Measuring Critical Thinking Skills with the RED Model

Riska Wulandari¹, Baedhowi², Aniek Hindrayani³
¹,²,³The Faculty of Teacher Training and Education, Sebelas Maret University
Jl Ir. Sutarmi No 36A, Kentingan, Surakarta, Indonesia
wulan.rwd12@gmail.com; bdhwi@yahoo.co.id;

Abstract: Critical thinking skills are one of the core and fundamental skills that are needed in 21st-century learning. In education in Indonesia, critical thinking skills are contained in the 2013 Curriculum as one of the goals of education. This article provides insight into critical thinking skills and discusses the concept of the RED Model's critical thinking skills and its indicators in measuring critical thinking skills. This research uses the Grounded Theory method, which aims to find new theories or to empower existing theories. The RED Model's critical thinking skills framework has three main indicators including (1) Recognize Assumptions; (2) Evaluate Arguments; and (3) Draw Conclusions. The RED Model's critical thinking skills framework and its indicators are expected to assist in encouraging the development of critical thinking skills and measuring critical thinking skills.

Keywords: 21st-century skills, critical thinking skills, RED Model.

1. Introduction

Education in Indonesia generally aims to develop student potential [1] where in achieving these educational goals, the implementation of learning activities is guided by the standards and references that have been determined, namely the curriculum. In the history of the implementation of education in Indonesia, there have been several changes and improvements to the curriculum, the latest being the 2013 curriculum. The 2013 curriculum was developed with an improvement in mindset [2] to achieve educational goals, one of which is a development mindset that can develop critical thinking skills.

The 2013 curriculum was developed to encourage higher-order thinking skills. Through the 2013 curriculum, efforts to develop higher-order thinking skills begin early, namely for students at the basic education level [3]. This is intended to train critical thinking from an early age so that it becomes a habit that will develop not only skills for critical thinking but also a critical attitude.

The term critical thinking emerged in the early 20th century which is believed to have been coined by John Dewey. Critical thinking skills have been a significant subject of study for decades [4]; [5]; [6]. Several studies have shown that critical thinking skills are important skills [7]. Critical thinking skills are increasingly being discussed in the educational aspect. The 2014 Times Educational Supplement survey found 92% of teachers identified critical thinking skills as very important skills [7]. Critical thinking skills are not only important in the educational aspect but also the field of work. The results of the 2010 AMA/P21 critical thinking skills survey identified that 73.3% of companies prioritized critical thinking skills as skills that workers need to develop [8].

In the 21st-century learning framework, critical thinking skills are in the aspect of learning and innovation skills along with other skills known as 4Cs which include Critical Thinking and Problem Solving, Communication, Collaboration, and Creativity and Innovation. This 21st-century learning framework demonstrates the important role each skill plays in every aspect of the field.
2. Research Question

In the 21st-century learning framework, critical thinking skills are in the aspect of learning and innovation skills along with other skills known as 4Cs which include Critical Thinking and Problem Solving, Communication, Collaboration, and Creativity and Innovation. This 21st-century learning framework demonstrates the important role each skill plays in every aspect of the field.

In education in Indonesia, critical thinking skills are contained in the 2013 Curriculum as one of the goals of education. This article provides insight into critical thinking skills and discusses the concept of the RED Model's critical thinking skills and its indicators in measuring critical thinking skills. This research uses the Grounded Theory method, which aims to find new theories or to empower existing theories.

Based on the background, the formulation of the problem can be broken down as follows: (1) how to measure critical thinking skills with the RED Model's? (2) What new theory can be found or what is the empowerment of existing theories? And the purpose of the study is to: (1) measuring critical thinking skills with the RED Model's, (2) find the new theories or to empower existing theories.

3. Methods

This research uses the Grounded Theory method. The Grounded Theory method aims to find new theories or to empower existing theories. This is done by studying the concepts, principles, and theoretical basics which will then become the basis of reference in making theoretical conclusions. The Grounded Theory method is a qualitative research method. This method does not test hypotheses but finds or supports research-related theories.
4. Results and Discussion

4.1 Critical Thinking Skills

Critical thinking is a logical thinking strategy. Critical thinking skills are skills or skills to think logically about new information by recognizing and evaluating facts and assumptions. These critical thinking skills help understand information from various perspectives by separating facts from opinions and assumptions [9] to reach correct and rational decisions.

Critical thinking skills are becoming more important in today’s era of industrial revolution and digitalization. Where a critical thinking strategy is needed in recognizing the right information, analyzing problems, and making the right decisions. Critical thinking skills are the basic material to encourage other skills [10]. This makes critical thinking skills a very important and needed skill that underlies the development of other skills.

Fig. 2: Critical thinking skills as a basis for encouraging other skills
Source: [10]

Critical thinking skills are skills to analyze and evaluate information objectively to form assessments [11]. Critical thinking skills are now needed more than ever [7]; [12]. Critical thinking skills are needed to help adapt to the development of information [12]. Individuals need to think critically about new information as a basis for making decisions so that they can solve problems constructively, draw reasonable conclusions, and make appropriate decisions.

Critical thinking skills are one of the core skills of the four core skills or 4Cs. In education, critical thinking skills are one of the higher-order thinking skills that need to be developed in 21st-century learning. This is in line with Abdi’s opinion [13] that the important thinking skills students must acquire are critical thinking skills. Critical thinking is about interpretation and evaluation [14]. Furthermore, Johnson [15] argues that critical thinking is a systematic and organized process in formulating and evaluating assumptions. This allows students to assess evidence of an assumption or information.

According to [16], the critical thinking process involves elements of judgment and reasoning of information. Students who have critical thinking skills tend to be able to identify relevant information as a basis for decision making. Critical thinking skills tend to help students in analyzing problems and solutions [17]; [18]. [19] states that researchers agree that critical thinking involves solving problems and requires evaluating facts.
The framework for critical thinking skills conceptualized by Watson and Glaser was originally expressed as cognitive abilities [19]. Watson and Glaser's framework for critical thinking includes:

Table 1. Watson and Glaser's framework for critical thinking skills

| Ability         | Area                                           |
|-----------------|------------------------------------------------|
| Critical thinking | 1. Draw conclusions from information           |
|                 | 2. Identify assumptions                        |
|                 | 3. Draw logical conclusions based on evidence  |
|                 | 4. Evaluate evidence                           |
|                 | 5. Evaluate arguments                          |

Source: [19]

Furthermore, Ennis [20] defines critical thinking as logical and reflective thinking that underlies decision-making to believe or act. According to Ennis, the framework for critical thinking skills as an important skill is:

Table 2. Ennis's critical thinking skills framework

| No | Area             | Description                                                                 |
|----|------------------|-----------------------------------------------------------------------------|
| 1  | Basic classification | a. Focus on questions; b. Argument analysis; c. Ask clarifying questions.    |
| 2  | Basic support    | a. Judging the credibility of the source; b. Observe and judge observational reports. |
| 3  | Inference        | a. Deduction and judge deduction; b. Induction and judge induction; c. Make and judge statements |
| 4  | Advance clarification | a. Defines terms and judge definitions; b. Identify assumptions.         |
| 5  | Strategy and tactics | a. Define actions; b. Interaction.                                    |

Source: [20]

Teachers need to develop critical thinking skills in learning activities. Ormrod [16] concluded that experts provide several suggestions to teachers to encourage the development of critical thinking skills of students, including: (1) Teaching material topics in depth; (2) Ask questions that encourage critical thinking; (3) Stimulates reason and challenge ideas and opinions; (4) Encouraging activities to identify, evaluate, use evidence and logic, argue.

The development of critical thinking skills has been encouraged in recent years both in the fields of education to work. In the development of critical thinking, there are tools in the assessment or measurement of critical thinking skills such as those developed by Watson and Glaser, Ennis, and other researchers. Assessment of critical thinking skills has objectives that include [20]: (1) Diagnosing the level of critical thinking; (2) Give feedback; (3) Provide motivation; (4) As a basis for teacher success reports; (5) Conducting research on critical thinking teaching problems; (6) Giving consideration in making decisions; (7) Provide information on critical thinking skills.

4.2 The RED Model’s critical Thinking Skills

Pearson TalentLens [9] defines critical thinking skills as the ability to see and understand a situation and information from various points of view followed by separating facts from opinions and assumptions. Pearson TalentLens [9] explains that this critical thinking ability involves three main
aspects including: (1) Think logically carefully in recognizing assumptions; (2) Evaluating arguments using an objective approach; (3) Focus on relevant information.

Pearson has done a lot of research related to critical thinking skills and their measurement and assessment have been done in recent times. In his latest work, Pearson TalentLens has developed the RED Model’s critical thinking skills which consist of (1) Recognize Assumptions; (2) Evaluate Arguments; (3) Draw Conclusions, as an effort to apply and measure critical thinking skills. This model is believed to be very helpful in developing critical thinking skills.

![Fig. 3: RED Model of Critical Thinking Skills](source: [10])

### 4.2.1 Recognize assumptions

An assumption is something that is believed to be true even without evidence. In developing critical thinking skills, the ability to recognize assumptions is required. Questioning assumptions helps to separate information from baseless logic [9]. It is important to separate assumptions from facts and opinions. Assumptions also need to be examined from multiple points of view [9].

### 4.2.2 Evaluate arguments

The ability to evaluate arguments is essential. In evaluating arguments an objective analysis of information and opinions is needed and evidence analysis is also needed [9] to strengthen and clarify the truth of an argument.

### 4.2.3 Draw conclusions

Drawing conclusions is an end goal that needs to be achieved precisely. After the process of identifying the assumptions correctly and the process of evaluating the arguments objectively, we arrive at a logically determined conclusion accompanied by evidence.

According to [9], there are several key questions of the RED Model that can help in encouraging and developing critical thinking skills. The key questions for the RED Model fall into three areas of the critical thinking framework of the RED model. The key question of this RED model is expected to be able to assist in encouraging the development of thinking skills, namely critical thinking skills.
Based on the description of the critical thinking skills of the RED Model above, the RED Model's critical thinking skills framework according to [9] can also be described into a description of indicators and descriptions which can be seen in Table 3 below.

Table 3. RED Model critical thinking skills framework

| No | Indicator          | Description                                      |
|----|--------------------|--------------------------------------------------|
| 1. | Recognize Assumptions | a. Questioning assumptions                      |
|    | b. Examining assumptions from multiple points of view |
|    | c. Gather information                                      |
| 2. | Evaluate Arguments | a. Analyzing arguments                          |
|    | b. Evaluating evidence                                     |
|    | c. Be objective                                             |
| 3. | Draw Conclusions   | a. Draw logical conclusions                      |
|    |                   | b. Draw evidence-based conclusions               |

5. Future trends and Conclusion

The ability to think critically is one of the important skills in learning in the 21st century. In the objectives of education in Indonesia in particular, critical thinking skills are also one of the goals that need to be achieved and developed even from an early age at the basic education level as stated in the 2013 Curriculum. Critical thinking skills are skill in the thinking process, by analyzing information and evidence to draw logical conclusions supported by evidence. The RED Model’s critical thinking skills framework developed by Pearson TalentLens has three main indicators including (1) Recognize Assumptions; (2) Evaluate Arguments; and (3) Draw Conclusions. This framework is expected to assist in encouraging the development of critical thinking skills and measuring critical thinking skills.
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