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The Validity of Contextual-Based Learning Video on the Physics Fluid Material For Senior High School

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Abstract — **Entering the 21st century, human needs are increasing along with the development of technology. Various demands occur that require humans to improve their quality. Teachers as educational subjects play an important role in providing provisions for students to develop and improve their quality through the use of instructional videos. Based on the problems encountered, it turns out that videos used by teachers in learning have not met the needs of the 21st century. To meet the needs of the 21st century, A contextual-based learning video was developed. In order for the video to suit the needs, the video quality was tested through the validity test. This type of research used a *Research and Development* referring to *Addie's Development Model*. The instrument used was a questionnaire instrument which had five Likert scales. Then, the data were analyzed by using Aikens'V formula. Based on the results and the discussion that has been done, it illustrated that the contextual-based learning video on the physics fluid material for SMA is in the valid category and can be used as a physics learning medium in schools.**

Keywords* — *Validity, Video, 21st Century skill, Contextual, Fluid .

I. INTRODUCTION

Entering the 21st century, human needs are increasing. Increasing needs along with increasingly developing technology. This period, competition in the world of work is getting tighter and human resources are getting higher [1],[2],[3]. Therefore, it requires humans to have a balance of life in knowledge and technology. The needs that must be fulfilled at this time are being literate towards IT [4],[5], having critical thinking skills, creative thinking, communicating and being able to work with teams [6].

To meet the needs of the 21st century, the government is implementing a learning paradigm [7],[8], using contextual learning [9], innovative, creative, collaborative, student-centered learning [10], by encouraging students to identify problems, analyze, determine solutions, evaluate results [11], and use technology in learning according to current demands [12].

Learning is a communication process that involves three components: the sender of the message (teacher), the recipient of the message (students) and the message (the subject matter itself) [13]. This learning can make students change their behavior [14],[15] by involving active students directly in the surrounding environment to gain learning experiences. Interacting directly can make students learn optimally [16] and develop their skills.

Physics is a branch of science [17]. It has a major contribution to develop student skills. In studying physics, students not only understand the concepts but also connect one concept to another [18],[19] which requires high reasoning and imagination in solving physics problems [20],[21].

Teachers as educational subjects play an important role in providing provisions for students to develop skills according to current needs [22], by displaying physics phenomena in real life in the classroom, inviting students to solve physics problems through a scientific process [23],[24] and involves critical, creative and innovative skills [25],[26],[27]. In this process students gain in-depth experience of physics symptoms with the material being studied [28] and changes in behavior.

Fluid material has many applications in everyday life and technology. Of course, it requires a solution to show the real fluid phenomenon in the classroom and teach students. The solution applied is to teach students using instructional video media.

In addition, learning videos can show fluid phenomena in real terms, they can also develop students 'understanding in learning [29] by broadening students' insights into phenomena faced with the material being studied through the development of cognition and metacognition [30]. Asrizal et al [5] argue that using video in the learning process is a solution that is relevant to the 21st century because students are trained to use technology and also help students master physics material in its entirety.

Based on the survey in the seven schools in West Sumatra, there were three teachers using video media in the fluid material learning process, the rest did not use it. The minimal use of videos was due to insufficient teacher time in making videos and lack of competence. The video used was not self-made but taken from *YouTube*. The instructional videos used by the teachers were also not relevant to the needs of the 21st century which train students to use technology in learning. The videos were only shown in front of the class through *infocus.* The videos used also have not trained critical thinking skills, creative thinking, communication and cooperation in accordance with the demands of the 21st century. The videos were shown only in the form of a spectacle containing explanations of material in written form accompanied by music. There were not many fluid examples shown, only one and two examples. The average score of students' critical and creative thinking skills was 55 and 62.5 in the low category. The student cooperation skills were in the medium category with an average score 68, oral communication skills were in the low category with an average score 60.7 and written communication skills were in the medium category with an average score 66.7. The student collaboration and communication skills encountered were not all students who were active in the learning process. Students who are active tend to have critical thinking skills and high creative thinking skills. Others don't. From this explanation, it illustrates that the learning videos used are not in accordance with the needs of the 21st century.

To meet the needs of the 21st century, a contextual-based learning video is developed. Contextual reasons for use in addition to video can show fluid phenomena in real life in the classroom, it can also invite students independently or in groups to analyze phenomena with material learned through scientific processes. The existence of contextual students can find the meaning between the material and the real context and not just a spectacle. According to Hastiti [31], Ariansyah, et al [32] & Nurhidayah, et al [33] found meaning not just knowing but shaping students to experience what is learned by encouraging students to find a relationship between material and real context. Using a contextual approach can make students active in learning [34] and improve students' higher order thinking skills [35]. Asrizal, et al., [36] also argue that using a contextual approach is very relevant to be used to meet the learning needs of the 21st century.

Thus, to make the video developed is in accordance with a contextual approach and meets the needs of the 21st century, the video quality test is carried out. It can be done by testing the quality of the video through the validity test. The validity test was carried out to determine that the contextual-based video developed was correct according to the expert and was suitable for use as a learning medium. Then, it is done by testing the feasibility of the video through expert judgment using validation instruments.

II. Methods

This research used a research and development type. A *Research and Development* is a process carried out to produce and test product quality [37]. Research and Development refers to Addie development model which consists of five stages, namely analysis, design, development, implementation and evaluation. This development research was in Addie's third stage which is carried out to produce contextual-based learning videos that are valid according to the expert. A valid video sees the truth of the video according to the physicist (content validation), learning expert (construct validation) and linguist (language validation). Videos are validated by experienced experts in their respective fields.

The instrument was used to validate the contextual-based learning video using a questionnaire instrument. There are three instruments used by experts to validate contextual-based learning videos, namely the validation instruments from the learning experts (construct validation), physicist validation (content validation) and linguist validation (language validation). The questionnaire instrument used by the experts contained a Likert scale which had five scales: scale 5 (very good), scale 4 (good), scale 3 (enough), scale 2 (poor) and scale 1 (very poor). The Likert scale was used as a benchmark by experts to rate videos developed according to their respective views. The data obtained from the experts were then analyzed by using the Aikens'V formula like the formula below:

$$V = \frac{\Sigma s}{[n(c-1)]} \quad (1)$$

The values obtained from the Aikens'V formula are further categorized as in Table 1 [38].

TABLE I. VALIDITY CATEGORY

Value	Category
$\geq$ 0,6	Valid
< 0,6	Invalid

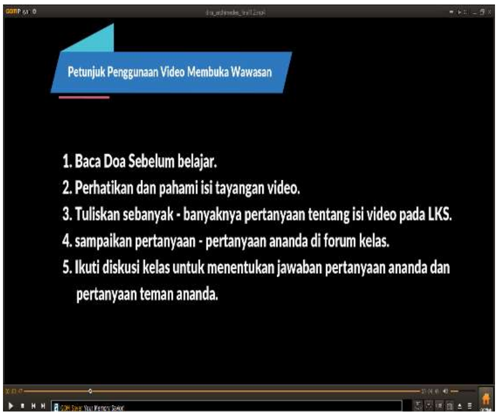
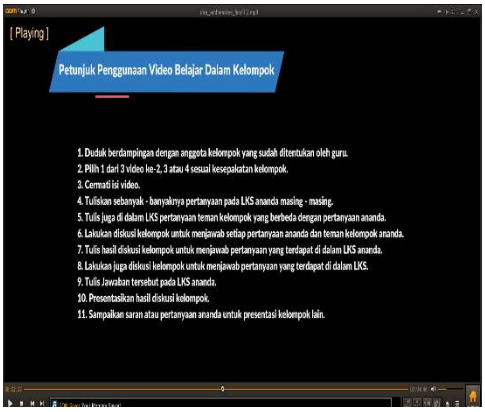
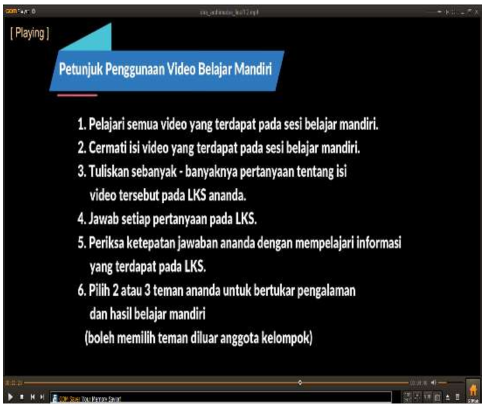
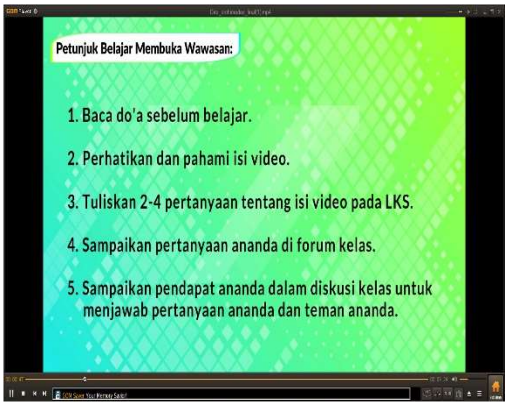
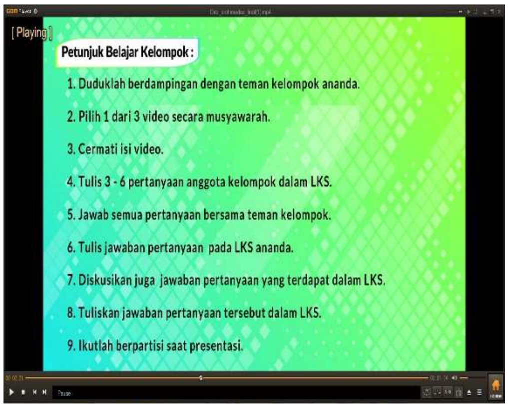
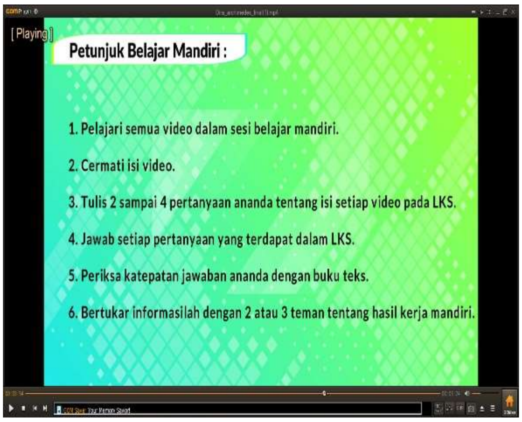
Based on Table 1, a video is valid if the value obtained is equal to 0.6.

III. RESULT AND DISCUSSION

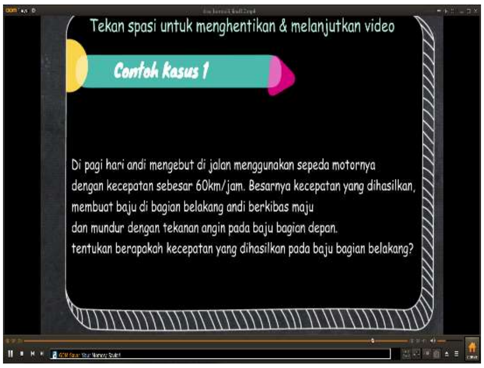
Testing the quality of contextual-based learning video has been carried out from the beginning of August to mid-September. During this month and a half the video has some revisions to obtain a valid video. The video revisions were carried out in accordance with the advice given by experts as in Table 2.

TABLE II. TABLE 2. SUMMARY OF EXPERT ADVICE

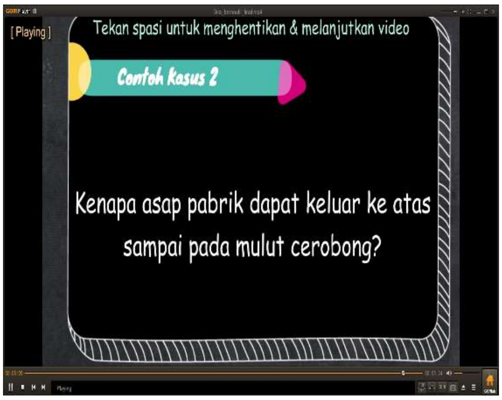
Validator	Before Revision	After Revision
Physicist (content validation)	adjust the video display to the size of the laptop and cellphone screen.	The video display has been revised and is in accordance with the screen size of laptops and cellphones.

Learning Expert (construct validation)	Simplify the learning instructions contained in the instructions for insightful, group and independent activities.   	Instructions for opening insights, groups and independence have been simplified.   
	The background contained in the instructions is changed to a more attractive background	The background has been changed to an attractive background
	The voice contained in the instructions was replaced with the original researcher's voice	The voice has been replaced

<table>
<tr>
<td></td>
<td>Change and divide the examples of cases at the end of the video into two cases, namely qualitative cases and quantitative cases.



</td>
<td>The case examples have been fixed.



</td>
</tr>
<tr>
<td></td>
<td>Add a preface by writing video 1, 2, 3 and so on to sort the fluid phenomenon impressions.</td>
<td>The preface has been written.

</td>
</tr>
<tr>
<td>Linguist (language validation)</td>
<td>Simplify the language in the study instructions and correct it according to good and correct Indonesian.</td>
<td>The language in the study instructions has been simplified and has been improved according to good and correct language.</td>
</tr>
</table>

Based on the advices that have been conveyed by the three experts in Table 2, the video has been corrected and has been declared valid by the experts. The validity of the video according to the physicist (content validation) can be seen in Figure 1.

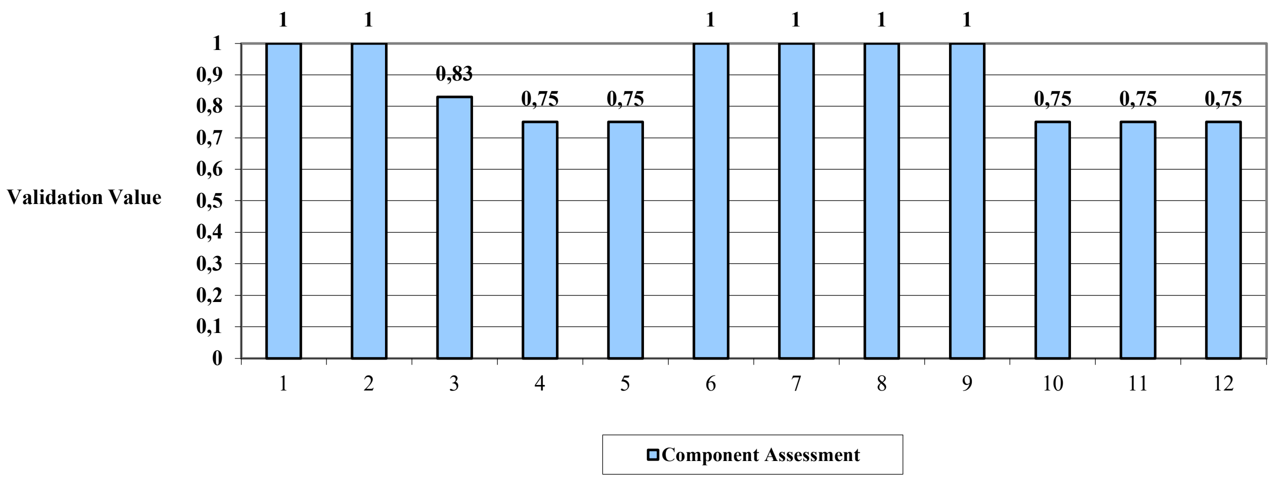


Fig 1. Component Assessment Results of content validation

Figure 1 is the assessment results of the video content feasibility conducted by physicists using the twelve assessment components. Based on the twelve components of the video assessment, it was in the range 0.75 to 1 with an average value 0.88 in the valid category. The validity of the video content shows that the video presented is in accordance with the topic of fluid material. Then, the examples shown on the video are in accordance with the fluid material in everyday events; the examples shown on the video are in accordance with the application of fluid material in technology; the examples video shows have a renewable side; the video shows can be used for exploration; the examples in video shows are presented original; the examples in video shows from other sources include thier sources; the illustrations in videos are presented according to material topics; the examples of related video shows with natural phenomena; the daily events and technology according to material topics; the videos can describe material topics appropriately; the symbols are presented according to material topics and numbers / values / sizes in the video are presented accurately.

Furthermore, the video validation according to the learning expert (construct validation) can be seen in Figure 2.

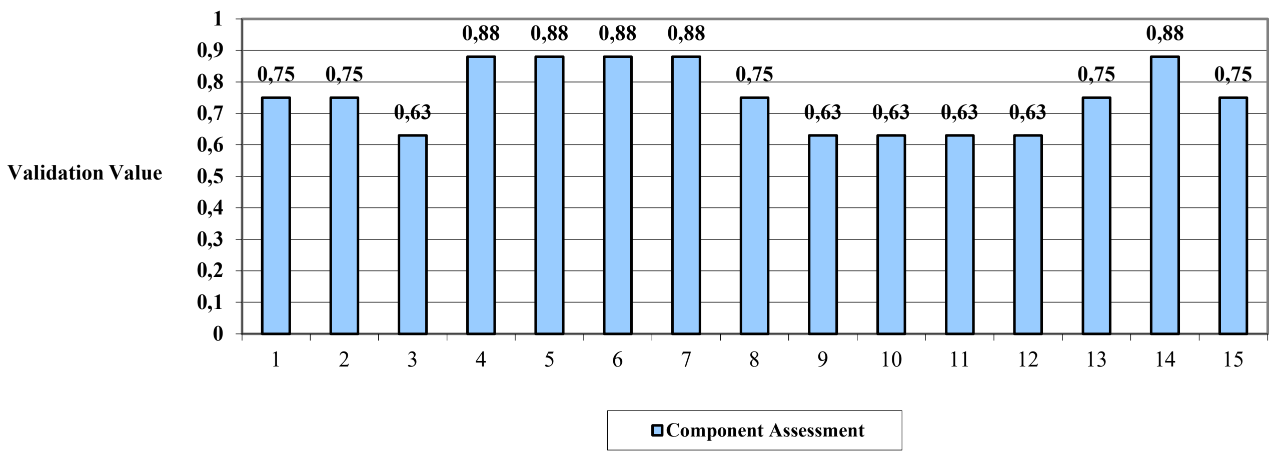


Fig 2. Component Assessment Results of construct validation

Figure 2 is the assessment results of the video construct feasibility by the physics learning expert using fifteen assessment components. Based on the fifteen components of the video assessment, it was in the range 0.63 to 0.88 with an average value 0.75 in the valid category. The validity of the video construct shows that the video presented is able to teach the students in the learning process by facilitating students to interact with the examples shown in the video; it can grow to motivate student learning, can increase student creativity; it can stimulate students' curiosity, at the stage of opening insight there is a contextual video which is used as study material in learning; at the group learning stage contextual videos are available which are used as study material in learning; at the independent learning stage there are contextual videos that are used as study material in learning; the learning video can train students' high-order thinking skills in learning physics; it trains skills Collaboration and student communication skills in learning; it helps to practice student problem solving skills, illustration and video descriptions that support each other, and presentation of videos arranged systematically starting from the title, identity, examples and video cases.

The video validation according to the linguist (language validation) can be seen in Figure 3.

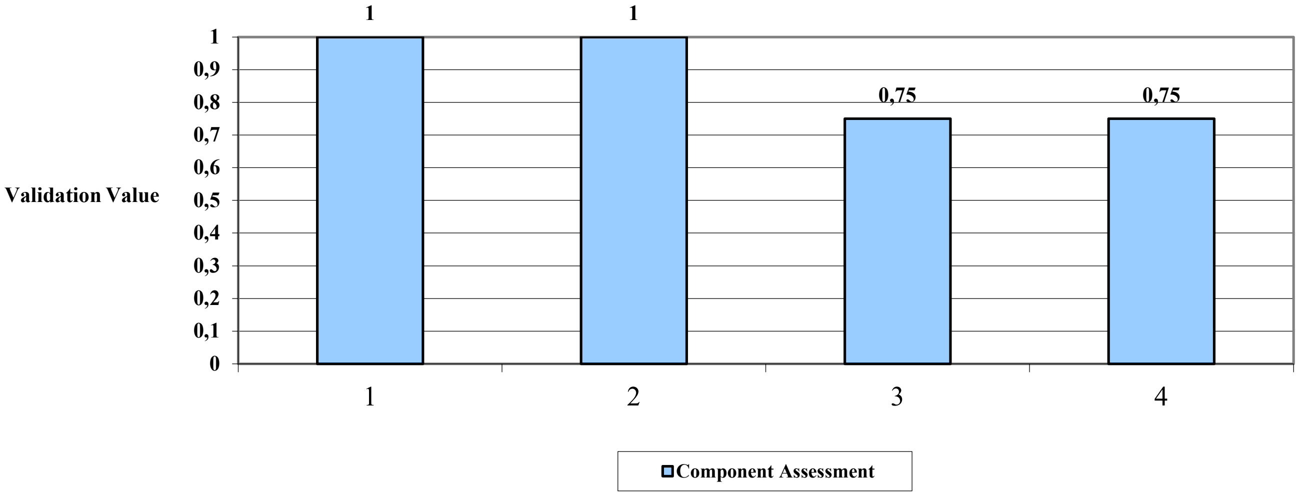


Fig 3. Component Assessment Results of language validation

Figure 3 is the assessment results of the video language feasibility conducted by a linguist using four assessment components. Based on the four components of the video assessment, it was in the range 0.75 to 1 with an average value 0.88 in the valid category. The valid video language shows that the video presented is in accordance with the correct Indonesian rules, uses short and concise language, and uses language that is easy to understand and uses standard language.

Based on the assessments that have been made by three experts, it is described that the contextual-based physics learning video was in a valid category according to the physicist (content validation), learning expert (construct validation) and linguist (language validation). The valid video shows that the video developed is in accordance with the needs and is suitable for use as a medium for learning physics. Simanjuntak, et al [39] dan Husniah, et al [40] suggest the validity of a product illustrates that the product is feasible to be used in learning. Product feasibility is seen from the suitability of material content, presentation and language [41].

IV. Conclusion

Based on the results and discussion that has been done, it shows that the contextual-based learning video developed on high school physics fluid material is in the valid category and it can be used as a medium in learning physics in schools.

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