

Module (Novick Learning) Physics to Improve Critical Thinking

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Abstract: Critical thinking is a skill which must be owned by the students. The purpose of this study is to improve physics module based on Novick Learning on the thermo dynamic theme to improve physics module based on the Novick Learning on the thermo dynamic theme to improve the students' critical thinking. The critical thinking skill is a must to be owned by the students. It is the development research (R& D) 4-D Thiagrajan (Define, Design, Develop, & Disseminate). The instrument of this research is answer sheet for the material expert, media expert, the teacher and the students of Junior High School as the respondent. The subject of this research consists of the experts, physics Junior High School teacher, and the students of Junior High School as the respondent of early field study. The result of the study is Novick Learning Module for thermo dynamic theme to increase students' critical thinking. It is hoped, this module can explore the early students concept and create conceptual conflict so the students can improve the critical thinking.

1 INTRODUCTION

The critical thinking capability is needed to be improved for the students since the school age (Ismail, 2018).

It is suggested the educator must support the students to think critically by comprehend their curriculum and define the specific skills and make sure they have gotten the right module (Larsson, 2017; Castle, 2009). The capability of critical thinking can improve by many ways. (Huda, 2018) One of the ways to improve critical thinking is improving Novick Learning module (Özsoy-Güneş, 2015) this learning can improve the physics learning achievement surely (Ratnaningdyah, 2017) and critical thinking capability (Sulaiman, 2012).

The improvement of Novick learning is still rare to use. This research purpose is to improve the module of learning based on the Novick Learning to improve critical thinking of the students for thermodynamic theme.

2 METHODS

The application development procedure is adapted from the 4D model (Define, Design, Develop, and Disseminate) (Aji, 2018; Hudha, 2018). The steps are arranged as in Figure 1.

The subject of this research are the experts, physic teacher of Junior high School, and the students of Junior High School. During the legible test students, the instrument used is three kind of data namely: students needed questionnaire, product validity questionnaire, and students' response' questionnaire. The instrument can be seen generally in table 1.

Table 1: The blue print of research instrument generally.

No	Data	Source	Instrument
	Validity of RPP	The expert of lecturer Physics teacher of Junior High School	Validity questionnaire of RPP

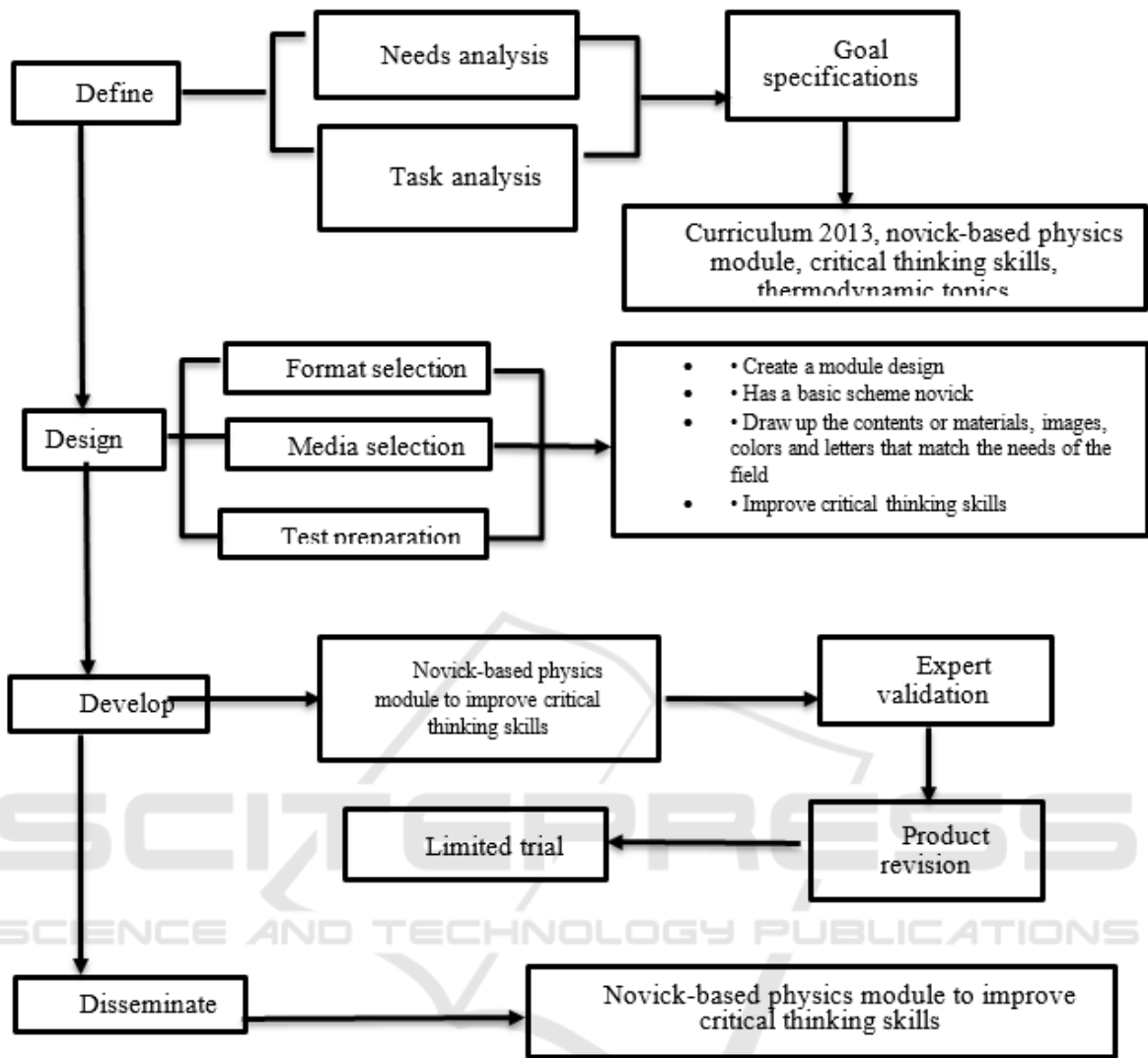


Figure 1: Research Procedure.

3 RESULTS AND DISCUSSION

The result of module product of physics learning is the RPP validity, the result of sufficient test, and the trial test of the students. The trial test is done to know the response data as user.

The RPP validity analyse result is shown in Table 2.

Table 2: The result of RPP validity analyse.

No	Component	Score	Criteria
	Subject identity	4	Very good
	Competent	3,67	Very good
		2,83	Good

Competent achievement indicator	2,67	Good
Learning goal	3	Good
Learning material	3	Good
Learning modele	3	Good
Learning Instruction	2,67	Good
Learning Source Scoring		

Learning plan is very important to succeed the teaching learning process (Moxley, 2017; Gülten, 2013). The expert teacher in learning plan have many fluently and efficiency, and more concentrate of learning design and activity choice pattern. Their duty

is compatible and supported with the teachers knowledge about pedagogic (Li, 2017).

Qualification data is gotten from two experts of material and media, and one Junior High School physics teacher. The data gotten is qualitative and quantitative data. The quantitative data is gotten by answer sheet of module by using likert scale and to know the qualification of module. While qualitative data is gotten is the suggestion used to revise module. The result of learning modul qualification can be shown on Table 3.

Table 3: The result of Qualification Component Analyzis of Learning Module Content.

No	Component	Score	Criteria
	Content Qualificationa		
	The suitability with KD	3	Good
	Material Accuracy	3	Good
	Additional Material	2,83	Good
	Update material	2,92	Good

From the trial test of XI MIPA SMA Negeri 6 Malang class is gotten quantitative data and qualitative data. Quantitative data is taken from answer sheet of the students toward the module by using gutman scale while quantitative data is taken from students suggestion. The result of trial test is shown in Table 4.

Table 4: The response analyze result of Learning Module.

No	Component	Score	Criteria
	Module content		
	Concept map based on material	0,9	agree
	Concept map to make the easy memorizing the material	0,8	agree
	Concept map for material for easy understanding	0,9	agree
	The problem appear is the real daily problem	1	agree
	The problem appear based on the material discussion	0,8	agree
	The problem appear need analyze and understanding of previous material	1	agree
	The practice make the material easier to understand	0,8	agree

	Material appearance is suitable with the problem appearance	0,8	agree
	Content and writing style of module give impression of the module is useful to know	0,7	agree
	The exercises of task make understanding of material well	0,8	agree
	The task is suitable with the material	1	agree

The content of the module is very important for the learning process. The language improvement and content give a strong contribution for students reading capability (Pollard-Durodola, 2016). So it is important for having a book or a module based on the teachers and students needed.

4 CONCLUSION

The quality of physics module based on the Novick learning with thermo dynamic theme of validator has good quality and based on the students response also got the agree category. The module is hoped can support the students in learning physics and help the teachers to improve the critical thinking of the students.

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