Development of HOTS-Based Interactive Worksheets Using Wizer.Me Media on Ecosystem

Erna Afriliyanti[1*], Fatikhatun Nikmatus Sholihah[2], Ospa Pea Yuanita Meishanti[3]
[1,2,3]Biology Education, Universitas KH. A. Wahab Hasbullah

*Email: liaafriliyanti65@gmail.com

ABSTRACT

The development of increasingly sophisticated technology has become an important means of achieving more effective and efficient educational goals. But behind that, there is a big demand for lecturers/teachers to develop skills in mastering technology and learning media. So it is necessary to develop learning media using the wizer.me application. The aims of this study are: 1) to describe the results of HOTS-based interactive worksheet validation using wizer.me media on ecosystem material according to media experts; 2) Describe the results of HOTS-based interactive worksheet validation using media wizer.me on ecosystem materials according to material experts. This research method is development using the ADDIE model. The instrument used was a validation questionnaire for media experts and material experts. Data analysis techniques in the form of validation and suggestions from the validator. The validation results from media experts showed that 82% were declared very feasible and the validation results from material experts showed 72.7% were declared feasible, indicating that wizer.me learning media on ecosystem material is suitable for use as a medium for learning ecosystem biology material.

Keywords: Ecosystem, HOTS, Wier.Me, Worksheet.

INTRODUCTION (font size 12pt)

The rapid development of the times has affected changes in various fields. The impact of this development changes and has an impact on many aspects of human life, including education. The development of the era with digital technology is the most influential education system in the world today. This is due to the aspects of effectiveness, efficiency, and attractiveness offered by digital technology-based learning. If in the 1980s learning media used concrete man-made objects dominated their use as learning tools, currently digital technology-based learning media is becoming a more effective, efficient, interactive and interesting tool (Putrawangsa and Hasanah, 2018).

At present the development of science and technology is increasing rapidly, this situation has brought changes to almost all aspects of human life, and various problems can only be solved by mastering and improving science and technology. In the world of education, technology has had a major impact on the progress of education, making information technology a reservoir of knowledge and a means of learning (Wardani et al, 2021). In the world of education, technology plays an important role in helping the advancement of education. Various national and international studies have documented the use of teaching materials packaged as a vehicle for information and communication technology. Therefore, using technological learning media to encourage the widespread use of technology in society (Tafanao, 2018). Learning media is a vehicle for communication that conveys messages and information so that the teaching and learning process is more effective. The use of technology products with appropriate and effective learning media certainly brings convenience, which will later affect the progress of the education level (Muharam et al, 2018).

The development of HOTS-based interactive worksheets using the Wizer.me application aims to encourage students to think critically and creatively and improve problem solving skills. At the same

time, the Wizer.me application offers teachers the opportunity to teach students in new and interesting ways that can help them achieve better results (Wibawa and Agustin, 2019). Wizer.me learning media can help teachers create more interactive materials so students can learn more effectively. Wizer.me learning media uses the concept of Higher Order Thinking Skills (HOTS) to encourage more effective learning. This concept focuses on improving students' abilities to analyze information, make inferences, apply, understand and evaluate information. Wizer.me learning media helps teachers present interactive and interesting material that can help students achieve better results. Wizer.me learning media can also help teachers develop interactive worksheets that encourage HOTS questions and help students better understand the questions (Nadapdar et al, 2022)

The Wizer.me website has a variety of question features that help create interactive worksheets. These question features include categorization, matching, multiple choice, open-ended questions, pictures, word puzzles, and picture descriptions. Some functions are not available in the worksheet, add audio/video. A study conducted by (Kopniak, 2018) states that there are pros and cons in using the Wizer.me website. The advantage of using the Wizer.me media app is that it's easy to create and share interactive content. Wizer.me creates and shares interactive multimedia presentations, as well as provides engaging learning experiences, customizable content. Wizer.me customizes questions to suit teacher needs, questions that can be accessed globally, so that they can reach users around the world, offering analytical tools Wizer.me offers a dynamic and interactive learning experience, so as to achieve better results in learning (Kaliappen et al, 2021)

The results of the needs analysis at MAN 10 Jombang with the resource person Mr. Nanang Setiawan S.Pd he said that during online learning the learning media used was only WhatsApp but using the WhatsApp application for video playback was limited, the pictures were less interesting and seemed monotonous as a result, children got bored easily. The LKPD used during online learning only uses printed LKPD but using printed LKPD does not match what is expected by the teacher because there is no variety of questions and the material is too short so it seems monotonous. He said that in learning ecosystem material, only using textbooks so the teacher had difficulty conveying material because the pictures about ecosystems were limited and could not provide examples of other images, resulting in students lacking in activity and participation in ongoing learning. Ever applied HOTS-based questions but did not support online learning. Therefore, based on this background, it is necessary to develop learning media in the form of HOTS-based interactive worksheets using wizer.me media on ecosystem material.

METHOD (font size 12pt)
The development model used in this study is the ADDIE model which consists of five stages, namely Analysis, Design, Development, Implementation, Evaluation (Nugraha, 2021). This development model was chosen because it contains systematic and simple steps for the development of instructional media.
- Analysis

The analysis phase is the initial stage to identify the causes of the learning problems that occur. At this stage, a needs analysis and material analysis are carried out.
- Design

The Design Phase is the second stage which is carried out by designing learning product designs in accordance with the material concepts and basic competencies.
- Development

The development stage is the third stage which aims to produce and validate learning media. The production of learning media is carried out according to the design that has been determined in the previous step. In compiling the Wizer.me media, it contains media titles, namely the "Abiotic and Biotic" Ecosystem Component Worksheet, Core Competencies, Basic Competencies, and questions. The developed media product has the form of questions, the contents of which are Ecology material contained in the Basic Competencies that have been determined in the analysis, so regulations need to be made later so that they can direct students to use Wizer.me media properly.
- Implementation Stage

The implementation stage is the fourth stage which was not carried out due to limited time and development personnel.

- Evaluation Stage

The Evaluation Stage is the fifth stage of the evaluation stage which is carried out after the development stage aims to evaluate the results of media expert validation and material expert validation so that feasibility is known.

- Data Analysis Techniques

The technique of analyzing the results of media validation and material experts with the researcher made a validation sheet containing assessment items. Then the validator answered by ticking the category provided by the researcher based on the Liket scale which consists of 5 rating scales as follows:

Table 1 Expert Validation Assessment Score

Information	Score
Very Good	**5**
Good	4
Enough	3
Not Enough	2
Very Less	1

The data obtained in the form of validation assessment results will then be analyzed descriptively by the researcher. The data collected is in the form of validation by media experts and material experts. The data is then calculated by the formula

$$Presentase = \frac{skor\ dari\ validator}{skor\ maksimal} \times 100\%$$

x = Score from the validator
xi = Maximum score

Data obtained from media experts were analyzed descriptively. Wizer.me media development is said to be theoretically feasible if it obtains a feasibility percentage of $\geq 61\%$ with feasible and very feasible criteria (Sari and Kamal, 2018). This feasibility calculation is calculated using the following formula:

Table 2 Feasibility Validation

No	Percentage	Eligibility category
1.	81-100%	Very Worth it
2.	61-80%	Worthy
3.	41-60%	Decent Enough
4.	21-40%	Less Eligible
5.	0-20%	Not feasible

RESULT AND DISCUSSION (font size 12pt)

research results

The test data presented by Media Wizer.me development research is Ecosystem material, namely data from lecturer validation as media experts and data from lecturer validation results as material experts. The validation activity was carried out by two lecturers from the Faculty of Education, KH University. A. Wahab Hasbullah Tambakberas Jombang.

Learning Media Expert Validation Data

Data from the validation results of learning media experts were obtained from the results of a questionnaire given to Biology lecturers at the Faculty of Education, University of KH. A. Wahab Hasbullah Tambakberas Jombang namely Ospa Pea Yuanita Meishanti, M.Pd. The validation questionnaire for the development of the Wizer.me application learning media Ecosystem material contains 20 assessment questions by including suggestions and input sheets.

Table 3 Data from the Validation Results of Media Development Experts

No	Rating Items	Results			
		x	xi	Percentage	Criteria
I	**Display Design Effectiveness**				
1	Attractive appearance design	4	5	80%	Worthy
2	The suitability of selecting font sizes, text types, use of colors, and backgrounds	3	5	60%	Decent Enough
3	Compatibility of images in the material	4	5	80%	Worthy
4	The clarity of the image in the video	4	5	80%	Worthy

No	Grading item	x	xi	Percentage	Criteria
5	Voice use and clarity	4	5	80%	Worthy
6	Media wizer.me is not easily corrupted	4	5	80%	Worthy
7	There are many answer options on mediawizer.me	4	5	80%	Worthy
II	**Ease of Compression**				
8	Ease in operating Wizer.me Learning Media	5	5	100%	Very Worth it
9	It can be used by anyone	4	5	80%	Worthy
10	Safe to use	4	5	80%	Worthy
11	Ease of answering questions	4	5	80%	Worthy
12	Ease of logging in	4	5	80%	Worthy
13	The results of student answers can be seen immediately	4	5	80%	Worthy
14	Can be used using cellphones and laptops	4	5	80%	Worthy
15	In this Online LKPD only the teacher knows the students' answers	4	5	80%	Worthy
16	Teachers can find out students who do not work on LKPD Online	5	5	100%	Very Worth it
III	**Benefit**				
17	The benefits of using media wizer.me can be done anywhere	5	5	100%	Very Worth it
18	Educators can give assignments to students without correcting because there is already an auto correct feature to check student answers,	4	5	80%	Worthy
19	Media.wizer me is free without paying	5	5	100%	Very Worth it
20	Can save time	4	5	80%	Worthy
	Amount	82	100	82%	Very Worth it

Information

x = Score from the validator

xi = Maximum score

The average score of learning media experts is 82 % with very good criteria. A total of 4 aspects get a score of 5, 14 aspects get a score of 4 and 1 aspect gets a score of 3 from learning media experts. Aspects that get a score of 5 are: Ease of operating Wizer.me learning media, teachers can find out students who are not working on online worksheets, the benefits of using wizer.me media can be done anywhere, and media.wizer me is free and free. Aspects that get 4 scores are: Attractive display design, suitability of images in the material, clarity of images in the video, use and clarity of sound, media wizer.me is not easily damaged, there are many answer options on media wizer.me, can be used by anyone, safe to use, Ease of answering questions, ease of logging in, results of students' answers can be seen directly, can be used using cellphones and laptops, in this online LKPD only the teacher knows students' answers, Educators can assign assignments to students without correcting because there is already an auto correct feature to check student answers, and *can* save *time* . Aspects that get a score of 3 are: Appropriateness of choosing font size, type of text, use of color, and *background* . As for the suggestions and input of learning media experts on the Wizer.me application media, namely the fonts for KI and KD letters must be equated, after the command marks there is no need to put a period, and the automatic correction feature for essay questions the teacher must correct independently.

Material Expert Validation Result Data

Data from ecosystem material expert validation results were obtained from the results of a questionnaire given to Biology lecturers at the Faculty of Education, University of KH. A. Wahab Hasbullah Tambakberas Jombang, namely mother Anggun Wulandari S.Si, M.Pd. The material validation questionnaire contains 11 assessment items including suggestions and input.

Table 4 Material Expert Validation Results

No	Grading item	Results			
		x	xi	Percentage	Criteria
I	**Material**				
1	Material suitability with basic competencies	3	5	60%	Pretty decent
2	The suitability of the image with the material	3	5	60%	Pretty decent
3	The suitability of the video in the material	4	5	80%	Worthy
4	The suitability of questions using discovery learning	4	5	80%	Worthy

5	The systematic presentation of material on HOTS-laden media is aided by the discovery learning method	3	5	60%	Pretty decent
II	**Learning**				
6	Ease of understanding questions in the media	4	5	80%	Worthy
7	Media wizer.me is relevant to content	4	5	80%	Worthy
8	Ease of students in using media wizer.me	4	5	80%	Worthy
III	**Benefit**				
9	Attract students to work on online questions in ecosystem material	4	5	80%	Worthy
10	Media wizer.me helps teachers to make LKPD online	4	5	80%	Worthy
11	Media wizer.me can be used anytime	4	5	80%	Worthy
	Amount	40	55	72.7%	Worthy

Information:
x = Score from the validator
xi = Maximum score

The average score from the results of material experts is 72% with the Kayak criteria. A total of 7 aspects get a score of 4 and get 4 aspects get a score of 3. Aspects that get a score of 4 are: The suitability of the video in the material, the suitability of questions using *Discovery Learning,* the ease of understanding questions in the media, Wizer.me media is relevant to the material, the ease of students in using the Wizer.me application media, attracts students to work on online questions on ecosystem material, the wizer.me media helps teachers to make online LKPD and the wizer.me media can be used at any time. Aspects that get a score of 3 are: suitability of the material with basic competencies, suitability of the images in the material, and systematics on HOTS media with the help of the *Discovery Learning method.* The suggestions and input given by material experts are as follows:

1. The material in the questions listed only involves ecosystem components (biotic and abiotic) while the interactions between components are not clearly visible in e.LKPD.
2. KD 4.10 regarding food webs and biogeochemical cycles is not yet in the e-LKPD, there is only a picture of the food chain.
3. The pictures in the material are only food chains. If you ask HOTS questions, you should be able to show more pictures.
4. Many questions put more emphasis on media wizer.me, not material.
5. There are still easy questions for class X students.
6. The material listed is still too minimal.

Discussion
Media Validation Data Analysis
The media expert validation results data that has been obtained is then translated through analysis of media validation data, media validation data which is the basis used to determine the theoretical feasibility of the media, the instrument used for media assessment is a questionnaire with 20 assessment indicators equipped with suggestions and conclusions. The media expert validator gave an assessment of the wizer.me learning media with a percentage of 82%, although in his assessment not all assessments received a percentage of 100%, of the 20 assessment indicators: 4 assessment items received a percentage of 100%, 14 assessment items received a percentage of 80% and 2 assessment items received a percentage of 60%. The validation results of media experts stated that 82% were declared very feasible, as explained by (Fuad et al. 2020) that the results of the media validity test can be calculated using a formula and converted using a validation eligibility table. The validation results related to the ease of operation of the media show that 4 items get a percentage of 100% and 14 items get a percentage of 80%. This is in line with research (Erawati, 2023) which states that Media wizer.me can be directly used in learning by sharing media via a link that students can access online via cellphone or PC. Supported by (Nasution, 2020) that the procedures for using the Wizer.me website for teachers and students are quite easy and practical. Based on this opinion the Wizer.me website is a website that provides the opportunity to make interactive online assessment activities for free and easy to use according to user creativity. Suggestions from media experts, in writing the font letters are equal in size and after the command sign it is not necessary to put a period (Qhadafi, 2018) which states that an exclamation point is used at the end of the expression so that there is no need to add a period to the end of the exclamation point. The

validation results related to the suitability of choosing font sizes, text types, use of colors, and backgrounds get a percentage of 60% because in the wizer.me application media the KI and KD text fonts are not the same, (Cahyani et al, 2018) stated that using the same font in one writing is important to achieve visual uniformity, increase legibility, and maintain format consistency. This creates an organized, professional impression and makes it easier for the reader to understand the text well.

Material Validation Data Analysis

The percentage results obtained from the material expert validation questionnaire were 72.7 %, which means they were feasible to use. Assessment item no. 10 gets a score of 4. This shows that this media can help students work on online questions easily, so that it can help students understand ecosystem material. (Sulastri et al , 2023) explained that interactive media using wizrer.me can improve student learning outcomes. The results of validating the eligibility of this media are supported by (Safitri, 2022), namely media using wizer.me is suitable for use if the percentage results are above 70%.

The results of the validation are 4 aspects that get a percentage of 60%. In items related to the suitability of the material with basic competencies, a percentage of 60% is not listed, this does not include questions about KD 4.10, it only contains KD 3.10 questions such as the results (Abrori et al, 2023) stating that learning materials are in accordance with basic competencies , we can ensure that students get directed, relevant, and effective learning in accordance with predetermined learning goals, material must be in accordance with basic competencies because it helps achieve predetermined learning goals and basic competencies are detailed descriptions of what students must master at the end of learning in a subject or field certain knowledge.

Assessment items related to the suitability of images in the material get a percentage of 60% in the e-LKPD only images containing KD 3.10 regarding biotic, abiotic and food web components while KD 4.10 regarding interactions between components and biogeochemical cycles have not been listed (Ismail, 2018) states that the two basic competencies are interrelated and require one another to be fully understood, KD 3.10 emphasizes students' ability to apply concepts, principles or procedures related to certain fields of study correctly and consistent and able to solve problems using various methods that have been studied, meanwhile, KD 4.10 focuses more on the ability of students to carry out an analysis of an event or phenomenon related to a particular field of study so that it can provide conclusions or recommendations for solutions to these problems, and in the context of learning ecosystems for example, the use of images is very important to help students understand related concepts such as the food chain, the water cycle, interactions between living things in the surrounding environment etc. D 4.10), then learning objectives will be difficult to achieve optimally.

Assessment items related to the systematic presentation of material on HOTS-loaded media using the *Discovery Learning learning method* get a percentage of 60%. In HOTS questions, there must be a lot of images for students to analyze, but the images listed are only food chains (Siregar and Aghni, 2021) stated that the use of images is very important because it can provide a strong visual stimulus for students to be able to respond to questions in more complex and in-depth ways. other concepts that have been studied before and the use of pictures can also make learning more fun and interactive for students because they can immediately see concrete examples of what is being learned so that it becomes easier for the brain to understand and digest.

On the item related to the ease of questions in the media getting a percentage of 60% because the questions in the media are in the form of multiple choice and matching, the questions on analysis are still a few HOTS-based questions in the form of analytical questions (Mawardi et al, 2020) stating that analysis questions can also make learning more interactive and provide opportunities for students to exchange thoughts and opinions, this will certainly broaden their horizons and train social skills such as teamwork and effective communication, HOTS-based media should be equipped with analysis questions so that they can help improve students' learning abilities in doing more academic tasks complex and challenging and analytical questions are a form of developing higher order thinking skills or High Order Thinking Skills (HOTS) in students.

Suggestions from material experts on Wizer.me media are to include KD 4.10 material, because in the media the questions related to KD 4.10 have not been listed, multiply the pictures in the questions, some questions are still easy because there are questions in the form of multiple choice and matching and in the media there are no pictures explaining biogeochemical cycles.

CONCLUSIONS

The results of the validation from media experts showed that the criteria were Very Eligible with a percentage value of 82% and the validation results carried out by material experts showed the criteria were Eligible with a percentage value of 72.7%. This shows that the Wizer.me learning media on ecosystem material is suitable for use as a Biology learning medium for Ecosystem material.

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