Assyfa Journal of Multidisciplinary Education

AJME. Vol. 4 No. 1 (2026) 226-243

e-ISSN: 3047-3942 p-ISSN: 3047-3942

DOI: 10.61650/ajme.v3i1.1424

ORIGINAL RESEARCH ARTICLE

# Development of Android-Based Learning Media Assisted by Smart Apps Creator for Technical Drawing Material at SMKN 11 Malang

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**Article History**: Received: 12 Mar 2026 • Revised: 25 Aug 2026 • Accepted: 25 Sep 2026 • Published: 30 Sep 2026

**ABSTRACT**

This study aimed to develop Android-based learning media assisted by Smart Apps Creator for technical drawing material in the Basic Automotive Engineering subject at SMKN 11 Malang and to assess the feasibility of the product and users' responses to it. The study employed a research and development method using the ADDIE model, which comprises analysis, design, development, implementation, and evaluation. The product contains structured material, illustrations, video tutorials, exercises or quizzes, a discussion forum, and navigation features that support learning access through Android devices. Product feasibility was assessed by one media expert and one content expert using a four-point scale instrument. The validation results showed a media feasibility score of 86% and a content feasibility score of 95%. Students' response to the product was reported at 87%. The score distribution data showed changes between the pretest and posttest results: before using the media, 4 students were in the 75–100 range, whereas after using the media the number rose to 26. In the posttest, 1 student was in the 25–49 range and 4 students were in the 50–74 range. These findings indicate that the product was judged feasible by the validators and received a positive response from users. The change in score distribution supports the potential learning benefits of the product; however, without inferential analysis and a comparison design, these results cannot be interpreted as definitive causal evidence.

**Keywords:** learning media; Android; Smart Apps Creator; technical drawing; vocational education.

**ABSTRAK**

Penelitian ini bertujuan mengembangkan media pembelajaran berbasis Android dengan bantuan Smart Apps Creator untuk materi gambar teknik pada mata pelajaran Dasar Teknik Otomotif di SMKN 11 Malang serta menilai kelayakan dan respons pengguna terhadap produk. Penelitian menggunakan metode penelitian dan pengembangan dengan model ADDIE yang meliputi analisis, desain, pengembangan, implementasi, dan evaluasi. Produk memuat materi terstruktur, ilustrasi, video tutorial, latihan atau kuis, forum diskusi, serta navigasi untuk mendukung akses belajar melalui perangkat Android. Kelayakan produk dinilai oleh seorang ahli media dan seorang ahli materi menggunakan instrumen skala empat. Hasil validasi menunjukkan skor kelayakan media sebesar 86% dan kelayakan materi sebesar 95%. Respons peserta didik terhadap produk dilaporkan sebesar 87%. Data distribusi nilai menunjukkan perubahan hasil pretest dan posttest: sebelum penggunaan media, 4 peserta didik berada pada rentang 75–100, sedangkan setelah penggunaan media jumlahnya menjadi 26. Pada posttest, 1 peserta didik berada pada rentang 25–49 dan 4 peserta didik pada rentang 50–74. Temuan ini menunjukkan bahwa produk dinilai layak oleh validator dan memperoleh respons positif dari pengguna. Perubahan distribusi nilai mendukung potensi manfaat pembelajaran, tetapi tanpa analisis inferensial dan desain pembanding, hasil tersebut tidak dapat ditafsirkan sebagai bukti kausal yang definitif.

**Kata Kunci:** media pembelajaran; Android; Smart Apps Creator; gambar teknik; pendidikan vokasi.

**How to cite**: Irawan, D., Prastya, F. F., Firmanasari, F., Deca, G. V. P., Ramadhan, G. A., & Satria, G. (2026). Development of Android-Based Learning Media Assisted by Smart Apps Creator for Technical Drawing Material at SMKN 11 Malang. *Assyfa Journal of Multidisciplinary Education*, *4*(1). Retrieved from https://journal.assyfa.com/index.php/ajme/article/view/1424

## 1. INTRODUCTION

The development of digital technology has changed the way information is presented, accessed, and used in the learning process. In vocational education, this change is important because learning targets not only conceptual understanding but also the mastery of skills related to procedures, symbols, tools, and technical representations. Digital learning media can help educators present information in a structured manner through a combination of text, images, video, and interactive activities. The use of media must still be grounded in learning needs, learner characteristics, learning objectives, and the context of the available facilities.

Learning media serve as intermediaries for delivering messages and learning experiences. Arsyad (2016) describes media as an important part of the process of delivering instructional information, while Sudarsana (2018) discusses the optimization of technology in curriculum implementation. Visual media can help clarify objects or procedures that are difficult to explain through verbal description alone. In engineering learning, visual representation is important because learners need to read symbols, understand shapes, recognize dimensions, and relate drawings to actual components or work. Studies of multimedia learning explain that the presentation of words and pictures should be designed so that they mutually support the comprehension process (Mayer, 2002, 2011, 2024).

Technical drawing material in the Basic Automotive Engineering subject is a basic competency for students in the automotive expertise program. Students need to recognize drawing equipment, symbols and codes, presentation standards, and how to read drawings in order to understand the position and function of components. Mastery of this material is related to the ability to follow work instructions and understand the technical documentation used in automotive settings.

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Therefore, learning media need to provide step-by-step explanations, easy-to-read illustrations, and opportunities to practice and evaluate understanding.

The research documents describe that technical drawing instruction at SMKN 11 Malang still relies heavily on verbal explanations, writing on the board, presentations, and videos. Observations of learning activities recorded uneven student engagement: some students paid little attention to the explanations, and only a few answered questions correctly. This condition became the basis for developing media that can be used more flexibly and that provide access to material beyond the teacher's direct explanation. These observational findings are positioned as a context of need, not as a quantitative measurement of motivation levels.

Smart Apps Creator is software that enables developers to compile multimedia content for applications without having to build the entire application through conventional programming. The content can combine text, images, video, navigation buttons, animations, and quizzes. Mahuda, Meilisa, and Nasrullah (2021) reported the development of Android-based mathematics media assisted by Smart Apps Creator, while Khoirudin, Ashadi, and Masykuri (2021) discussed the use of Smart Apps Creator 3 in biology learning. These studies show that the platform has been used in various learning contexts; however, automotive technical drawing material requires content and navigation design suited to vocational competencies. The use of SAC in other contexts has also been reported in the development of media for informatics learning and vocational material (Ashari et al., 2025; Romisa et al., 2025; Reza et al., 2023). The development of Android-based SAC media has also been applied to informatics and computer hardware material (Asy'ari & Rosita, 2025).

Several previous studies cited in the research source also discuss the development of Android media using other platforms or for different materials. Al Amin and colleagues developed interactive media on the procedure of ablution (wudu) using Smart Apps Creator; Hasan and colleagues developed media for the Cooperatives and MSMEs course; Setyawan and colleagues developed Appypie-based Android media for the power transmission system course; and Afnan and colleagues developed Smart Card Augmented Reality media for cooling system material. These studies share the use of digital media as learning products but differ in content, users, features, and learning contexts.

Studies on Smart Apps Creator-based media show the application of this platform in diverse learning contexts, ranging from biology, mathematics, and thematic learning to technical drawing and automotive systems (Ferlianti et al., 2022; Jaiz et al., 2022; Khoirudin et al., 2021; Mahuda et al., 2021; Muhaimin & Zumrotun, 2023; Setiyawan et al., 2023; Sudiarti et al., 2024; Yallah & Huda, 2022). Studies closer to vocational and automotive education report the development of SAC media for light vehicle electrical systems and cooling systems, thus providing a relevant comparison for the development of technical drawing media (Al Farouqi et al., 2025; Setiyawan et al., 2023; Yallah & Huda, 2022).

The mobile learning literature also emphasizes that mobile devices open opportunities for learning access across time and place, but their success depends on pedagogical design, user readiness, and learning support (Crompton & Burke, 2018; Crompton et al., 2017; Parsons et al., 2024; Rangel-de Lazaro & Duart, 2023; Sophonhiranrak, 2021). Another systematic review discusses the role of smartphones in learning activities and the variety of their applications in education (Firmansyah et al., 2020).

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For designing multimedia content, multimedia learning theory emphasizes the processing of verbal and visual information and the importance of reducing elements that are irrelevant to the learning objectives (Mayer, 2002, 2011, 2024). A recent meta-analysis shows that the benefits of multimedia design depend on the type of media, learner characteristics, and the type of learning outcome measured; therefore, the presence of digital features alone is insufficient to conclude effectiveness (Cromley & Chen, 2025). The ADDIE development stages in this study follow the instructional design framework described by Branch (2009), with the consideration that instructional design models need to be applied according to contextual needs, as discussed by Mutlu (2016).

Based on these needs, this study developed Android learning media assisted by Smart Apps Creator for technical drawing material for Grade X Motorcycle Engineering students at SMKN 11 Malang. The product was designed with a home page, user guide, introduction, material, videos, evaluation, discussion forum, and developer profile. The objectives of the study were to describe the product development process, to assess its feasibility based on validation by a media expert and a content expert, and to describe students' responses and the change in score distribution before and after using the media. This focus distinguishes the assessment of product feasibility from the testing of causal effectiveness.

## 2. RESEARCH METHODS

This study employed a research and development method using the ADDIE model. The model comprises five stages, namely Analysis, Design, Development, Implementation, and Evaluation. These stages were used as a framework to identify needs, design the product structure, develop the media, try out the product with users, and evaluate the development results. The ADDIE framework was used as a systematic instructional design process covering analysis, design, development, implementation, and evaluation (Branch, 2009; Mutlu, 2016).

In the analysis stage, the developer identified the learning conditions, the characteristics of the technical drawing material, content needs, and the devices used by students. Product requirements included media accessible through Android devices, material aligned with Basic Automotive Engineering instruction, and the presentation of images and videos that aid understanding. The design stage included compiling the material structure, navigation design, page layout, quizzes, and multimedia components. The development stage was carried out by building the pages in Smart Apps Creator, inserting the content, and generating the Android application.

In the implementation stage, the product was introduced to Grade X Motorcycle Engineering students at SMKN 11 Malang. Data collection included expert validation, a user response questionnaire, and tests before and after using the media. The source reports 31 students in the description of the response analysis and score distribution, whereas one part of the methods section mentions 20 students in class X TSM 2. Because these figures are not uniform, the descriptive analysis in this article follows the number shown in the score distribution table and the questionnaire, with this limitation noted in a separate audit report.

Media validation was carried out by a media expert, Erwin Komara Mindarta, S.Pd., M.Pd., and content validation was carried out by a content expert, Taufik Hidayat, S.T., M.Pd. The instrument used a four-point scale, with a highest score of 4 and a lowest score of 1. Media validation consisted of 11 items, while content validation consisted of 15 items. Validation results were calculated as a percentage of the maximum score. The criteria used in the source categorize 85.01–100% as

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valid/feasible without revision, 70.01–85.00% as fairly valid, 50.01–70.00% as less valid, and below 50% as invalid.

Students' responses were collected through a questionnaire covering the attractiveness of the media, the presentation of videos and material, the ability to aid understanding, ease of operation, and practice questions. Response scores are presented descriptively as percentages. To describe changes in learning outcomes, pretest and posttest scores were grouped into four ranges: 0–24, 25–49, 50–74, and 75–100. The source presents the distribution of the number of students in each range but does not fully report the mean, standard deviation, paired individual scores, or inferential tests. Therefore, the test results are discussed as a change in distribution, not as evidence of statistical significance.

The analysis was conducted descriptively by comparing the validation results, students' responses, and the pretest–posttest score distribution. The product was also revised based on the validators' feedback, including the addition of an instructional video, updated icons and colors, game-based exercises, 3D objects, a discussion forum, and material on line types and line thicknesses. Figure 1 shows the ADDIE flow used in the development.




**Figure 1.** Media development stages using the ADDIE model.

## 3. RESULTS AND FINDINGS

### 3.1 Learning Media Product

The resulting product is an Android-based learning application for technical drawing material. The application was designed so that students can access the material step by step through the main menu. The product components include a guide page, a discussion forum, an introduction, a material and sub-material menu, video tutorials, an evaluation or quiz, and a developer profile. The material was arranged according to the learning objectives, which include identifying technical drawings, preparing drawings, and recognizing technical drawing symbols and codes.

The product combines text, images, visual objects, videos, and practice questions. The quiz feature provides automatic scoring, while the discussion forum was added to open space for interaction. The media can be used on Android devices that meet the minimum specifications stated in the source, namely Android version 5.0 with at least 1 GB of RAM and 16 GB of storage. Downloading the application requires an internet connection; once installed, the material available within the application can be accessed according to the product's functions.

### 3.2 Media and Content Expert Validation

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The media expert validation obtained a score of 38 out of a maximum score of 44, reported as 86%. This result falls into the feasible category based on the criteria used. The media expert's feedback covered the need for more intuitive navigation, improved visual appeal, interactivity, image quality, and text clarity. The follow-up actions included adding a short video on how to use the application, updating icons and colors, adding puzzle-based exercises and 3D objects, and improving image quality and text size.

The content expert validation obtained a score of 57 out of a maximum score of 60, reported as 95%. This result indicates the feasibility of the content according to the validator. The content feedback focused on adding a discussion of work levels or machining marks, categories for selecting pen/rapidograph thickness, and the technique of transferring lines using two set squares. These improvements were aimed at strengthening the alignment of the material with basic technical drawing skills.

**Table 1.** Summary of expert validation and student response.

| Assessment aspect | Score | Maximum score | Percentage | Category |
|---|---|---|---|---|
| Media expert validation | 38 | 44 | 86% | Feasible |
| Content expert validation | 57 | 60 | 95% | Feasible |
| Student response | — | — | 87% | Feasible |

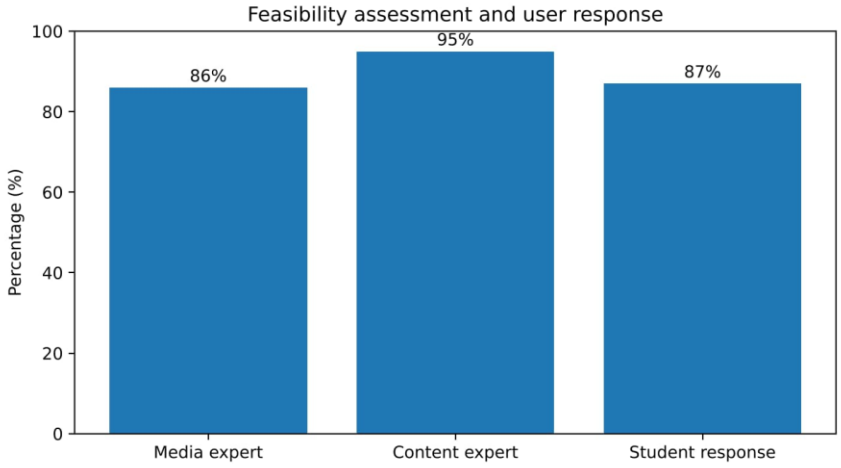



**Figure 2.** Percentages of media expert validation, content expert validation, and student response.

### 3.3 Student Response

Students' response to the media was reported at 87% and categorized as feasible. The assessment covered visual appearance, presentation of material, videos, support for understanding, ease of use, and exercises. This result indicates positive acceptance of the product's format and features in the trial context. The response represents users' assessment of the product; this figure does not in itself indicate the magnitude of improvement in learning outcomes.

### 3.4 Pretest and Posttest Score Distribution

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The score distribution shows a shift toward higher score ranges after students used the media. In the pretest, 1 student was in the 0–24 range, 14 in the 25–49 range, 12 in the 50–74 range, and 4 in the 75–100 range. In the posttest, no students were in the 0–24 range, 1 was in the 25–49 range, 4 were in the 50–74 range, and 26 were in the 75–100 range. The total in both distributions was 31 students.

**Table 2.** Pretest and posttest score distribution by score range.

| Score range | Pretest (students) | Posttest (students) |
|---|---|---|
| 0–24 | 1 | 0 |
| 25–49 | 14 | 1 |
| 50–74 | 12 | 4 |
| 75–100 | 4 | 26 |
| **Total** | **31** | **31** |

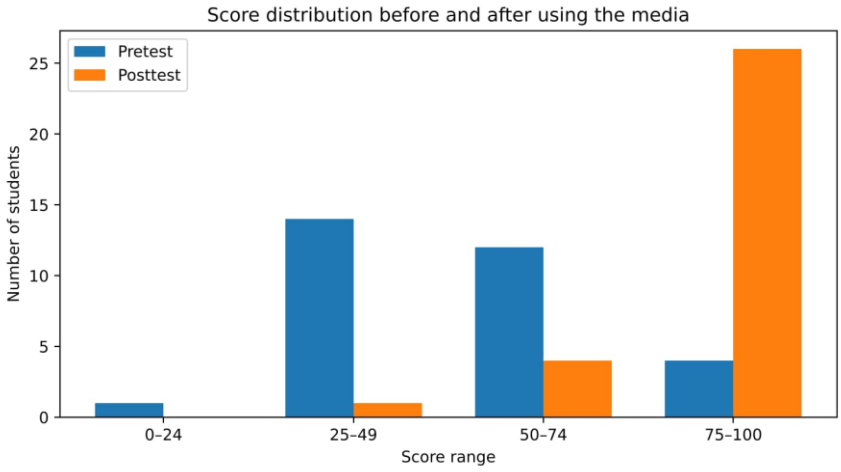



**Figure 3.** Comparison of pretest and posttest score distributions.

The most notable change occurred in the 75–100 range, which increased from 4 to 26 students. At the same time, the number of students in the 25–49 range decreased from 14 to 1, and in the 0–24 range from 1 to 0. This descriptive pattern is consistent with improved achievement after using the media. However, because the source does not present paired individual scores or inferential tests, this article does not state an effect size or statistical significance.

### 3.5 Product Revision

Revisions were made after the validation process and before or during implementation. In terms of appearance, the icons, background colors, and text size were updated. In terms of usability, an instructional video was added. In terms of interactivity, the product was equipped with game-based exercises, 3D objects, and a discussion forum. In terms of content, material on line types and line thicknesses was added in accordance with the content expert's feedback. These revisions show that development did not stop at compiling the application but involved expert feedback to improve usability and content appropriateness.

### 3.6 Details of Product Design and Characteristics

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The product is organized according to a usage flow that starts from the home page. From the home page, users can open the application guide, introduction, material, videos, evaluation, discussion forum, and developer profile. This arrangement places usage orientation before students study the content. The application guide helps users recognize the navigation functions, while the introduction conveys the context and objectives of learning. The material menu is the center of the conceptual content, and sub-materials divide the content into sections that are easier to follow.

In the material section, the application covers technical drawing topics including an introduction to equipment, symbols, codes, line types, and how to read drawings. The prioritized objectives are identifying technical drawings as needed, preparing technical drawings, and recognizing drawing symbols and codes. This scope follows the product scope described in the source. With this focused coverage, the application is intended as supporting media for initial competencies, not as a replacement for the entire Basic Automotive Engineering material.

The video tutorial feature serves as visual support for the written explanations. In technical drawing instruction, sequences of actions and visual examples can help students follow procedures step by step. The evaluation feature provides practice questions and displays the score after students complete them. The discussion forum was designed as an interaction channel that complements independent learning. This combination gives the application functions for delivering material, practice, and communication support, although the quality of actual interaction still depends on how teachers and students make use of these features.

### 3.7 Needs Analysis and Technology Selection

The needs analysis identified the learning conditions and the resources available at the school. The research source notes that most students own Android smartphones, students are allowed to bring and use smartphones to support learning, and a Wi-Fi network is available in the classrooms. These three conditions are potential supports for implementing Android-based media. At the same time, observations identified a limited variety of media, suboptimal use of reading resources, and uneven student engagement in the technical drawing material. Accordingly, product development was directed toward utilizing devices already familiar to students and arranging the material in a format that can be accessed flexibly.

The selection of Smart Apps Creator relates to the need to build a multimedia application without developing the entire application through programming from scratch. The source describes the use of several supporting tools: Canva for designing the logo and backgrounds, Smart Apps Creator for building the application, Padlet for the discussion forum, 3D Viewer for viewing three-dimensional models, and PowerPoint for preparing presentation materials. These tools have different functions in the production workflow. Canva supports visual consistency; Smart Apps Creator is the main environment for assembling pages and navigation; Padlet provides a discussion space; 3D Viewer supports the provision or review of visual assets; and PowerPoint helps prepare material that is then integrated into the media.

The needs analysis also considered the scope of material relevant to the Motorcycle Engineering program. The content developed includes an introduction to technical drawing, the functions and standardization of drawings, drawing equipment or tools, drawing preparation, types of views, geometric construction, projection, dimensioning, and basic technical drawing procedures. This scope serves as the basis for selecting the images, text, videos, and exercises to be displayed. Arranging the material according to the learning objectives helps ensure that multimedia elements do not stand alone but instead support the attainment of the targeted competencies.

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The decision to use an Android application also has implications for access and technical support. The source states minimum specifications of Android version 5.0, 1 GB of RAM, and 16 GB of storage. These specifications describe the devices targeted by the product, but the actual experience may differ depending on screen size, operating system version, and device capability. Therefore, compatibility and readability remain important aspects when the media are used on a variety of smartphones. Internet access is required to download the application and to access certain external services, while installed content can be used according to the functions available within the application.

### 3.8 Interface Design, Navigation Flow, and Storyboard

Product design began with the preparation of a flowchart and a storyboard. The flowchart describes the sequence of user access from the main page to the menus provided, while the storyboard details the content and layout of each page. These two design tools serve as a bridge between the needs analysis and application production. The flowchart helps the developer check whether the navigation paths are coherent, while the storyboard helps organize content, visual elements, buttons, and the sequence of information before they are assembled in Smart Apps Creator.

The main page serves as the entry point that displays the menu icons. The menus include the application guide, discussion forum, introduction, material, evaluation, video tutorials, and developer profile. This menu arrangement allows students to choose functions according to their needs, but it must also provide sufficient guidance so that new users do not lose their orientation. Therefore, icons and labels need to be easily recognizable, menu positions consistent, and the path back to the previous page clear. The media expert's feedback on navigation and appearance is relevant to this function.

The guide page explains how to use the application, while the introduction page provides an initial orientation to the material. The material menu breaks the content into sub-materials so that users can access specific sections without having to browse the entire content from the beginning. The video page provides audiovisual material that complements the text, while the evaluation page is used to complete exercises. The discussion forum is the component that connects individual learning with communication among users or with the teacher. The developer profile provides information about the party that produced the product.

The storyboard also helps maintain consistency between learning objectives and layout. In technical drawing material, visuals need to be selected based on their pedagogical function, for example to clarify equipment, symbols, line types, or examples of technical representation. Text readability and image proportions need to be considered because part of the material depends on small visual differences. The improvements to text size, icons, colors, and image quality made after validation show that the initial design was treated as a prototype that could be improved through expert feedback.

The product was developed through the process of inserting content into each page, setting up navigation and interactions, reviewing the layout, and then generating the Android application. The source also describes the process of installing the software, creating the backgrounds and navigation menus, filling in the content, and converting the output into an Android application. This sequence shows that development involves not only writing material but also processing assets, organizing the structure, and testing basic functions so that the application can be used as designed.

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### 3.9 Product Implementation and Evaluation

In the implementation stage, students were introduced to the application and given the opportunity to open and explore the available features. This activity was preceded by measuring initial ability through a pretest; students then studied the material and used the application's features, and subsequently completed a posttest. In addition to the tests, students completed a questionnaire to convey their assessment of the attractiveness of the media, the presentation of videos and material, the quality of the material, support for understanding, ease of operation, and practice questions. Thus, the implementation data include user responses and the score distribution before and after using the media.

Evaluation in the ADDIE model was used to review product quality based on the information collected during validation and implementation. At this stage, the expert validation results formed the basis for assessing feasibility, while the student questionnaire provided a picture of user acceptance. The change in pretest and posttest distribution provided descriptive information on students' achievement after using the media. These three types of information do not serve the same function: validation assesses the suitability of the product based on expert criteria, the questionnaire measures user response, and the test provides a picture of achievement on the material tested.

The validators' feedback was translated into product revisions. In the media aspect, revisions included adding a short instructional video, updating icons and colors, adding game-based exercises, adding 3D objects, and improving image quality and text size. In the content aspect, revisions included adding material on machining marks, pen or rapidograph thickness, and the technique of transferring lines using two set squares. These revisions show that feedback was used to improve both operational aspects and content accuracy.

Product evaluation must also consider the alignment between claims and the available data. The source describes an improvement in the score distribution after using the media but does not provide all the statistics needed to assess the effect size inferentially. Therefore, this article separates the results on feasibility, response, and score distribution. This presentation prevents response percentages from being treated as learning outcomes and prevents the change in distribution from being treated as tested causal evidence.

## 4. DISCUSSION

The first finding shows that the developed learning media obtained ratings of 86% from the media expert and 95% from the content expert. Both values are above the 85.01% threshold used as the valid or feasible category in the source. The difference between these percentages can be read as a relative assessment: the content obtained a higher percentage than the media aspect. This is reasonable in the context of the development process, because the accuracy and coverage of the material can be assessed separately from navigation, visual quality, and user experience. However, each value comes from a single validator and is therefore more appropriately understood as an expert assessment of this product rather than a broad consensus among many experts. A similar pattern of feasibility assessment is also found in several SAC media development studies in different contexts, although values across studies cannot be compared directly without equating the instruments and sample characteristics (Al Farouqi et al., 2025; Ashari et al., 2025; Khoirudin et al., 2021; Yallah & Huda, 2022).

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The validators' feedback also shows that product feasibility is not determined solely by the availability of material. Intuitive navigation, text size, contrast, image quality, and clarity of instructions affect how students use the media. Adding an instructional video can reduce dependence on the teacher's direct explanation when students first open the application. Meanwhile, improvements to images and line material are relevant to the nature of technical drawing, which requires visual precision. Engineering learning products should prioritize accuracy of representation, readability of symbols, and the connection between conceptual explanations and visual examples.

The student response of 87% indicates that the product was positively received by users in the trial context. This response covers visual elements, material, videos, ease of operation, and exercises. Combining multimedia elements allows the material to be accessed through several forms of representation, so that students do not rely solely on text or verbal explanations. Nevertheless, positive responses should not be treated as a substitute for measuring learning outcomes. Response questionnaires and achievement tests have different functions and need to be analyzed separately.

The pretest and posttest distributions show a strong change in score ranges. Before using the media, 4 of 31 students were in the 75–100 range; after using the media, the number rose to 26. The number in the 25–49 range fell from 14 to 1. This pattern is consistent with the possibility that access to structured material, videos, illustrations, and exercises helped students understand technical drawing material. However, a single-group design with only score-range distributions cannot isolate the effect of the media from other factors, such as teacher instruction, additional practice, test-taking experience, or changes in study time. Therefore, these results are more appropriately reported as a descriptive change after implementation.

These development findings are conceptually consistent with the literature on digital learning media, which emphasizes the role of visual representation and flexible access. Arsyad (2016) positions media as a component that supports the delivery of instructional messages, while Sudarsana (2018) discusses the optimization of technology in curriculum implementation. The studies by Mahuda et al. (2021) and Khoirudin et al. (2021) show the use of Smart Apps Creator in different subject contexts. This study adds an example of applying the platform to automotive technical drawing material, with features tailored to the needs of basic vocational competencies.

The practical contribution of the product lies in organizing the material into a single application containing an introduction, content, videos, evaluation, and discussion. This structure can support independent learning and give teachers an alternative for enriching classroom instruction. The quiz feature can be used as formative practice, while video tutorials and visual objects help clarify steps or concepts. Use of the application still requires integration with learning strategies, teacher guidance, and opportunities for practice. The media do not replace the need for hands-on drawing practice, the use of tools, or feedback on students' work.

This study has limitations. First, the number of students in several parts of the source is inconsistent: one description mentions 20 students, while the score distribution table and the response description show 31. Second, validation was carried out by one media expert and one content expert, so the generalizability of the expert assessments is limited. Third, learning outcomes are reported as a distribution of score ranges without the mean, standard deviation, paired individual scores, or inferential testing. Fourth, there was no comparison group that would allow comparative testing. These limitations do not negate the value of the product as a development outcome, but they limit claims about its effectiveness.

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Future development could broaden validation by involving several experts and schools, conduct more systematic usability testing, and collect learning outcome data in the form of anonymized individual scores that allow paired analysis. Further research could also use a quasi-experimental design with a comparison group, quality-tested instruments, and reporting of effect sizes. From the product side, content updates and display compatibility across devices need to be considered, in line with the development suggestions listed in the source. Strengthening design and evaluation is also consistent with mobile learning reviews that emphasize the importance of pedagogical support, user readiness, and evaluation of learning outcomes (Crompton & Burke, 2018; Parsons et al., 2024; Sophonhiranrak, 2021).

### 4.1 Alignment of the Product with Vocational Learning Needs

The characteristics of vocational education require a clear connection between conceptual material and the competencies used in practical activities. Technical drawing is a visual language for conveying shape, position, dimensions, symbols, and relationships between parts. Errors in reading lines or symbols can lead to mistakes in interpreting working drawings. Therefore, media that present text together with illustrations and videos can give students the opportunity to review information according to their needs.

This product also provides an alternative means of accessing material beyond the teacher's direct explanation. Access through Android devices allows students to open the material without always depending on printed books or projector displays in class. This flexibility is relevant for reviewing material, preparing before lessons, and reinforcing learning afterwards. Nevertheless, device use must be adjusted to the availability of devices, application compatibility, and students' access conditions. Digital media will be more inclusive if teachers continue to provide alternatives for students who experience device constraints.

Navigation design is important because having many features does not automatically make media easy to use. Users must understand where the material is located, how to return to the main menu, how to open videos, and how to complete evaluations. The media expert's feedback on navigation and instructions shows that user experience needs to be treated as an element of instructional design. Adding an instructional video and updating icons can help reduce the initial burden when students adapt to the application. Display clarity is also important for material that requires precision in reading symbols and line details.

The use of visual objects and 3D objects has the potential to enrich the learning experience by providing additional representations. However, their benefits are determined not only by the presence of the features but also by the alignment of the features with the learning objectives. Decorative visuals with no direct connection to the material can increase cognitive load. In this product, visuals should be used to emphasize differences in line types, shapes, positions, or examples of working drawings. In this way, interactive elements support the explanations rather than merely serving as ornaments of the application.

### 4.2 Meaning of the Validation Results and User Response

The media expert's rating of 86% indicates that the product reached the feasible category according to the threshold used in the study. This percentage comes from 38 points out of a maximum score of 44 on 11 items. This result shows that most aspects of the media received positive ratings, while also explaining why some suggestions for improvement remain relevant. The feasible category

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does not mean that the product requires no refinement; it indicates that the product met the criteria set at the validation stage and could proceed to the trial stage.

The content expert's rating of 95% comes from a score of 57 out of a maximum of 60 on 15 items. This value indicates a high level of content appropriateness according to a single validator with experience teaching Basic Automotive Engineering. The suggestions regarding machining marks, the selection of pen or rapidograph thickness, and the use of two set squares show that technical drawing material requires specific procedural accuracy. This feedback illustrates the value of qualitative validation: the percentage score provides a quantitative summary, while the validator's comments help identify the parts that need clarification.

The student response of 87% provides information about users' acceptance of the media. A positive response can support the decision to use the product as a learning companion, but it cannot replace the assessment of competency attainment. Students may like the appearance or ease of use without fully mastering the concepts. Conversely, challenging media can still support learning if they provide appropriate practice. Therefore, user responses need to be read together with learning evaluation results and teacher observations, not as the sole indicator of success.

### 4.3 Interpretation of the Change in Score Distribution

The pretest distribution shows that most students were in the 25–49 and 50–74 score ranges, while only four students were in the 75–100 range. In the posttest, the distribution shifted to the highest range, with 26 students in the 75–100 range. This shift is a prominent descriptive finding and is consistent with the purpose of using the media as a learning resource that provides access to material, videos, and exercises.

Nevertheless, score ranges simplify the variation in individual scores. Two students in the same range may have considerably different scores, and a change in position between ranges does not indicate the exact gain for each student. Without paired raw scores, means and standard deviations, and appropriate testing, the magnitude of change cannot be fully calculated. Thus, the result most strongly supported by the available data is the shift of the distribution toward higher score ranges after using the media.

Interpretation also needs to consider that pre- and post-tests can be influenced by other factors. Students received exposure to the material and guidance during implementation; post-learning results may reflect a combination of application use, teacher explanations, practice, and familiarity with the test format. Without a comparison group or a design that controls for these factors, the change cannot be attributed entirely to the application. Limiting the claims in this way maintains consistency between the conclusions and the research design.

### 4.4 Implications for Development and Use

Teachers can use the media as a companion to classroom explanations, a resource for review, and a means of formative practice. Before use, teachers can introduce the learning objectives and the navigation flow. During learning, students can access the material and videos in sequence and then complete the quiz to obtain initial feedback. Afterwards, teachers can discuss the questions that were frequently answered incorrectly and link them to manual drawing practice. This approach integrates digital media with practice rather than separating the two.

Developers can use the validation results as a basis for prioritizing improvements. Readability, image accuracy, navigation consistency, and content appropriateness should be prioritized before

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adding more complex features. Product updates also need to consider variations in screen size and device capability. Cross-device usability testing can help identify pages that are difficult to read or buttons that are not easily accessible. Content should be reviewed periodically so that examples and procedures remain aligned with learning needs.

For subsequent testing, researchers can collect anonymized individual scores and use test instruments aligned with the learning objectives. A design with a comparison group or repeated measurements can provide a stronger basis for evaluating changes in achievement. In addition to test scores, data on usage observations, task completion time, types of errors, and brief interviews can help explain which parts of the media are most beneficial. With more complete data, further research can assess not only the feasibility of the product but also its conditions of use and the attainment of competencies.

### 4.5 Comparison with Previous Studies

Previous studies summarized in the source show that Smart Apps Creator has been used to produce learning media in several fields. The development of media on the procedure of ablution focused on religious procedural material, while the development of media for the Cooperatives and MSMEs course focused on students' learning interest. The study by Mahuda and colleagues discussed Android-based mathematics media and problem-solving ability. Khoirudin and colleagues examined the use of Smart Apps Creator 3 in biology learning. These differences in fields show that the platform can be used for various types of content, but product design must still be adapted to the characteristics of the material.

Other studies listed in the source used different platforms or visual approaches. Appypie-based development for the power transmission system course likewise positioned an Android application as a learning product, while Smart Card Augmented Reality media for cooling system material incorporated elements of augmented reality. These studies are relevant because they are oriented toward digital products, but they cannot be compared directly based solely on validation percentages or reported results. Differences in instruments, number of validators, participant characteristics, material, and evaluation design affect the interpretation of results.

The contribution of this article lies mainly in the context of automotive technical drawing material at SMKN 11 Malang and the combination of features arranged for that need. Technical drawing material requires clear visual representation and practice in reading or interpreting symbols, so the media combine explanations, images, videos, evaluation, and a discussion forum. Product feasibility was assessed by a media expert and a content expert, while students' responses were collected after use. This combination provides a specific description of development but is not sufficient to conclude that the product is superior to other platforms or media.

To strengthen comparisons across studies, future research needs to use evaluation indicators that can be aligned, report sample characteristics and validation procedures in full, and include clear measures of learning outcomes. Development research can report feasibility and usability, while claims of effectiveness require an appropriate evaluation design. Separating these objectives will help readers understand whether a product has met content and media standards, has been accepted by users, or has been shown to improve learning achievement under particular research conditions.

### 4.6 Limitations and Agenda for Further Research

The interpretation of the research results is limited by the reporting of student numbers that is not fully consistent across parts of the source. The methods description mentions 20 students in one

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section, while the response analysis and the score distribution table show 31 students. Because the totals in the pretest and posttest tables are each 31, the article uses these tables to report the distribution of results and does not conceal the existing discrepancy. This inconsistency limits the accuracy of the overall description of the sampling procedure.

A further limitation is that the number of validators was limited to one media expert and one content expert. The resulting percentages provide the assessments of the two validators involved but do not reflect the variation in views of a broader group of experts. Subsequent validation could involve several experts with complementary expertise, for example technical drawing content experts, learning media experts, and automotive teacher practitioners. Inter-rater consistency could also be reported if the procedures and data are available.

The learning outcome data in the source are presented as the number of students in each score range. This form of reporting is useful for showing the direction of change in the distribution, but it does not provide information on each student's exact score. Anonymized individual data would allow more complete descriptive statistics, paired change analysis, and effect size reporting. If the research aim is to test effectiveness, a design with a comparison group can help distinguish changes related to the media from changes that may occur due to regular instruction or other factors.

Further research could also evaluate aspects of product use in more detail. Observation data could show whether students are able to find menus, complete exercises, and use videos as needed. Interviews or open-ended questions could explain which parts were most helpful and which remained confusing. Cross-device compatibility testing could assess text readability, image proportions, access speed, and application stability on different specifications. This information could be used to improve the user experience without changing the main objectives of the product.

On the learning side, the application could be developed with graduated exercises, feedback that explains the reasoning behind answers, and activities that connect digital representations with manual drawing practice. Game-based quizzes can add variety to practice, but each activity must still measure relevant competencies. The material and questions also need to be updated in line with the curriculum in use. With systematic development and evaluation, the product can continue to be adapted to classroom needs and developments in digital devices.

### 4.7 Principles for Using the Media in Learning

The use of media should be positioned as part of the learning design, not as a stand-alone activity. Teachers can link each menu to the intended objectives, for example by asking students to recognize symbols before completing drawing-reading exercises. After students study a video or illustration, teachers can assign tasks to draw or identify components based on working drawings. The connection between digital material and practical activities helps keep the use of the application competency-oriented rather than merely focused on exploring features.

Independent use of the application also requires guidance on the learning sequence and how to make use of feedback. Students can be directed to read the material, observe visual examples, complete exercises, and then review the parts they have not yet understood. If quiz results reveal errors, teachers can use them as a starting point for discussion or re-demonstration. This strategy allows the application to support repeated learning and gives teachers the opportunity to tailor assistance to students' needs. Implementation must still take into account differences in learning pace and device access.

### 4.8 Product Sustainability and Maintenance

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The sustainability of digital learning media relates to content updates, alignment with the curriculum, and technical maintenance. The suggestions in the source emphasize the need to update the backgrounds, fonts, colors, quizzes, display on various screen sizes, and material content. Visual updates should maintain readability and interface consistency. Design changes that merely follow trends without regard for accessibility can reduce user comfort, especially when the material contains symbols or lines that require precision.

Content maintenance is also necessary so that examples, terms, and exercises remain aligned with the applicable learning outcomes. Teachers or media managers can review the material periodically, note the parts that frequently cause errors, and update questions based on the same objectives. If the application depends on external links or services, the functioning of those links needs to be monitored because changes in services can affect access. With sustained management, the media can remain relevant as a supporting learning resource without neglecting the need for direct instruction and workshop practice.

The application of the media also needs to consider the teacher's role as a facilitator. Teachers still determine the sequence of activities, provide context for technical terms, check the accuracy of drawing interpretations, and connect the exercises in the application with work standards. With this approach, the application can become part of a learning ecosystem that combines digital resources, demonstrations, practice, and feedback. This facilitation role is important because technical drawing skills develop through observation, understanding of symbols, and repeated practice, not merely through access to information.

## 5. CONCLUSION AND SUGGESTIONS

This study produced Android-based learning media assisted by Smart Apps Creator for technical drawing material in the Basic Automotive Engineering subject at SMKN 11 Malang. The product was developed through the five ADDIE stages and combines structured material, images, video tutorials, exercises or quizzes, a discussion forum, and application navigation. The validation results obtained 86% from the media expert and 95% from the content expert, while students' response was reported at 87%; all three fall into the feasible category based on the criteria used. The score distribution also showed a shift to the 75–100 range, from 4 students in the pretest to 26 in the posttest. These findings support the feasibility of the product and show a descriptive change in achievement after using the media. Because the available data do not include inferential testing or a comparison group, conclusions about causal effectiveness need to be limited. The media can be used as a supporting learning resource while remaining combined with teacher guidance and practical activities.

**Data Availability Statement**

A summary of the data used in this article is presented in the results tables. The media product and supporting materials are listed in the research documents.

## 6. REFERENCES

Al Farouqi, S., Hadromi, & Widjanarko, D. (2025). Development of interactive learning media using Smart Apps Creator on electrical system of light vehicles in vocational high schools. Journal of Mechanical Engineering Learning, 14(2), 57–62. https://doi.org/10.15294/jmel.v14.i2.31176

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Ashari, S. A., Suhada, S., Putra, R. D., Mulyanto, A., Dwinanto, A., & Muthia. (2025). Implementasi Smart Apps Creator dalam pengembangan media pembelajaran informatika berbasis Android. Jurnal Teknik, 23(2), 427–440. https://doi.org/10.37031/jt.v23i2.716

Asy'ari, H., & Rosita, D. (2025). Pengembangan media pembelajaran berbasis Android menggunakan Smart Apps Creator pada mata pelajaran informatika materi perangkat keras komputer kelas X. ARDHI: Jurnal Pengabdian Dalam Negeri, 3(3). https://doi.org/10.61132/ardhi.v3i3.1349

Branch, R. M. (2009). Instructional design: The ADDIE approach. Springer. https://doi.org/10.1007/978-0-387-09506-6

Cromley, J. G., & Chen, R. (2025). A meta-analysis of Richard Mayer's multimedia learning research: Searching for boundary conditions of design principles across multiple media types. Educational Research Review, 49, 100730. https://doi.org/10.1016/j.edurev.2025.100730

Crompton, H., & Burke, D. (2018). The use of mobile learning in higher education: A systematic review. Computers & Education, 123, 53–64. https://doi.org/10.1016/j.compedu.2018.04.007

Crompton, H., Burke, D., & Gregory, K. H. (2017). The use of mobile learning in PK–12 education: A systematic review. Computers & Education, 110, 51–63. https://doi.org/10.1016/j.compedu.2017.03.013

Ferlianti, S., Rusdiana, D., Suwarma, I. R., & Nurbani, A. R. (2022). Pengembangan multimedia pembelajaran interaktif SAC pada materi tekanan hidrostatis. Jurnal Pendidikan Indonesia, 3(1), 13–24. https://doi.org/10.59141/japendi.v3i01.479

Firmansyah, R. O., Hamdani, R. A., & Kuswardhana, D. (2020). The use of smartphone on learning activities: Systematic review. IOP Conference Series: Materials Science and Engineering, 850(1), 012006. https://doi.org/10.1088/1757-899X/850/1/012006

Jaiz, M., Vebrianto, R., Zulhidah, & Berlian, M. (2022). Pengembangan multimedia interaktif berbasis Smart Apps Creator pada pembelajaran tematik SD/MI. Jurnal Basicedu, 6(2), 2625–2636. https://doi.org/10.31004/basicedu.v6i2.2428

Khoirudin, R., Ashadi, A., & Masykuri, M. (2021). Smart Apps Creator 3 to improve student learning outcomes during the pandemic of COVID-19. JPBI (Jurnal Pendidikan Biologi Indonesia), 7(1), 25–34. https://doi.org/10.22219/jpbi.v7i1.13993

Mahuda, I., Meilisa, R., & Nasrullah, A. (2021). Pengembangan media pembelajaran matematika berbasis Android berbantuan Smart Apps Creator dalam meningkatkan kemampuan pemecahan masalah. AKSIOMA: Jurnal Program Studi Pendidikan Matematika, 10(3), 1745–1756. https://doi.org/10.24127/ajpm.v10i3.3912

Mayer, R. E. (2002). Multimedia learning. In B. H. Ross (Ed.), The psychology of learning and motivation (Vol. 41, pp. 85–139). Elsevier. https://doi.org/10.1016/S0079-7421(02)80005-6

Mayer, R. E. (2011). Applying the science of learning to multimedia instruction. In J. P. Mestre & B. H. Ross (Eds.), Psychology of learning and motivation (Vol. 55, pp. 77–108). Elsevier. https://www.sciencedirect.com/science/article/pii/B978012387691100003X

© 2026 The Author(s). Published by CV. Bimbingan Belajar Assyfa, Indonesia

Mayer, R. E. (2024). The past, present, and future of the cognitive theory of multimedia learning. Educational Psychology Review, 36, Article 8. https://doi.org/10.1007/s10648-023-09842-1

Muhaimin, M. R., & Zumrotun, E. (2023). Pengembangan media pembelajaran berbasis Smart Apps Creator pada materi satuan ukuran kelas V sekolah dasar. Jurnal Basicedu, 7(3), 1935–1950. https://doi.org/10.31004/basicedu.v7i3.5753

Mutlu, G. (2016). A qualitative analysis and comparison of the two contemporary models of instructional design. Journal of Human Sciences, 13(3). https://doi.org/10.14687/jhs.v13i3.4350

Parsons, D., Palalas, A., Nikou, S., & Rodulfo, S. (2024). Mobile learning frameworks and pedagogy: A systematic review. European Journal of Education, 59(2), e12601. https://doi.org/10.1111/ejed.12601

Rangel-de Lazaro, G., & Duart, J. M. (2023). Moving learning: A systematic review of mobile learning applications for online higher education. Journal of New Approaches in Educational Research, 12, 198–224. https://doi.org/10.7821/naer.2023.7.1287

Reza, R. H., Basrowi, B., & Rahmadani, K. (2023). Pengembangan media pembelajaran menggunakan Smart App Creator berbasis Android pada mata pelajaran TIK di SMPN 12 Cilegon. Jurnal Pendidikan dan Ilmu Sosial, 1(4), 95–105. https://doi.org/10.54066/jupendis.v1i4.873

Romisa, F., Rifani, R., & Suriaty. (2025). Pengembangan e-modul interaktif berbasis Android pelajaran dasar-dasar program keahlian TJKT di SMK YPS Samarinda. Petik: Jurnal Pendidikan Teknologi Informasi dan Komunikasi, 11(1), 62–78. https://doi.org/10.31980/petik.v11i1.1745

Setiyawan, A., Alvindo, R., Kurniawan, A., & Manggalasari, L. C. (2023). Innovation of cooling system learning media Android-based using Smart Apps Creator for vocational high school students. Journal of Vocational Education Studies, 6(2). https://doi.org/10.12928/joves.v6i2.8812

Sophonhiranrak, S. (2021). Features, barriers, and influencing factors of mobile learning in higher education: A systematic review. Heliyon, 7(4), e06696. https://doi.org/10.1016/j.heliyon.2021.e06696

Sudiarti, M., Siregar, S. N., & Susanto, E. (2024). Pengembangan media pembelajaran berbantuan Smart Apps Creator 3 pada materi transformasi untuk siswa kelas IX SMP/MTs. Jurnal Cendekia: Jurnal Pendidikan Matematika, 8(2), 899–912. https://doi.org/10.31004/cendekia.v8i2.2135

Yallah, S. O. R., & Huda, Y. (2022). Pengembangan media pembelajaran Smart App Creator 3 berbasis Android pada mata pelajaran kerja bengkel dan gambar teknik di SMK N 1 Sumatera Barat. Jurnal Pendidikan Tambusai, 6(1), 1244–1255. https://doi.org/10.31004/jptam.v6i1.3046

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