered as a solution (Sadago, 2020) especially in PPKn online learning at the junior high school level (Nitami, 2021).

Mastery of understanding the concept is very important. Understanding the concept is the basis and provision for students. Understanding the concept is a provision to build creative thinking skills (Trianggono, 2017). With these higher-order thinking skills, a constructive understanding of concepts is needed in solving problems (Hartati et al., 2017; Trianggono, 2017). In other words, conceptual understanding is needed to achieve higher order thinking skills. However, the reality is that students' understanding of concepts is still relatively low (Suraji et al., 2018) included in the subject of PPKn (Fithry, 2021; Nazirin, 2018). This is indicated by the low mean score of understanding the concept of PPKn in students (Sugihartono, 2021). So that efforts are needed to improve students' understanding of concepts in online learning.

The implementation of online learning relies heavily on the use of technology (Alfiana, 2021). Therefore, a theoretical framework is needed to combine learning materials and strategies for delivering materials with technology integration. In this case the TPACK (technological pedagogical content knowledge) approach can meet expectations. TPACK is a theoretical framework that combines material as content with pedagogical aspects and the use of technology (Koehler & Mishra, 2009; Tunjera & Chigona, 2020). TPACK is seen as new knowledge that must be mastered by teachers to be able to integrate technology well in learning (Rahmadi, 2019).

The TPACK approach is becoming popular and widely applied in learning (Mishra, 2019), including in PPKn subject (Nursyifa et al., 2020; Sarkadi & Fadhillah, 2020). Besides being applied in learning (Akturk & Ozturk, 2019; Baran et al., 2019), TPACK can also be developed in the manufacture of learning media (Sitompul et al., 2018; Wijaya et al., 2020), as well as learning tools (Hofer & Harris, 2017; Irmita & Atun, 2017; Schmid et al., 2021).

Currently, the TPACK approach is also widely used in the development of online learning modules (Semingson et al., 2017; Srisawasdi et al., 2018). Various scientific fields apply the TPACK approach in the preparation of modules such as the field of science (Anggraeni, 2018; Aulia et al., 2021; Utami, 2020), mathematics (Kuncoro & Arigiyati, 2020), etc. However, the development of TPACK-based PPKn modules has not been found.

The TPACK approach combines technology with materials and delivery strategies (Kriek et al., 2016; Marcovitz & Janiszewski, 2015). So, in addition to determining the material to be studied, it is necessary to determine the delivery strategy and technology used. The development of e-modules is wise decision for online learning (Kimianti & Prasetyo, 2019; Oksa & Soenarto, 2020).

The use of the Frayer model can improve students' understanding of new vocabulary in the learning process (Aryanti & Apriliaswati, 2017). The use of the frayer model has a significant influence on students' vocabulary mastery, because the value of students who are taught using the frayer model is higher than using conventional methods (Rahmadani, 2018). Therefore, the frayer model can be applied in teaching and conveying terms on the concept of PPKn material. The frayer model can be modified in its use by integrating the frayer model into learning modules and formative assessment tools, so that it can help develop students' scientific vocabulary and academic achievement (Randel D.Estacio, 2017). Therefore, this research present combination of the Frayer model and TPACK approach in PPKn module for 7th grade Junior high school through online learning environment.

RESEARCH METHOD

Educational research and development are conducted to develop and validate educational product (Gall et al., 2003) such as learning media, material, module, etc. This research and development is designed to produce a product in the form of PPKn learning modules in printed and electronic form or e-modules. While validation process of the product involves material experts, media and instructional design expert, subject teacher and student. Questionnaire is developed and used to collect data for validation process. The development product needs instructional design theory as guidance. To produce these products, the development design chosen is ADDIE model (Branch, 2009; Reigeluth & An, 2020). The ADDIE model includes 5 stages with the ADD-IE pattern, namely analysis, design, development, implementation and evaluation (Rusdi, 2019, p. 117).

Analysis, carried out by carrying out a needs analysis to find out whether the PPKn learning module using the TPACK approach is needed for online distance learning. To obtain this information, teachers and students were given a needs analysis questionnaire. Then, the next step is the analysis of basic competencies/KD in the 2013 Curriculum that is applied. This is done to map the basic competencies that will be discussed and studied in the learning module to achieve learning objectives.

Design, done in several stages. At the design stage, the development team, development schedule and material coverage are determined. In addition, at this stage the preparation of validation instruments is also carried out. The final step is to design the shape of the product to be developed, namely the print module and e-module using the flip application on fliphtml5.com.

Development, At this stage, the product manufacturing process begins. After collecting data to enrich the module, the module framework was developed by: (1) making illustrations, (2) schematics, (3) typing, (4) arranging layouts and (5) editing. Furthermore, the first draft of the module was validated to test the feasibility of the module. Validation instrument adapted from Cahyono (2019) and modified as needed for data collection purposes. The validation questionnaire was developed from the following aspects:

Table 1 Validation Questionnaire Grid

No.	Aspect
1	Eligibility of content/material
2	Serving eligibility
3	Linguistic eligibility
4	Feasibility of using approach
5	TPACK in module
6	Overall view eligibility
7	Cover design eligibility
8	Feasibility of module content design
9	Eligibility of e-module design
10	Clarity
11	Impact of Questionnaire in Learning

Adapted from (Cahyono, 2019)

To provide an assessment of the learning module based on questionnaire questions, an assessment qualification based on the Likert scale is used (Likert, 1932) with a score of 1-5 (Istianah et al., 2020).

Product validation involves 1 material expert, 1 instructional design and media expert and 3 PPKn subject teachers. The focus of material expert validation is to assess the

feasibility of the content of the module. Meanwhile, the validation of instructional design and media experts emphasizes the appearance of the module. However, subject teacher validation assesses both content and appearance. The responses from these experts' triangulation tests became material for module revision. To calculate the feasibility of the product from the questionnaire, the following formula is used:

$$Feasibility\ Persentage = \frac{Total\ Score\ Obtained}{\text{Maximum Score}}\ x\ 100\%$$

Adapted from (Fatirul, A. N., & Walujo, 2018, p. 102)

The results of the percentage of product eligibility are then converted into the following category table:

Table 2 Score Interpretation Criteria

Achievement Level	Qualification
1-20	Very Poor
21-40	Poor
41-60	Pretty good
61-80	Well
81-100	Excellent

Adapted from (Istianah et al., 2020)

Implementation and *evaluation* are stage that connects researcher as product developer to product users, namely students. This stage contains elements of formative evaluation in the form of one-on-one evaluation or individual tests, small group evaluations and field evaluations (Rusdi, 2019). This stage is done by applying the module to learning. The application of the module aims to test the feasibility level of the developed module. The feasibility of the module was assessed through an individual test involving 5 students, a small group test with 10 students and a field test with 30 students.

In the implementation and evaluation phase, the module was tested in 3 learning activities for field testing. After being implemented in the form of learning activities, an evaluation is then carried out to provide feedback on the developed module. Thus, the results of product development goals can be known.

The TPACK module is used in learning to measure its effectiveness in improving students' conceptual understanding. The module is applied to the real learning process in the classroom for one semester. students were given pretest and posttest. In the pretest and posttest data, a prerequisite test was carried out, namely the normality test. This step must be done before the data is analyzed in a further data analysis. The difference test is used to compare the difference in mean values. The difference test was carried out by using the paired t-test because the research sample was the same group.

RESULTS

In this study, PPKn learning module for grade 7th junior high school is developed for second half semester. The modules are presented in both printed and electronic forms which are freely accessible by students. During product development curriculum 2013 is adopted. The basic competencies (KD) which were applied to PPKn subjects for junior high school grade 7th, based on *Permendikbud* No. 37 of 2018. The steps for compiling the module are guided by the ADDIE model.

Analysis This study was conducted to find out whether the preparation of modules with the TPACK approach was needed by teachers and students. From the questionnaire given to 4 PPKn teachers, all teachers stated that the PPKn module based on the TPACK

approach that combines the role of technology, strategies and learning materials is needed to overcome problems in online PPKn learning. The teachers mentioned that the problems that occurred were: (1) Students' interest in online learning which was categorized as lacking, (2) Student learning outcomes were relatively unsatisfactory because one of the reasons why students did not read much of the learning material, (3) Lack of enthusiasm of students in finding resources. other learning, other than those from textbooks, (5) Lack of students' ability to understand material that is conceptually high-level thinking/problem solving, (6) Lack of students' independence in learning.

The need analysis questionnaire given to 26 students. The results of the questionnaire showed that all of them stated that there was a need for a module that combines materials, learning strategies and technology. The existence of the module is a hope for students to be able to overcome the obstacles experienced by students in online PPKn learning.

Design is the design stage of the PPKn learning module which contains several components. These components include: (1) basic competencies, (2) learning objectives, (3) instructions for using modules, titles of learning activities, (4) concept maps, (5) learning materials, (6) learning strategies as outlined in the LKPD (worksheet), (7) exercise, (8) assessment rubrics, (9) summaries and (10) answer keys. Because the TPACK approach requires a strategic component, the Frayer model was chosen to improve students' understanding of PPKn material. The Frayer model as a learning strategy is applied in a worksheet in the form of a table consisting of keywords, definitions, facts or characteristics, examples, and not examples.

Development refers to the stages of product validation by experts. Product validation aims to assess the feasibility of the developed learning module product. Experts also provide suggestions for module revision. The module is validated by material experts, learning design experts, and PPKn teachers as education practitioners.

Material Expert Validation

The material expert who involves in the validation of the module is a doctor and lecturer in PPKn at a private university in the city of Surabaya. The assessments and suggestions given by material experts are as follows:

Table 3 Material Expert Validation Results

No	Eligibility Aspect	Score Earned	Maximum Score
1	Material	57	60
2	Presentation	57	60
3	Language	39	40
4	Using the TPACK approach in modules	20	20
5	Overall view	9	10
	Total	182	190
	Percentage	95.8%	

From the material expert's assessment, the percentage of module feasibility is 95.8%. Based on table 4, the feasibility of the module is included in excellent criteria. However, there are suggestions from material experts to improve learning modules, namely writing and cover, which need to be made better according to academic rules.

Instructional Design and Media Expert Validation

The instructional design and media expert selected as a validator to provide an assessment of the PPKn learning module is a doctorate in Educational Technology who is

a lecturer at a private university in the city of Surabaya. The following is the validation data of media and instructional design experts:

Table 4 *Instructional Design and Media Expert Validation Results*

No	Eligibility Aspect	Score	Max Score
1	Cover	30	35
2	Content design	29	35
3	Overall view	28	35
4	e-module design	16	20
Total		103	125
Percentage		82.4%	

Based on the table score interpretation criteria, then the final score is 82.4% are in excellent category. However, instructional design and media experts suggest to adopt variance of fonts to attract readers.

Subject Teacher Validation

Three teachers with the latest education in master of education (S2) as practitioners of Junior high school PPKn learning were selected as validators to provide assessments and suggestions for the module. Following data is teacher validation result:

Table 5 Subject Teacher Validation Results

No	Eligibility Aspect	Respondent		
		1	2	3
1	Material	39	39	39
2	Presentation	54	53	53
3	Language	25	24	24
4	Using the TPACK approach in modules	19	20	19
5	Overall view	20	20	19
6	e-module design	19	20	19
	Total	176	176	173
Maximum score		180		
Average Eligibility Percentage		97.2%		

Based on the score interpretation criteria table, the final score of 97.2% is in the excellent category. This can be interpreted that the level of eligibility for the PPKn learning module is excellent. This is supported by comments from the teacher who stated that overall this learning module was very good and suitable for use in learning.

Implementation and *Evaluation* is done by applying the product to real situations in the classroom. At this stage, the researcher implements or tests the learning module to students as product user. The responden are student of grade 7th junior high school in Sidoarjo. Product evaluation is carried out through 3 stages of testing to determine the feasibility of the learning module, namely individual testing, small group testing and field testing.

Individual Trial Results

Individual validation aims to identify writing errors in the module. The number of students involved in this validation process are 5 people. The data presented in this test are in the form of findings as corrections for errors found in the module. In addition, respondents also assessed the feasibility of the module.

From the respondents' responses, there were no errors in the use of capital letters and words that were difficult to understand. However, respondents found 2 errors in the use of punctuation and 5 errors in writing words. The module feasibility assessment data is presented in the following table:

Table 6 Individual Validation Results

No	Eligibility Aspect	Respondent				
		1	2	3	4	5
1	Clarity	44	47	41	47	47
2	Impact	10	9	7	10	9
3	Appropriateness	23	24	23	23	22
Total		77	80	71	80	78
Maximum score		85				
Average Eligibility Percentage		90.8%				

Based on the score interpretation criteria table, the final score of 90.8% is in the excellent category. This means that the feasibility level for the PPKn learning module is very good.

Small Group Trial

Small group validation aims to convince students that students can use the module independently. In addition, this validation process also intends to determine whether the product development made can determine the effectiveness of changes in individual test results. The number of students involved in the small group validation are 10 people. The data obtained in the small group trial are presented in the following table:

Table 7 Small Group Test Results

Respondent	Clarity	Impact	Appropriateness	Total
1	47	8	23	78
2	49	10	25	84
3	44	10	24	78
4	48	10	25	83
5	46	8	24	78
6	46	8	22	76
7	45	10	24	79
8	45	9	23	77
9	45	9	23	77
10	45	9	23	77
Maximum score			85	
Average Eligibility Percentage			92.6%	

Based on the score interpretation criteria table, the final score of 92.6% is in the excellent category. This means that the feasibility level for the PPKn learning module is very good. Respondents stated that the module can be used for independent study. In this test there is no suggestion for product revision so the module is not revised. Then, the module is ready for use in field tests.

Field Trial

Field validation aims to improve the results obtained from the previous stages. The data obtained in the field trial are presented in the following table:

Table 8 Field Test Results

Student	Clarity	Impact	Appropriateness	Total
1	43	9	75	75
2	34	7	58	58
3	50	10	85	85
4	45	10	78	78
5	36	6	63	63
6	38	8	67	67
7	47	8	76	76
8	46	9	79	79
9	50	10	85	85
10	50	10	85	85
11	41	8	70	70
12	40	8	68	68
13	39	10	70	70
14	50	10	85	85
15	40	10	72	72
16	50	10	85	85
17	40	9	71	71
18	48	10	83	83
19	47	10	82	82
20	48	8	81	81
21	46	8	75	75
22	36	8	65	65
23	44	10	77	77
24	42	10	77	77
25	40	8	67	67
26	40	6	66	66
27	40	8	67	67
28	50	10	85	85
29	39	6	65	65
30	50	10	85	85
Maximum score				85
Average Eligibility Percentage				88.1%

Based on the score interpretation criteria table, the final score of 88.1% is in the excellent category. So that the module does not need to be revised and is ready to be tested for its effectiveness.

Effectiveness of Module

To measure the effectiveness of the application of the developed PPKn module, a t-test is adopted. Pretest and posttest data were used to test the effect of implementing the module. The following are the results of the paired t-test:

Table 9 Paired Sample Test

	mean	Std. Deviation	t	df	Sig
Pretest-Posttest	-11.93	14,484	-4.513	29	.000

Based on table 10, it is known that the significance value obtained is 0.000 which is smaller than 0.05. Thus it can be concluded that there is an average difference between the pretest and posttest. That is, there is an effect of applying PPKn module in increasing students' understanding of concepts. This conclusion is supported by the difference in average values as shown in table 11 below:

Table 10 Paired Sample Statistics

		N	mean	Std. Deviation
Pairs 1	*Pretest*	30	61.07	14.012
	Posttest	30	73	12,744

From the output table above, the average value of students' conceptual understanding before the TPACK module was applied was 61.07. The use of the TPACK module in the learning process can increase the achievement of students' conceptual understanding to 73. So that the TPACK module developed is proven to be able to improve students' conceptual understanding.

DISCUSSION

The availability of adequate learning materials as learning resources for students is an important thing that must be in learning activities, both face-to-face and online learning. Therefore, teachers are expected to be able to be creative in preparing learning materials in the form of teaching materials such as learning modules that students can study independently and are easily accessible, especially during the COVID-19 pandemic which requires online distance learning. In addition, teachers are also expected to be able to provide active, innovative, creative, and fun learning activities even though learning is done online.

The development of learning modules is needed because it is one solution to overcome problems that arise, especially during online distance learning. The results of this study are in line with the results of previous studies which state that the learning module is a necessity to develop students' independence (Mulyasari & Sholihah, 2021; Rufii, 2015). The development of learning modules is feasible to be applied in overcoming problems in learning (Muttaqin et al., 2019).

Module development refers to the application of the ADDIE model instructional design steps (Branch, 2009; Budoya et al., 2019). The ADDIE model has systematic steps so that it is widely applied in the development of learning products, education and training programs (Ghani & Daud, 2018). Products produced by adopting ADDIE measures have high feasibility (Chalifah et al., 2020; Nindiawati et al., 2021; Waskito et al., 2020).

The application of the TPACK approach is a solution in learning, especially during online distance learning (Galanti et al., 2020; Papanikolaou et al., 2017) because this approach integrates material, pedagogy (in the form of learning strategies and models) and technology that must be mastered by teachers in carrying out learning (Mishra, 2019; Othman et al., 2021). The results of this study are in line with previous research which states that TPACK is a new knowledge that must be mastered by teachers to be able to integrate technology well in learning (Rahmadi, 2019).

TPACK module development is very much needed (Huda et al., 2017). This is because the TPACK module provides many benefits in learning. The application of the TPACK approach to compiling learning modules can support web-based online learning

(Utami, 2020). TPACK-based modules are proven to improve literacy in learning (Aulia et al., 2021), representational fluency and student character values (Anggraeni, 2018). Based on the results of data analysis, the application of TPACK in module development is proven to improve students' understanding of concepts.

CONCLUSION

The development of PPKn learning modules using the TPACK approach is needed as a solution to overcome problems that arise during the implementation of online distance learning. PPKn learning module for grade 7th junior high school is developed for second half semester. Modules are presented in print module and e-modules.

Based on the product development objectives, it is concluded that the PPKn learning module using the TPACK approach has a very good feasibility level. This is evidenced by the results of material expert validation with a stated feasibility level of 95.8%, instructional design and media experts obtained a feasibility percentage of 82.4%, from teachers 97.2%. Furthermore, in 3 user tests, namely students in individual validation, the feasibility level is 90.8%, in small group validation 92.58% and field validation 88.1%. The results of the t-test showed that the TPACK module are proven to be effective in improving students' conceptual understanding. The achievement of students' conceptual understanding has increased due to the use of the TPACK module in learning. This research has limitation on the sample amount since only one group of samples involved. There are no other group to be compare. Therefore, the effectiveness of module measures using pretest and posttest of one group sample. The implications of this research can be a contribution to science, especially PPKn learning conducted online.

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