

## Development of *Android-based Interactive Multimedia Social Impact Informatics (Maksim)* in Support of the Independent Curriculum

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**Abstract :** This study aims to examine the viability of incorporating android-based interactive multimedia into the Informatics curriculum for seventh-grade students. The expectation is that the captivating and interactive elements of this multimedia will serve as a catalyst for students to cultivate a deeper understanding of Informatics, regardless of whether they are engaged in a traditional classroom environment or pursuing independent learning from their residences. The ADDIE model, encompassing analysis, planning, development, introduction, and evaluation, was employed as the developmental framework for this study. Based on the results of the study, it was determined that the validation rates for the instrument were as follows: 93% validation by instrument experts, indicating a high level of validity; 81% validation by media experts, also indicating a high level of validity; and 100% validation by content experts, indicating a complete agreement on the validity of the instrument. In addition, it was found that the assessment's accompanying questionnaires were deemed highly applicable by both teachers and students, with a rating of 100% for teachers and 89% for students. The findings of this study indicate that the Maxim multimedia materials developed for the purpose of teaching and learning Informatics in class VII at UPT SMPN 3 Pangsid demonstrate both validity and utility.


### Article History

Received: 15-07-2023  
Reviewed: 18-07-2023  
Published: 20-07-2023

### Key Words

*multimedia, maksim, android*

**How to Cite:** Faiqah, N., Nurmayanti, N., & Agussalim, A. (2023). Development of Android-based Interactive Multimedia Social Impact Informatics (Maksim) in Support of the Independent Curriculum. *Jurnal Teknologi Pendidikan* : Jurnal Penelitian dan Pengembangan Pembelajaran, 8(3), 662-671. doi:<https://doi.org/10.33394/jtp.v8i3.8477>

 <https://doi.org/10.33394/jtp.v8i2.8477>

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## Introduction

In the 21st century, it is imperative to design learning projects that effectively harness the potential of students by leveraging computer-based technology and android platforms. Technology is utilised in the educational context by employing existing technological tools as resources for learning and task completion. This adaptation pertains to the prevailing circumstances following the COVID-19 pandemic, wherein educational institutions have adopted the E-learning or online learning approach as a prominent feature of the ongoing digital transformation in the field of education. Learners have the opportunity to engage in a pedagogical approach known as "online learning," wherein the internet serves as a medium for facilitating communication and interaction between educators and learners, supplemented by a range of supporting multimedia resources. Consequently, the information retrieval process can occur (Nurmayanti & Ferdiansyah, 2021).

Throughout the COVID-19 pandemic, educational institutions at all levels have adopted the practise of implementing remote or online learning from home (Ferdiansyah et al., 2021). It has become widely acknowledged among various participants in the field of

education, such as educators, students, parents, and other stakeholders, that the utilisation of technology as an instructional tool in schools is currently at a rudimentary stage, as evidenced by the impact of the Covid-19 pandemic (Fadilah & Supriadi, 2023). This aligns with the adoption and execution of the Independent Curriculum. According to the Guidelines for Curriculum Implementation within the Framework of Learning Recovery, as outlined in Decree Number 56/M/2022 issued by the Minister of Education, Culture, Research, and Technology of the Republic of Indonesia, it has been determined that students enrolled in class VII at UPT SMPN 3 Pangsid have the opportunity to receive education aligned with the Independent Curriculum. As a result, various schools, both domestic and international, have been identified as potential candidates for the adoption of the Kurikulum Merdeka. The contemporary Merdeka curriculum demonstrates enhanced adaptability to students' needs due to its integration with modern technology, thereby fostering a more flexible educational milieu.

Multimedia learning exemplifies the process of modernization through the integration of technological advancements within the realm of education. According to Binanto (2010), multimedia encompasses various forms of media such as text, art, sound, photos, and video. These elements are typically digitised and can be delivered or manipulated interactively. Multimedia learning not only provides educators with the potential to enhance students' learning strategies for optimal outcomes, but also holds the promise of substantial transformations in students' learning approaches, information acquisition, information evaluation, and other related cognitive processes (Kuswanto, Joko. 2017).

The system that emerges when users exercise direction, control, and modification over content across various presentation media is commonly referred to as interactive multimedia (Armawi, 2018). The process of developing interactive multimedia involves the utilisation of diverse software and applications. Android applications are a prominent illustration of applications that are presently undergoing development. The Android operating system is designed for a range of mobile devices, including smartphones, tablets, and other portable devices. It is built on the Linux kernel (Amperiyanto, 2014).

Based on empirical observations, it is evident that the application of instructional practises in the Informatics curriculum for seventh-grade students at SMPN 3 Pangsid can be characterised by the following: (a) a persistent reliance on conventional pedagogical approaches by teachers, (b) a predominant utilisation of textbooks as the primary instructional resource in Informatics classes, and (c) a lack of access to interactive multimedia learning materials. The aforementioned constraints and circumstances highlight the imperative need to create interactive multimedia learning materials for grade VII students at UPT SMPN 3 Pangsid in order to effectively implement the independent curriculum that has been adopted. The topic of interest is multimedia applications that are based on the Android operating system. Maksim's involvement in the educational setting of UPT SMPN 3 Pangsid is anticipated to have a transformative impact on students' inclination and motivation towards informatics-related subjects, both within the confines of their homes and within the classroom environment.

## **Research Methods**

The present study utilizes a research and development (R&D) methodology that is based on the ADDIE paradigm, encompassing the sequential phases of analysis, design, development, implementation, and evaluation. Molenda (2008) posits that the process encompasses the analysis of multiple domains, including competency, characteristics, and materials. The design phase involves the development of interactive multimedia, which

includes tasks such as initial design, format selection, and media selection. Development refers to the process of creating interactive multimedia, which is then evaluated by expert validators. The process of implementation entails the execution of product trials in order to evaluate its efficacy. The evaluation phase of this research entails formative evaluation carried out by expert validators. The objective of this evaluation is to ascertain any deficiencies and evaluate the viability of the Android-based Maksim multimedia products that have been created.

The current investigation is being conducted at UPT SMPN 3 Pangsid, wherein the research project entails the involvement of two validators who will assess the level of validity. The validators comprise individuals who possess expertise in the relevant subject matter as well as professionals with a background in media. The evaluation of feasibility will be carried out by instructors of Informatics courses and seventh-grade students at UPT SMPN 3 Pangsid. To assess the validity and practicality of Android-based multimedia maxims, as outlined in the publication by Tegeh et al. (2014), researchers may utilize the subsequent percentage formula for computational purposes.

$$\text{percentage} = \frac{\sum x}{\text{SMI}} \times 100$$

Information:

$\sum x$  = Number of scores

SMI = Ideal Maximum Score

100% = Constant

Table 1 displays the percentage results from media and material validation evaluations, which are used to draw conclusions.

Table 1. Validity Criteria

Criterion	Level of Validity	Information
81,00% - 100,00%	Highly Valid	Direct use without rework
61,00% - 80,00%	Valid	With minor improvements
41,00% - 60,00%	Less Valid	It is recommended not to use
21,00% - 40,00%	Invalid	Cannot be used
00,00% - 20,00%	Highly Invalid	Can't be used, needs major revision

Source: (Wandani & Nasution, 2017)

Meanwhile, tabel 2 displays the results of an assessment of the level of practicality, from which conclusions can be drawn.

Table 2. Practicality Criteria

Criterion	Level of practicality	Information
81,00% - 100,00%	Very Practical	Direct use without rework
61,00% - 80,00%	Practical	With minor improvements
41,00% - 60,00%	Less Practical	Not recommended for use
21,00% - 40,00%	Impractical	Cannot be used
00,00% - 20,00%	Very impractical	Can't be used, needs major revision

Source: (Wandani & Nasution, 2017)

Figure 1 is a flow chart detailing the procedure to be followed during the study .

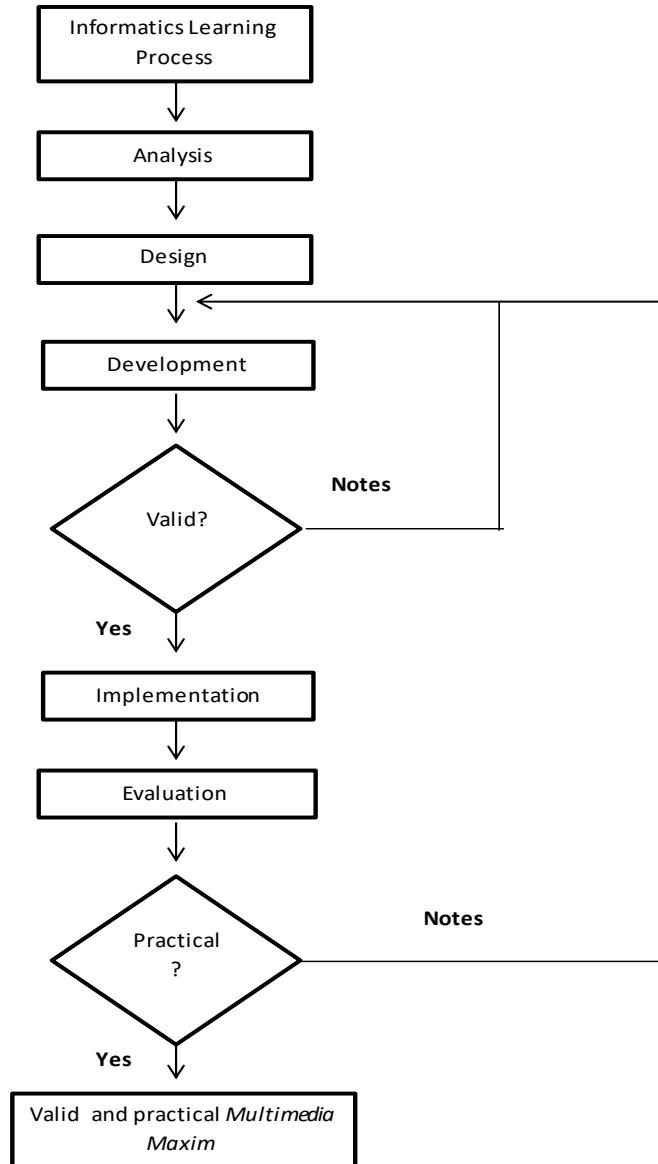


Figure 1. Research Flow Chart

## Research Results and Discussion

### A. Analysis Phase

#### 1. Analysis of Competency

During the current stage of competency analysis, researchers have identified phase D learning outcomes within the Learning Objectives Flow (ATP) of the Independent Curriculum. One of these outcomes pertains to the development of the ability to engage in ethical behavior and effectively navigate digital spaces as responsible members of society.

2. Analysis of Characteristics

During this phase, researchers conducted observations in class VII E UPT SMP Negeri 3 Pangsid in order to ascertain the learning activities, characteristics, and learning styles of individual students. Based on empirical observations, it has been noted that students enrolled in class VII E encounter challenges in comprehending educational content due to the exclusive reliance on textbook-based learning. This approach fails to cater to the diverse learning styles exhibited by students. For instance, some students exhibit an auditory learning style, wherein auditory stimuli are more effectively assimilated and retained compared to visual stimuli.

3. The examination and evaluation of materials.

During this phase of material analysis, researchers have discovered the presence of ATP (Adenosine Triphosphate) in the autonomous curriculum employed by educators as an instructional aid. Additionally, they have identified material related to Social Impact Informatics, which focuses on enabling students to comprehend the digital landscape surrounding them, the accessibility of data and information via social media platforms, and the application of cyber ethics through case studies involving digital information sourced from social media applications and global ethical considerations, such as Maya ethics.

**B. Design Stage**

During this phase, researchers engage in the compilation of flowcharts and storyboards. A flowchart is a graphical depiction of the sequential progression and final outcomes of a program, encompassing the essential components of interactive multimedia from initiation to conclusion. This paper presents an overview of Maksim, a multimedia flowchart framework developed for the Android platform.

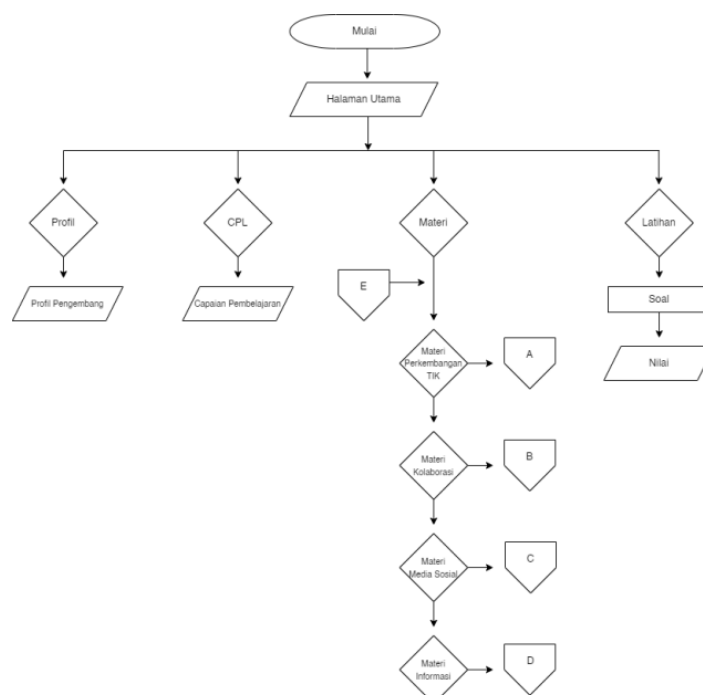


Figure 2. Interactive multimedia *flowcharts*

A storyboard serves as a visual depiction of multimedia concepts, offering a comprehensive overview of the forthcoming multimedia creation. This document provides a concise summary of the Maksim multimedia storyboard, which is based on the Android platform.

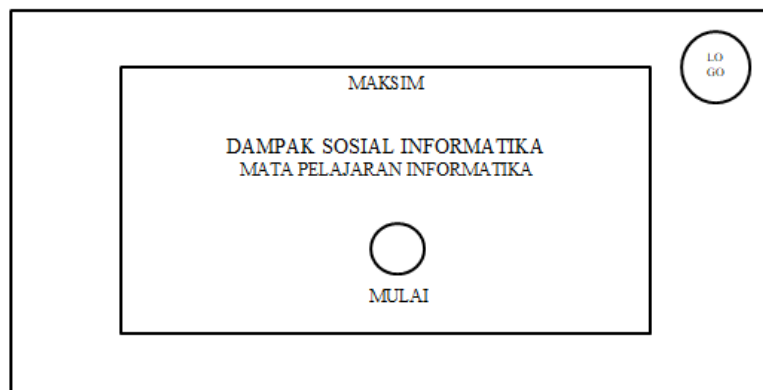


Figure 3. *Storyboard* Max Interactive Multimedia Home View

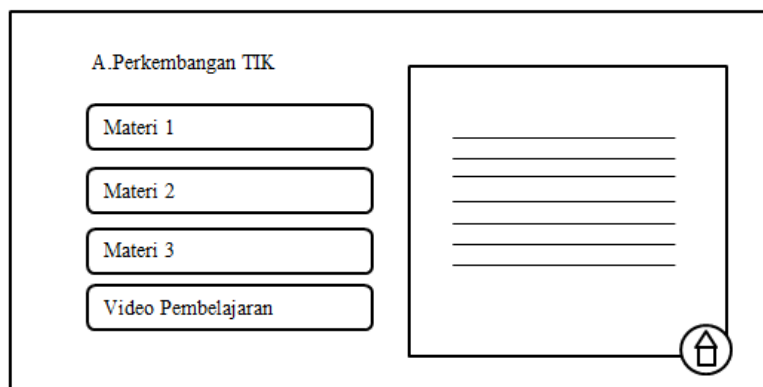


Figure 4. *Storyboard* Interactive Multimedia Material Page Maksim

After designing flowcharts and storyboards, then researchers choose the right media to be used in presenting subject matter using text, audio, images, and video packaged into the Maksim application utilizing the *Smart Apps Creator* program.

### C. Development Phase

Utilize the *Smart Apps Creator* program to design multimedia content generated by researchers and developed during this phase. The Maksim application encompasses content pertaining to the Social Impact of Informatics, specifically derived from the Informatics textbook for Grade VII students following the SMP/MTs Curriculum Merdeka. The researchers have developed a total of 47 pages of interactive multimedia applications. Among these pages, there are 13 main pages which include the intro or opening pages, home pages, main menu pages, profile pages, learning outcomes pages, material pages (specifically material A, material B, material C, and material D), and exercise pages (divided into four sections corresponding to each material).



Figure 5. Splash Page



Figure 6. Max Interactive Multimedia Home Page



Figure 7. Page Materi Multimedia Interactive Maksim

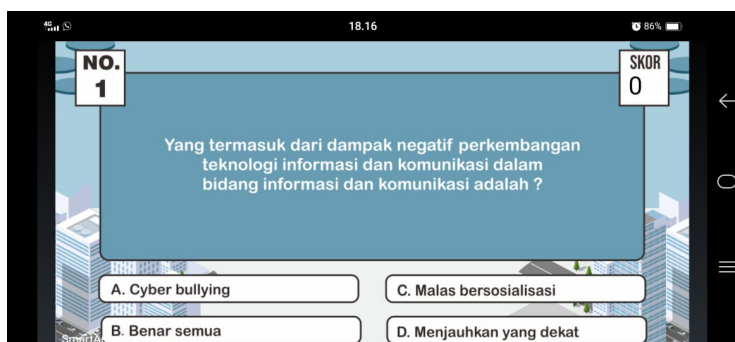


Figure 8. Page Latihan Multimedia Interactive Maksim

Following the development of the Android-based Maksim multimedia application, a validation questionnaire was employed to evaluate the feasibility and validity of the aforementioned application. This validation process entails the participation of three distinct experts, specifically media expert validators and material expert validators.

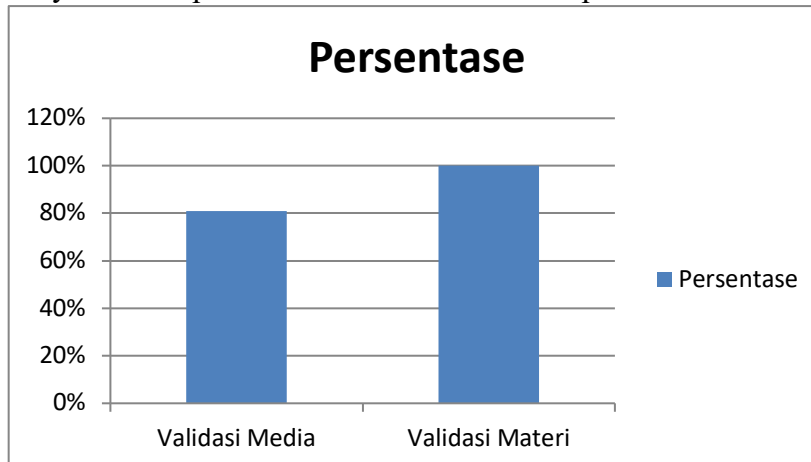


Figure 9. Validation Results

Based on the aforementioned data, the outcomes of the media validation assessment, which yielded a result of 81%, and the material validation, which achieved a result of 100%, it can be inferred that the Android-based Maksim multimedia is deemed to be highly valid.

#### D. Implementation Phase

In this section, a study was conducted by researchers to evaluate the effectiveness of an android-based Maksim multimedia trial. The trial was initially conducted with one teacher who taught Informatics subjects, and subsequently extended to include 18 students from grade VII E at UPT SMPN 3 Pangsid. Researchers administered questionnaires to educators and students in order to assess the practicality of multimedia Maksim, an Android-based multimedia system, following a series of trials.

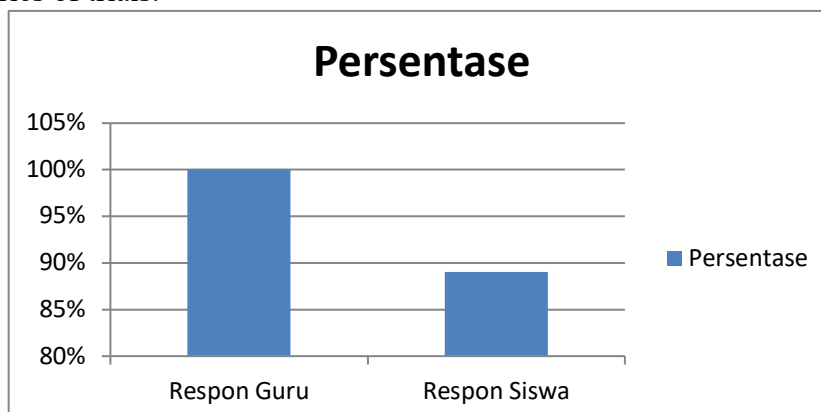


Figure 10. Response Results

Based on the aforementioned data, the assessment results indicate that the practicality level of teacher responses is 100% and that of student responses is 89%. Consequently, it can be concluded that the Android-based multimedia Maksim is deemed to be highly practical.



### E. Evaluation Phase

Following the implementation phase, an evaluation is conducted, serving as the conclusive stage of the ADDIE model's development process. The study incorporated formative evaluation methods during the development of multimedia materials. This involved the creation of validation sheets to assess both the material aspects and multimedia aspects, as well as gathering feedback from teachers and students. At the conclusion of the activity, learners engage in the completion of questions and exercises as a means of summative assessment. The subsequent illustration depicts the graphical representation of the outcomes derived from the comprehensive assessment of the Maxim Multimedia project.

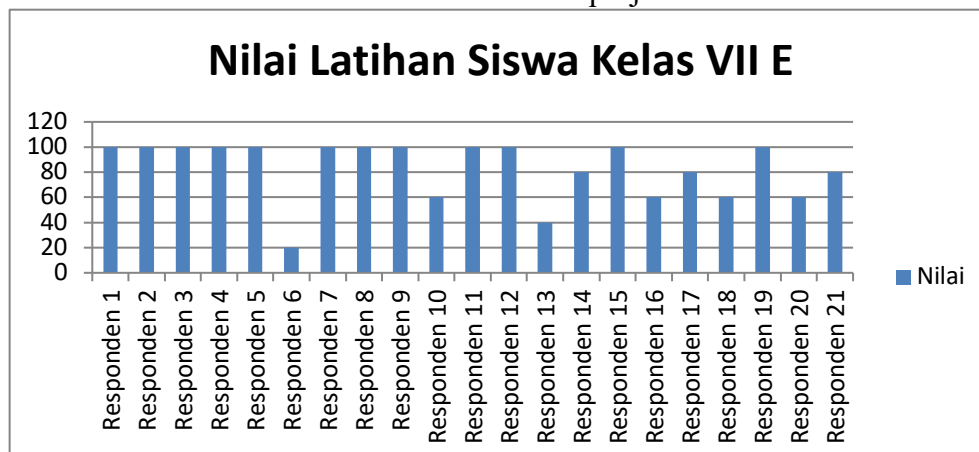


Figure 11. Multimedia Summative Evaluation Results Data

According to the data presented in Figure 11, it is evident that there were 12 participants who achieved a score of 100, 3 participants who obtained a score of 80, 4 participants who attained a score of 60, 1 participant who received a score of 40, and 1 participant who scored 20. Based on the provided data, it is evident that the average value of students is 83. This finding demonstrates that the utilization of maximmulti-media is regarded as efficacious and can be employed in the educational setting for instructional purposes.

### Conclusion

The research employed the ADDIE development model in order to create an android-based Maksim multimedia for the Informatics class of seventh grade students at UPT SMPN 3 Pangsid. The results indicated that the interactive multimedia, which was subjected to validation by field experts, attained a validation rate of 93%. In addition, the media expert validators assigned a validation percentage of 81%, whereas the material expert validators assigned a validation percentage of 100%. The multimedia maxim, which was developed for the Informatics class VII UPT SMPN 3 Pangsid and is based on the Android platform, has received a validation rating of "highly valid" based on the results provided by three expert validators. The current investigation focused on analyzing the results of the Maksim multimedia research, which employed an Android platform. The examination of data derived from questionnaires completed by teachers revealed a success rate of 100%, whereas data obtained from questionnaires completed by students indicated a success rate of 89%. Based on

the available data, the Informatics class VII of UPT SMPN 3 Sidrap found the practical examination of the multimedia application called Maksim, which operates on the Android platform, to be highly practical. The study conducted by Susanti et al. (2021) yielded the criteria of "very valid" and "very practical," which are consistent with the findings of the current study.

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