Student Development Zone: Higher Order Thinking Skills (Hots) in Critical Thinking Orientation

by Syarifuddin Syarifuddin

Student Development Zone: Higher Order Thinking Skills (Hots) in Critical Thinking Orientation

Riswan Jaenudin; Umi Chotimah; Farida; Syarifuddin

Faculty of Teacher Training and Education, Sriwijaya University, South Sumatera, Indonesia

Abstract

Education is an important thing for humans to need because it functions to prepare human resources in the nation's development process. There are several characteristics in formal education, namely: having a clear curriculum, applying certain conditions for students and teaching staff must meet certain classifications. A person's ability to achieve success in life is determined by how much his ability to think in facing and solving life's problems. Someone who has the ability to think critically will always evaluate an activity to conclude everything that is factual. This research uses qualitative methods and literature study approaches. The results of the study describe: 1. Educational Zones: Higher Order Thinking Skills (HOTS); 2. Student Zone: Higher Order Thinking Skills (HOTS) in the Orientation of Increasing Critical Thinking; 3. Higher Education Zone: Reflections on Critical Thinking. The conclusion obtained is that HOTS is said to be good because it can find problems, solve problems and in the process of problem solving involves thinking processes of analyzing, evaluating, creating. This is because in the learning process students are actively involved to search for and find various concepts of knowledge so that it will increase creativity, innovation ability and critical thinking processes of students in solving a problem. If this continues to be honed, we will be able to compete in the 4.0 industrial revolution era.

Keywords: Student Development; HOTS; Critical Thinking

Introduction

Education is a very important thing that humans need because education has the duty to prepare human resources for the development of the nation and state. Advances in science and technology produce change and growth in a more complex direction. Especially for Indonesia, because Indonesia is a developing country's education for the purpose will be prioritized, because education m , emiliki a very important role in the realization of the nation's dignity civilization. In Indonesia, the purpose of education is in the National Education System Law, Number 20 of 2003 Article 3: the function of national education to develop capabilities and shape the character of the nation and civilization in order to educate the living nation, which aims at developing the potential of students to become human beings who have faith and devotion to God Almighty, noble, healthy, knowledgeable, capable, creative, independent, and become a democratic and responsible citizen (Kemdikbud, 2015). Education is one of the human needs not only to

enhance and explore the potential that is in humans, but also to develop cognitive aspects, psychomotor aspects and affective aspects.

Education is carried out in a family environment (in formal), school (formal) and community (non-formal). In formal education, there are several characteristics, including: having a clear curriculum, applying certain conditions for students, the learning material used is academic, the education process is long enough, teaching staff must meet certain classifications, the delivery of education comes from the government and personal. A person's ability to achieve success in life is determined by how much his ability to think in dealing with and solving life problems and lives faced (Direktorat Pendidikan, 2003).

Aside from being a means for overcoming and solving problems, thinking is also a means to achieve educational goals, namely students have the ability to find solutions in an effort to solve problems that are above average reflective, critical and creative thinking abilities. Reasoning activities in intellectual processes involving concept formation, application, and analysis assess existing information (Fisher, 2014) . Critical thinking is one of the fundamentals of capital for everyone, someone who thinks critically will always evaluate what is followed by activities to infer everything that is factual to make a decision. Businesses in the habit of critical thinking gradually have a tendency to shape learners motivated by their curiosity about their immediate environment in giving meaning (Kowiyah, 2012).

People who think critically have goals, namely; realizing in-depth knowledge, so that with the ability referred to students can realize predetermined competency standards (Horvath and Forte, 2011) . There is an assumption that critical thinking requires a level of intelligence that is high or above average, on the contrary, critical thinking can be done by everyone (Mulnix, 2012). Furthermore it is said that critical thinking is a skill in life, not a hobby in academics or education. Because critical thinking is a hobby of thinking that can be developed by every human being, this hobby must be taught and applied in learning not only in elementary school but also in universities.

Students in universities are people who are categorized as adult humans. A student is required to master the abilities of course, one of the essential capabilities controlled by students is the ability to think critically or otherwise known as Higher-Order Thinking Skills (HOTS), because higher-level thinking is one of the stages of thought that can not be separated from ordinary life day and every student is directed to have a high-level thinking pattern because high-level thinking skills make someone able to think critically (Lai, 2011).

Methodology

This study uses a qualitative paradigm and includes the type of literature study research by finding reference theories that are relevant to the case or problem found. The theoretical references obtained by means of research literature studies serve as the basic foundation and the main tool for research practice in the middle of the field. Literature study is a method used to collect data or sources related to the topics raised in a study. Literature studies can be obtained from various sources, journals, documentation books, internet and literature (Bruce 2013) . Research with literature studies is still rarely done, literature study is a study whose preparation is the same as other studies but the sources and methods of data collection by taking data in the library, reading, recording, and processing research materials. Research with literature studies is also a research and can be categorized as a scientific work because data collection is done by a strategy in the form of research methodology (Melfianora, 2017).

Results

Based on the formative assessment and observations from the research observer in the first meeting to the second meeting by answering questions with this HOTS-based assessment instrument, it can be seen in table 4.22 below.

Table 4.22 Recapitulation of formative assessment for FKIP Unsri Students

No	Content	Score Avarage	Category
1.	Economy	66.02	Good enough
2.	Civics	77.68	Good
3.	History	72.26	Good
	Average	71.99	Good

Table 4.23 Recapitulation of formative assessment for OIU Sudan Students About Civics

No	Score Range	Frequency	Percentage (%)	Category
1.	85 – 100	2	8	Very Good
2.	70 – 84	12	48	Good
3.	55 – 69	10	40	Good enough
4	0 - 54	1	4	Poor
		25	100	
	Average		70.00	Good

Table 4.24 Recapitulation of formative assessment for OIU Sudan Students About History

No	Score Range	Frequency	Percentage (%)	Category
1.	85 – 100	1	6.67%	Very Good
2.	70 – 84	10	66.67%	Good
3.	55 – 69	3	20.00%	Good enough
4	0 - 54	1	6.67%	Poor
		15	100.00%	
	Average		71.57	

Table 4.25 Recapitulation of formative assessment for OIU Sudan Students About Civics and History

No	Content	Score Avarage	Category
1.	Civics	70.00	Good
2.	History	71.57	Good
		70.78	Good

No	Score Range	Frequency	Percentage (%)	Category
1.	70-84	12	48	Good
2.	70-84	10	66.67	Good
	Total/Average		57.36	

From the data that can be collected in the field as in the table it can be concluded that 57.36% the critical thinking ability of students both students of Civic education and History Education programs of FKIP and Sudanese OIU students are good in the average, but the highest score average is different.

Education Zone: Higher Order Thinking Skills (HOTS)

Thinking is a mental process that involves the work of the brain, also involving all humans and human feelings and desires. When we think about something that means we direct ourselves to a particular object, realize its presence and while actively expressing it in our minds for the next emergence of ideas or ideas about which mind objects we think about. Rudnick (1999) in the article Idris Harta, thinking skills consist of four levels, namely memorization (recall), basic (basic thinking), critical (critical thinking), and creative (creative thinking). Lorin Anderson revised Bloom's taxonomy in 1990. The improvement results were published in 2001 under the name Revised Bloom taxonomy (Ramos, Dolipas, and Villamor, 2013).

According to Krulik Lorin Anderson revised Bloom's taxonomy in 1990. The results of the revision were published in 2001 under the name Bloom Revised Taxonomy. HOTS in Bloom's taxonomy, is a sequence of levels of (cognitive) thinking from low to high. In the cognitive domain, HOTS is at the level of analysis, synthesis and evaluation. HOTS was first appointed in 1990 and revised in 1990 to make it more relevant to the 21st century education. Furthermore, the old version of HOTS is a noun, namely: Knowledge, Understanding, Applied, Analysis, Synthesis, Evaluation. Whereas HOTS after being revised becomes a verb: Remembering, Understanding, Implementing, Analyzing, Evaluating, and Creating. In essence, High Order Thinking Skills (HOTS) or higher order thinking abilities are defined as thoughts that occur at a high level in a cognitive process. According to Bloom's taxonomy, the ability to think revision in the cognitive domain is divided into six levels, namely knowledge, understanding, application, analysis, synthesis, and evaluation (Retnawati et al. 2018).

Krathwohl (2002) and Schraw et al. (2011) classifies Bloom's thinking skills into two levels, namely Lower Level Thinking Skills consisting of knowledge and understanding, as well as higher level thinking skills consisting of application, analysis, synthesis, and evaluation. According to Brookhart (2010) Higher Level Thinking Skills (HOTS) are understood as the top end of Bloom's cognitive taxonomy: Analyzing, Evaluating, and Creating, or, in older languages, Analysis, Synthesis, and Evaluation. The teaching goal behind each cognitive taxonomy is to equip students to be able to transfer. "Being able to think" means students can apply the knowledge and skills they develop during learning to new contexts. "New" here means applications that have not been thought of by students before, are not necessarily something that is universally new. Higher-order thinking is understood as students can connect their learning with other elements beyond those taught to be associated with it (Taxonomy, 2000).

According to Curtis Jay Bonk and G. Stevenson Smith (1998) that critical thinking includes cognitive processes that look for evidence and demand justification including selecting relevant information, distinguishing relevant and irrelevant facts, analyzing the credibility of information sources, determining the strength of arguments, identifying the strength of arguments, identifying relationships and alternatives, smart and peer, recognize assumptions / biases / and logical errors, defend ideas and hypotheses and draw conclusions and conclusions. Critical thinking is the ability to make judgments in complex real-world situations based on available evidence and value systems and then draw conclusions (Thompson and Wennemer, 1979).

A study conducted by Suarsana (2013) with the title: "*Development of Problem Solving-Oriented E-Modules to Improve Students' Critical Thinking Skills*", The purpose of this study is to develop problem-oriented algebra-oriented e-modules, find out the effectiveness of using e-modules in

improving thinking skills critical of students as well as knowing students' responses to the use of e-modules in algebra lectures. This research was carried out using a development research design by adopting the Plomp model which included several phases such as: 1) the initial investigation phase; 2) design phase / design; 3) realization / construction phase; 4) test, evaluation and revision phases; and 5) implementation phase. This research did not reach the implementation stage because of the time that was not possible. The results obtained through this study are as follows: 1) E-modules that have been prepared are of good quality, but still need further refinement; 2) The use of e-modules can improve students' critical thinking skills; 3) Student responses to the use of e-modules in lectures are very positive.

Student Zone: Higher Order Thinking Skills (Hots) in Critical Thinking Orientation

A student is someone who is in the process of gaining knowledge or learning and is enrolled undergoing education in one form of higher education consisting of academics, polytechnics, high schools, institutes and universities (Hartaji, 2012). In the Indonesian Language Dictionary (KBI), students are defined as people who study at tertiary institutions (Language Center for Ministry of Education and Culture, 2016).

According to Siswoyo 2007 students can be defined as individuals who are studying at the tertiary level, both public and private or other institutions that are on the same level as tertiary institutions. Students are considered to have a high level of intellect, intelligence in thinking and action planning. Critical thinking and acting quickly and precisely are traits that tend to be inherent in every student, which are complementary principles. Higher education can be a time of intellectual discovery and personality growth. Students change when responding to a curriculum that offers new insights and ways of thinking such as; towards other students who differ in terms of views and values, towards student cultures that are different from cultures in general, 20 and towards faculty members who provide new models. The choice of higher education can represent the pursuit of passionate desires or the beginning of a future career (Pudjowati and Widodo, 2016).

Academic life gives freedom and honesty of thinking to produce innovative thoughts and works to advance a field of science, technology and art. In social and cultural life is a consequence of living in a civilized society that is expected that students can develop themselves so that they can succeed, among others, in social intercourse, learning art, culture, sports, organizing, knowing ethics and manners, and eliminating psychic in him to find and shape identity. Whereas in political social life is a life that pays attention to how the Indonesian nation grows as a nation that is democratic, just, pays attention to human rights, social justice that generates prosperity and a dynamic, productive and contributory society to growth (Azwar, 2013).

The number of demands that must be achieved by students will certainly be responded to differently by each student. The expectation that arises is that students will be able to respond positively to these demands by making adjustments to various demands outside without ignoring the demands within themselves. To meet all these demands, it is not an easy job so that eventually many students fail halfway or at least wasting time. There are still many students who have not been able to make adjustments so that students are faced with various problems concerning academic and non-academic life. One of the problems faced by many students is about student discipline in managing time. Related to the discipline, in the scientific literature of psychology there is a term procrastination that refers to the behavior of time discipline. Procrastination is a tendency to postpone starting or completing overall performance so that performance is hampered (Herawati, 2015).

This is further explained by Knaus (in Nurpitasari, 2001) that the length of a student's graduation is an indication of academic procrastination. Procrastination is one of the inefficient behavior in the use of time (Premadyasari, 2012) . The tendency not to start immediately when facing a task is an

indication of procrastination. People who do procrastination have difficulty doing something according to the deadline. (Khairat, Maputra, and Rahmi, 2014) the percentage of students who postpone and are stuck in lectures with academic reasons is quite high. The number tends to increase along with the longer a student is in college. Every year the number of students postponed in one class continues to increase along with the increasing length of study period. The research results of Solomon and Rothblum (in Ferrari, et al, 1995) found that of the various types of academic assignments, the most frequently procrastinated task was the task of composing and studying for exams (Amri and Hendrastomo, 2016) . Delays made on the writing task referred to here are delays in doing the final project which is often done for various reasons by students who ultimately hinder their graduation. Therefore students must have a Higher Order of Thinking Skill (HOTS) so that they will automatically have critical thinking skills.

Higher Order of Thinking Skills (HOTS) is the ability to think, logical, reflective, metacognitive, and creative thinking which is a higher order thinking ability (Lewis and Smith, 1993). Higher Order of Thinking Skills (HOTS) is a thinking ability that not only requires the ability to remember, but requires other higher abilities, such as the ability to think creatively and critically. HOTS (Higher Order of Thinking Skill) shows an understanding of information and reasoning rather than just remembering information. Lecturers do not only test memories, so sometimes it is necessary to provide the information needed to answer questions and students show understanding of ideas, information and manipulating or using that information. Other engineering techniques that can develop students' critical and creative thinking skills can be directed by lecturers in accordance with Higher Order of Thinking Skill indicators (King, Goodson, and Rohani, 1998).

The presence of questions that have HOTS (Higher Order of Thinking Skills) background on national examinations (UN) and joint selection into state universities (SBMPTN 2019), are things that we should appreciate in order to improve the ability of prospective students to compete and did well in college and graduated later. HOTS is implementatively a test material (questions / questions) that stimulates high-level reasoning because it requires high analytical skills. This is a kind of selection process for prospective students to have started to get used to understanding how the atmosphere of a true college life requires an adequate level of reasoning. According to the Taxonomy of Educational Objectives: The Classification of Educational Goals that guide, a book by Benjamin S. Bloom in 1956, there are six levels of thought that exist in the human brain which are divided into six classifications ranging from low to high (Goodson and Spiritual, 1998).

According to Bloom's Taxonomy, the name commonly known finally, the low level of thinking (LOTS-Low Order of Thinking Skills) is to remember, understand and apply, while those classified as high level of thought (HOTS) are to analyze, synthesize, evaluate and create. Seeing the current development of the digital world marked by the discovery of Artificial Intelligence (Artificial Intelligence), financial technology Blockchain (Blockchain technology), Disruptive Innovation (Disruptive Innovation), Machine Learning, Data Science, Big Data, Algorithms and many other things that will be created, if you rely solely on a low level of ability (memorizing and understanding), in general Indonesian students will find it difficult to compete in international competitions. How is it possible that only the ability to memorize can create ideas out of the box such as Bitcoin, Big Data, AI and others? This revolution of thinking marked the presence of the Industrial Revolution 4.0 which began with wireless communication and the rapid development of the computer world (machine learning) (Perner and Dienes, 1999).

So HOTS will encourage prospective students to find alternative and rich answers and not just rely on one answer obtained from the memorization process without understanding the concept of knowledge. This is a characteristic of 21st century learning skills that include critical thinking, creative / creative, able to combine a lot of knowledge that is used (collaborative) and sociable and active in understanding technological developments that are trendy (communicative) through concepts This subject

matter covers three domains namely cognitive (ability and reasoning / logic skills about science), affective (emotional ability and attitude) and psychomotor (physical ability in activities). HOTS is included in the cognitive domain in Taxonomy Bloom which was later updated by Lorin Anderson, David Kartwohl, et al in 2001 so that the sequence is to remember, understand, apply, analyze, evaluate and create. The types of questions such as what allows us to get logical responses from students turn out to have several categories here (Ahmad et al. 2018).

Questions such as multiple-choice (multiple choice), match (matching) and fill in the fields / box empty (fill in the blank) have a tendency to get a student's ability low level of knowledge / recall (knowledge / remembering) and understanding (comprehension / understanding). While essay-type questions, experiments / research, exposure (portfolios), appearance / performance (performance) tend to measure the ability in higher thinking, namely analysis, synthesis, evaluation and creation (Five, 1993).

Higher Education Zone: Critical Thinking Reflection

Higher Education is a formal institution that will produce competent workforce who are ready to face the growing work industry in line with technological advances. Work skills, adaptability and dynamic mindset become challenges for human resources, which should be obtained when receiving formal education in Higher Education. The success of a tertiary institution is no longer the main indicator for quality, but the quality of its graduates. The success of a country in facing the industrial revolution 4.0 is closely related to innovation created by quality resources, so that universities must be able to answer the challenges to face technological advances and competition in the world of work in the era of globalization. Higher education institutions in Indonesia must be able to anticipate the rapid development of technology that occurred in the era of the industrial revolution 4.0. Education curricula and methods must also adapt to an increasingly competitive business and industry climate and follow developments in technology and information. The challenge faced is how to prepare and map the workforce of education graduates in the face of the industrial revolution 4.0 (Che Teh, Isa, and Omar, 2018).

The world of work in the industrial revolution era 4.0 is an integration of the use of the internet with production lines in the industrial world that utilize technological and information sophistication. The characteristics of the 4.0 industrial revolution include digitization, optimization and customization of production, automation and adaptation, human machine interaction, value added services and businesses, automatic data exchange and communication, and the use of internet technology (Shaari, 2018) . Higher education must be sensitive to the challenges faced by society, because with that sensitivity universities can provide recommendations and solutions to answer all problems. Industry 4.0 is a journey in the field of innovation and technology. However, specifically in Indonesia, what is also spurred on is empowering human talents. So, there are three key keys, human resources, technology and innovation (Rohida, 2018).

Minister of Research, Technology and Higher Education (Menristekdikti) Mohamad Nasir explained, based on the initial evaluation of the country's readiness in facing the industrial revolution 4.0 Indonesia was estimated as a country with high potential. Although still below Singapore, at the level of Southeast Asia Indonesia's position is taken into account. Whereas related to the global competitiveness index at the World Economic Forum 2017-2018, Indonesia ranks 36th, up five ranks from the previous year 41st position out of 137 countries. "But compared to Malaysia, Singapore and Thailand, Indonesia is still below. This year Thailand's global competitiveness index is ranked 32, Malaysia 23, and Singapore third. Some of the causes of Indonesia are still losing because of the weakness of higher education and training, science and technology readiness, and innovation and business sophistication. This is what needs to be improved so that our competitiveness is not low". So the need for students to have sharp analytical skills in all social problems is urgently needed. Hots gave a gap for the mission (Ghufron, 2018). According to the Director General of Learning and Student Affairs Kemenristekdikti, Prof. Intan Ahmad, Ph.D., HOTS is a way to test whether someone can analyze, compare, calculate, and so on. "*So*

an unusual ability is needed. Not just to memorize or memorize it," explained Prof. Intan in the SBMPTN LIVE Special Ruangguru on Tuesday, October 30 in Jakarta.

Conclusion

High order thinking is said to be good because it already has the ability to think in finding problems, solving problems and in the process of problem solving involves thinking processes analyzing, evaluating, creating. This is because in the learning process students are actively involved to search for and find various concepts of knowledge so that it will increase the power of creativity, innovation ability and critical thinking processes of students in solving a problem. If this continues to be honed, we will be able to compete in the 4.0 industrial revolution era. HOTS encourages prospective students and students to make high-level reasoning so that it is not fixated on only one pattern of answers that results from the memorization process, without knowing the concept of knowledge. HOTS is one of the skills demands in 21st century learning, namely critical thinking, creative, collaborative, and communicative. In preparing students who are ready to compete in the face of the millennium era and the industrial revolution 4.0, teachers must be able to direct students to be able to think critically, analytically, and be able to provide conclusions or problem solving. HOTS questions do not mean difficult problems, long and convoluted editors so many waste a lot of time reading and confusing students at the same time, but the questions are arranged proportionally and systematically to measure Competency Achievement Indicators (IKK) effectively and have depth so that they are stimulated to answer not just "button counting" or answering carelessly. The answers to the questions besides being closed can also be open in order to be able to construct the answers freely.

References

Ahmad, S. et al. (2018). "The Instruments of Higher Order Thinking Skills." In *Journal of Physics: Conference Series*,.

Amri, Rivan, and Grendi Hendrastomo. (2016). "Dinamika Gerakan Kritis Mahasiswa Universitas Negeri." *E-Societas*.

Azwar, Budi. (2013). "Analisis Faktor-Faktor Yang Mempengaruhi Niat Kewirausahaan (Entrepreneurial Intention). Studi Terhadap Mahasiswa Universitas Islam Negeri SUSKA Riau." *Jurnal Menara*.

Bruce, 2011. (2013). "Studi Literatur." *Journal of Chemical Information and Modeling*.

Che Teh, Norhezan, Nor Hashimah Isa, and Ainon Omar. 2018. "Promoting Higher Order Thinking Skills in Literature Class via Critical Thinking Module (CTM)." *ASIAN TEFL Journal of Language Teaching and Applied Linguistics*.

Direktorat Pendidikan Menengah Umum. (2003). "Sistem Pendidikan Nasional." *Jakarta: Direktorat Pendidikan Menengah Umum*.

Fisher, Alec. (2014). "Berpikir Kritis." *Berpikir Kritis Sebuah Pengatar*.

Five, Chapter. (1993). "Teaching Higher-Order Thinking." *Educational Leadership*.

Ghufron, M A. (2018). "Revolusi Industri 4.0: Tantangan, Peluang Dan Solusi Bagi Dunia Pendidikan." *Seminar Nasional dan Diskusi Panel Multidisiplin Hasil Penelitian dan Pengabdian kepada Masyarakat*.

Goodson, Ludwika, and Faranak Rohani. (1998). "Higher Order Thinking Skills • Definition • Teaching Strategies • Assessment." *Thinking*.

Herawati, Nyoman Trisna. (2015). "Kontribusi Pembelajaran Di Perguruan Tinggi Dan Literasi Keuangan Terhadap Perilaku Keuangan Mahasiswa." *Jural Pendidikan dan Pengajaran*.

Horvath, Christopher P., and James M. Forte. (2011). Critical Thinking *Critical Thinking*.

Kemdikbud.go.id. (2015). "Kementerian Pendidikan Dan Kebudayaan." *Http://Kemdikbud.Go.Id/*.

Khairat, U., Y. Maputra, and F. Rahmi. (2014). "Pengaruh Prokrastinasi Akademik Terhadap Perilaku Menyontek Pada Siswi SMA Di Pesantren X." *Jurnal RAP*.

King, F. J., Ludwika Goodson, and Faranak Rohani. (1998). "Higher Order Thinking Skills." *Publication of the Educational Services Program, now known as the Center for Advancement of Learning and Assessment. Obtido de: www.cala.fsu.edu.*

Kowiyah. (2012). "Kemampuan Berpikir Kritis." *Jurnal Pendidikan Dasar.*

Krathwohl, David R. (2002). "A Revision of Bloom ' s Taxonomy :" *Theory Into Practice.*

Lai, E.R. (2011). "Critical Thinking: A Literature Review." *Transfusion.*

Lewis, Arthur, and David Smith. (1993). "Defining Higher Order Thinking." *Theory Into Practice.*

Melfianora. (2017). "Penulisan Karya Tulis Ilmiah Dengan Studi Literatur." *Studi Litelatur.*

Mulnix, Jennifer Wilson. 2012. "Thinking Critically about Critical Thinking." *Educational Philosophy and Theory.*

Perner, Josef, and Zoltan Dienes. (1999). "Higher Order Thinking." *Behavioral and Brain Sciences.*

Premadyasari, Dianrika. (2012). "Prokrastinasi Dan Task Aversiveness Tugas Makalah Pada Mahasiswa Fakultas Psikologi Univeritas Surabaya." *Calyptra: Jurnal Ilmiah Mahasiswa Universitas Surabaya.*

Pudjowati, Veronica Erna, and Dyah Wahidyanti Widodo. (2016). "Nursing News Volume 3, Nomor 1, 2018." *Nursing News.*

Pusat Bahasa Kemdikbud. (2016). "Kamus Besar Bahasa Indonesia (KBBI)." *Kementerian Pendidikan dan Budaya.*

Ramos, Jennifer Lyn S, Bretel B Dolipas, and Brenda B Villamor. (2013). "Higher Order Thinking Skills and Academic Performance in Physics of College Students : A Regression Analysis." *International Journal of Innovative Interdisciplinary Research.*

Retnawati, Heri et al. (2018). "Teachers' Knowledge about Higher-Order Thinking Skills and Its Learning Strategy." *Problems of Education in the 21st Century.*

Rohida, Leni. (2018). "Pengaruh Era Revolusi Industri 4.0 Terhadap Kompetensi Sumber Daya Manusia." *Jurnal Manajemen dan Bisnis Indonesia.*

Shaari, Muhammad Nizam. (2018). "Revolusi Industri 4.0: Suatu Pengenalan." *abatan Perdana Menteri.*

Suarsana, I M. (2013). "Pengembangan E-Modul Berorientasi Pemecahan Masalah untuk Meningkatkan Keterampilan Berpikir Kritis Mahasiswa." *JPI (Jurnal Pendidikan Indonesia).*

Taxonomy, Revised. (2000). "Revised Bloom ' s Taxonomy." *Thinking.*

Thompson, A.B., and M. Wennemer. (1979). "Heat Capacities and Inversions in Tridymite, Cristobalite and Tridymite-Cristobalite Mixed Phases." *The American Mineralogist.*

Student Development Zone: Higher Order Thinking Skills (Hots) in Critical Thinking Orientation