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**PISCES****Proceeding of Integrative Science Education Seminar**Journal homepage: <https://prosiding.iainponorogo.ac.id/index.php/pisces>**Article****DEVELOPMENT OF INTERACTIVE LEARNING MEDIA BASED ON SMART APPS CREATOR "ADDICTION GAMES" ON ADDITIVE AND ADDICTIVE SUBSTANCE MATERIAL**Emeraldo Romadhoni<sup>1\*</sup>, Arnada Putri Exta Rahmadani<sup>2</sup>, Diah Lutfiatun Ni'mah<sup>3</sup>, Aziza Karenina<sup>4</sup><sup>1,2,3,4</sup>IAIN Ponorogo, Ponorogo\*Corresponding Address: [emeraldodo26@gmail.com](mailto:emeraldodo26@gmail.com)**Article Info**

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**ABSTRACT**

Smart Apps Creator (SAC) Learning Media can be a solution to present a simple representation of abstract objects. This study aims to describe the form of interactive learning media based on Android using Smart App Creator (SAC) in the subject of Science with a focus on additive and addictive substances. The research method used in this study is research and development, utilizing modifications and development models from Borg & Gall. The assessment subjects in the interactive media based on Smart Apps Creator are subject matter experts and media experts. Meanwhile, the target subjects for the trial are eighth-grade students. Data collection techniques used are validation and distribution of response questionnaires. The data collection instruments used are validation sheets and student response questionnaires. The validation results show that the Addiction Games Application used has obtained a valid category with a percentage of 77.37% through material validation and 74.81% through media validation. Based on the student response questionnaires, the media is considered highly practical with a practicality percentage of 79.59%. The percentage of suitability of the Addiction Games application for learning based on the questionnaire responses is 79.18%, while the design percentage is 75.88%. Therefore, the media is deemed suitable to be operated and used in learning to enhance students' interest in learning Science, particularly in the topic of additive and addictive substances.

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**INTRODUCTION**

The development process consists of five categories, namely analyzing learning needs and conditions, designing effective and efficient learning environment specifications, developing aspects that are suitable for learners and material management, implementing developed material, and evaluating formative and summative results of development (Gustafson, 1991). From this explanation, it can be understood that development is a concept of systematically carrying out activities to achieve maximum results. This assumption is in line with the theory proposed by Bahri (2017), which states that development is a process of

designing learning systematically and logically by considering the potential and abilities of learners to achieve maximum results. This assumption emphasizes the importance of creativity based on work systematics and paying attention to the conditions of learners in the learning process. Therefore, the concept of learning development contributes to the development of the potential and abilities of learners. Suyitno (2014) states that development is also a teaching material aspect that is conditioned by knowledge both theoretically and practically. This concept emphasizes the importance of developing learning strategies that are appropriate to the existing knowledge development.

Learning media is a medium that contains instructional information or messages used in the learning process. Learning media plays an important role in helping learners acquire new concepts, skills, and competencies (Hasan, 2021). Learning media has a very important role in the learning process. As a learning source, learning media can help teachers expand students' knowledge. By using various types of learning media, teachers can deliver lesson material in a more interesting and easily understandable way for students. The use of instructional media can also enhance students' interest in learning new things in the subject matter.

Therefore, the management of instructional aids is crucial in formal educational institutions. Interactive and engaging instructional media can serve as a stimulus for students in the learning process. As educators, it is important for us to choose appropriate and suitable instructional media to achieve the teaching objectives set by the school. Interactive instructional media is a form of two-way communication between the media and the user. This interaction occurs when the user provides input to the media and receives a response from it. In the context of instructional media, interactive media can be defined as everything related to software and hardware used as intermediaries to convey teaching materials from the source to the learner. The learning method used in interactive media can also provide feedback to the user. In its creation, interactive media is designed using multimedia technology. Experts also state that there is a significant difference in learning outcomes through visual and auditory senses. Therefore, the use of interactive media in learning can provide a better and more effective learning experience for students (Sutarti, 2017).

There are several software programs that can be utilized to create interactive learning media. One of them is Smart Apps Creator (SAC). This tool is designed without programming to create Android-based applications with HTML5 or .exe end formats (Elvina et al., 2022). SAC's interactive learning media is composed of interesting items to engage students in learning about additive and addictive substances. The material is presented in a simple and easily understandable manner, with attractive features for students. The material on additive and addictive substances is presented in the form of images accompanied by explanations that can be operated by students. There is also a quiz at the end to evaluate the learned material. The quiz consists of several questions that can be answered by students. The students' answers will be immediately displayed as correct or incorrect, and the students' scores will also be shown.

The advantage of the Smart Apps Creator tool is that it can overcome students' comprehension barriers. With this media, students can learn and use it independently and easily. Especially in the subject of science, particularly in the topic of additive and addictive substances, which certainly requires visuals such as images or videos that can provide a direct and communicative experience so that they can prove hypotheses or temporary assumptions. Therefore, science learning cannot be solely delivered directly by teachers without the support of media that can visualize the material being studied (Mawardi et al., 2019).

By utilizing its advantages, Smart Apps Creator can assist students in overcoming comprehension barriers towards the subject of additive and addictive substances in science by presenting these concepts in a more easily digestible and memorable format. With interactive

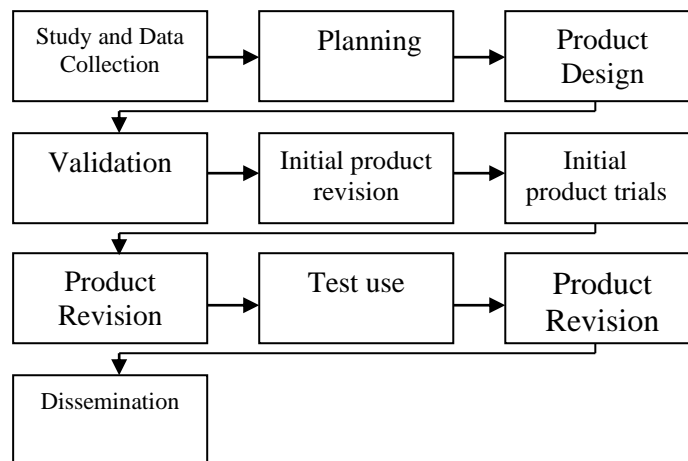
visual elements and a game-based approach, learning becomes more engaging and effective, enabling students to comprehend and retain the necessary information more easily (Dyah, 2022).

The research on the development of instructional media has three objectives: (1) to describe the form of interactive Android-based instructional media using Smart App Creator (SAC) in the subject of science with a focus on additive and addictive substances, (2) to contribute to the development of more effective teaching methods in delivering the content of additive and addictive substances to students, and (3) to explore the potential use of Smart Apps Creator (SAC) in education.

Based on the aforementioned description, the problem statement is how to develop interactive instructional media that aligns with the objectives stated in the curriculum for the topic of additive and addictive substances?

## METHODS

The development procedure of this research refers to the development method developed by Borg and Gall. The main objective of this development method is to test the product. There are 10 R&D research steps that have been established by Borg and Gall (1989), which can be seen in the Figure 1.



**Figure 1.** R&D Borb and Gall Development Model

However, in this research, it is conducted until the fourth stage, which is validation. In the initial stage, the researcher has conducted interviews with science teachers in junior high school. The problem found is the lack of innovation in the procurement of learning media as a means of delivering learning materials, which results in a low level of understanding of the students. In addition, classroom learning is still monotonous and there is no new innovation in the procurement of media, making the learning process appear boring. The researcher collects data to assist in the development process of learning media. The data collection process is carried out through observation and interviews with science teachers. Based on the data obtained, the researcher compiles the SAC learning media.

In the second stage, in the process of media development, several planning activities need to be carried out for product design. This includes determining the achievement of learning objectives in the selected materials, and then determining the materials and planning the preparation of interactive learning media storyboards..

In the third stage, the initial development of the Addiction Games application involves aligning the achievement of learning objectives with the planned content.

The fourth stage involves media validation conducted by media experts and content experts. The purpose of validation is to assess the value of the designed media product and provide feedback for interactive media.

A group of 8th grade students from a junior high school are the subjects of the research trial. The analysis techniques used include validation sheets, questionnaires, as well as pretest and posttest sheets. The media validation sheet contains a questionnaire assessing the suitability of the media by the validator. This instrument is used to determine the validity of the Smart Apps Creator (SAC) media. The assessment of the validation instrument uses the Likert scale according to Siregar (2017:25-27) with the following table arrangement:

**Table 1. Likert Scale Criteria**

Score	Criteria
1	Strongly Disagree
2	Disagree
3	Doubtful
4	Agree
5	Strongly Agree

Reference : Siregar (2017)

The Validator will respond to the validation sheet provided by selecting an assessment based on the observations made from the media developed by the researcher, in accordance with the Likert scale assessment criteria in Table 2. The questionnaire is used as supporting data for the practicality and attractiveness level of a media product. The researcher creates a questionnaire containing detailed questions or statements and alternative answers that will be presented using the Guttman scale according to Siregar (2017:29) in the following table:

**Table 2. Guttman Scale Criteria**

Score	Criteria
1	Yes
0	No

Reference : Siregar (2017)

Test sheets are used to assess the effectiveness of the Smart Apps Creator (SAC) media. A number of students are selected as research subjects and given test sheets consisting of 10 multiple-choice pretest and posttest questions. The effectiveness of SAC media can be determined from the posttest results, which indicate scores above the Minimum Mastery Criteria (KKM) and an improvement in scores from before the implementation of the media to after the implementation of the media for the students.

Based on the data obtained, data processing is conducted to draw conclusions on whether SAC media is suitable or not suitable for students. The data in this study consists of qualitative data obtained from interviews with junior high school science teachers, criticism or suggestions from validators, and responses from media questionnaires. In addition, quantitative data is also obtained from media validation analysis, material validation analysis, learning suitability analysis, design validation analysis, and media effectiveness analysis.

The researcher calculates the percentage based on the predetermined formula.

$$N (\%) = \frac{\text{Total assessment scores by validators}}{\text{maximum score}} \times 100\%$$

Based on calculations, the percentage of validity for SAC media products can be determined. Furthermore, the obtained score percentage can indicate the level of validity that aligns with the following criteria in table 3.

**Table 3.** Validation Criteria

<b>Kriteria</b>	<b>Persentase</b>
Invalid	0%-20%
Less Valid	21%-40%
Quite Valid	41%-60%
Valid	61%-80%
Very Valid	81%-100%

Reference : Kartini &amp; Putra (2020)

## RESULTS AND DISCUSSION

Based on the data presented in table 4, the validation test conducted by media and material experts showed that the interactive learning media achieved an average validity percentage of 74.81% and 77.37% respectively, with a valid validation criteria. Meanwhile, the material suitability assessment reached a percentage of 79.18% with a valid validation criteria, indicating the relevance between the composition theory and the media. According to the student response questionnaire, the media was found to be very practical with a practicality percentage of 79.59% and a valid validation criteria. The interactive learning media design resulted in a percentage of 75.88% with a valid validation criteria, indicating that the learning media can be utilized in the learning process (Khazanah, 2020).

**Table 4.** Validation Test Results

<b>No</b>	<b>Validation Aspect</b>	<b>Persentase</b>	<b>Criteria</b>
1	Media	74,81 %	Valid
2	Material	77,37 %	Valid
3	Suitability	79,18 %	Valid
4	Practicality	79,59 %	Valid
5	Design	75,88 %	Valid

However, feedback from media experts suggested that the Addiction Games media used was still slow when entering other menus, and the available buttons in the game section were difficult to operate. Therefore, improvements are needed to facilitate its use. Overall, the media was considered good. On the other hand, feedback from material experts suggested that the material provided was not varied enough, and the quiz created was too easy, making it too easy for the participants to answer. Improvements are needed to create higher-order thinking skills questions and to add more material to increase readers' knowledge. It is also recommended to include learning objectives before the material slide. Based on the feedback from media and material experts, the learning media product will be improved in the next phase (Iffah, 2019).

The highest percentage of questionnaire responses was obtained in the practicality validation, with a percentage of 79.59%, suitability validation, with a percentage of 79.28% and percentage was found in the material validation, with a percentage of 77.37%. On the other hand, the lowest percentage, the design validation, with a percentage of 75.88% and the media validation, with a percentage of 74.81%. These findings indicate that the practicality of using interactive learning media is highly reliable and convenient, making it the most preferred medium for students when face-to-face learning activities are not possible (Rima, 2022). The use of interactive learning media also stimulates students' desire to learn and assists them in their learning activities (Azizah, 2020). Furthermore, the alignment between the addictive substance and the basic competencies, indicators, and learning objectives in the interactive learning materials is crucial. On the other hand, the lowest categories are the material, media, and design. The material is considered low because it is not yet fully organized and the delivery of the material lacks variation, indicating the need for further

development in this area (Fariz, 2021). Similarly, the media used is not very responsive when transitioning to other menus, and there are some navigation buttons that do not function smoothly. Additionally, the design of the media is visually appealing, with color usage that complements the background, images, and text (Sutarsih, 2021).

Practicality refers to the ease of use of learning media by users, both students and teachers. The aim is to ensure that the learning conducted is meaningful, engaging, enjoyable, and useful for students, while also enhancing creativity in learning (Milala et al., 2022). In the context of modern learning, practical learning media are those that are easily accessible to teachers and students, easy to manage, and capable of replacing or complementing conventional learning methods. Practical media should also be able to enhance student engagement, aid in understanding the material, and facilitate the evaluation process. In scientific literature, the assessment of the practicality of learning media often involves user responses, such as satisfaction levels and effectiveness in achieving learning goals. In other words, practical learning media must efficiently and effectively meet the needs of learning.

The high practicality of Addiction Games as a learning media can be attributed to several factors that drive its usage in the context of education. Firstly, practical learning media is often more accessible to both teachers and students. By utilizing the Addiction Games application, learning can be conducted online and accessed through various devices such as tablets or smartphones. This provides flexibility in media usage, allowing teachers and students to access learning materials anytime and anywhere, according to their schedules and preferences. Additionally, the practicality of learning media is also high because it can be tailored to the needs of individual or group learners. With the possibility to customize content, difficulty levels, or learning methods within specific media, teachers can easily accommodate the diverse needs of students (Santoso & Muslich, 2018). This can enhance the effectiveness of learning and assist students in better understanding the subject matter. Secondly, Addiction Games as a learning media is capable of increasing student engagement in the learning process. Various types of media, such as instructional materials, educational games, and simulations, can make the learning process more interesting and relevant for a generation accustomed to technology. Students can actively participate in exploration, experimentation, and application of the concepts taught, thereby reinforcing their understanding of the subject matter. The use of Addiction Games as a learning media also does not require extensive supporting facilities and there are guides available to assist in its operation.

The impact of practical learning media Addiction Games in the education process is significant. Firstly, practical learning media enables educators to reach more students in a more efficient manner. Additionally, Addiction Games learning media can enhance the quality of learning by providing more varied, dynamic, and interactive material, enriching the student learning experience. The second impact is the improvement of the quality of learning and student understanding. Addiction Games learning media can combine multimedia elements, simulations, and interactivity that help students understand and remember lesson material better. It can also improve students' ability to develop critical thinking skills, problem-solving, and communication (Badia et al., 2017). By using appropriate technology, educators can create a meaningful and useful learning experience that positively impacts student achievement.

The principle of instructional material suitability is crucial in education to select and present relevant, appropriate, and effective materials to achieve predetermined learning objectives. This involves the selection of teaching materials, instructional methods, and other supportive resources that align with students' comprehension levels, learning needs, and specific learning contexts. By maintaining instructional material suitability, educators can enhance teaching effectiveness and facilitate a more efficient and meaningful learning process (Suparman, 2018). The high percentage of instructional suitability found in the

Addiction Games application is said to be valid and has several important reasons. Firstly, the alignment of instructional materials and methods with students' comprehension levels and needs enables them to actively engage in the learning process. This can enhance student motivation, conceptual understanding, and learning achievement. Secondly, the flexibility in designing the learning application allows for the customization of learning content to match students' learning styles and appropriate difficulty levels. With the ability to adapt the materials and features of the Addiction Games application, the level of suitability to individual or group learning needs is increased. Additionally, the integration of various media types, such as images, audio, and video, can help enhance student engagement and attractiveness in learning. Thirdly, by ensuring material and method suitability, learning objectives can be achieved more effectively, saving time, energy, and resources, while also enhancing students' overall learning experience. Therefore, the high percentage of instructional suitability is crucial in creating meaningful and successful learning experiences for students (Slavin, 2015).

The suitability of learning in the Addiction Games application is said to have a significant impact on student learning outcomes and development. One of the most notable impacts is the improvement in understanding and retention of material. When learning material is tailored to students' level of understanding, they are better able to assimilate the information being taught. This means that students are more likely to grasp concepts deeply and connect them to their personal experiences. The result is an increase in academic achievement, improved critical thinking skills, and the ability to solve problems. High suitability of learning also motivates students to be more engaged, as they feel that the material being taught is relevant to their lives (Tomlinson, 2014). This contributes to active participation and more meaningful learning.

Based on the percentage results, it is evident that the Addiction Games material falls under the high category. Material refers to any form of resources used to assist teachers or instructors in conducting classroom teaching and learning activities (Sitohang, 2014). The written material must truly support the achievement of the basic competency standards and indicators (Muhammad Syamsul Arifin, 2023). The high quality of the material contained in the Addiction Games application is attributed to several factors, including the comprehensive discussion of addictive substances, the extensive presentation of the material, and the ability to solve problems without any constraints. Upon completing the material from start to finish, users will have a better understanding of the content of the Addiction Games material. Users will also quickly grasp the entire learning material and be enticed to further explore and learn.

A high percentage of learning materials used in a curriculum or educational program can have significant impacts on students. Firstly, well-structured learning materials can enhance students' understanding and mastery of concepts. When materials are well-organized, with clear explanations, relevant examples, and supportive tasks, students are better able to comprehend the material. This has a positive impact on their ability to apply this knowledge in different contexts and to solve problems. Moreover, good learning materials can motivate students. When materials are presented in an interesting and relevant way, students are more likely to be motivated to learn and develop an interest in the subject. This can increase students' engagement in the learning process and encourage them to explore further.

Based on the percentage results, the Addiction Games design falls under the low category. The design is created as a service related to the development of concepts, specifications, and data analysis that optimize the value and function of a product for a specific project that benefits both the producer and the consumer. The design process not only prioritizes the form and function of the product but also how it interacts with its usage. The design used as a teaching material in this application is everything that helps instructors in carrying out teaching and learning activities (Ahmadi, 2011). There are several reasons

why the Addiction Games design falls into the low category based on its usage. The low quality of the design is caused by the lack of creativity in arranging the media used, such as the suitability of image size and learning media shape with the android or smartphone used. In addition to the low quality of the image, another reason that becomes a factor is the selection of sound (background) and color that is not suitable for the background, image, and text.

The selection of colors for text and images is not something that can be ignored. In a design, color composition is crucial in creating comfort and enhancing one's ability to read. As a result, users tend to be less effective in using the Addiction Games application. To avoid the problems caused by this, the developer can add certain features, such as displaying the score automatically when the game is finished. By adding a scoring feature, it is expected that users will be more attentive in using the Android application. In addition to adding a scoring feature, users can also incorporate attractive and creative navigation buttons. This way, the design of the Addiction Games application will be more appealing and enhance its high level of creativity. If the design quality is improved to the point where the resulting score falls into the high category, then the created Addiction Games design will achieve its learning objectives and maximum end results. Thus, the design can serve as a means of communication used to effectively convey messages or learning materials (Sadiman et al., 2005).

An interactive learning tool is an application that contains material content about additive and addictive substances, along with quiz questions and games. However, this media is still categorized as low and requires further development. The low impact of the Addiction Games application can affect the effectiveness of learning media, which in turn affects the interest of students in learning. By improving the media, it can stimulate motivation for the presented material to be easily understood by students (Sisda, 2022). Media development can be improved by adjusting it to the characteristics of students, using concise and clear language, and incorporating elements such as text, images, buttons, and design to enhance understanding, attention, interest, and experience of students towards the material (Lia, 2022).

If the research and development of Addiction Games learning media is deemed appropriate, it will proceed to the next stage.

## **CONCLUSION**

Based on the results of research conducted on media experts and material experts, the highest percentage obtained from the results of filling out the validation questionnaire was validation of practicality with a percentage of 79.59% and suitability with a percentage of 79.28%. Meanwhile, the lowest percentage was in material validation with a percentage of 77.37%, media with a percentage of 74.81% and design validation with a percentage of 75.88%. This shows that there is a need to improve the quality of the interactive learning media Addiction Games, because this is proven that this media is suitable to be continued to the next stage to increase students' interest in learning science related to additive and addictive substance material.

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