

Developing Students' Worksheet Based on Higher Order Thinking Skills for Economics Learning in Senior High School

Tri Kurniawati¹, Abel Tasman², Menik Kurnia Siwi³

¹Universitas Negeri Padang, Padang, Indonesia, ✉ trifeunp@gmail.com

²Universitas Negeri Padang, Padang, Indonesia, ✉ abelltasman@gmail.com

³Universitas Negeri Padang, Padang, Indonesia, ✉menikkurnia@gmail.com

Abstract

Higher order thinking skills test is formulated for improving student critical thinking abilities. This study is conducted by using research and development approach. The aim of this study is to develop student worksheet based on higher order thinking skills for economics learning in senior high school and will be carried out for 2 years. This study uses the Plomp (1982) model. The development procedures of the Plomp model consists of five steps, namely; (1) initial investigation, (2) design, (3) construction, (4) test, evaluation and revision, (5) implementation. The result of this research is a set of students' worksheet based of higher order thinking skills for economics learning in senior high school.

Keywords: higher order thinking skills, economics learning.

Introduction

The rapid development in the business and technology known as the Industry 4.0 (the I4) has generated new challenges in many aspects. The process of education is also affected by this progress. There is a strong urge in the educational field to produce graduates who are competitive, skilled, have the problem-solving ability and are adaptive to the developments of the technology. For this reason, sustainable efforts to develop the education in the millennium era should continue progressively to cope with the updated challenges (Soffi & Abdul, 2014).

Learning is a process that is performed to develop various abilities of the students. There are several conditions that are vital requirements in order that the students succeed in learning (Sagala, 2005). First, the learning should foster the students' interest to learn. Second, the learning process should develop the students' potential, interests and talents. Third, the learning process should encourage the development of the students' learning abilities, both in critical, logical and systematic thinking. Based on this outlook, it shows that the learning process should develop the students' interests, talents and critical thinking skills.

The ability to think critically is also known as the higher order thinking skill. Through the higher order thinking skill, students can prepare themselves to face the real world beyond simple learning of facts and content (Ramos, Dolipas, & Villamor, 2013). The knowledge gained by students through higher-order thinking processes will be easy to be implemented and students will possess a deep understanding so that they can use the knowledge in the process of problem-solving.

The learning environment will strongly affect the success or the failure of the learning process. Teachers should possess the ability to develop the teaching materials, choose the correct learning methods, use the proper media and learning resources and conduct valid and reliable evaluations. There are many kinds of media and learning resources that could be used by the teacher. One of them is the student's worksheets.

The worksheet is one of the learning tools that can encourage the students to be active and to participate in learning activities. There are many studies about utilizing the worksheets in improving the student's learning results and learning activities (Karsli & Ah, 2009, Septiani et. al, 2013). A study on the effect of the concept cartoon worksheets, the gender and their interaction on pre-service science teachers' conceptual understanding of geometrical optics have found that the worksheets have produced a statistically significant treatment effect; however, gender and gender post-test performances are not significant (Ta, 2016). In mathematics learning, using the student worksheets

can improve the students' abilities of mathematical discovery which was taught using the developed student's worksheet, and this study shows that the experimental class has higher results than those learning in classroom with traditional approaches (Suratno, 2016). In study of science that is performed with a scientific approach by using student's worksheet shows that using students' worksheet is more effective in improving the student achievement (Saptaningrum, 2016). In the learning at the junior high school level, using the student's worksheet also has a positive and significant effect (Kusmanto, 2014). These various results have indicated that utilizing the student's worksheet can improve the effectiveness of learning.

According to Sukirno (2005), economics is a study about individuals and society in making choices, with or without using the money, using the limited resources—but it can be used in various ways to produce various types of goods and services, and to distribute them for consumption, in the present and for the future, towards the various individuals and the groups of society. Moreover, Case and Fair (2005) explain that economics is the study about how an individual and society choosing the way to use the resources with scarcity that are provided by nature and are inherited from the previous ancestors.

Learning materials of the economics subjects in high school is quite complex and has high relevance to everyday life. Most of the learning materials that are taught consist of the recitation thing, but the concepts applications are observable to find in everyday life. Some analysis in economics also use mathematical approaches such as demand functions, supply functions, production functions and some other calculation material. If learning economics is conducted only through a recitation method, it will be boring for the students and it will be difficult for them to understand the subject. Learning economics will be interesting if it is associated with real-life situation and it gives the students opportunities to explore, analyze or think critically about the concepts they have learned.

Thus, the applications of higher order thinking skills become an important part in learning economics. Higher order thinking skills are cognitive abilities that include abilities in analysis, comparison, inference and evaluation (Ramos et al., 2013). Higher order thinking skills also include critical, logical, reflective, meta-cognitive, and creative thinking (Goodson & Rohani, n.d.). This ability of higher order thinking skills will come out if the students are accustomed to the learning process that contains challenging problems, uncertainties or dilemmas (Mohamed, Khan, & Masood, 2015).

In order to develop higher order thinking skills for high school students, the student's worksheet in this study were developed with a higher order thinking skills approach. The worksheet can be used in the learning process with the 2013 Curriculum. The worksheet contains activities for the students in learning economics using scientific approaches that are combined with various learning models such as group discussions, project-based learning and discovery learning and problem-solving model. Then, the development of the worksheet is based on higher order thinking skills and it is expected to provide innovative contributions, especially in learning economics in high school.

Methods

This study used a research and development approach. The objective of this study was to produce a student's worksheet which is based on higher order thinking skills for learning economics in senior high schools. The development model used in this study is the Plomp model (1982). This model has five steps which consist of: (1) Preliminary investigation, (2) Design, (3) Construction, (4) Test, Evaluation and Revision, (5) Implementation.

The stage of initial investigation is the process of problem definition by collecting and analyzing information about the studied problem. At the design stage, it produces various alternatives for problems solutions toward necessary comparison to get the best alternative choice as a blueprint for the solution. The construction stage contains a written work plan for the alternative choice of problem solving model that is chosen to be realized in the form of a product. The test, evaluation and revision stage is to assess the problem-solving model (the product). At this stage, the developed model is tested, whether it fits the desired situation, which solution is satisfactory and which is not. Model

testing is performed in the form of repetitive cycles. At the implementation stage, the product is introduced to the public (user). The steps of Plomp's Development Model are visualized by the figure below:

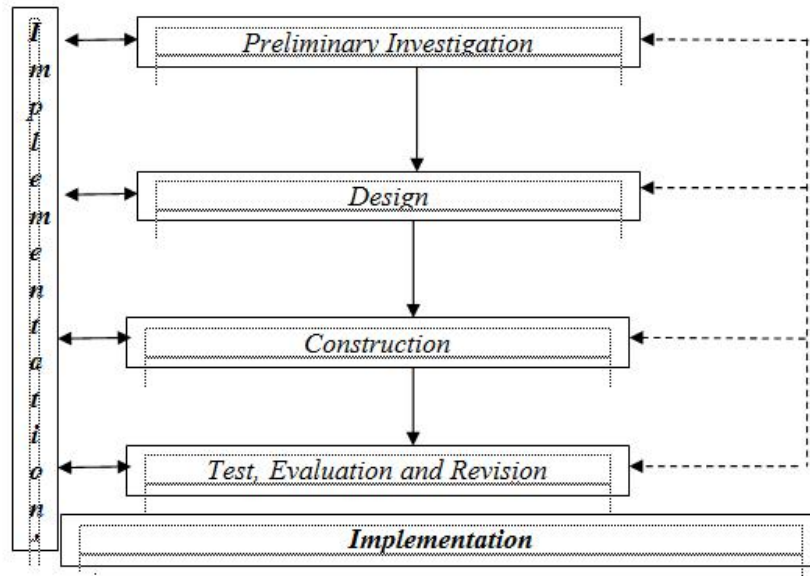


Figure 1 The General Model of Educational Research Design

Results and Discussion

In its concept and procedure, developing a student's worksheet which is based on the higher order thinking has to refer to the general method of education development. The development model used is the Plomp model (1982). The stages of development in the Plomp model consist of five steps, namely; (1) initial investigation, (2) design, (3) construction, (4) test, evaluation and revision, (5) implementation. For the first year of this research, our target was to produce the prototypes of student worksheet that is based on higher-order thinking skills for learning economics in senior high schools. The initial investigation stage is the process of defining the problem by collecting and analyzing information about the problem on the subject study. At this stage the exploration of the literature and field observations were performed. The studied literature included the 2013 Curriculum, the textbooks that are currently in use in high schools and the models of existing worksheets. Besides, the study also collected the data of classroom assessment that were currently used by the teacher. Samples were taken from Bukittinggi, Padang, Agam Regency, and Pesisir Selatan Regency, in the form of semester exams and daily tests. From the observations, it was obtained that 80-90% of the tests used by teachers were still at levels C1 to C3, while the questions of HOTS only existed for 0-20%. The highest use of the HOTS question was in Padang, while the other cities and regencies only use it under 10%. The HOTS questions were also only found on the questions in the final semester exam. In the sample of the daily tests at the suburban regions, no have HOTS questions are found at any exam. This becomes an empirical description that the teachers in West Sumatra has not made the students familiar with high-order thinking skills.

After the initial investigation stage is completed, then design steps are performed. At the design stage, it produces various alternatives of problem solutions that need to be compared to find the best choice as a blue print. At this stage the research team began to formulate the forms, patterns, designs and models of worksheets to be made. One of the focuses in the design preparation is to study the existing student worksheet and the Regulation of The Minister of Education And Culture (Permendikbud) Number 24 of 2016 concerning the Core Competencies and Basic Competencies of Subjects in the 2013 Curriculum for Elementary and Intermediate Education. The results of this stage

are a structure, chapter and design of the worksheets that were used in the process. This worksheet was developed into 11 chapters in accordance with the basic competencies found in the Regulation of The Minister of Education And Culture (Permendikbud) Number 24 of 2016.

This competency was then translated into the chapters on student's worksheet. This student's worksheet were developed into 11 chapters, namely: Chapter I about the concept of economics, Chapter 2 about economic problems and economic system, Chapter 3 about consumer behavior, Chapter 4 about consumer behavior, Chapter 5 about demand, supply and market balance, Chapter 6 about market structure, Chapter 7 about institutions of financial service in the economy, Chapter 8 about management, Chapter 9 about cooperatives, Chapter 10 about business entities and Chapter 11 about money. The systematic of the students' worksheet is in the form of: title, learning instructions (instructions for students), competencies to be achieved, material and tasks and work instructions.

The next stage of this research is the fourth stage, namely the tests, evaluations and revisions. Theoretical validation was performed through the expert judgment. Prototypes validation of the students' worksheet by the experts was emphasized on the conceptual assessment and the internal structure of the worksheets and the implementation guidelines. The objective of the theoretical validation is to obtain input and suggestions from the experts and practitioners. Assessment aspects given by experts include the form of systematic and content feasibility, language feasibility and tasks (practice/questions). Then, the research team revised the student's worksheet according to the advice and input of the experts. The process of revision and discussion with experts was carried out several times until the expert granted a proper score for all aspects of the assessment. The results of revisions that have been discussed and agreed upon by the experts were then tried out for empirical testing in the field.

Furthermore, the empirical validation was performed by trying-out the student's worksheet on site through limited and expanded tests. The limited tryout only tested the students' worksheet to a number of students within certain limits (one class) at a high school. The objective of the limited tryout is to determine the students' review on the student worksheets as well as their practicality and effectiveness. Limited trials were conducted at the Laboratory High School Universitas Negeri Padang. The results of the students' and the teachers' review over the developed students' worksheet is shown in the following table with a maximum score of 5:

Table 1 Assessment Result in The Limited Tryout

No	Assessment Aspect	Average score in Student Assessment	Average score in Teacher Assessment
1	Aspect of Content Feasibility	4,5	4,8
2	Aspect of Language Feasibility	4,5	4,4
3	Aspect of Activity / Observation Feasibility	4,8	5
4	Aspect of Interface Feasibility	4,0	4
5	Aspect of Presentation Feasibility	4,3	5
6	Aspect of Performance and Measurement Feasibility	4,5	5

Teachers' and students' review over the developed worksheet are quite good. On average, the score for the aspect was scored with 4 out of 5. They have provided advice about the interface of student's worksheet as the improvement is expected.

Furthermore, the tests were extended into the State-owned High School No.1 and State-owned High School No.2 of Padang. The results of the assessment on the extended tryout are as follows:

Table 2 Assessment Result in the Extended Tryout

No	Assessment Aspect	Average score in Student Assessment	Average score in Teacher Assessment
1	Aspect of Content Feasibility	4,3	4,2
2	Aspect of Language Feasibility	4,2	4,2
3	Aspect of Activity / Observation Feasibility	4,2	4
4	Aspect of Interface Feasibility	4,0	3,7
5	Aspect of Presentation Feasibility	4,2	4,2
6	Aspect of Performance and Measurement Feasibility	4,3	4,4

Results from the expanded and limited tryout have found that the lowest ratings on teachers' and students' review were found in the aspect of the worksheet's interface. This is because this student's worksheet was still in the form copy printed and was still not well-printed and well-designed like the work of a professional publisher. Other aspects in this assessment received good review with the score above 4. The results of the review and written critics from the teachers and students were applied on the final revision of the student's worksheet.

The constraints of this study are the limitation on research process and development of worksheets that are based on the higher order thinking skills. The developed worksheets have not been used in real teaching yet, either with the classroom action approach or even in the quasi-experimental research. Future research can be performed with these kind approaches to analyze the effectiveness of this worksheet in improving the students' skills in critical thinking in real teaching situation.

Conclusions

The objective of this study is to develop the student's worksheet that is based on higher order thinking skills in learning economics at high school. This study used a research and development approach with five steps, namely; (1) initial investigation, (2) design, (3) construction, (4) test, evaluation and revision, (5) implementation. Based on the results and discussion as described previously, it is concluded that the developed student's worksheet, as per the review from experts, economic subject's teachers and high school students, is classified as "good" and are feasible to be used in learning economics to improve the students' higher order thinking skills.

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