



EVALUATIVE PROCESS BASE ON CONCEPTUAL PROBLEM BASED LEARNING MODEL : A CONCEPTUAL FRAMEWORK FOR LEARNING TOOLS TO TRAIN CRITICAL THINKING

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ABSTRACT: Critical thinking has important applications in every area of life and learning and is allegedly the main theme and goal of achieving competence in learning. Critical thinking can be taught through learner-centered interactive learning using learning tools that are relevant to the attributions of achievement of critical thinking skills. This study aims to develop a conceptual framework for evaluative-process learning tools based on conceptual-problem-based learning models to train students' critical thinking. The conceptual framework in question is a hypothetical evaluative-process framework based on the CPBL model, this is supported by the accompanying textbook mode. This study is a preliminary research (develop preliminary form of product). The product in question is an evaluative-process tool based on the CPBL model to train students' critical thinking. In accordance with the objectives of this study, the hypothetical framework was developed based on: a) research and information collecting; and b) planning. Research and information collecting is based on several aspects that have been carried out by researchers, namely a review of literature, classroom observation, and preparation of a state-of-the-art report. While in the planning process, defining skills and stating objectives determining course sequence have been carried out, where in the study conducted, critical thinking skills have been determined as the main aspect of the objectives of development, and the CPBL model has been determined as the basis model in the development of evaluative-process tools. The focus in this study covers two main aspects, namely developing a hypothetical evaluative-process framework based on the CPBL model and developing a textbook framework as an evaluative-process supporting tool based on the CPBL model.

Keywords: Evaluative Process, Conceptual Problem Based Learning, Critical Thinking.



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INTRODUCTION

Developing critical thinking skills in higher education is an important aspect of education, as it is believed that it can lead to better academic performance. The Indonesian National Qualifications Framework (level 6) explicitly emphasizes learning on skills to analyze and evaluate the information obtained in order to be able to make the right decisions and problem solving (Permenristek, 2015), and is a form of the Indonesian government's response to the importance of critical thinking being taught at the higher education level (Partnership for 21st Century skills, 2011; Wasis, 2016). Critical thinking skills can be taught through an interactive learning model centered on students using





learning tools that are relevant to critical thinking attributions. Learning models that can facilitate critical thinking learning include conceptual problem based learning (CPBL). The CPBL model has been empirically declared effective for teaching critical thinking skills, but there are weaknesses in some critical thinking indicators such as evaluation and inference (Karmana & Samsuri, 2018). These problems can be solved through evaluative processes that are integrated in learning using the CPBL model. The evaluative process is a directed, planned, and systematic effort to control the success rate of the learning process and can be integrated into the syntax of the learning model (Arifin, 2012).

The learning process in higher education which focuses on the transfer of information is a supporting factor for developing learning tools that have the characteristics of systematic knowledge construction (Fitriani *et al.*, 2018). Learning devices are one of the factors that play an important role in learning activities. The development of learning tools that are in accordance with the characteristics of teaching materials and learning models tend to have an impact on directed learning, so that the goal of optimizing learners' skills can be achieved (Akbar, 2013; Fitriani & Ikhsan, 2018).

The results of the empirical study on physics and biology prospective teacher, found that among the critical thinking components that have been tested there are weaknesses in the evaluation and inference aspects (Karmana & Samsuri, 2018). Critical thinking is one of the essential abilities that students must have in this century, so it is very important to carry out a learning innovation by developing learning tools (Fitriani & Ikhsan, 2018; Hunaepi *et al.*, 2018). Through the development of evaluative-process learning tools based on the CPBL model, it is considered very relevant to encourage students to construct the knowledge they have and what will be learned, so that this can train students' critical thinking skills as demanded by the standard learning process at the higher education level. The CPBL model has features that emphasize the process of exploring students' initial knowledge by presenting authentic concepts, associating students' prior knowledge with new information to be learned, identifying and implementing problem solving approaches, interpreting the results of investigations, and monitoring knowledge through a reflection process by presenting similar phenomena (evaluative process). This is very relevant to be used in learning to train critical thinking skills and accommodate problem solving in students.

This study aims to develop a conceptual framework for evaluative-process learning tools based on conceptual-problem-based learning models to train students' critical thinking. The conceptual framework in question is a hypothetical evaluative-process framework based on the CPBL model, this is supported by the accompanying textbook mode.

METHOD

This study is a preliminary research (develop preliminary form of product). The product in question is an evaluative-process tool based on the CPBL model to train students' critical thinking. In accordance with the objectives of this





study, the hypothetical framework was developed based on: a) research and information collecting; and b) planning. Research and information collecting is based on several aspects that have been carried out by researchers, namely a review of literature, classroom observation, and preparation of a state-of-the-art report. While in the planning process, defining skills and stating objectives determining course sequence have been carried out, where in the study conducted, critical thinking skills have been determined as the main aspect of the objectives of development, and the CPBL model has been determined as the basis model in the development of evaluative-process tools. The focus in this study covers two main aspects, namely developing a hypothetical evaluative-process framework based on the CPBL model and developing a textbook framework as an evaluative-process supporting tool based on the CPBL model.

RESULT AND DISCUSSION

Critical thinking has applications in every area of life and learning and is allegedly a major theme in modern education. The purpose of education in Indonesia explicitly emphasizes learning that directs students to the skills to analyze and evaluate the information obtained in order to be able to make appropriate problem solving decisions, and is a form of government response to the importance of critical thinking taught at the higher education level. Critical thinking skills can be taught through a learner-centered interactive learning model using learning tools that are relevant to critical thinking attributions. The learning tool in question is an evaluative-process based on the CPBL model. The hypothetical evaluative-process framework based on the CPBL model is presented in Table 1.

Table 1. A Hypothetical Evaluative-Process Framework Based on the CPBL Model.

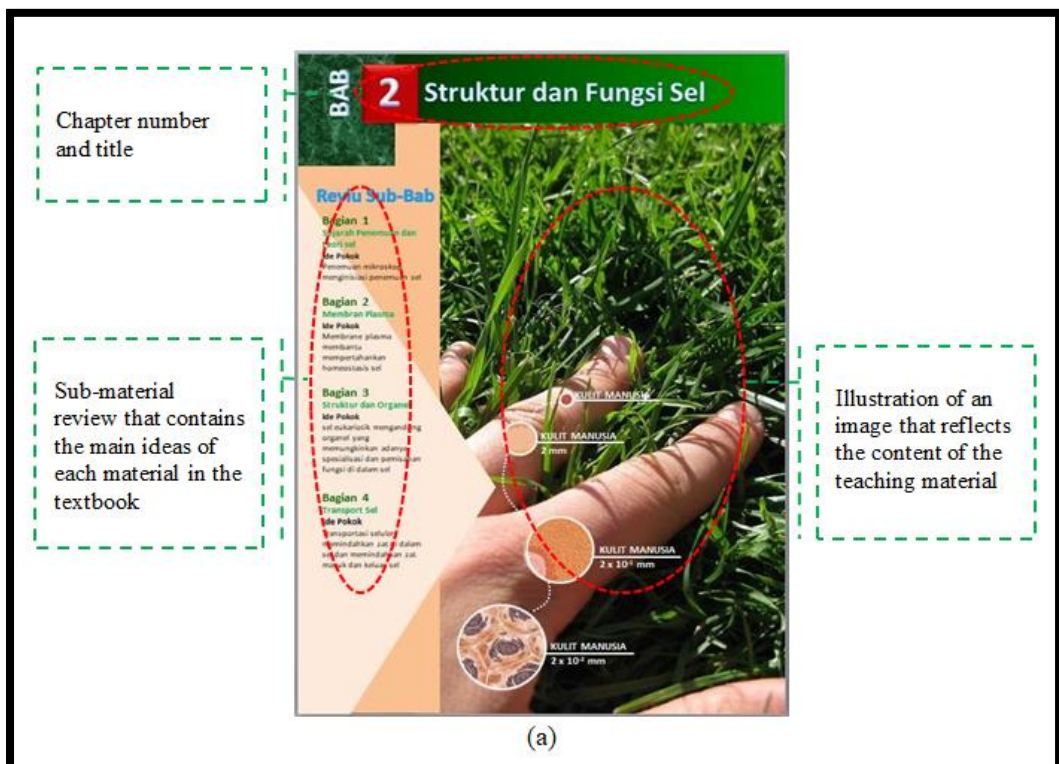
Learning Phases	Learning Activities
Prior Knowledge	<ul style="list-style-type: none">▮ The teacher explains the learning objectives, the necessary logistics, and motivates students to engage in problem solving activities and explore students' prior knowledge.▮ Define important concepts related to learning materials.▮ Classifying the terms contained in the definition of the concept of learning materials.
Advance Organizer	<ul style="list-style-type: none">▮ Provide examples to illustrate key characteristics or attributes in concepts in teaching materials.▮ Provide more examples and ask students to categorize concepts, explain the categorization, or ask students to generalize examples of concepts that students propose.▮ The teacher strengthens the concept through the step advance organizer related to the problem, namely the comparative organizer, activating existing schemes or reminding about what is known that may not be realized as relevant to the problem.▮ Expository organizer, namely providing new knowledge according to topics that will be needed to understand future information (problems to be solved).▮ The teacher reviews the concepts related to the problem with questions to the students.▮ Ask students to formulate plans to solve problems to be solved.



Learning Phases	Learning Activities
Investigate	<ul style="list-style-type: none"> ▸ The teacher helps students in groups to solve problems that will be investigated according to the plans that have been prepared. ▸ Gather relevant information. ▸ Carry out the experiments.
Analyze	<ul style="list-style-type: none"> ▸ Analyze the results of investigations that have been carried out. ▸ Looking for explanations and solutions according to a predetermined plan.
Evaluate	<ul style="list-style-type: none"> ▸ Evaluating the learning process. ▸ Asking students to make a concept map of the material being studied.

The CPBL model is based on the weaknesses of the problem based learning (PBL) model, where according to some experts it is stated that in the implementation of PBL students tend not to understand conceptual knowledge, declarative knowledge, and the idea that prior knowledge and advance organizer are needed in learning (Karmana & Samsuri, 2018). On this basis, the PBL model is arranged into a CPBL model by strengthening the acquisition of conceptual knowledge. Meanwhile, on the aspect of strengthening critical thinking, this model becomes the basis for learning that is attributable to evaluative-process.

Furthermore, the learning tools developed in this study focus on textbooks. One example of teaching materials in science developed is the structure and function of cells. The prototype and features of textbooks as supporting evaluative-process based on the CPBL model are presented in Figure 1.



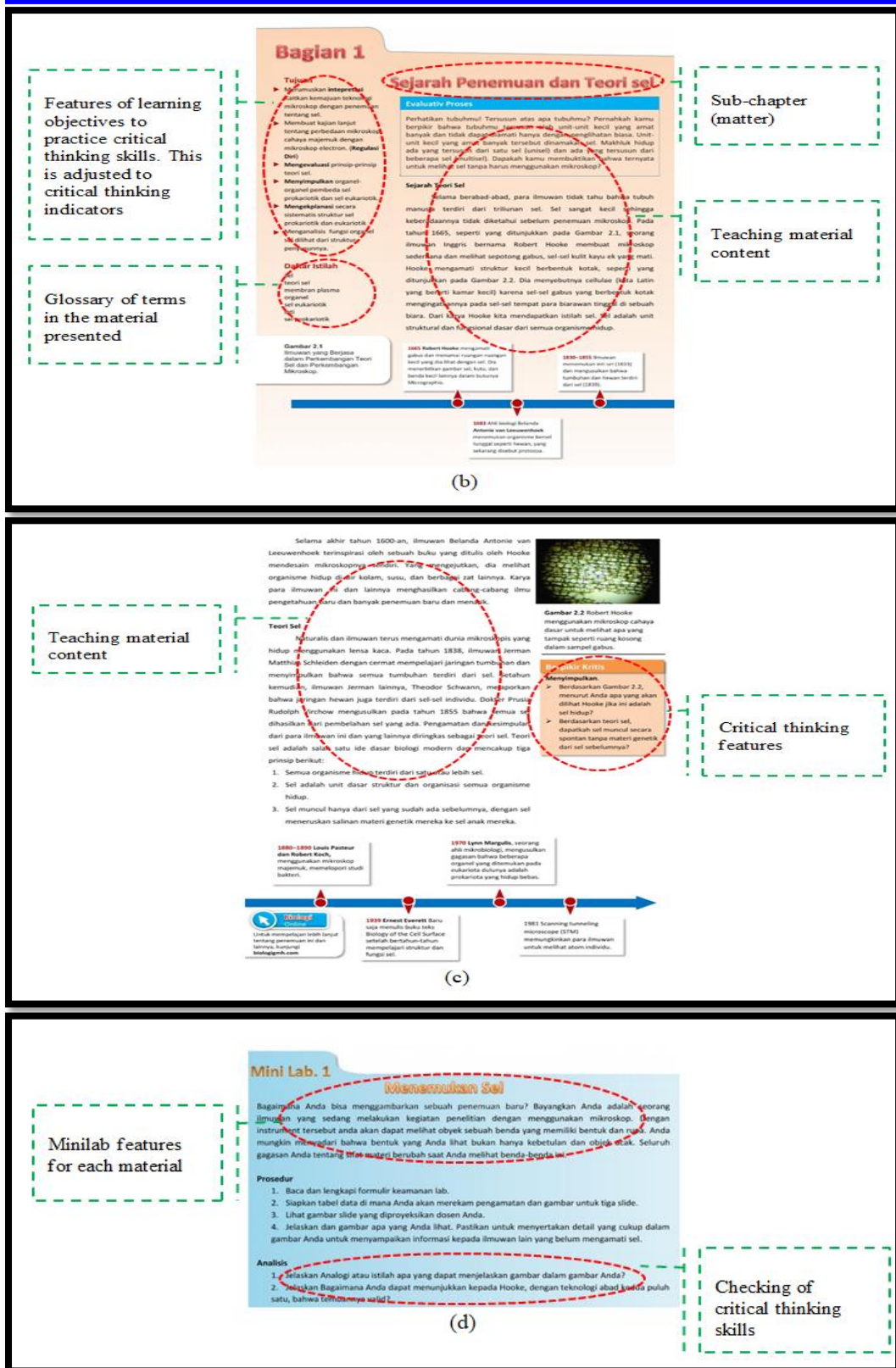


Figure 1. Features of Textbooks as the Main Tool for Supporting Evaluative-Process Based on the CPBL Model.



Based on Figure 1, some of the main features of textbooks as evaluative-process supporting tools based on the CPBL model are: a) sub-material review containing the main ideas of each material in the textbook; b) learning objectives to practice critical thinking skills. This is adjusted to the critical thinking indicators that will be trained; c) the content of teaching materials accompanied by picture illustrations; d) glossary of terms in the material presented; e) critical thinking features; and f) minilab for each sub-teaching material.

In the learning process, the presentation of teaching materials becomes the main competence of a teacher in designing activities and thinking skills that must be mastered by students (Dick & Carey, 1990). In addition, it contains information, tools and texts that are needed by the teacher in presenting the material and skills that students must possess (Prayogi, *et al.*, 2018). The textbooks in this study have fulfilled the elements according to Dick & Carey (1990), where the textbooks are designed specifically for the purpose of training students' critical thinking and facilitating the growth of active learning activities. The teaching materials developed by the teacher also contain learning objectives and experiences Blanchard (2002), as well as the books developed in this study, which have included these two things as attributions.

CONCLUSION

The conceptual framework of an evaluative-process tool based on the CPBL model has been designed, it is intended to train students' critical thinking. The CPBL learning phases that become the reference for the development of the device are prior knowledge, advance organizer, investigate, analyze, and evaluate. The main tools developed to support the evaluative-process based on the CPBL model are textbooks. The main features of the textbooks developed include: a) sub-material review containing the main ideas of each material in the textbook; b) learning objectives to practice critical thinking skills. This is adjusted to the critical thinking indicators that will be trained; c) content of teaching materials accompanied by picture illustrations; d) glossary of terms in the material presented; e) critical thinking features; and f) minilab for each sub-teaching material. To show that the developed device can train students' critical thinking, it is necessary to carry out implementation steps in the classroom.

RECOMMENDATIONS

The effects of critical thinking skills training will be more visible if the learning tools developed can be implemented on more participants and different subject matter.

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