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Opportunity Integrated Assessment Facilitating Critical Thinking and Science Process Skills Measurement on Acid Base Matter

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Abstract. Recognizing the importance of the development of critical thinking and science process skills, the instrument should give attention to the characteristics of chemistry. Therefore, constructing an accurate instrument for measuring those skills is important. However, the integrated instrument assessment is limited in number. The purpose of this study is to validate an integrated assessment instrument for measuring students' critical thinking and science process skills on acid base matter. The development model of the test instrument adapted McIntire model. The sample consisted of 392 second grade high school students in the academic year of 2015/2016 in Yogyakarta. Exploratory Factor Analysis (EFA) was conducted to explore construct validity, whereas content validity was substantiated by Aiken's formula. The result shows that the KMO test is 0.714 which indicates sufficient items for each factor and the Bartlett test is significant (a significance value of less than 0.05). Furthermore, content validity coefficient which is based on 8 experts is obtained at 0.85. The findings support the integrated assessment instrument to measure critical thinking and science process skills on acid base matter.

INTRODUCTION

Nowadays, we are in the area of science and technology where scientific knowledge has grown exponentially and technology has progressed at rapid pace. Science education plays a major role for the futures of societies. Globally, countries have continuously sought to improve the quality of science education particularly developing countries. Based on Indonesian Law number 20/2003 the government construct curriculum to produce human resources who are productive, creative, innovative, and affective throughout attitude, skills, and knowledge in integrated manner [1]. Therefore, school should enable students to integrate their knowledge with problems in daily life. Those potency can be materialized if the science learning process can grow students' critical thinking and science process skills, so do chemistry as a part of science.

Recognizing the importance of science process skills, lately several studies related to that has been done. Science process skills could use in each step of students' life by being scientifically literate by comprehending the nature of science. Therefore, science process skills are necessary tool to produce and use scientific information, to perform scientific research, and to solve problems [2]. It is more important for the students to learn how to apply science than learning reality, concepts, generalizations, theories and laws in science lessons [3]. Science process skills should be applied to students because indirectly involving them in various inquiry activities. In addition, it is able to direct them to apply both basic and integrated science process skills [4].

Critical thinking skills are essential part of the process of scientific investigation, especially the analysis and evaluation of scientific evidence [5]. In the other words, science process skills have correlation with critical thinking skills because it has a close relationship with the mastery concept [6]. Some scholars and educators erroneously assume critical thinking to be higher order thinking [7]. Therefore, it is important to develop science process skills to ensure student master the concepts taught well. Upon the statements of experts, students should be prepared to cope with this world with higher level skills involving critical thinking and science process skills, so that they can solve problems in education learning and other fields.

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