

Development of Web-Based Interactive Learning Media on Excretory System Materials to Increase Learning Interest

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Abstract: Education today requires the utilization of increasingly sophisticated technology, which provides new effectiveness and innovation in learning. One of them is the development of interactive learning media to optimize classroom learning, which aims to increase interest in learning and can make it easier for students to understand learning materials. This media development uses research and development (R&D) with the development model ADDIE. The data collection technique uses a questionnaire, which is divided into a feasibility questionnaire (for media experts and material experts), a practicality (for biology teachers and student responses), and a learning interest questionnaire. The results obtained from feasibility and practicality are very good criteria, and the results of learning interest show a much higher average value in the experimental class (79.21) than the control class (62.26). In general, it can be concluded that learning media are feasible, practical, and effective for increasing learning interest.

Keywords: Excretory system; Interactive learning media; Learning interest

Introduction

The development of technology is increasingly sophisticated in this modern era, which facilitates human activities, including in the world of education. Technology in education is a system that is utilized in order to achieve learning outcomes it can be implemented as learning media, learning resources, and administrative tools (Lestari, 2018). The implementation of technology in learning, one of which is making learning media, aims to help students understand the concept of material through independent learning that is easy to access and flexible (Nurlatifah & Suprihatiningrum, 2023).

The utilization of technology as a learning medium will create creative and innovative teachers. In line with Hamzah et al. (2021), teachers are required to be creative in designing and developing learning media using technology in accordance with the times. In fact, teachers

very rarely design and develop learning media by utilizing technology. In line with the results of observations and interviews at SMA Negeri 1 Piyungan, teachers use learning media in the form of powerpoint (PPT) and teaching materials that are still in printed form, such as package books, modules, and learner worksheet.

Teaching materials in the form of textbooks (package books) are the main product of learning, but textbooks have weaknesses such as being less interactive, unable to visualize dynamically, and not supporting multi-source learning (Sidiq & Najuah, 2020). The use of learning media in the form of PPT does not attract students' attention and enthusiasm for learning and makes them quickly feel bored. In line with the questionnaire results, learning at school tends to be boring, so students are not interested in participating in learning. Overcoming these problems requires

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interesting learning media to overcome student boredom in learning activities (Afandi, 2015).

Learning media can also help students understand learning materials that are difficult to visualize, such as the excretory system. Rambe & Ristono (2022) argue that excretory system material is difficult to visualize, as evidenced by 87% of students saying that the human excretory system is difficult because all processes occur in the body, making it difficult to observe and understand. According to Irsan et al. (2021), learning media can help students understand the material being taught. In addition, learning media can increase students' interest in learning. In line with previous research, learning media can increase learning interest (Sudianto & Samsu, 2019; Wulandari, 2020; Sari & Harjono, 2021).

The results of observations made at SMA Negeri 1 Piyungan show that students have low interest in learning. The explanation is based on student activities in class, such as students lacking enthusiasm for learning, sleeping in class when learning takes place, and students tending to be passive in participating in learning. Students who have no interest in learning are characterized by being less active in following learning (Sulaiman & Sa'idah., 2022). Interest has an important effect on the learning process, such as learning outcomes (Nugroho et al., 2020). Therefore, efforts are needed to foster student interest in learning, one of which is the development of interactive learning media.

Interactive learning media is a type of device that utilizes technology and is applied to convey and illustrate information in learning (sabani, 2024). The media will be more efficient if they use a website (web), aiming to be an information service that can be accessed by everyone, from teachers to students at large (Permana & Kurniawati, 2020). Website-based media is created using web technology through online networks, as well as learning that can be filled from various learning resources such as text, images, audio, video, animation, and digital learning books (Nugroho et al., 2020).

To overcome the problems that have been described and optimize the learning process, it is necessary to develop and research web-based learning media to increase student interest in learning.

Method

This type of research is research and development (R&D) with a development model, namely ADDIE (Analysis, Design, Development, Implementation, and Evaluation). This research was conducted in March 2024 at SMA Negeri 1 Piyungan. The subject of this research is student response to learning media using XII MIPA 1 class while distributing questionnaires of interest in

learning using 2 classes, namely control class (XI MIPA 3) and experimental class (XI MIPA 1). The control class only uses PPT, while the experimental class uses interactive learning media. The determination of the class is done by the cluster random sampling technique.

The data collection technique uses a questionnaire that is divided into feasibility questionnaires (for media experts and material experts), practicality questionnaires (for biology teachers and student responses), and learning interest questionnaires. Specifically, the distribution of learning interest questionnaires was carried out twice, namely before and after the lesson. The data obtained was analyzed quantitatively with an assessment score based on a Likert scale in Table 1.

Table 1. Questionnaire scoring score

Rating Criteria	Assessment Score
Strongly agree	4
Agree	3
Disagree	2
Strongly disagree	1

The results of the feasibility and practicality questionnaire assessment scores are calculated as the average value, and then the interpretation of the assessment is carried out in Table 2. The results of the learning interest questionnaire assessment score are calculated as the average value, then the *N-gain* test will be carried out, and the interpretation of the *N-gain* assessment is carried out in Table 3.

Table 2. Interpretation of the Feasibility and Practicality Assessment

Formula	Interval Score	Criteria
$Mi + 1.5 SDi \leq X \leq Mi + 3.0 SDi$	$3.25 < X \leq 4.00$	Very good
$Mi + 0 SDi \leq X \leq Mi + 1.5 Sdi$	$2.50 < X \leq 3.25$	Good
$Mi - 1.5 SDi \leq X \leq Mi + 0 Sdi$	$1.75 < X \leq 2.50$	Deficient
$Mi - 3 SDi \leq X \leq Mi + 3.0 Sdi$	$1.00 < X \leq 1.75$	Very poor

Table 3. N-gain assessment criteria

N-gain value	Criteria
$g \geq 1.7$	High
$0.3 \leq g < 0.7$	Medium
$g < 0.3$	Low

Results and Discussion

The results of research and development are web-based interactive learning media on excretory system material. The development of the media aims to increase the learning interest of students in class XI SMA Negeri 1 Piyungan. The stages of developing interactive learning media are as follows:

1. Analysis Stage

The analysis stage is carried out to collect information related to facts that occur in biology learning so that the needs of students can be known to support the achievement of biology learning. This

analysis stage consists of three, namely curriculum analysis, learning analysis, and needs analysis. The results of the analysis at SMA Negeri 1 Piyungan have important points that can be seen in Table 4.

Table 4. Analysis results

Analysis	Analysis Results
Curriculum	The curriculum applied at school is the merdeka curriculum, which consists of phases E and F.
Learning	Learning at school uses learning media in the form of PPT, while teaching materials are still in printed form, such as package books, modules, and learner worksheet
Student needs	Students are allowed to bring smartphones, but students often misuse smartphones during learning. Students are interested in learning by using smartphones, and there are elements of images, videos, and animations. Learning at school has never used interactive learning media in biology learning.

The results of the analysis as the basis for developing interactive learning media show that the learning media used by teachers are still simple in the form of PPT and teaching materials that are still in printed form. The use of printed teaching materials tends to be monotonous, affecting the interest and enthusiasm of students to use them (Herawati & Muhtadi, 2018). Therefore, it is necessary to develop new variations of learning media that contain elements of images, videos, and animations that are in accordance with the needs of students, as well as utilizing smartphone technology for learning activities.

2. Design Stage

This stage is done by making a learning media design based on the needs analysis. This design stage is carried out after collecting references to learning materials from books and journals that are in accordance with the material of the excretory system. The design stage consists of making an outline as a guide to the learning flow contained in the interactive learning media, creating a learning media background display design with the Canva application, and compiling assessment instruments in the form of feasibility questionnaires, practicality, and learning interest.

3. Development Stage

This stage is carried out as the realization stage of interactive learning media using the Lactora Isprite

application. The application can combine text, images, video, audio, and animation. The results of learning media in the form of HTML are connected to web services that aim to make it easier for students to access them via the internet network. The results of web-based interactive learning media can be seen in Figure 1.

Figure 1 shows the results of the developed interactive learning media. The media has a cover page and menus that make it easy for students to learn excretory system material, including competency menus, user instructions, profiles, materials, LKPD, evaluations, and references. This medium also contains images, audio, video, and animation. Media that display text, images, videos, animations, audio, images, and graphics can make it easier for students to understand lessons (Hapsari & Zulherman, 2021).

This learning media is interactive such as learning that has drag and drop and hot spots, navigation buttons, and is equipped with an evaluation that has results in the form of score scores. Interactive learning media can generate student interest in self-study aimed at improving learning achievement (Zulhelmi et al., 2017). Interactive learning media that has been realized, then validated to determine the feasibility and practicality of learning media. The results of feasibility and practicality validation are in Table 5.

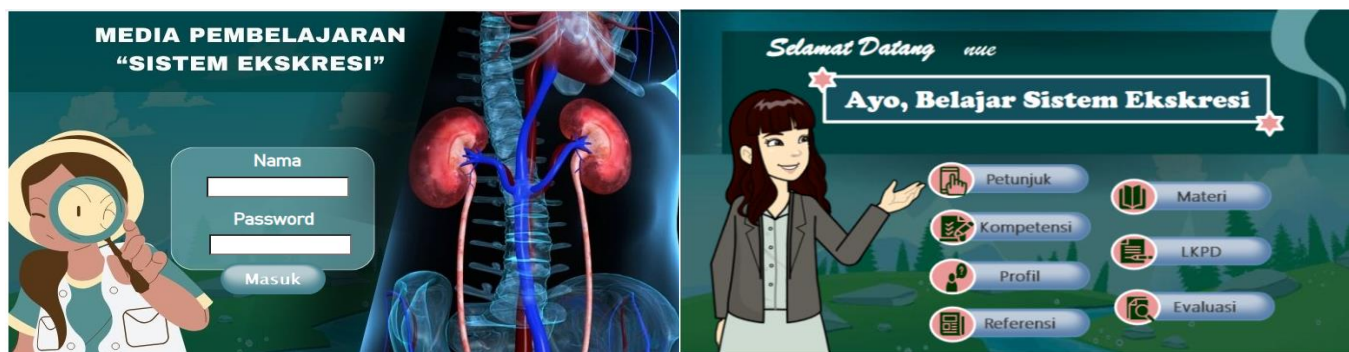




Figure 1. Results of web-based interactive learning media

Table 5. Average results of the feasibility and practicality of learning media

Validation	Assessment	Sum of scores	Number of items (sum of n)	Avarage	Criteria
Feasibility	Material expert	60	15	4.0	Very good
	Media expert	60	15	4.0	Very good
Validation	Teacher	80	20	4.0	Very good
	Student response	1652	480	3.4	Very good

Table 5 contains the average results of the feasibility and practicality of interactive learning media. Feasibility validation is carried out by material experts and media experts who have an average score of 4 with very good criteria, so that interactive learning media is suitable for use in learning the excretory system. Learning media that present material visually and interactively very well can clarify concretely sub-sub material that is abstract (Havizul, 2019). In addition to material, learning media also have an excellent or attractive appearance that can influence students in learning. According to Alfi et al. (2022) learning media with a very attractive appearance can foster feelings of pleasure and enthusiasm for students when participating in learning.

Practicality validation is carried out by teachers and student responses with an average score of 4 and 3.4 in very good criteria, so that interactive learning media is practically used in learning the excretory system. Media that is declared practical can be easy to use and help students understand learning (Damayanti & Qohar, 2019). The results of feasibility and practicality validation are not only in the form of assessment scores, but there are suggestions for improvement, such as ineffective sentences, typographical sentences, and font types. These suggestions are made to improve

interactive learning media to continue the implementation stage.

4. Implementation Stage

This stage is carried out to determine the effect of interactive learning media on learning interest. The application of interactive learning media was carried out by the experimental class, while the control class only used PPT. 64 students were divided into experimental and control classes; the average results and N-gain test of learning interest in both classes can be seen in Figure 2 and Table 6.

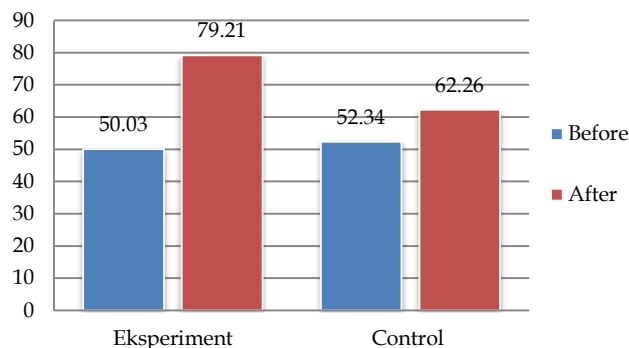


Figure 2. Average Results of Interest in Learning

Based on the average graph of learning interest, before learning there is a value of learning interest whose difference is not significant, while the value after learning has a significant difference. The difference is seen in the average value, which is much higher in the experimental class (79.21) than the control class (62.26). The difference in the average results on student interest in learning can be strengthened by the results of the N-gain test found in Table 6.

Table 6. N-gain results of learning interest

Class	N-gain value	Criteria
Experiment	0.58	Sedang
Control	0.20	Rendah

The N-gain test results of learning interest show differences in the experimental and control classes. The experimental class has an N-gain value of 0.58 with moderate criteria, and the control class has an N-gain value of 0.20 with low criteria. The difference in N-gain values between the two classes can be influenced by differences in learning techniques, such as the experimental class using interactive learning media while the control class using PPT. The N-gain test results prove that learning media affect student interest in learning. in line with Tarigan & Siagian (2015) that learning using interactive learning media has a higher level of effectiveness than the use of PowerPoint media.

5. Evaluation Stage

This stage is carried out as the final stage of development and research with the ADDIE model. The evaluation stage aims to determine the success of interactive learning media on learning interest. The average results and N-gain test stated that students' interest in learning increased by using interactive learning media compared to using PPT.

Conclusion

The results of research and development show that web-based interactive learning media are declared feasible by material experts and media experts and practical by biology teachers and students, so that this media is feasible and practical to use in learning the excretory system. Web-based interactive learning media has a much higher average value of learning interest in the experimental class than the control class, so that learning media effectively increases learning interest.

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Author Contributions

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Conflicts of Interest

The authors declare no conflict of interest.

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