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DEVELOPMENT OF ISPRING INTERACTIVE POWERPOINT MEDIA IN PHOTOSYNTHESIS TOPIC TO TRAIN CRITICAL THINKING SKILLS

Pengembangan Media Powerpoint Ispring Interaktif Pada Materi Fotosintesis Untuk Melatihkan Keterampilan Berpikir Kritis

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Abstract

Critical thinking skills is one of skill that must be able to face educational challenges in 21-st century especially during pandemic. Critical thinking skills also suitable for photosynthesis topic due to many actual problems and require deep analysis of learning. The purpose of this research was to produce a feasible media that valid, practical and effective based on ispring interactivepowerpoint in photosynthesis topic to train students's critical thinking skills. This study used ADDIE model which has*Analyze, Design, Development, Implementation* and *Evaluation.* This research is a descriptive quantitative research. Limited trials were conducted on 20 students of XII MIPA in SMAN 1 Geger. This research instruments were validity sheet, questionnaire for teacher also student responses and critical thinking skills test. Research result shown that media validity has valid categorized with average score of 83,44%. Students and teacher responses showed very good result for the practicality with a score of 94,3% and 100%. *Powerpoint* ispring interactive was stated to be good to train critical thinking skills with a score of 84,54% completeness indicators. Therefore, ispring interactive*powerpoint* media in photosynthesis topic able to train critical thinking skills.

Keywords: ispring interactive*powerpoint*, photosynthesis,critical thinking skill.

Abstrak

Keterampilan berpikir kritis adalah salah satu keterampilan penting yang harus dimiliki dalam menghadapi tantangan pendidikan di era 21 terutama pada masa pandemi. Keterampilan berpikir kritis cocok digunakan pada materi fotosintesis sebab di dalamnya terdapat permasalahan aktual yang membutuhkan analisis pada saat pembelajaran. Tujuan dari penelitian ini adalah untuk menghasilkan powerpoint ispring interaktif yang valid, praktis dan efektif pada materi fotosintesis dalam melatihkan keterampilan berpikir kritis peserta didik. Penelitian ini menggunakan model ADDIE meliputi Analyze, Design, Development, Implementation dan Evaluation. Penelitian ini merupakan penelitian deskriptif kuantitatif. Uji coba terbatas dilakukan terhadap 20 peserta didik kelas XII MIPA SMAN 1 Geger. Instrumen penelitian yang digunakan meliputi lembar validasi, angket respon untuk peserta didik serta guru dan lembar tes. Hasil penelitian menunjukkan bahwa media memperoleh rata-rata skor validasi 83,44% dengan kategori valid. Respon peserta didik dan guru menunjukkan hasil sangat baik dengan kepraktisan sebesar 94,3% dan 100%. Powerpoint ispring interaktif dinyatakan efektif untuk melatihkan keterampilan berpikir kritis dengan nilai ketuntasan indikator sebesar 84,54%. Dengan demikian media powerpoint ispring interaktif pada materi fotosintesis dapat digunakan untuk melatihkan keterampilan berpikir kritis.

Kata Kunci: *powerpoint ispring interaktif, fotosintesis, keterampilan berpikir kritis.*

INTRODUCTION

Learning media that based on information, commnunication and technology (ICT) is very needed during this pandemic situation that everything depends on technology especially students. Learning media also can stimulate students to be more focus, increase their interest to learn and keep their feelings in the topics during learning (Kristanto, 2016). One of media that included a lot of interesting aspect for learning is *powerpoint*.

Powerpoint is a software that developed by *Microsoft* as one of multimedia that packaged in the form of program (Daryanto, 2010). Learning media based ispring*powerpoint* will help teacher to deliver the learning topic in more interesting and interactive way, because some teachers convey their topic concept directly so students become passive and learning outcomes will not optimal. The advantages of using *powerpoint* in learning class such as more practical, variative, use color combinations, sound effect, animation effect and *timeless.*

Several studies shown that *powerpoint* media in biology have great result which is proved by feasibility data and student's score analysis got increased with data average of *pretest* on 23 students is 44.7 while the *posttest* show average result is 81.0 (Sinta and Rufa, 2020). On the other hand, *powerpoint* interactive also make students more interest to understand the topic which is proved by student's score that categorized as satisfying and worthy used as learning media (Julia, 2019). But on that research *powerpoint* that developed does not to train critical thinking skills, whereas critical thinking skills very important for helping students analyze a problem and thinking deeply.

Critical thinking skills is systematic and deep thinking skills so will get information surely (Surya, 2011). Critical thinking skills has 6 phasesthat were*interpretation, analyze, evaluation, inference, explanation and self regulating* (Facione, 2013). This skill also matched with photosynthesis topic because there are a lot of actual problems that need deep analysis for example biochemical reaction concept that affected by environtmental factors or enzyme concept in photosynthesis. Critical thinking skills can help students to solve a problem deeply by discussion based on thought and analyze problem with some relevant questions.

Critical thinking skill can be train by using interactive media that contain actual case for students, beside that *powerpoint*has trigger and simple animations fitur that will make students and teacher more active in learning. Active learning will demand students for critical thinking and asking for question or opinion. Johnson (2010) stated amazing thing from students that they have openness to new information and willingness to good change. Therefore, in this research will develop interactive media using *powerpoint* including some fiturs and case question to train critical thinking skills for students and needed skills in 21st century.

Based on the pre-research questionnaire and observation sheet on 19 students of XII-6 Senior High School 1 Geger which 52,6% revealed that biology learning in the classroom still less interactive. As well as in learning method 57,9% revealed that teachers still often use lecture method in the classroom so its motivate researcher to develop learning to be more modern and interactive. Saputri and Febriani (2017) stated that learning nowadays just emphasize mastery of concepts. Consequently, students just memorize topic for getting high score in test, while this situation make students do not thinking critically in solving problems.

Selection of photosynthesis topic in this research based on national test result in this topic still classified as low and not accordance with the standards. Based on data national test result show that in Senior High School has the average score for photosynthesistopicindicated by indicators of identifying processes that occur of carbohydrate anabolism only getting an absorption score of 36,08 with a completion limit score ideally of 55,00 and a maximum score of 100 (Puspendik, 2019). It shown that understanding of the concepts, interesting media and learning results is still low. One of the advantages using media in photosynthesis topic is can help interpret basic competence that want to be achived, because there is an abstract concept such as metabolism process and enzymatic reaction of living things that can not be seen directly around them. Regarding to this phenomenon, this research aimed to release ispring interactive *powerpoint*media about photosynthesis topic that feasible in terms of the validity, practicality and effectiveness of the *powerpoint* based on the result of validity sheet, student responses also teacher responses and critical thinking skill test.

METHOD

This research is a development research using ADDIE model that developed by Maribe Brach (Sugiyono, 2017). This development model has five phases that were *Analyze, Design, Development, Implementation and Evaluation. Analyze* stage including needs analysis, curriculum analysis,

technology analysis and school situation analysis. *Design* stage including media content preparation, making *powerpoint* design and composing interactive *powerpoint*. *Development* stage includingvalidation by expert lecturer. *Implementation* stage including limited trial. *Evaluation* stage including field trial and giving criticism or suggestions to the media.This research conducted at Biology Department of Biology FMIPA Unesa and Senior High School 1 Geger from November 2021 – Desember 2021. This research was trial limited to 20 students heterogeneously and one teacher of Senior High School 1 Geger.

The student's critical thinking skills will be known by the test in the end of learning. From this test, researcher will see the completeness of critical thinking skill indicators by calculating the phase including interpretation, analysis, evaluation and inference. However the explanation and self regulating stages was not conducted and calculated for critical thinking skills in this research. According to Widoyoko (2014) the learning completeness of each indicator was obtained by calculating as below.

$$C\ (\%) = \frac{\text{number of complete students}}{\text{number of all students}} \text{ x } 100\%$$

Further, the percentage of each indicator was interpreted as Table 1 below.

Table 1. The Criteria for Interpretation of Learning Completeness Indicator

Score (%)	Category
0-20	Not completed
21-40	Less completed
41-60	Enough completed
61-80	Completed
81-100	Very completed

(Widoyoko, 2014)

Based on the table, effectiveness of the media will achived if ≥61% of the students get completed indicator.

Furthermore, the limited trial also to determine the response of students and teachers. This responses were measured using Guttman scale. Score 1 is for yes answer and 0 for no answer (Sugiyono, 2013).

Further, the questionarre result interpreted as in **Table 2** below.

Score (%)	Interpret Criteria
86-100	Very good
71-85	Good
51-70	Good Enough
26-50	Less good
0-25	Not good

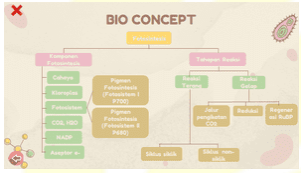
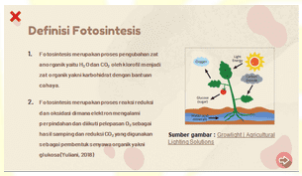
(Ratumanan and Laurens, 2011)

Based on the table, practicality of the media will achived if the questionnaire have interpreted ≥71%.

RESULT AND DISCUSSION

Result of this development research will release ispring interactive *powerpoint*media in photosynthesis topicwith many advantages such as interactive features including bio-concept, aku beritahu, evaluate, referensi and other features that makes students more active in learning, complete and coherent topics that containing concepts also HOTS (*High Order Thinking Skills*) standart quizes to train student's critical thinking skills in photosynthesis topic. The profile of the features in the developed media can be seen more clearly in table 4 below.

Table 4. Profile of the features of Ispring Interactive*Powerpoint*

Display and Features Name	Description
1. Bio-Concept 	Contains a concept map on photosynthesis topic
2. Aku Beritahu 	Contains topic about photosynthesis for students
3. Case-Do 	Contains cases obtained based on journals as a stimulus for students
4. Evaluate 	Contains short questions as a learning evaluation

In this development, researcher develop ispring interactive*powerpoint* in photosynthesis topic to train critical thinking skills that feasible based on validity, practicality and effectiveness. Critical thinking skills that trained by this ispring interactive *powerpoint* media involving interpretation, analyze, evaluation and inference.

1. Validity of *Powerpoint* Ispring Interactive

Validity ofispring interactive*powerpoint* to train critical thinking skills in photosynthesis topicconducted by two validator lecturers that the first one is topic expert lecturer and the second one is education expert lecturer are presented in Table 5 below.

Table 5. *Powerpoint* Ispring Interactive Validity Recapitulation

No	Indicators/Aspects assessed	Score	
		V_1	V_2
I.	**FEASIBILITY OF CONTENTS**		
1.	There is a linkages between content and various photosynthesistopics	65	75
2.	There are features that shown involving : a) Bio-Consept b) Aku Beritahu c) Case-Do d) Aku Bisa e) Guide-Me f) Evaluate g) Referensi		
3.	There are features or exercises that train critical thinking skills in the case of questions given, among others: a) interpretation, b) analyze, c) evaluation, d) inference		
4.	Facilitate to mastery of topic concept		
II	**PRESENTATION**		
1.	The order of topic presentation	31	32
2.	There are linkages between another slides		
3.	Tables and pictures clarify content		
4.	Illustration suitable with the topics		
5.	Attractive media display		
III	**LANGUAGE AND READABILITY**		
1.	The language used is accordance with the level of readerdevelopment (high school students and the general public)	20	19
2.	The terms used are precise and understandable		
3.	Using foreign/scientific names and symbols consistently		
Total Validity Score		**116**	**126**
Validity Score (%)		**80%**	**86,89%**
Validity Score Average		**83,44%**	
Criteria		**Valid**	

Based on the recapitulation in Table 5, known that the overall average validity obtained a percentage of 83.44% with valid categorized (Wiyono, 2016). Validity is degree of accuracy between existing data with data that obtained by researchers (Sugiyono, 2014). The components that were validated in this study included the feasibility of content, presentation, language and readability, got a total score of 116 from the educational expert validator lecturer and 126 from the topic validator lecturer with maximum score 145.Ispring interactive *powerpoint*media that developed has been adjusted to the 2013 curriculumin the knowledge criteria (KI3). From the recapitulation result inn the table shown that the validity is 80% with valid categorized from education validator lecturer and 86,89% with very valid categorized from topic validator lecturer. This result is in line with BNSP (2014) which stated that good media must complete three feasibility components that is feasibility of contents, presentation and language.

2. Practicality of Ispring Interactive*Powerpoint*

Practicality of *powerpoint* ispring interactive in photosynthesis topic to train critical thinking skills reviewed through the responses of students and biology teacher are presented in Table 6 below.

Table 6. Recapitulation of Students and Biology Teacher Response Questionnaires

Statement	Students		Biology Teacher	
	Yes %	Category	Yes %	Category
Media can motivate students in learning	95	Very Good	100	Very Good
Media is easy to understand for students	100	Very Good	100	Very Good
Attractive design that suitable for learning process	100	Very Good	100	Very Good
Media helps students to	100	Very Good	100	Very Good

recognize a problem				
Media helps students to describe a problem	80	Good	100	Very Good
Media helps students identify and analyze information connection	100	Very Good	100	Very Good
Students are able to collect the required information from credible sources	95	Very Good	100	Very Good
Students are able to make conclusions based on the facts that given	85	Good	100	Very Good
Average	**94, 3**	**Very Good**	**100**	**Very Good**

Based on the recapitulation result of students and biology teacher responses in Table 6 shown positive responses of ispring interactive *powerpoint* to train critical thinking skills in photosynthesis topics stated to be very good with an overall average of students responses 94,3%. From the results presented, it can be seen that the developed media is interesting so it motivates and makes easier for students to learn and understand the topic. This is supported by (Huang et al., 2020) which reveals that the use of media can increase learning motivation and ability to solve problems. So from an attractive presentation in this development, it is expected to increase learning motivation so the student learning outcomes will also increase (Retariandalas, 2017).

Biology teacher response get 100% percentage with very good categorized. Ispring interactive *powerpoint* media that developed also get positive response from biology teacher as a whole because makes students more enthusiasm in learning with the help of pictures and cases on topic delivery. This case giving is in line with research of (Irit et al., 2018) which revealed that the class whose given with HOTS treatment showed an increase in argumentation, submission of opinion and thinking system. So the case giving in this development is positive thing for students learning and the media practicality score to train critical thinking skills.

It is known that the mediastated to be practical if it obtains a percentage of the questionnaire result with an interpretation ≥71% (Ratumanan and Laurens, 2011). Teacher involvement in giving response also affect development because teacher is important thing in use and selection of teaching topics that suitable with students need so the learning outcomes can be achieved optimally (Kantun, 2015).

3. Effectiveness of Ispring Interactive*Powerpoint*

The effectiveness of ispring interactive*powerpoint*that developed to train critical thinking skills for students in terms of completeness on critical thinking skills indicators that including interpretation, analyze, evaluation and inference. The results are presented in Table 7 below.

Table 7. Recapitulation of Completeness on Critical Thinking Skills Indicators

No	Indicators	Completeness Percentage (%)	Category
1	Interpretation	91,42	Very Good
2	Analyze	86,25	Very Good
3	Evaluation	73	Good
4	Inference	87,50	Very Good
Average score		**84,54**	**Good**

Based on the results of the recapitulation, the results of the completeness indicators on critical thinking skills are obtained by an average score of 84,54% with a good categorized.From four critical thinking skills indicator that trained, there are three indicators with very good categorized such as interpretation, evaluation and inference. It shows very positive result supported by (Lauren et al., 2021) which reveals that interpretation, analysis and evaluation are very important in critical thinking skills. The only one indicator with good categorized and lowest score of 73% is evaluation imdicator. Evaluation is activity of assessing or testing a statement or conclusion whether it has good credibility (Facione, 2013). Evaluation is also intended as the ability to determine the advantages and disadvantages of a thing (Liudmila et al., 2021). So in this indicator, students are still lacking in achievement due to determining thinking and considering something, they need to think more deeply and reflect.

Stated by Sri Utari et al in (Arafah et al, 2012) that questions which train critical thinking in learning can

improve student learning outcomes.The learning outcomes of students in this study were used as indicators of completeness in assessing the effectiveness of ispring interactive*powerpoint*to train critical thinking skills on photosynthesistopic.Ispring interactive*powerpoint* can be said to be effective as a learning media if ≥ 61% of the complete students by the total number of students (Widoyoko, 2014).Based on the results, it can be seen that the developed media was stated to be effective to train critical thinking skills because it obtained 95% of students' mastery.

CLOSING

Conclusion

Based on the results of the study, it can be concluded that the development of ispring interactive *powerpoint*media is feasible to train critical thinking skills on photosynthesistopic based on validity, practicallity and effectiveness. From the results of the validity obtained 83,44% with a valid categorized. Questionnaire responses from students and biology teachers showed practicality results of 94,3% and 100% withvery good categorized. The effectiveness through the indicators of critical thinking learning outcome indicators obtained results of 84,54% with good categorized. This media also supported with some fitures that helps to train critical thinking skills such as Bio-Concept, Aku Beritahu, Case-Do and Evaluate.

Suggestion

Based on the research that has been done, there are several suggestions given, including to do development in similar media on other topics because of the positive response given and more aspects or indicators of critical thinking skills that are not trained yet including explanation and self-regulation.

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