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Testing Carbohydrate Substance as Flash Based Flipbook Learning Media

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Abstract. This study aims to produce a flash-based flipbook and find out the quality of flash-based flipbook products that are suitable for use as supporting learning media. The study consisted of preliminary research in the form of carbohydrate test practicum consisting of barfoed test, benedict test and iod / lugol test. The results of the study were developed into flash-based flipbook using macromedia flash and microsoft word 2010 through the data entry stage to the developer software, preparation of layouts and provision of activities on flash-based flipbook. The final product in the form of flipbook is flash-based. Flash-based flipbook was assessed by 1 material expert, 1 media expert, 1 science teacher, 3 peer reviewers, and tested on 10 junior high school students. The results of the evaluation of flash-based flipbook according to material experts were 90.87% (Very good), media experts 88.10% (Very good), peer reviewers 93.39% (Very good), biology teachers 75.00% (Good) , and 85.6% (Very good) student response. Based on this assessment, the flash-based flipbook that was developed is worthy of being used as a source of learning biology.

Keywords: Carbohydrate test, Flash based, Flipbook development, Learning media

INTRODUCTION

Improving the quality of education from year to year is always pursued by developing learning media. The aim is to facilitate learning so as to make it easier for students to understand the material (Gestaning, 2014). Learning media can bring up problems to be studied further and solved by students in their learning (Dzamarah and Aswan, 2006). This interaction between students and the media is actually a real form of learning action (Degeng, 1989). But currently the use of learning media can still be said to be minimal or not innovative, because of the limited ability of teachers to find resources to get more interesting learning media. The use of media that is often used in schools is in the form of textbooks, LKS and power points. Teachers need to use learning media that can generate motivation and learning activities and bring psychological influence on students (Arsyad, 2008).

In the subject matter of the Food Digestion System in Humans there is a sub-material content of food that explains carbohydrates. Carbohydrates are the most common food substances in everyday life, so they need specific explanations to be easily understood by students to be linked to everyday life. So far at the secondary school level, the practicum carried out on the subject matter of the Food Digestion System in Humans is the Food Ingredient Test, there is no practicum on the specific topic of carbohydrate substance testing. This topic is important for students to know that the food ingredients that contain carbohydrates are not only rice. Therefore, through this research will be developed flash-based flipbook learning media with carbohydrate substance test discussion so that it can help students to learn material taught by the teacher not only when in school, but can be anytime and anywhere.

The media offered in the form of flash-based flipbook which is teaching material is independent (self-learning materials) so that students can review the material at any time if they need it. Flipbook is the development of e-books where e-books are only digital books while flipbooks are in the form of books that can be opened page by page. The presence of a flipbook will make students seem to read a real book, so get a better visual experience. Facilities offered in using flash-based flipbook media such as presentation media, animation, images and videos are expected to make students not bored in accessing them. The ability of Macromedia Flash to make presentations supports multimedia insertion such as sound, image and ease of operation (Hasrul, 2011). The ease of operation in the use of flash-based media is an interactive key function that facilitates teaching and learning activities as desired (Chandra, 2004).

MATERIAL AND METHODS

Media Development Design

The activity at this stage is the creation of flash-based flipbook content based on the elaboration of the structural framework to produce the initial product design. The software needed to create this media is Microsoft Windows XP and Windows 7 as the Operating System and Macromedia Flash 8 as software to create media.

Identification and Capture of Carbohydrate Test
The tools used include test tubes, test tube shelves, test tube clamps, pipettes, measuring cups, and spirtus bunsen burners. The ingredients used include avocado seed powder, durian seed powder, jackfruit seed powder, barfoed reagent, benedict reagent and iodine reagent. The first stage is making powder from avocado seeds, durian seeds, and jackfruit seeds. The second stage is a qualitative test of carbohydrates which is a test to determine whether there is carbohydrate content.

Product Trial
The product testing phase consists of reviewers, peer reviewers and limited trials. The assessment was conducted by 1 material expert lecturer, 1 media expert lecturer, 3 peer reviewers and 1 science teacher.

Product Assessment
The product assessment design in this development study uses descriptive descriptions. The product quality assessment subjects in this study were 1 material expert, 1 media expert, 3 peer reviewers, 1 science teacher and 10 junior high school students. The data used in this study are qualitative data and quantitative data. The instrument in this study is a questionnaire about the quality of flash-based flipbook. Data analysis techniques used were media development process data in the form of descriptive data from experts, IPA teachers, and peer reviewers, as well as the resulting product quality data were analyzed by converting qualitative data into quantitative data.

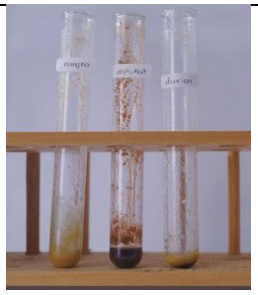
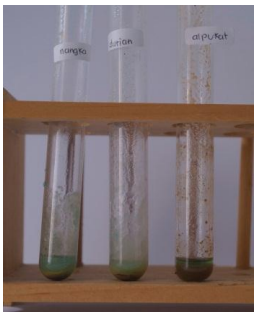
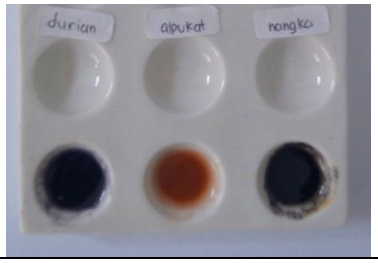
RESULTS AND DISCUSSION

Results

Results Flash-based flipbook design
The stage of designing flipbook is flash-based using Macromedia Flash and Microsoft Word 2010. Both software are selected as learning media for flashbook-based flash development because of their ease of use and software that is familiar to teachers and students.

Results of identification and shooting of carbohydrate test results can be seen in table 1.

Table 1. Results of carbohydrate test research.

No	Test of Carbohydrate	Test Results
1.	Test Barfoed Barfoed test is a qualitative test of carbohydrates using reagents in the form of solutions containing kuprisulfat and acetic acid in water. The reactants react with reducing sugars (monosaccharides) so that the resulting red carbon dioxide deposits are produced.	
2.	Test Benedict Benedict test is a qualitative test of carbohydrates using reagents in the form of solutions containing kuprisulfat, sodium carbonate and natriumsitrat. Glucose can reduce Cu ++ from kuprisulfat ion to Cu + ion which then settles as Cu2O. The precipitate formed can be green, yellow, or brick red. The color of the sediment depends on the number of carbohydrates examined.	
3.	Lugol Test The iodine test is a testing method for polysaccharide molecules. Starch is a polysaccharide containing two main components, namely amylose and amylopectin. In the test results, the material samples showed positive results on the iodine test, indicated by the change in color to blackish blue.	

Product Testing Results

a. Expert Assessment

Table 2. Product assessment by material experts.

Aspect	Input	Follow-up
Learning	Added molecular structure of carbohydrates	Already added
Truth Contents	Added reactions that occur at the test stage	Already added

Table 3. Product assessment by media experts.

Aspect	Input	Follow-up
Display	The front cover doesn't need the previous button	Already repaired
Programming	Consistent in the instructions section that appears when clicked using the keyboard	Already repaired

Table 4. Product assessment by peer reviewers.

Aspect	Input	Follow-up
Learning	Need to add questions for evaluation	Already added
Display	On the cover page the button/button on the left is removed The consistency of the distance between paragraphs is improved Change the color on the page background because it's too flashy	Already repaired

b. Product Quality Assessment Results

Table 5. Results of product quality assessment by material experts.

Aspect	Ideal Highst Score	Score of Assessmnt Results	Percente (%)	Quality
Learning	28	25	89,29	SB
Truth content	24	22	91,67	SB
Linguistic	12	11	91,67	SB
Total	64	58	90,87	SB

Description: SB (Very Good)

The quality of flash-based flipbook according to material experts is very good with a percentage of 90.87%. The results of product quality assessment according to media experts are presented in table 6.

Table 6. Results of product quality assessment by media experts.

Aspect	Ideal Highest Score	Score of Assessment Results	Percentage (%)	Quality
Learning	8	7	87,50	SB
Display	20	18	90,00	SB
Progammig	12	10	83,33	SB
Linguistic	12	11	91,67	SB
Total	52	46	88,1	SB

Description: SB (Very Good).

The quality of flashbook based on flash carbohydrate test material according to media experts is very good with a percentage of 88.1%. The results of the assessment of product quality according to peer reviewers are presented in table 7.

Table 7. Results of evaluating product quality by peer reviewers.

Aspect	Ideal highest score	Score of assessmt results	Percentage of ideals (%)	Quality
Learning	28	26,3	94,05	SB
Display	20	18,3	91,67	SB
Linguistic	12	11,3	94,44	SB
Total	60	56	93,39	SB

Description: SB (Very Good).

The quality of flipbook based on flash carbohydrate test material according to peer reviewers is very good with a percentage of 93.9%. The results of product quality assessment according to the teacher are presented in table 8.

Table 8. Results of product quality assessment by teachers.

Aspect	Ideal Highet Score	Score of Assessmet Results	Percentage (%)	Quality
Learning	28	21	75,00	B
Display	20	15	75,00	B
Linguistic	12	9	75,00	B
Total	60	45	75,00	B

Description: B (Good).

The quality of flashbook based on carbohydrate test material according to the teacher is very good with a percentage of 75.00%. Furthermore, the products presented in a limited manner to students to get responses from students are presented in table 9.

Table 9. Student responses to flash-based flipbook products.

Aspect	Ideal Highest Score	Score of Assessment Results	Percentae (%)	Qualiy
Pembelajarn	24	20,10	83,75	SB
Tampilan	32	26,40	82,50	SB
Kebahasaan	8	6,80	85,00	SB
Motivasi	16	14,60	91,25	SB
Total	80	67,90	85,60	SB

Description: SB (Very Good).

Flash-based flipbook products get an assessment from students of 85.60%.

Discussion

This research is included in the development research (Research and Development) which is divided into three main stages, namely the design of flash-based flipbook using Macromedia Flash and microsoft word 2010 developer software, carbohydrate test practicum with taking pictures, and product trials on teachers and students who validated by experts and peer reviewers.

In the first phase of the research, the development planning stage. This development phase uses Macromedia Flash and Microsoft Word 2010 developer software. The second stage is the carbohydrate test practicum in the laboratory. Alternative sources of carbohydrates used are avocado seeds, durian seeds and jackfruit seeds which are seeds that are often found in everyday life, but apparently students do not know that the seeds contain carbohydrates.

In the carbohydrate test barfoed test, benedict test, and iodine test were carried out. The first test is barfoed test is a qualitative test of carbohydrates using reagents in the form of a solution containing kuprisulfat and acetic acid in water In the experiment, it was found that in the three test materials there were brick red deposits. The second test is benedict test is a qualitative test of carbohydrates using reagents in the form of solutions containing kuprisulfat, sodium carbonate and natriumsitrat. In the experiment, obtained in avocado seeds there were brick red deposits, in durian seeds there were yellow deposits and on jackfruit seeds there were green deposits. The third test is iod test which is a testing method for polysaccharide molecules. In the test results, the material samples showed positive results on the iodine test, indicated by the change in color to blackish blue.

The assessment results provided by material experts and media experts showed that flash-based flipbook has very good quality with percentages of 90.87% and 88.10% respectively. The next assessment was carried out by peer reviewers as many as 3 people and obtained a percentage of 93.39% with very good quality. While the quality of flash-based flipbook according to the teacher is good with a percentage of 75%. The results of the analysis of student responses to flash-based flipbook are of very good quality with a percentage of 85.6%. According to students, the flash-based flipbook that was developed can add insight so that it can motivate students to learn. Based on the overall discussion that has been described, that flashbook based on carbohydrate test material has fulfilled the requirements as a teaching material for science learning.

CONCLUSIONS

1. The development of flash-based flipbook media regarding carbohydrate substance testing meets the criteria of good media quality successfully developed through the main stages of carbohydrate test practicum, product development and testing.
2. The results of the assessment of the development of flash-based flipbook based on the assessment of experts, peer reviewers are included in the very good category. Whereas for teacher assessment included in the good category. Student responses to flash-based flipbooks included in quality are very suitable for use as learning resource media with an ideal percentage of 85.60%.

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