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The validity of the Argumentation - Flipped Learning (AFL) Model to Increase Critical Thinking Skills for Students of Junior High School in the Covid-19 Era

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ABSTRACT

The purpose of this study was to determine the validity of the argumentation-flipped learning (AFL) model to iincrease students critical thinking skills in the Covid-19 era. The validity that was reviewed was the content validity and construct validity of the AFL model and its learning tools consisting of syllabus, LP, teaching materials, worksheets, critical thinking skills test sheets. Data was collected by giving the AFL model and its learning tools to science education experts, science assessment experts, and science experts to be tested. The conclusion of this study is that the AFL model is valid for increasing the students skills of critical thinking of junior high school in the Covid-19 era, with results of the construct validity dan content validity tests of the AFL model in very valid criteria with reliability above 75%; and test the validity of learning devices in valid criteria with reliability above 75%.

Keywords: *AFL, Covied-19, Junior high school.*

1. INTRODUCTION

It's been more than a year since the coronavirus (covid-19) pandemic has not ended. Teaching and working at home has also been running for more than a year. However, to anticipate uncertain conditions, where the pandemic does not seem to show any signs of ending, and also to fulfill 21st century life skills, learning needs to be improved, in the sense that it is not only implemented, but also can meet the demands of instructional goals. An educational program organized by an educational institution must meet its validity, practicality, and effectiveness [1]. Validity refers to the prepared learning models and tools, practicality refers to the implementation of the lesson plans, and effectiveness refers to the learning objectives to be achieved.

One of the learning objectives to be achieved in accordance with 21st century life skills during the COVID-19 pandemic is critical thinking skills. This is because critical thinking skills do not grow by themselves following the physical and psychological development of individuals, but must be trained and taught. Critical thinking skills are ways of thinking that contain questions, experiments, and belief in the knowledge gained through experiments [2]. Skills of critical thinking involve several activities such as analyzing, synthesizing, making judgments, creating, and applying new knowledge to the real world [3]. Indicators of critical thinking skills refer to the Revised Bloom's Taxonomy (RBT), namely analyzing (C4), evaluating (C5), and creating (C6) [4];[5].

Indonesian students' critical thinking skills are still relatively low. The four-year international study by TIMSS, which was conducted on junior high school students with high cognitive questions that functioned to measure students' critical thinking skills, turned out to show that Indonesian students were still in the lower rank [6]. Subsequent research by PISA, that Indonesia's literacy score is 382 with a rank of 64 out of 65 countries [7]. This means that Indonesian students are one strip above the caretaker, which is very concerning.

The above findings are consistent when field observations are then made regarding the students

critical thinking skills of junior high school. A study at SMPN 5 Wates for the 2019/2020 school year found that learning evaluation materials still used cognitive levels C1, C2, and C3 which were included in the category of lower order thinking skills (LOTS), and had not used questions with higher order thinking skills (HOTS). This shows that there are problems in the process of learning critical thinking skills, although learning to increase the students critical thinking skills has been widely used [8]. Moreover, in the current COVID-19 era, learning is only a fulfillment of obligations for teachers to teach and students learn, without giving the burden of achieving the curriculum used.

From the findings above, as well as the demands of 21st century skills that must be met, it is necessary to find a breakthrough to teach critical thinking skills. One way is to blend several learning models. On this occasion the mixed learning model is the argumentation and flipped learning (AFL) model.

Arguments are needed by teachers and students. Arguments do not arise naturally following the physical and psychological development of students, but are highly dependent on the environment and practice [9];[10]. Therefore, argumentation must be trained, so that someone is able to argue well.

The use of argumentation in learning will strengthen the understanding of the main concepts discussed. Therefore, argumentation is often used in learning by combining it with other learning models. For example, the Problem-Based Learning (PBL) model which was entered by the Argumentation model and then integrated into the Problem-Based Learning with Argumentation (PBLA) model was able to improve the critical thinking skills of junior high school students and higher critical thinking skills of students than using PBL alone[12].

Word of argumentation comes from the word argument which means a refutation or reason to reject an opinion, idea, stance, or idea of another person by giving rational and objective reasons [13]. In everyday life, arguments are more simply interpreted by arguing to defend each other's ideas. According to Toulmin (1956) argumentation has six components to analyze an argument, namely claim (C) or position statement, data (D) or facts, warrant (W) or guarantee, backing (B) or support, quilifier (Q) or modality statement, and rebuttal (R) or exception [13];[12].

Claim (C) is the view of observers, researchers or learners in this case students studying science. Data refers to facts or findings in observations with certain data collection techniques, analysis results with certain methods and techniques. This data (D) will be used to formulate a position statement or claim. Warrants/guarantees (W) refer to expert statements or theories that support the student's position/claim. Because the claim (C) is supported by facts or data (D), warrants (W) must be in harmony with the position statement and the data, and become a connecting component between the data and the claim (D and C). Backing (B) refers to existing theories, statements or previous research results that support the warrant (W). In this position the backing (B) provides evidence that the statement in the warrant (W) is true. Thus, backing (B) will further strengthen the claim (C). Qualifier (Q) is a tool to sharpen claims (C), so that the nature of the qualifier is convergent and specific. The last component of Toulmin's argument is rebuttal (R) which is an exception statement. This exception will greatly determine the validity of the claim (C) related to certain conditions. By using the six components of Toulmin's argument, the learning quality will increase.

The argumentation model used in online learning requires one more learning model. This is intended to be compatible with online submissions. One of the learning models in question is the reverse learning model or flipped learning (FL). The application of this mixed model is intended so that students' rights to get 21st century content learning, one of which is critical thinking skills, can be implemented.

Flipped learning is the result of an innovative learning model from a chemistry teacher in Colorado who in 2007 often left the classroom so he could not teach in the classroom. The teacher makes a recording of the learning process that is given to students via YouTube, before doing learning in class [15]. Furthermore, students are asked to study the material that will be discussed in meetings both online and offline. This way is usually referred to as school work done at home or homework. So, flipped learning is a learning model that is done in reverse [16]. The form of learning is blended between face-to-face and online with a combination of joint learning (synchronous) and independent learning (asyncrhonous) [17]. Synchronous learning usually occurs in real time in the classroom. Students interact directly together at the same time with teachers and classmates to follow learning and feedback. While asynchronous learning is a stand-alone learning and is the opposite of synchronous learning. Because it is often referred to as learning with a reverse class approach.

In this reverse classroom approach, learning content is usually delivered on a digital platform. Students are required to learn the subject matter provided by the teacher by downloading it on YouTube before the teacher does the learning. Therefore, video is a medium that is often used as input for independent study, and can be studied according to student needs, meaning that it is possible to stop and watch it again. Text and audio can also be used for media to convey material and ensure students' readiness to carry out synchronous learning. Students can choose when they study and they can also ask questions through the comments column,

and can share ideas and understanding about the material being studied with the teacher or other students in the class. Feedback is not received collectively, so it is more individual.

In the flipped learning model, things that are usually done in the classroom such as delivering subject matter, giving assignments, conducting training, and delivering homework are transferred online. So, the delivery of subject matter, giving assignments, doing exercises and delivering homework are done online. Students listen to the teacher's explanations and receive online assignments/practices that allow places to be separated from one another, but connected by information technology devices. Such learning will be student-centered. So students are required to be independent.

So, flipped learning is a way of carrying out the learning process that is reversed from the learning process in general. The implementation of reverse learning is to provide lesson material and then discuss it in class after the material is studied first. The nature of flipped learning is to minimize direct learning from the teacher and maximize indirect learning to students with material support that can be accessed online by the students concerned. This nature is very suitable for learning during the pandemic to avoid the transmission of covid-19.

Flipped learning has characteristics, among others: one way to optimize personal interactions between teachers and students, providing opportunities for students to be responsible for the learning materials delivered by teachers, placing the teacher's position as a motivator and dynamist in the learning process, applying constructivist learning, provide opportunities for students to adjust to the subject presented by the teacher when the student concerned cannot take part in learning together with other students, as a gathering place for all students involved in the learning process, and a place where students receive personalized learning [18] ;[19].

1.1. Problem of research

The problem formulation of this research is how is the validity of the Argumentation Flipped Learning (AFL) model to improve students' critical thinking skills in the covid-19 era? The validity of the AFL model can be fulfilled if it is declared valid, both content validity and construct validity. To analyze the validity, the percentage of agreement (R) with R above 75% was used [20]. the learning tools must also meet the validity requirements with an R above 75%.

1.2. Research focus

This research focuses on fulfilling a valid AFL model that can be used to inreasing students skills of critical thinking of junior high school in the covid-19 era. therefore the research question is: How is a validity of AFL model and its learning tools?

2. METHODOLOGY

2.1. Instruments and procedures

The AFL model and AFL learning tools that have been made are then tested for validity. The process of testing the validity of the AFL model and its tools is done by giving it to science education experts, science assessment experts, and science experts.

2.2. Analysis of Data

Data validitas model AFL ini terdiri dari data validitas isi dan data validitas konstruk serta data perangkat pembelajaran model AFL. untuk menganalisis data-data tersebut digunakan skala ordinal 1-5. Kemudian pengujiannya menggunakan dpersentase persetujuan (R) dengan R= [(AB)/(A+B)]x100%, dimana A adalah skor tertinggi dari semua validator, dan B adalah skor terendah dari semua validator. validator [20].

3. RESEARCH RESULT

3.1. The validity test results of AFL model

The results of the validity of the AFL model are presented in Table 1. below.

Table 1. The results of the validity of the AFL model

Number	Assessment Aspect	Validation score	Validation criteria	Reliability coefficient (%)	Reliability
A	**Content validity**				Reliabel
1	AFL model requirement	4.00	Very valid	87.68	Reliabel
2	State of the art of knowledge	4.33	Very valid	89.75	Reliabel
3	AFL model theory support	4.00	Very valid	88.00	Reliabel
4	Implementing the AFL model	4.67	Very valid	87,68	Reliabel
5	AFL learning environment	5.00	Very valid	87.68	Reliabel
6	Use of state-of-the-art evaluation techniques	4.67	Very valid	88.00	Reliabel
B	**Construct validity**				
1	Theoretical and empirical support of the AFL model	4.67	Very valid	90.25	Reliabel
2	Model syntax	4.33	Very valid	89.89	Reliabel
3	Social system	5.00	Very valid	90.00	Reliabel
4	Reaction principle	5.00	Very valid	89.89	Reliabel
5	Learning environment	4.67	Very valid	88.89	Reliabel
6	Implementation of evaluation	4.33	Very valid	90.25	Reliabel

From Table 1 above, it is known that the average score of the content validity test data and the average construct validity test data are in the very valid category. Likewise, the reliability test for content validity data and construct validity data resulted in a reliability coefficient above 75%, which means that content validity data and construct validity data were very reliable.

3.2. The validity test results of the AFL model learning tools

The learning tools used in this AFL model are syllabus, lesson plans (LP), teaching materials, student activity sheets or worksheets, and critical thinking skills test sheets. The validity test results of the learning tools are presented in Table 2.

Teble 2. The validity test results of the AFL model learning tools

No	Materi	Rerata validator			Jumlah rerata	Kriteria	Koefisien %	Reliabilita
		1	2	3				
1	Syllabus	4.67	4.33	4.00	4.33	Valid	87.67	Reliabel
2	Lesson plans (LP)	4.33	4.33	4.33	4.33	Valid	86.00	Reliabel
3	Teaching materials	4.33	4.00	4.00	4.11	Valid	87.67	Reliabel
4	Worksheets	4.00	4.33	4.00	4.11	Valid	86.67	Reliabel
5	Critical thinking skills test sheet	4.00	4.00	4.67	4.22	Valid	88.70	Reliabel

The validity test rseults of the learning tools shown in Table 2 produce scores above 4. This means that the learning tools are in the valid category. the reliability test results are above 75%, which means it is in the reliable category.

4. DISCUSSION

The AFL model is prepared to face learning in the covid-19 era, so the learning process is online. Before being used, the AFL model was tested for validity, because validity is the key to all research. The validity test was carried out by giving the AFL model and learning tools to science education experts, science assessment experts, and science experts. The data obtained from the results of questionnaires, questionnaires, and or tests are then assessed by experts in their fields [21];[22].

The AFL model contains the constructs and contents of the model, while the AFL model contains syllabus, lesson plan (LP), teaching material, worksheet, critical thinking skills sheet. Table 1 shows that the AFL model consists of content validity and construct validity. Content validity consists of (1) the AFL model requirement, (2) the state of the art of knowledge, (3) the AFL model theory support, (4) the application of the AFL model, (5) the AFL learning environment, and (6) the use of state of the art evaluation. Validity is an index that shows that the measuring instrument actually measures what is being measured. Content validity means focusing on providing evidence on the elements that exist in the measuring instrument and processed with rational analysis.

The AFL model requirement data is indicated by the need for online learning. In this Covid-19 era, online learning is intended to inhibit the dissemination of the Covid-19 virus. The Ministry of Education and Culture Number 4 of 2020 made a Circular on the Implementation of Education in the Corona Virus Disease (Covid-19) Emergency which strengthens online learning policies and provides a legal basis for online learning. The learning in question is meaningful online learning, there is a learning experience but it is not required to complete the learning objectives listed in the curriculum, and no less important is that there are learning activities and the accompanying tasks that vary, differing from one student to another. So, even though the assignments are in accordance with the learning objectives, the assignments are adjusted to the interests and conditions of each student.

The model implementation data describes the role of the AFL model related to: (1) the online learning process played by the teacher; (2) student responsibilities in participating in online learning activities and teacher readiness in managing online frustration which has an impact on increasing critical thinking skills[27] and teacher participation in guiding students to learn science both theoretically and empirically [28], [29]; and (3) the teacher is able to act as a student's learning partner so that students are aware of their responsibilities to learn, then students are able to build the knowledge they have acquired in learning, and finally students have a positive attitude in learning [30]; The positive attitude in question includes the ability of students to respect others, be able to participate in learning, be able to work together, be able to communicate and express their opinions well and come up with creative and innovative ideas, be able to solve problems, and finally be able to enjoy learning [31]; [32]; [33]. So, the key to success in the presentation of learning is the teacher, so they are required to move quickly to adjust the situation by preparing materials to learning models to maintain the continuity of learning.

The AFL model of online learning environment data describes everything that is around individuals who learn online that affect the process and learning outcomes. The online learning environment is the features that affect internet-based learning such as a well-structured website which then presents e-journals, e-books, e-mails, e-libraries, e-laboratory as commonly used virtual experiments, namely laboratory equipment. from Physics Environment Technologies (PhET) [34]; [35]; [36]. With an online learning environment, it is hoped that the demands of 21st century learning can be met.

Data on the latest evaluation techniques illustrate the application of online evaluation media. With an online system, the supply of knowledge resources can be done without time and space limits [37]. The teacher's task is not only to plan and implement learning, but also to evaluate student learning outcomes. Evaluation is very necessary to find out the extent of student mastery after carrying out learning activities, including online learning activities. Because the evaluation is done online and the teacher cannot supervise, it is necessary to adjust the evaluation regulations, for example with an

integrated online system where exams can be done at home in real time according to a predetermined schedule. The change from a traditional class to a virtual class is not an easy matter to be carried out by teachers and students. However, flexibility in choosing the right instrument can help facilitate the assessment that must be done by the teacher.

Table 1 also shows construct validity which consists of (1) empirical support and theoretical support for the AFL model, (2) model syntax, (3) social system, (4) reaction principle, (5) learning environment, and (6) implementation. evaluation. All elements of the construct validity data are in the very valid category. The learning model as a product of educational research must meet the validity criteria for both content validity and construct validity [38]. Constructively the syntax of the AFL model is divided into three stages. The three stages are preclass, inclass and postclass. Preclass contains student activities by studying downloaded learning materials and compiling arguments, followed by inclass activities with students presenting the material learned during preclass to get feedback from other students and teachers. Postclass student activities carried out are applying the learning outcomes of the previous two stages, namely preclass and inclass. The hope is that learning like this can improve critical thinking skills in the Covid-19 era. So that even in the Covid-19 era, it can still fulfill the instructional objectives in learning, namely increasing skills of critical thinking [39].

The model syntax is implemented using a syllabus, lesson plan (LP), teaching materials, worksheets, and critical thinking skills test sheet [40], all of which are in the valid category (Table 2), and reinforced by model implementation data that the phases of the AFL model can be implemented. properly so that it is practically used for learning in the Covid-19 pandemic season (Table 3). Construct validity data in this study, namely syntax, social system, support system, instructional impact and accompaniment impact showed their consistency [41].

The application of this AFL model takes into account the following considerations: (1) avoiding crowds, therefore during Covid-19 face-to-face learning is avoided or minimized. If forced to face-to-face learning, it is feared to accelerate the transmission of Covid-19. However, students still have the right to get a proper education, especially to prepare students' future. So the best way is online learning. 2) To increase students' critical thinking skills, where critical thinking skills are one of the 21st century life skills. 3) To implement the 2013 curriculum[39].

5. CONCLUSION

This study concludes that the AFL model is valid for improving the critical thinking skills of Junior High School students in the Covid-19 era. The results of the validity test of the AFL model are very valid with reliability above 75%, and the results of the AFL model learning tools test are valid with reliability above 75%.

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