Validity Test Development of Wizer.me-based Interactive Worksheet On Human Excretion System For Class VIII

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ARTICLE INFO	ABSTRACT
Article history Submission Dec 10th, 2022 Revision May 10th, 2023 Accepted May 17th, 2023 **Keyword** Interactive Worksheets Wizer.me Human Excretory System ADDIE R&D	When online learning was implemented, teachers are encouraged to use digital technology base for teaching. According to interview results with junior high school science teachers in Yogyakarta, Bekasi, and Lampung, the problem encountered is the lack of use of interactive worksheets because some teachers have not mastered today's technology. The material chosen is the eighth grade human excretory system because it has a complexity in many names of organs and processes that occur in these system. This research aims to develop, determine the validity and feasibility of interactive worksheet using Wizer.me on eighth grade human excretory system material. This research uses R&D methods and ADDIE model as a reference for research implementation. This article is limited to the development section, especially the validity test. To test the validity of the worksheets, the instrument sheets are used. There were two aspects that being validatet, material and media. This research had made 3 interactive worksheets using Wizer.me. The validation conducted by four validators consisting of one media expert, one material expert, and two science subject teachers. The results showed an average value of 93.2% with very valid criteria. Therefore, the interactive worksheets based on Wizer.me is eligible to be tested with revisions according to suggestions from the validators.

Introduction

Teachers who teach in the 21st century are required to mastery not only teaching materials, but also required to integrate the use of digital technology in learning process. Before the pandemic, the use of digital technology in classroom was not playing important role. The pandemic has disruptive effect to education. Currently, the digital technology is playing an important role in learning and teaching process[1]. It was a huge leap in 2 years in teaching technology. However, the implementation of digital technology in the classroom is mostly affected by teacher ability and willingness to shift from conventional approach to digital one[2].

On the other hand, it is agreed that the use of digital technology may help students especially in natural science learning[3]. One of natural science subject that being focus of this study is biology for class VIII. Based on the interview with junior high school science teachers in Yogyakarta, Bekasi, and Lampung, the material that was considered complicated by the respondents was material that had many names of organs and processes that occurred in these organs. They said that complicated material also needed to be taught in detail, slowly, and accompanied by illustration tools. Therefore, they need to be assisted by a tool to be used in learning process. The researchers summarized that the material regarding the work of systems on humans in class VIII was identified as a difficult material. To be specific, that material refers to Basic Competence (KD) 3.10 regarding the excretory system in humans. Teachers identified that KD as a complicated material because it is related to various organs and processes of human organs. To learn this material, the teachers must explain the process of human excretion in order from the name of the organ, how the organ works, to the excretory substance produced. This is the reason why this study was conducted.

The subject matter of the excretory system material includes organs that play a role in the excretory process. Those organs are kidneys, skin, liver, and lungs. Beside that, the material also covering the process of forming residual substances, as well as disturbances in the excretory system and a healthy lifestyle. The excretory system material requires a high concentration because this material includes basic concepts and complicated processes that are difficult for students to understand [4].

In addition to experiencing problems with the material, another problem faced by respondents during online learning is the worksheet which does not attract the attention of students. According to the speakers, many students think that student worksheet is a question sheet like assignments in general, therefore one of the speakers does not give student worksheet to their students. In addition, several speakers said that during online learning they rarely use student worksheet because it is too complicated and not too important when learning online. The purpose of worksheet is so that students can understand the material more deeply, form interactions between students and teachers, and increase activities to find and study information about a material.

The worksheet that has been known so far is presented in written form, but with the development of the times student worksheet can be presented in the form of interactive computer-based or internet-connected devices. An interactive student worksheet can present materials, animations, videos, and various other activities that can attract attention and increase students' understanding in learning a material.

The worksheet is one of the learning tools in the form of a sheet of solving activities to help the learning process [5]. In general, there are 6 worksheet structures, namely titles, learning instructions, learning indicators, supporting information, work steps, and assessments. The title of worksheet contains the theme and title of the activity on worksheet. Study instructions contain instructions to find out the contents of the worksheet. Learning indicators contain indicators that will be achieved on a particular material. Supporting information contains record information or a summary of certain materials on the worksheet. The work step contains the way students will work in doing worksheet. And the assessment contains the types of assessments that will be assessed on the worksheet work[6].

The worksheet used in the learning process is divided into 5 forms according to its purposes, namely (1) worksheet to help students finding a concept, (2) to guide during study , (3) to guide students applying and integrating various concepts that have been found, (4) to guide students in a practicum, and (5) to reinforce concepts[7].

In this study, the worksheet made by the researcher was a combination of student worksheet to find the concepts studied and the one as a material reinforcement provider. A

worksheet to find concepts provides an opportunity for students to find the concept of a material independently, and it is hoped that students can find concepts through the information obtained. Furthermore, student worksheet as a material reinforcement provider is worksheet which helps students get notes of a material, usually this student worksheet includes instructions, work steps, main material, and additional materials such as videos, images, and articles related to the material [8].

Interactive Worksheets are one application of digital learning media [9]. Worksheets that are known so far are often presented in written form, but over the years student worksheet can be presented in an interactive computer-based form[10]. An interactive student worksheet can be made as creative as possible so that it can be equipped with videos, animations, and games that can increase student understanding and are interesting to work on. The development of a worksheet is important for students because it is a tool to improve understanding of the material[11]. A that can be used to create an interactive student worksheet is Wizer.me.

Wizer.me has two mode, there are free and paid service mode. Both mode can be used to create an interactive worksheet[12]. By using Wizer.me, teachers can create interactive worksheets according to creativity and material needed. The question features found on Wizer.me include: matching, classifying, multiple choice, blurbs, puzzles, crossword puzzles, and image descriptions[13]. Questions created on Wizer.me will be connected to the Wizer.me network. Having such wide connection, students only need a link from the questions made on the Wizer.me.

On Wizer.me, students do not need to download questions anymore, but simply do the questions on the Wizer.me site. The answers given by students will be saved by the system by themselves, so students don't have to be afraid if they forget to save the answers or lose their internet connection[14]. Students who have saved the answer will be corrected by the system automatically, so that teachers do not need to manually correct one by one. In the assessment process, Wizer.me has a feedback feature that can be given by the teacher so that students can learn the inputs given by the teacher[15].

Based on the above problems, there is a need of the development an interactive student worksheet for junior high school science teachers. Aims of this research were to develop interactive student worksheet using a Wizer.me on class VIII human excretion system material and to test its validity.

Method

The type of research used is Research and Development (R&D). This research uses an approach from the ADDIE development model[16]. The ADDIE development model was chosen because it has a structured approach, especially for developing learning media. In this study, researchers limited it to the development stage, especially the validity test. The resulting product is an interactive worksheet using a Wizer.me on the material of the human excretion system of SMP class VIII as many as 3 worksheets for 3 meetings. The material used in this study is class VIII human excretory system material, which has KD 3.10 "Analyzing the excretory system in humans and understanding disturbances in the excretory system and efforts to maintain the health of the excretory system" and KD 4.10 "Making works on the excretory system in humans and its application in maintaining self-health". The steps of this study in more detail will be described at the following stages:

1. The first stage is to analyze the needs (analyze). At this stage, peneliti conducted a needs analysis through interviews with science subject teachers at SMP Negeri 16 Bandar Lampung, SMP Pangudi Luhur Sedayu, SMP Negeri 6 Yogyakarta, SMP Mahanaim Bekasi, and SMP Marsudirini Bekasi.
2. The second stage is the design stage. At this stage, the researcher writes the idea into a

formulation that describes the learning media in detail. Researchers developed an interactive worksheet using the Wizer.me . The design of this product combines images, videos, and variations of questions on the topic of human excretory systems.

3. The third stage is the development stage which includes the learning media production stage and the learning media development stage. The development carried out by researchers is the development of worksheet and product validation as well as assessment instruments.

The data collection techniques carried out in this study were interviews and questionnaires. Interviews were conducted with 5 junior high school science teachers in Yogyakarta, Bekasi, and Lampung. Meanwhile, the stage of distributing questionnaire sheets is carried out to validators to validate the feasibility of the products that have been developed. The questionnaire was given to media experts, material experts, and science teachers. The validation product is divided into two, material validation and media validation. The questionnaire that was given to validators are closed questionnaire using 1 – 4 rating scale, which is a modification of the validation item[17]. The material validation questionnaire grid can be seen in Table 1 and the media validation questionnaire grid can be seen in Table 2.

Table 1. The material validation questionnaire gird

No.	Aspects	Indicator	Question Number
1	Content	Material correctness	1, 2
		Presentation of the material	3, 4
		Completeness of the material	5
		Material suitability	6, 7
2	Presentation	Material presentation techniques	8
		Systematics of drafting	9
3	Language	Sentence clarity	10, 11
		Sentence writing follows the rules of PUEBI	12
		Word writing follows KBBI	13

Table 2. The media validation questionnaire grid

No.	Aspects	Indicator	Question Number
1	Didactics	Learning process	1, 2, 3
2	Construction	Accuracy of language and sentence use	4, 5, 6
		Pay attention to learners' answers	7
		Systematics of worksheets	8, 9, 10
3	Technical	Accuracy of the use of writing	11
		Accuracy of image use	12
		Accuracy of video use	13
		Correctness of color selection	14
		Attractiveness of appearance	15
		Product use	16

The data obtained by quetionnaire then analyzed qualitatively and quantitatively. Qualitative data analysis is obtained based on comments and suggestions given by validators. Comments and suggestions from validators are analyzed to be a reference for researchers to improve the developed product. Quantitative data analysis based on interactive worksheetvalidation results using Wizer.me is divided into two, namely material validation and media validation. The assessment results of the validator are calculated using the following formula[18].

$$Percent\ Value = \frac{Total\ Score}{Maximum\ Score}\ x\ 100\%$$

The percent value obtained is then interpreted into table 3 to measure the validity of the product being developed.

Table 3. Product validity criteria

Percent value (%)	Criteria
85,01% ≤ percent value ≤ 100%	Very valid
70,01% ≤ percent value ≤ 85%	Valid
50,01% ≤ percent value ≤ 70%	Less valid
01,01% ≤ percent value ≤ 50%	Not valid

Source: Modified from Sugiyono (2014) in Malau (2021)

Results and Discussion

Based on the results of needs analysis interviews with 5 science teachers in 5 different schools, one of the most difficult junior high school biology students to understand is the human excretory system. The material of the excretory system in humans is considered difficult because there are many organs of the body that have their own functions and there are certain processes in the human body system. Teachers need to accompany students so that the material can be accepted and understood easily.

Furthermore, the results from needs analysis found that theacers need to be provided with worksheet that can be used online. This answer was identified because of distance learning method during the pandemic. During that situation, teachers familiarity to use digital worksheets was not as big as now. Based on the interviews, at that time, about 4 out of 5 junior high school teachers experienced problems in using worksheet. Hence, they were rarely to use worksheet during online learning.

The reason why teachers rarely use worksheet is because they don't want to burden students with assignments and some teachers are also still not used to using applications that can support online learning. The researchers found that teachers seem do not know many s that can be used to create a digital worksheet. In addition, there are several obstacles when the teachers give worksheet, namely poor student responses such as being late in collecting and not even doing anything at all during the online class.

Based on the results of the needs analysis interview, the researcher chose to develop an interactive worksheetproduct with class VIII human excretion system material. Interactive worksheetwas chosen because based on the needs analysis there are some teachers who rarely use worksheet in learning. The reason teachers do not use worksheet is the lack of knowledge about IT technology and fear of burdening students.

The used in this study was the Wizer.me. The design of interactive worksheetproducts using the Wizer.me contains material summaries and practice questions that will be done by

students. Researchers chose Wizer.me because it has a variety of questions such as matchmaking, classifying, multiple choice, blurbs, puzzles, crossword puzzles, and image descriptions. The use of Wizer.me as an interactive worksheet is expected to increase understanding and attract the attention of students[12,14].

Based on the 4 stages of worksheet preparation by the Ministry of National Education[6], researchers first determine the material according to the KD to be achieved. First, researchers chose KD 3.10 regarding the class VIII human excretion system and then made 9 GPAs as a reference for achievement. In the second phase, researchers plan to compile 3 worksheets for 3 class meetings. In the third stage, the researcher divided the 9 GPAs into each worksheet, then determined the title based on the GPA to be achieved at the meeting. In the last stage, researchers make worksheet according to the GPA that has been divided. In this fourth stage, researchers pay attention to assessment instruments, material summaries, and structures in making worksheets. Interactive worksheet links using Wizer.me and sub-material divisions can be seen in Table 4.

Table 4. Links of worksheet in 3 class meetings and its sub-materials on Wizer.me

Number of class meeting	Sub materials	Link Wizer.me
1	Human excretory system (kidneys)	https://app.wizer.me/learn/QWHTDK
2	Human excretory system (skin, lungs & liver)	https://app.wizer.me/learn/FL4SQT
3	Disorders of the excretory system and effors to maintain its health.	https://app.wizer.me/learn/U3OTSY

Interactive worksheet product development using a Wizer.me on class VIII human excretion system materials adapted to the structure of LKPD in general. Researchers made 3 LKPD products, of which 1 LKPD was used for 1 meeting. The componentscontained in the interactive worksheet product use the Wizer.me, namely cover, KD, GPA, and learning objectives, learning instructions, materials, and questions.

The LKPD interactive product of human excretion system materials using the Wizer.me is validated by one material expert, one media expert, and two biology subject teachers. Validators consist of two lecturers of USD Biology Education, L.D.H as material experts (validator I) and R.H.S.C as media experts (validator II); science teacher of Pangudi Luhur Junior High School St. Vincentius Sedayu, T.T.S as a teacher of science class VIII (validator III); science teacher of SMP Negeri 16 Bandar Lampung, S.W as a teacher of science class VIII (validator IV).

The product validation developed includes two aspects, namely the material aspect and the media aspect. Validation of material aspects is carried out by one material expert and two teachers of science subjects. Validation of media aspects is carried out by one media expert and two teachers of science subjects. A recapitulation of the validation results of material and media aspects can be seen in Tables 5 and 6.

Table 5. Recapitulation of material aspects validation results

Assessed aspects	Obtained Score		
	Validator I	Validator Validator III	Validator Validator IV
Material (content)	24	28	25
Display	7	8	8
Language	16	16	15
Earned score	47	52	48
Maximum score	52		
Percent value	90%	100%	92%
Average Value	94%		
Criterion	Very valid		

Table 6. Recapitulation of media aspects validation results

Assessed aspects	Obtained Score		
	Validator Validator II	Validator Validator III	Validator Validator IV
Didactic	9	12	10
Construction	24	28	27
Technical	20	24	23
Earned score	53	64	60
Maximum score	64		
Percent value	83%	100%	94%
Average Value	92.3%		
Criterion	Very valid		

The assessment aspect by teachers of science subjects is a combination of material validation and media experts. The combination of validation aspects for teachers of science subjects is because teachers have direct experience in accompanying students. The developed product is validated by two teachers of science subjects in private schools and public schools. A recapitulation of the accumulative validation can be seen in Table 7.

Table 7. Recapitulation of accumulative validation results

Assessed aspects	Average Value (%)
Media	92.3
Material (content)	94
Average Value	93.2
Criterion	Very valid

The validity and feasibility of interactive worksheet based on Wizer.me stated by researchers. The product is declared valid based on a recapitulation of the percentage of validation test results interpreted in the product validity criteria (table 1)[17]. The product is declared feasible by the researcher if the product has gone through validation tests and revised based on the advice of the validator.

Based on all the research and development steps that have been carried out by researchers, it can be known that the quality of Wizer.me based worksheet is define as very valid. The result of the recapitulation of the values of the 4 validators resulted in an average value of 93.2%. According to reference, the average value of 93.2% falls in to very valid category. It is because the eligibility interval of $85.01\% \leq$ the percentage of $\leq 100\%$ results is included in the very valid criteria[22]. The results of the average value show that the interactive

worksheet product using Wizer.me is worth testing with revisions as suggested by validators. Revisions from material and media experts cover material, linguistic, construction, didactic, technical, and general aspects.

A reference stated that interactive worksheet can be made to analyze as creatively as possible so as to increase student understanding and be interesting to do[11]. The feasibility of interactive worksheet products using valid Wizer.me can improve the understanding of the material. In addition to being useful for students, teachers can design interactive worksheet using Wizer.me as creatively as possible with various existing features and determine assessment instruments according to learning objectives without worrying about misprinting. This is in accordance with Fransiska that interactive worksheet can be revised when used so that it does not interfere with learning[19].

Researchers designed the use of interactive worksheet with Wizer.me in online learning conditions with a discovery learning model. In the discovery learning model, teachers began to provide worksheet's links with Wizer.me and allowed students to gather in groups at the problem statement stage. Furthermore, at the data collection stage, students search and collect relevant information related to questions on worksheet with the Wizer.me   . The information that has been obtained will be discussed and processed in groups in order to be able to answer questions in worksheet with Wizer.me at the data processing stage. Worksheet with the completed Wizer.me will be collected (submitted) using the accounts of each student at the verification stage.

In addition to online conditions, worksheet is interactive with Wizer.me can be used in offline learning conditions. In offline learning, the use of interactive worksheet with Wizer.me is not much different from the use of conventional worksheet, the difference is only in the worksheet media used. If the teacher distributes conventional worksheet in the form of sheets, then with Wizer.me the teacher only provides the worksheet link.

Interactive worksheet with Wizer.me can also form interactions between teachers and students, especially during online learning. The feedback feature on the   Wizer.me allows teachers and students to interact indirectly. In the feedback feature, teachers can provide input on the results of worksheet work, provide reinforcement, motivation, and answer questions given by students. In addition to the feedback feature, reflection questions on Wizer.me allow students to ask questions or express their opinions. This is consistent with that teachers need to interact with learners to understand what they understand and give rise to reciprocal relationships that are directed towards educational goals[20].

The advantage of interactive worksheet using Wizer.me is that it can be done with an internet connection without the need to download worksheets, then the results of the work can be corrected and assessed automatically by the system and then the teacher can provide feedback to each student (feedback feature). The Wizer.me has an autosave feature, so students don't have to worry about losing answers if the internet connection is unstable or the web browser used is having problems. The answer feature that can be used by students is to answer fill-in-the-blank questions by recording voice (voice recording), so that students have other alternatives to answering by writing. In the worksheet sharing process, wizer.me can be connected to any LMS (Learning Management System) account such as Google Clasroom as long as it is connected with a link from the Wizer.me[21].

The interactive worksheet of Wizer.me can only be accessed using an internet connection, so if the user does not have an internet network, the Wizer.me cannot be accessed. The fill-in- type questions on the Wizer.me cannot be automatically corrected by the system, so teachers need to check the fill-in-type answers manually. The video, audio, and images listed on the worksheet have different qualities depending on each user's internet connection.

In use, Wizer.me can only be worked on in 1 device and cannot be worked on simultaneously on different devices. Therefore, work with Wizer.me in groups is done in a 1-device way for 1 group.

Conclusion

This study conclude that the Wizer.me in free mode can be developed as an interactive worksheet. The interactive feature in the worksheet allows teachers and students to interact indirectly. The interactive worksheet contains material of the class VIII about human excretion system. This study made 3 worksheets that was designed for 3 class meetings, according to its learning materials. Features of the products such as autosave menu, voice recording method to fill questions is applicable, in the sharing process, the worksheet can be connected to any LMS account while online. The product quality according to validators assessments is categorized as very valid with average score of validity of 93.2%.

After the development of interactive worksheet using the Wizer.me   on the material of the class VIII human excretion system, the researchers gave a suggestion, namely to always prepare an internet connection when using the Wizer.me in order to access and get perfect video, audio, and image quality. On the Wizer.me, avoid using fill-in questions if they will be corrected automatically. As well as working with Wizer.me in groups is done by means of 1 device for 1 group.

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