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Digital Storytelling Video to Analyze Students' Concept Mastery and Creativity in Learning Food Additives Topic

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ABSTRACT

The students have learning difficulties in learning science because their concept mastery and creativity were low. Digital storytelling is good media for students who make their own story. The research was conducted to identify student's concept mastery and creativity by digital storytelling video in learning food additives. The method used in this research is weak experiment. The sample of 36 students from private school in Cianjur, West Java. The students' concept mastery was measured by objective test based on bloom taxonomy. Objective test contained of multiple choices. Data analysis was using SPSS. The student's creativity is measured by Creative Product Semantic Scale (CPSS) rubric based on three dimensions such as novelty, resolution, elaboration and synthesis. The result of students' concept mastery is N-Gain is 0.30 categorized as medium improvement. The results of students' creativity are resolution is (54%), categorized as very low, revolution is (61%) categorized as medium. elaboration and synthesis is (66%) categorized as medium. Based on this result, Digital storytelling video can be utilized for students' concept mastery and students' creativity.

Keywords: Concept Mastery, Creativity, Digital Storytelling Video, Food Additives

INTRODUCTION

The As human development, education is the main interpretation to increase student's performance for rapid advances in scientific approach in science learning and technology for developing educational system (Hammond, et al., 2020). Technology has explored a big scope to stimulate students' interest in science learning (Wandari, et al., 2018). The techniques of science learning have some activities for producing product. It is produced by result of thinking and acting for determining problems through science learning. Thus, the students can be supported by physically working by hands and thinking to discovery information related to learning.

Concept mastery is the skill of the cognitive of learners to make a successful understanding science in school (Wicaksono, 2020). A systematic science concept is efficient for students are able to clarify complex ideas and make them simpler, easier to understand, and usable for various applications on a daily life (Hayes & Kraemer, 2017). Students' concept mastery results from students' comprehension.

Students must realize that they are imaginative in creating new ideas and that they can make use of products in their learning. The student's creativity must be focused on learning process. Students' creativity should be applied in all disciplines with a key role in innovation as aspect in developing creativity(Sugiyanto, et.al., 2018). Student creativity cane be inspire questions, open minds to new ideas, and learn from mistakes (Ridlo, 2018).

In order to develop students' concept mastery and creativity, the learning method begins with challenging questions about the phenomena for students to do activities that focus on finding and using knowledge of technological properties, rather than focusing on memorization (Hoque, 2019). Digital technologies can grow student creativity in a flexible way, using inspiration or self-expression can reinforce their curiosity and personal styles in the digital media creation (Tsortanidou, 2019). In technology advancements, learning experience is supposed to be relevant and memorable for students (Fatmawati, 2018).

Digital technology has to be easily usable and provide teacher and students in classroom. For advancing technology, it is proceed to be meaningful for student to learn science (Fatmawati, 2018). The example of digital technology is "Digital storytelling video" It is important for students to develop their understanding and creativity (Hava, 2019). Digital storytelling is made by oral storytelling (Saritepeci, 2020). Digital storytelling video is mixed with multimedia such as music, video, narration, and records. Digital storytelling video was one of the most prevalent ways of digital media in the 21st century (Saritepeci, 2020). It may also be applied to other fields and there is a major opportunity to promote learning objectives.

The digital technology can be utilized for student's comprehension. Also, digital storytelling video has images, animation to get the information easier. Digital storytelling is efficient tool for learning subject. Thus, Digital storytelling video generates creativity as a result of learning performance by students. Researcher will evaluate the student concept mastery and creativity that will be applied to the food additives topic based on the 2013 curriculum.

Problem of Research

Most students get a low score on understanding the concept since students have trouble in studying. They have learning difficulties. So, they have struggled to achieve learning objectives in the learning process (Ulfa, et al., 2017; Ridlo, 2018). The curriculum program used at school is more dominated by traditional learningMaulina, et al., 2020). Students are passive since the teacher only provides information, explanations and questions that are not enough to motivate students to learn (Alzahrani, 2018). Lack of concept mastery in science implied by weak learning achievement. Furthermore, students' understanding can be achieved in an instructional approach (Wewe, 2020).

Factors influence creativity development. One of the factor is students have limited knowledge to apply creativity in learning process (Wijayati,2019). Creativity is important in improving the skills of students when they have learning disabilities (Sugiyanto & Masykuri, 2018). on other study, student creativity is still far below the standard level. It can be inferred that the creativity of Indonesian students is still low. In addition, the outcome of learning focuses only on knowledge building, memorization (Fatmawati, 2018).

Research Focus

The aim of this research is to analyze students' concept mastery and creativity in learning food additives topic by using digital storytelling video.

METHODOLOGY OF RESEARCH

General Background of Research

This research was conducted in a private junior high school. It is located in Cianjur, West Java. The participants are from 8 grades. All students participated in this research. This research is weak experiment.

Subject of Research

The sample of this research was 50 participants. The sample is purposive sampling. All students participated in this research, but only 50 participants were chosen with the criteria in learning food additives topic.

Instrument and Procedures

There are instruments to conduct this study, instruments are objective test items, Creative Product Semantic Scale (CPSS) and lesson plan. Objective test is multiple choice question. It contains 30 multiple choices as referenced by bloom taxonomy. It composed by remembering (C1), understanding (C2), applying (C3), Analyzing (C4), Synthesis (C5), and Evaluation (C6). The objective test was validated by experts. Then, objective test was validated to 80 students from one of private school in Bogor. Data analysed by using the Rasch Model in 4.4.5.version.

Student's creativity is measured by Creative Product Semantic Scale (CPSS) rubric. It contains novelty, resolution, elaboration and synthesis (O'Quin and Besemer, 1989). It has ten indicators and use Likert-Scale. Lesson plan is planning structure for conducting teaching and learning process. The researcher conducted for 3 weeks. The implementation was taught by *Google meets and Whatsapp* application in online class.

Data Analysis

The objective test was analyzed by using SPSS 23 version to find homogeneity data,T-test paired, Gain score, normalized Gain, normality, and use Microsoft Excel 2010 to find highest and lowest score on pretest and posttest and find pretest and posttest average score.

The rubric result is analyzed by Microsoft Excel 2010 to find creativity score and average score of ten indicators in students' creativity by Creative Product Semantic Scale (CPSS) rubric.

RESULTS AND DISCUSSION

In this section,the result of student's concept mastery by digital storytelling video Objective test is based on Bloom Taxonomy. All 8th students did objectives tests. It is consisted of 30 multiple choices. The subtopics are food additives types, the effects of food additives and human effort to reduce food additives. Objective test consisted of cognitive levels are C1 (Remembering), C2 (Understanding), C3 (Applying), C4 (Analyzing), C5 (Evaluating), C6 (Creating) based on Bloom Taxonomy. The data analysis has been shown in Table 1.

Table 1. Students' Concept Mastery Recapitulation

Recapitulation	Pretest	Posttest
Normality	0.06	0.00
Homogeneity	0.5	0.5
Paired T-Test	0.0	0.0

Table 1 shows normality (Shapiro-Wilk). The prestest is normally distributed and posttest results non normal distributed. Participants of this research are 50 participants. The pretest normality is 0.061 and posttest normality is 0.000. The pretest is normally distributed because sig 0.061 > 0.05 and posttest is non-normally distributed because 0.00 < 0.05, Thus it indicates outlier (Southworth, 2012). It indicates there is score closes to small and big score.

Homogeneity used to analyze homogeneous data. Table 1 shows homogeneity is sig 0.0675 which means sig 0.675 > 0.5 it indicates the data is homogeneous. Thus, the students have same characteristics. Student position in one classroom with identical skills is often known as grouping of similar skills (Baker, 2018).

Table 1 shows a paired t-test compares before group and after treatment group. The pretest and posttest have sig (2-tailed) 0.000 < 0.5. it means the H_i is accepted. There is significant difference between before and after treatment in learning food additives through digital storytelling video. The students' concept mastery is higher after treatment. Digital technology supports student's achievement and understanding (Smeda, Dakich, Sharda, 2016)

Table 2. Student's Concept Mastery Recapitulation

Group	N	Score average	Lowest score	Highest score	<g>	G
Pretest	50	25.4	10	40	0.3	28.8
Posttest	50	46.9	37	70		

Table 2 shows participants are 50 to conduct the pretest and posttest. The pretest average is 25.4 and posttest average is 46.9. Lowest pretest score is 10 and lowest posttest score is 37. Highest pretest score is 40 and highest posttest score is 70. <g> is 0.30 it means middle enhancement. G value is 28.8, it indicates the student's concept mastery is low improvement. Pretest is used to evaluate student concept mastery before treatment. Posttest is used for the final outcome to conduct digital storytelling videos in food additives learning.

The average pre-test score is low, the participants have a low pre-test score because lack of foundation skills (Schalich 2015). They did not prepare to conduct test. The average of posttest is enough. They didn't prepare to take the exam. The average post-test is moderate. Digital storytelling has beneficial impact for students. The scores of pre-test and post-test is low improvement. The reason is the They lack of family support so, parents have to monitor them (Chairunnisa, 2016). Students study on the online system and need to adapt in distance learning. Other causes include student challenges, limited socialization with their friends, and longer view of the screen on a laptop and phone (Ratna,et al., 2020). These influences may affect the student outcomes in learning.

Next, student's creativity is evaluated by Creative Product Semantic Scale (CPSS) rubric. The rubric is adapted from Besemer, 1989. Creative Product Semantic Scale has 3 dimensions: novelty, resolution, elaboration and synthesis.The product is digital storytelling video.

In this research, students' creativity is assessed by Creative Product Semantic Scale (CPSS) rubric. The product is digital storytelling video. The rubric is adapted from (O'Quin & Besemer, 1989). CPSS has 3 dimensions: Novelty, Resolution and Elaboration and novelty. This students' creativity is assessed by 3 teachers. Figure 1 shows students' creativity based on each dimension.
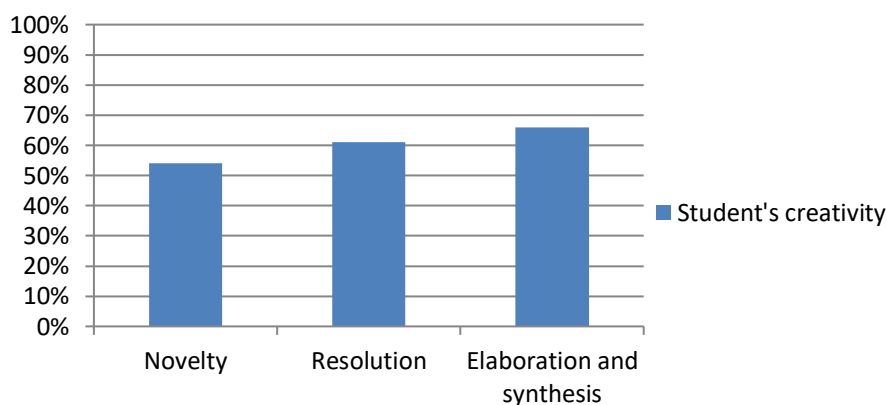

Figure 1. Students' creativity based on each dimensions

Figure 1 shows student's creativity based on each dimensions. The novelty is 54%, resolution is 61%, elaboration and synthesis result is 66%. Novelty indicates very low because the student's video is not suprising and germinal. The student videos only displayed the pictures of foods but cannot be able to encourage for next product because the model of product is standard. Also, the product is complicated to design and it affects students difficult to improve their ideas as standard product (DeJonge, et.al, 2018).

Resolution is medium because the students are moderate to make ideas to construct the video to be meaningful video. Elaboration and synthesis are medium because most of students are moderate to use multimedia elements such as pictures, video, records. Elaboration is easiest creativity dimensions and it is expressed student's capability to improve complex elements. Figure 2 shows students' creativity based on dimension.
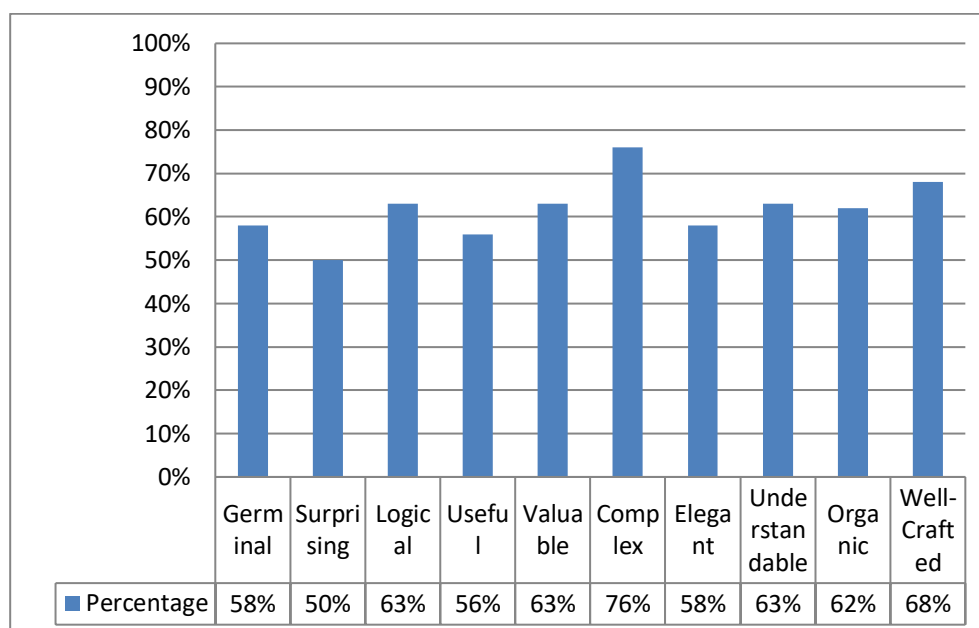
Figure 2. Students' creativity dimension

Figure 2 shows student's creativity based on groups. Germinal result is low because some students does not encourage ideas to the product. Surprising result is low because some videos is not unique and average, students attached pictures and lack of animation. Logical result is good because student's digital storytelling video relates with food additives story. Useful result is 56% because some of students' digital storytelling video can be used for learning food additives. Valuable is good because their videos add 1-2 food additives concepts such as food additives types, and the effects of food additives. Complex result is good because most of students attached videos, pictures, and records. Elegant result is low because some videos were unattractive, students add common pictures. Understandable result is good, most of students can tell their story in English. Organic result is good because students added completely components on the video. Well-crafted is good because student's video is done well. The previous research is Tang (2016) digital storytelling video can be express for students' creativity.

CONCLUSIONS

Digital storytelling video as learning food additives has been analyzed based on students' concept mastery and students' creativity. The result of digital storytelling video on students' concept mastery based on pretest and posttest have N-Gain are 0.30 it means medium improvement. T-paired test results sig. (2-tailed) 0.000, it means $0.000 < 0.005$ which H1 has positive influence for students' concept mastery. The result of pretest is 25.4 and posttest is 46.9 these are categorized as medium improvement, so the students need more effort to increase student's concept mastery.

The creativity dimensions include novelty, resolution, elaboration and synthesis. The novelty is 54% categorize as very low improvement in germinal and surprising criteria. Resolution is 61% categorize as medium improvement in logical, useful, and valuable criteria, elaboration and synthesis is 66% categorize as medium improvement in complex, elegant, understandable, organic and well-crafted criteria. It concludes that digital storytelling video has effect for students' creativity.

Acknowledgements

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