



Development of Interactive Teaching Materials for Excretory System Materials Using *Smart Apps Creator*

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Abstract

The purpose of this research is to develop interactive teaching materials using valid Smart Apps Creator Apps. This type of research is research and development (Research and Development), while the procedure for implementing research follows the stages of the ADDIE development model, in research only to the third stage, namely the development stage (Development). The instrument used is a validation sheet for experts, which consists of a validation sheet for material experts and a validation sheet for media experts. The data analysis technique used is validity data analysis. The data is analyzed quantitatively. The results of the material expert validator assessment of interactive teaching materials using Smart Apps Creator Applications are in the valid category with an average validity of 4.5 and the results of the media expert validator assessment of teaching materials are in the average valid category of 4.5 validity. The assessment results of the two validators show that interactive teaching materials using Smart Apps Creator that were developed are suitable for use or implementation in class as one of the teaching materials.

Keywords: Interactive Teaching Materials, Smart Apps Creator, Excretory System.

Introduction

The rapid development of information technology has brought significant changes in various aspects of life, including in the world of education. The application of technology in education not only helps in more effective delivery of material but also provides a more engaging and interactive learning experience for students. The urgency of this research lies in the need to develop learning methods that are more effective and in accordance with technological developments.

According to. The world is currently entering the era of society 5.0 super (Adlini, 2021) *smart society* (Society 5.0) can be seen from technology developing very fast and rapidly which also has an impact on the education sector where this will affect the teaching and learning process in a positive direction where there are many choices of media in delivering learning. The (Namiri Zaiyad & Namiri, 2023) use of digital technology by generation Z in learning is an investment in their future and preparation for an increasingly connected and digitized

world. By utilizing technology in learning such as digital literacy, they can improve the quality of their knowledge

Based on the observation that conventional teaching methods are often ineffective in explaining complex concepts such as the excretory system. Many students have difficulty understanding the processes and functions of the excretory system only through text study and lectures. Therefore, it is necessary to develop teaching materials that can explain this material more clearly and interestingly. According to (Rambe et al., 2022) the material, the excretory system in humans is difficult to understand, this is because the excretory process occurs in the body which makes it difficult to understand, therefore interactive teaching materials are needed that will be used by students to learn independently and understand the concept of the material.

The development of interactive teaching materials is relevant to efforts to improve the quality of education in Indonesia. By utilizing technology in learning, it is hoped that it can create a more dynamic learning environment and become a model for other Biology teachers in creating innovative teaching materials and in accordance with the needs of the times. One of the roles of a teacher is to design or compile teaching materials, because this greatly determines the success of the learning process and learning through a teaching material (Magdalene et al., 2020).

The excretory system material in Biology lessons is one example of a topic that students often find difficult. Concepts such as the structure and function of excretory organs, excretory processes, and their relation to body health require a deep understanding. Conventional teaching methods, such as lectures and the use of textbooks alone, are often insufficient to help students understand this material well. Therefore, innovation is needed in teaching materials that can explain the concept in a

more interesting and easy-to-understand way.

Smart Apps Creator (SAC) is a platform that allows the development of interactive teaching materials with various features that can support the learning process. The platform allows for the creation of engaging content such as animations, simulations, and interactive quizzes that can help students understand the material better. According to the application, SAC is an application to create interactive learning media where students or users can access it offline, can be used at any time without an internet connection. (Ramanda Elsa Holy, 2023). By developing interactive teaching materials using *Smart Apps Creator*, it is expected to provide practical and effective solutions to improve the quality of Biology learning, especially in excretory system materials. Interactive multimedia products based on *smart apps creator* can be used and implemented in the teaching and learning process (Jaiz et al., 2022).

The use of *Smart Apps Creator* in the development of interactive teaching materials is expected to answer the need for teaching methods that are more effective and in accordance with current technological developments. In this context, research on the development of interactive teaching materials for *the Smart Apps Creator* excretory system material becomes very relevant. This research aims to develop interactive teaching materials using *valid Smart Apps Creator Apps*. The development of this teaching material will not only be informative but also interesting and interactive, so that it can increase students' interest in learning and help them understand the material better. Thus, this research is expected to make a significant contribution in improving the quality of Biology learning in schools.

Method

The type of research used is Research and Development or *Research and*

Development. Research and development is research used to develop a product, validate and test its effectiveness). (Sumarni, n.d. 2019).

The research was conducted at the University of Muhammadiyah Sidenreng Rappang

The research implementation procedure follows the stages of developing the ADDIE model. The development of the ADDIE model has five stages, namely Analysis, Design, Development, Implementation, Evaluation. This research is limited to the third stage, namely the development stage (Development). This is in accordance with the research Research on the development of the ADDIE model which is carried out only until the Development stage, because the purpose of this research is only limited to developing and producing a valid learning media to be implemented based on validator assessment.(Aldoobie,2015), (Setiawan et al., 2021).

In collecting data, instruments in the form of validation sheets are used to collect data on the quality components of the products developed. This study consists of material expert validation sheets and validation for media experts. The data analysis technique used is validity data analysis. The collected data is then analyzed quantitatively. Determination of the validity category of teaching materials is carried out by matching the average value of the total score (Va) with the validity category table of a development product as Table 1.

Published:

Skor	Keterangan
$1 \leq Va < 2$	Vol. x – No. x, year (xxxx), page
$2 \leq Va < 3$	Kurang Valid
$3 \leq Va < 4$	Cukup Valid
$4 \leq Va < 5$	Receive: dd/month/year
Accepted:	Published:

Remarks : Va is the average total score (Hobri, 2010)

Results and Discussion

The stages of the process of developing teaching materials are as follows:

Analysis (*Analysis*)

(Maydiantoro, 2021, n.d.) The first stage carried out is analysis, analyzing the need for new product development and analyzing the feasibility and requirements of product development. The analysis aims to clearly define the details of the program. Through this stage the researcher identifies and evaluates all aspects related to the development of teaching materials, ensuring that each specific need and goal in the learning process is met. The activities carried out include needs analysis, content analysis and goal analysis

Needs Analysis

Needs analysis is the first step carried out in research. Related to student needs Development of interactive teaching materials using *Smart Apps Creator* can meet the learning needs of students and teachers, interactive and interesting learning media to facilitate understanding of the concept of the excretory system, Access to teaching materials that can be used anytime and anywhere through various devices, and interactive quiz and simulation features to test and deepen understanding independently.

Content Analysis

Content analysis is very important in the development of teaching materials which is a step in knowing the material that will be contained in teaching materials. The subject matter contained in the teaching materials is the Excretory System.

Goal Analysis

Objective analysis is carried out by compiling indicators and learning objectives according to the scope of material on the subject matter. Based on the indicators and learning objectives that have been compiled, then analyze the learning

objectives. The results of the analysis of learning objectives are presented in table 2. Analyze efforts to maintain the health of the excretory system

No.	Tujuan Pembelajaran
	Peserta didik diharapkan mampu:
1.	Menyebutkan organ-organ system ekskresi pada manusia
2.	Mendeskripsikan fungsi system ekskresi
3.	Menganalisis keterkaitan struktur dan fungsi pada organ ginjal
4.	Menganalisis keterkaitan struktur dan fungsi pada organ paru-paru
5.	Menganalisis keterkaitan struktur dan fungsi pada organ hati
6.	Menganalisis keterkaitan struktur dan fungsi pada organ kulit
7.	Mengidentifikasi kelainan dan penyakit yang terjadi pada system ekskresi
8.	Mengidentifikasi berbagai pola hidup untuk menjaga kesehatan system ekskresi
9.	Menganalisis upaya menjaga Kesehatan system ekskresi

Design

The next stage after conducting the analysis is product design. At this stage there are two things that need to be designed, namely biology teaching materials (products produced) and research instruments in the form of validation sheets (Yallah and Huda, 2022, n.d.).

Designing products

The product design consists of three stages, namely framework planning, determining the software you want to use in making teaching materials and designing storyboards, namely sketching images on paper to visualize the product workflow. The software used in this study is Canva which is used to create teaching materials, and *Smart creator* is used to create Android-based applications.

Research instrument design

The design of the research instrument is the design of the validation sheet. The expert validation sheet consists of 4 components,

namely (a) Title, (b) Assessment instructions, (c) Description of statement items and (d) Identity of validators. The expert validation sheet uses 5 rating scales, namely 1 = less once, 2 = less, 3 = enough, 4 = good and 5 = very good.

Development
 The development phase includes the development of (a) teaching materials, and (b) validation of developed teaching materials.

Development

(Zunaidah Farida Nurlailah, 2016)
 The development phase includes the development of (a) teaching materials, and (b) validation of developed teaching materials. According to the develop stage, this stage includes the validation stage of teaching materials that have been made to validators.

Development of teaching materials

The resulting product is based on the anatomy storyboard of teaching materials that have been made before. After the product is produced, it further validates the teaching materials. Representatives of the display of teaching materials can be seen in figure 1 to figure 5.



Figure 1. Splash Screen Display



Figure 2. Main Menu Display of Teaching Materials



Figure 3. Material Page View



Figure 4. RPS Menu Display



Figure 5. Evaluation Menu Display

Validation of Teaching Materials

Validation of teaching materials is carried out by bringing in experts who have experience in assessing a product. The assessment of teaching materials developed by material experts is presented in table 3 and the assessment of validators for media experts on teaching materials is presented in table 4.

No	Aspek	Valid Rat a- rata skor per aspe k (Ai)	Kategori
1	Kesesuai an	Scor e	Informatio n

Materi dengan Kompetensi Dasar			
$1 \leq Va < 2$	Vol. x – No. x, year (xxxx), page	$2 \leq Va < 3$	Less Valid
$3 \leq Va < 4$	Quite Valid	$4 \leq Va < 5$	Receive: dd/month/year
Accept ed:	Publishe d:	5	Sangat Valid
Rata-rata skor total (Va)		4.5	Valid

No	Aspek	Rata-rata skor per aspek (Ai)	Kategori
1	Tampilan	5	No.
Learning Objectives	Programs	Students are expected to be able to:	1.
Mentions organs of the excretory system in humans	2.	Describe the function of the excretory system	3.
Analyze the relationship of structure and function in kidney organs	4.	Analyze the relationship of structure and function in the lung organs	5.
	6.	Analyze the	7.

relationship
of
structure
and
function
in skin
organs

Conclusion

Interactive teaching materials for excretory system materials using *Smart Apps Creator* were developed referring to the ADDIE development model which consists of five stages, namely *Analysis*, *Design*, *Development*, *Implementation* and *evaluation* but this study is limited only to *Development* (Development) only. Interactive teaching materials for excretory system materials using *Smart Apps Creator* are suitable for use in the basic biology learning process because they have been valid from two validators. The assessment of material expert validators on interactive teaching materials for excretory system materials using smart creator applications is in the valid category with an average score of 4.5. And the assessment of media expert validators on interactive teaching materials for excretory system materials using smart creator applications is in the Valid category with an average score of 4.5.

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Author Profile

Jusman Tang was born in Sidrap, on July 14, 1991, currently working as a Permanent Lecturer at the University of Muhammadiyah Sidenreng Rappang. S1

education was taken at Alauddin State Islamic University Makassar in 2009 Biology Education Study Program. Continuing his S2 education at Makassar State University in 2016 Biology Education Study Program. Apart from being a lecturer, he is also an active writer, research and community service, and currently serves as Head of the Agricultural Engineering Vocational Education Study Program since 2021 – now. The author is actively writing educational and agricultural books.