



Systematic literature review: Gdevelop-based game learning

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Abstract

The game learning media based on GDevelop is a new solution that complies with the constructivist principles of learning effectiveness improvement. The proposed investigation is aimed at a Systematic Literature Review (SLR), which can be used to explore the empirical conditions, patterns of use, and viability of GDevelop as a platform to create educational media. The SLR methodology implied searching the Google Scholar and Publish or Perish databases within the period of 2020-2025. The selection of thirteen studies that met the inclusion criteria was followed by thematic analysis to synthesize the findings of the studies. The review shows that GDevelop has a consistent positive effect on the mathematical reasoning, conceptual understanding, and motivational interest of students of various levels of education. Additionally, the platform is considered practical and viable by both the media experts and the end-users. However, there are some challenges in the practice of implementation especially in the capabilities of educators to use and incorporate the tool in the curriculum. This study, therefore, suggests specific teacher training, content development based on the curriculum, and long-term research to determine the effectiveness of GDevelop in a wider range of learning conditions.

Keyword: gdevelop; game-based learning; systematic literature review; interactive learning media

Abstrak. Pemanfaatan media pembelajaran game yang dikembangkan melalui GDevelop merupakan metodologi progresif yang sesuai dengan paradigma konstruktivis, yang bertujuan untuk meningkatkan kemandirian pendidikan. Investigasi ini berusaha untuk melakukan tinjauan literatur sistematis (SLR) untuk memeriksa secara kritis kondisi empiris, aplikasi, dan kelangsungan hidup GDevelop sebagai media untuk penciptaan sumber daya pendidikan. Metodologi SLR melibatkan pencarian komprehensif untuk artikel ilmiah dalam database Google Scholar dan Publish or Perish, dengan fokus pada publikasi dari periode 2020 hingga 2025. Dari 13 artikel yang memenuhi kriteria inklusi yang telah ditentukan, analisis tematik dilakukan untuk mengintegrasikan dan mensintesis hasil. Temuan menunjukkan bahwa GDevelop secara konsisten menunjukkan kemandirian dalam meningkatkan kemampuan penalaran matematika siswa, pemahaman konseptual, dan motivasi untuk belajar di berbagai tingkatan pendidikan. Selain itu, platform ini dianggap layak dan praktis oleh para ahli di media dan penggunaannya. Namun demikian, penerapannya dalam praktik menghadapi hambatan, terutama sehubungan dengan kompetensi pendidik dalam memanfaatkan dan menanamkannya dalam kurikulum yang ada. Akibatnya, penelitian ini menganjurkan penyediaan pengembangan profesional untuk pendidik, pembuatan konten yang selaras dengan standar kurikuler, dan perlunya penelitian tambahan untuk menyelidiki kemandirian GDevelop di berbagai pengaturan pendidikan yang lebih luas.

INTRODUCTION

The introduction of digital technologies into the educational discourse has become a mandatory condition of the development of the curriculum that is relevant, interactive, and responsive to the modern pedagogical requirements. Technological progress has not only changed the ways of accessing information, but has also required the creation of new instructional strategies that would encourage student participation and understanding. Rahmadan et al. (2020) suggest that technology-based learning media are not only the sources of additional knowledge but also the tools to develop the critical thinking and problem-solving skills of students. More conventional pedagogical techniques, however, are often not up to the task of delivering the necessary interactivity, particularly when it comes to intricate material that would require visualisation and independent discovery.

Considering such challenges, the game-based learning (GBL) paradigm has become an effective educational approach. GBL uses game mechanics in an academic context to produce more interesting and deep learning experiences, and thus is consistent with constructivist ideas of making students active creators of knowledge. In contrast to a considerable amount of literature that has been conducted on visual programming environments like Scratch, the open-source, no-code/low-code development environment GDevelop, which allows the creation of 2D games, has been relatively underresearched, especially in the framework of systematic literature reviews. The lack of detailed syntheses that would explore the potential of GDevelop, the methods of its implementation, and its effectiveness in classrooms is a significant research gap that should be addressed through the systematic investigation.

As a result, the current research is going to suggest the implementation of a Systematic Literature Review (SLR) to locate, examine, and combine empirical evidence concerning the use of GDevelop as a pedagogical tool. Based on this, the following research questions will be covered in this review: (1) What empirical data is available on the use of GDevelop in educational institutions? (2) How is GDevelop used as a learning medium? and (3) How viable is the overall implementation of GDevelop? The proposed synthesis is likely to provide scholars, curriculum developers, and policymakers with a modern research map at the same time providing an evidence-based basis on which actionable recommendations can be developed to guide educators in designing creative learning approaches in the digital age.

RESEARCH METHODS

This study employs the Systematic Literature Review (SLR) method to collect, evaluate, and synthesize research findings relevant to the use of GDevelop as a learning medium. The SLR approach was chosen to provide a comprehensive, systematic, and replicable review of the current state of research. The SLR research model adapted for this study is illustrated in Figure 1, and the detailed procedure is outlined below.

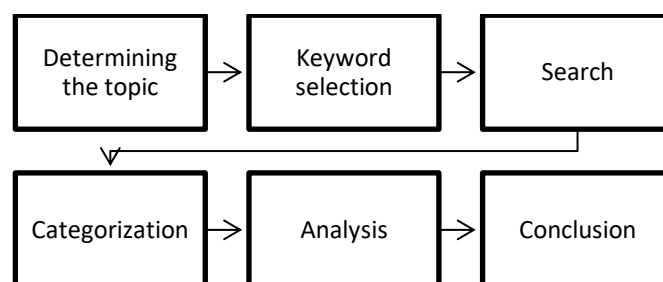


Figure 1 SLR research model

1) Research Question

The formulation of research questions is grounded in the central themes addressed in this study. These questions serve to guide the investigation and define its analytical scope. The research questions posed in this study are as follows:

RQ1: What are the factual conditions surrounding the use of GDevelop-based games?

RQ2: How are GDevelop-based games utilized as learning media?

RQ3: To what extent are GDevelop-based games feasible for use as educational media?

2) Search Process

A comprehensive search process was undertaken to identify relevant literature and data sources that address the stated research questions. During this stage, Google Scholar and the Publish or Perish software were employed as the primary search tools. The search was conducted using specific keywords relevant to the research topic, namely: "GDevelop-based game learning media."

3) Literature Search and Selection Process

The literature search was conducted based on a structured and pre-determined protocol, the flow of which is demonstrated in the PRISMA Flow Diagram (Figure 2).

- Databases:** Searching was conducted in the Google Scholar electronic database, which was supplemented with the Publish or Perish software to find probable relevant titles.
- Publication Period:** Articles that were published during the period 2020-2025 were taken into consideration.
- Keywords:** The following keyword combinations were used: "GDevelop" AND ("learning media" OR "educational game" OR "game-based learning") AND ("education" OR "teaching").

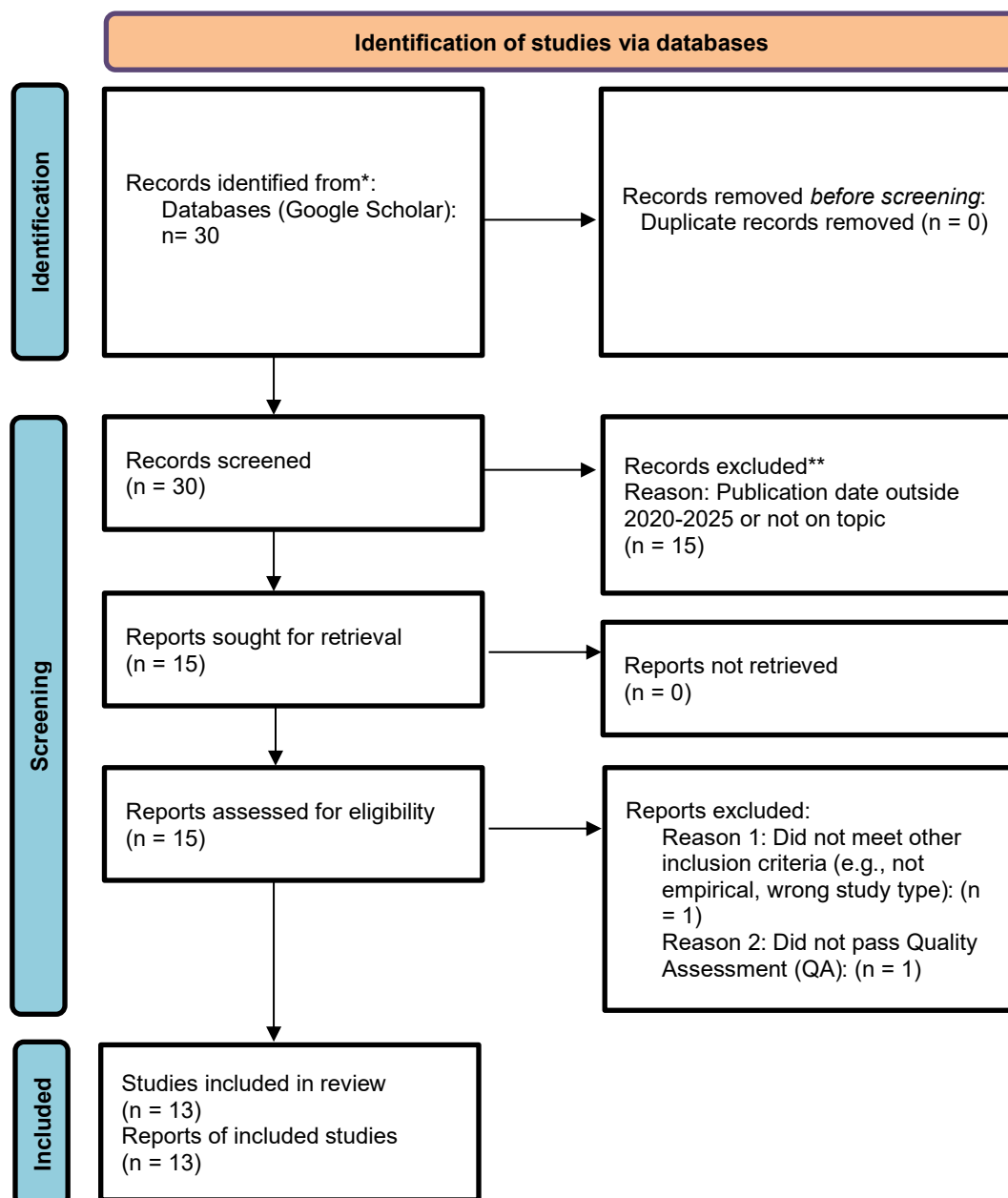


Figure 2 PRISMA flow diagram

4) Inclusion Criteria

To ensure the relevance and quality of the data included in this study, a screening process was implemented. Studies were deemed eligible for inclusion if they met the following criteria:

- a) The articles were published in reputable academic journals and accessed through Google Scholar and Publish or Perish.
- b) The publication date falls within the range of 2020 to 2025.
- c) The articles specifically discuss the use of game-based learning media, with a particular focus on the GDevelop platform.

5) Exclusion Criteria

- a) Review articles, opinions or editorials.
- b) Articles that only discuss GDevelop without providing an analytical discussion.
- c) Reproduction or pre-printed copies of articles which have already been officially published. Screening Process
- d) The process of selection was carried out in a series of steps, which started with the screening of titles and abstracts, and then full-text appraisal of the records that met the first inclusion criteria. This methodological process resulted in 13 articles that passed all the inclusion and exclusion criteria and were then included in the analytical process.

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6) Quality Assessment (QA)

In order to guarantee the methodological soundness of the reviewed literature, every article that survived the full-text screening was filtered systematically against a list of quality assessment (QA) criteria developed by the researcher. The assessment was conducted in the form of answering three main questions:

QA1: Does the article explain the factual circumstances surrounding the utilization of GDevelop based games?

QA2: Does the article describe the use of GDevelop-based games as a learning media?

QA3: Does the article expound on the viability or efficiency of GDevelop-based games as learning media?

Articles that contained sufficient information on at least two of the three QA questions were considered to be of the quality standard to be included in the synthesis.

7) Data Analysis and Synthesis Method

The information in thirteen chosen academic articles was analyzed using a thematic analytic scheme to identify trends, define categories, and draw the main findings to answer the research questions formulated.

- a) Familiarization: During the familiarisation phase, every article was read carefully in order to understand its contents and contextual subtleties.
- b) Initial Coding: The first coding stage was to retrieve pertinent pieces of data, including research objectives, development methodologies, results of feasibility tests, results of effectiveness tests, and implementation barriers, in each article and code them accordingly.
- c) Themes search: Themes search involved the aggregation of codes with conceptual similarity into larger themes, which were then mapped to the research question RQ1, RQ2 and RQ3.
- d) Synthesis and Interpretation: The synthesis and interpretation phase involved synthesis of findings in each theme into a unified narrative synthesis, which provided a summary of evidence as well as comparative and analytical interpretations of the data synthesized.

RESULTS AND DISCUSSION

Screening Results with Inclusion Criteria

From the results of the Screening with Inclusion Criteria in the initial stage, a total of 30 articles from reputable journals were obtained through the Google Scholar database. After the selection, it was found that around 15 articles were published in the 2020-2025 time span that were in accordance with the topic of the research discussion. Then from the final results of the selection, articles that are relevant to the

discussion of the use of GDevelop-based game learning media, which totals 13 articles. The 13 articles passed the next stage, namely Quality Assessment (see Table 1).

Table 1 Quality Assessment

No	Title & author	Research method & sample	Research results
1.	Development of mathematics learning media based on Android educational games using gdevelop to train students' mathematical reasoning skills. Komalasari, N. (2024).	Research and Development (R&D), qualitative and quantitative approaches. Students of SMA Karya Budi Cileunyi in class XI MIPA 1 and Class XI MIPA 2 in even semesters.	Based on the results of the effectiveness criteria for mathematics learning media based on android educational games, the criteria for "effective" media are used for media in learning to train students' mathematical reasoning skills.
2.	Educational Games as a Media to Help Elementary School Children Learn Mathematics. Aziz, F. A. (2024).	Game <i>Development Life Cycle</i> (GDLC) method with interactive approach and literature study.	It was concluded that mathematics education games for elementary school students can be one of the alternatives for children to learn mathematics.
3.	Android-Based Educational Game Puzzle Genre Using GDevelop for HTML Learning at SMK Negeri 1 Kamal. Saputra, M. D., Risnasari, M., Ningsih, P. R., Effindi, M. A., & Aini, N. (2024).	ADDIE's development model with teacher interviews and student observations.	In this study, it shows that the <i>game</i> is suitable for use as a learning medium, the assessment of media experts is 95%, material experts are 83%. The small group trial got a percentage of 87% and the large group 85%. With these results, it can be concluded that educational <i>games</i> based on GDevelop are declared suitable for use in the learning process.
4.	Solar system Android game creations: Interesting, valid, and well-liked by junior high school students. Prafitasari, A. N., Kurniawati, L. S., & Dewi, J. A. (2024).	Development research, (ADDIE) with grade VII students of SMP Negeri 7 Jember.	The results of this study, the Solar System Game developed has been declared "valid" by experts with a percentage of 74.22%. Student responses to the Solar System Game showed that 80.32% of students agreed with it. With these results, the development of android games with Solar System materials received a rating of "Good".
5.	Strengthening the Profile of Pancasila Students: Game Coding Training for Students of SMA Negeri 5 Jember. Prafitasari, A. N., Kurniawati, L. S., & Hasanah, N. (2024).	Model <i>Training Cycle</i> , 40 students who participated.	As a result, 48.2% of students stated that the training provided was in accordance with student needs and a total of 72% stated that the GDevelop application was easy to use. 67.5% of students were able to complete the stages of creating games according to instructions, but only 33% were interested in developing <i>games</i> independently.
6.	Development of Android-based Dompou Local Cultural Numeracy Literacy Educational Game. Supriyaddin, S., Prayudi, A., & Putra, A. (2023)	R&D research method, 4D model. The population was 56 students with a class VII research sample of 15 students, Analysis and interviews.	The results obtained are, <i>the Dompou Local Culture-based Numeracy Literacy education game</i> is very feasible to be implemented with a percentage of 87% by validators. Small-scale trials on 5 students got an average score of 78 with the effective category. And a large-scale trial of 15 people got an average score of 74 with the predicate of effective.
7.	Development of Educational Games for Flat Building Materials Using the G Develop Application. Sugiyanti, R., & Lestari, A. S. B. (2023).	ADDIE model with grade IX A STUDENTS OF SMP NEGERI 1 WINONGAN. Interview of mathematics teachers.	The instruments used by the researcher were expert validation sheets and teacher and student response sheets. The results of the media validation obtained a score of 4.54, material experts 4.52 and student responses of 4.15. It was concluded that the Lubangtarif learning media can be implemented in the classroom because it passes the results of the validity and effectiveness test.

No	Title & author	Research method & sample	Research results
8.	The Application of Gdevelop-Based Interactive Educational Games and Its Influence on the Mastery of Concepts of Elementary School Students. Swandi, A., Saputri, C. E., Arsyad, S. N., Nurwidyayanti, N., Rizal, A., Irwandi, A., & Rahmadhanningsih, S. (2023).	Pre-experimental research, using a quantitative approach with a comparison of initial and final tests. There are 13 students in class IVC Elementary School who have smartphones.	From this study, it is concluded that educational <i>games</i> developed using the GDevelop application are feasible and valid to be used in learning. The learning media has characteristics such as communicative, time-efficient, interactive, interesting and adaptable to the learning style of students, able to integrate the learning process with games.
9.	The Utilization of G Develop Media to Make Educational Games at SMA Negeri 1 Pekanbaru. Zidhan, M., Okmayura, F., & Khaidir, A. (2024).	The research method of quantitative approach with a case study research design. The student population and teachers of SM Negeri 1 Pekanbaru. Observation, interviewing and document analysis.	The results of the final evaluation showed that <i>the educational game</i> successfully achieved the set learning objectives. Students get high interest and motivation to use this game as a means of learning.
10.	Training on the Application of Educational Games in Indonesian Language Learning in Elementary Schools. Swandi, A., Arsyad, S. N., Balalembang, V., & Fansury, A. H. (2023).	The GOAD training model with participants in grade IV students of SDN Lariang Bangi 1 Makassar City totaled 34 respondents.	The findings of the study indicate that the majority of students were able to engage effectively with the educational games provided. The implementation of game-based learning fostered a high level of enthusiasm and motivation among students. The integration of questions within the game environment was particularly beneficial in reinforcing the instructional material previously delivered by the teacher. Furthermore, the inclusion of time constraints in answering questions introduced an element of challenge that stimulated students' cognitive engagement and encouraged active participation. Overall, the use of educational games contributed positively to both student motivation and content retention.
11.	<i>Jungle Math: An Educational Mobile Games for Preschoolers Learning Mathematic.</i> Dawson, J. G. M., Hibaullah, C. F., Matraf, M. S. B., Harun, N. H., Hashim, N. L., & Dahari, R. (2023).	R&D method, rapid application development model or RAD. With 16 study participants.	The results of the study as a whole participants gave a positive assessment of the application, with a high level of satisfaction, were interested in using it because it was fun, and also recommended the application to others. The application is considered attractive and can be used as an indicator of success in increasing the effectiveness of the learning process.
12.	<i>Developing students' digital competences through collaborative game design. Computers & Education.</i> Laakso, N. L., Korhonen, T. S., & Hakkarainen, K. P. (2021)	Using quantitative and qualitative methods using <i>pre-test</i> and <i>post-test</i> .	As a result, students responded that the game design project encourages informal and interest-based social-digital participation, which can create inspiring learning engagement and improve work practices in the school environment.
13.	Development of Android-Based Educational Games for Spatial Introduction Akmalia, L., & Farisi, O. I. R. (2024).	ADDIE Model with R&D method, Interview.	The results of product validation by 90% subject matter experts and 80% media experts put <i>the game</i> in the valid category. The trial was conducted on 20 students at MI Nurul Mun'im, with a success rate of 97.71% with positive student responses. From the results of validation and implementation, the educational game has proven to be effective as an alternative learning medium that is able to support students' understanding

No	Title & author	Research method & sample	Research results
			while providing motivation to learn more actively. This game can also create an interactive and fun learning experience, which ultimately improves students' understanding of the building materials.

The findings are synthesized into three central themes based on thematic analysis of the thirteen studies and they directly answer the research questions. This synthesis is not a simple study-by-study summary, but rather provides integrated information, which is connected to relevant theoretical frameworks.

Factual Conditions of Use of GDevelop-based Games

An overview of several studies proves that the level of consistency is high in terms of the feasibility and effectiveness of GDevelop-based learning media. With regard to feasibility, the findings of the expert validation in a number of studies give a sound picture. Saputra et al. (2024) found media-expert validation scores of 95% and material-expert scores of 83% and trials with small and large groups had 87 and 85% respectively. Akmalia and Farisi (2024) reported material-expert validation of 90% and media-expert validation of 87.5% and a success rate of 97.71% among the students who participated. Supriyaddin et al. (2023) also showed that validators rated a local culture-based game with a feasibility score of 87.00 percent. The accruing quantitative data thus goes a long way to support the fact that educational products created using GDevelop meet the technical and content feasibility standards of instructional application.

On the same note, this media has been found to be effective. Komalasari (2024) discovered that GDevelop-based mathematics learning media had 74 per cent success in developing mathematical reasoning abilities in students, which falls under the category of Effective. Swandi et al. (2023) concluded that interactive games based on GDevelop can be feasible and valid to use and have communicative, time-efficient, and interactive properties and allow merging learning and gameplay. As a result, it may be stated that GDevelop allows creating the media that is not only possible in terms of expert view but also efficient in terms of reaching the specific learning goals.

Pedagogical Benefits and Learning Outcomes

This helps to understand the details of the pathological process in the body and the way the body reacts to the pathology. The pedagogical benefits of GDevelop implementation in education are consistent with the constructivist philosophy and Game-Based Learning (GBL) theory. Regularly, other researchers state that the integration of games into teaching has significant positive outcomes, especially when mobile-based games are employed as an effective and interesting learning tool (Komalasari, 2024; Prafitasari et al., 2024). These games create the conditions of active construction of knowledge by students with the help of practical activities and problem-solving, which is demonstrated by Saputra et al. (2024) with references to HTML syntax and Akmalia and Farisi (2024) to the visualization of spatial shapes.

GBL-wise, these games are effective in motivating, engaging, and increasing the learning interest of the student. Swandi et al. (2023) observed that the media is appealing, interactive and can accommodate various learning styles. According to Zidhan et al. (2024), educational games can play an important role in enhancing learning efficiency. Dawson et al. (2023) clearly mentioned that their application will help children learn mathematics in a more amusing, imaginative, and fun way. In addition to content consumption, Laakso et al. (2021) found that collaborative game-design projects are a pedagogically significant way of involving students in knowledge-generating learning. This means that GDevelop is also capable of promoting student-centered learning and the acquisition of digital competence.

Implementation Problems and Opportunities

Although it has a significant potential, the synthesis brings forth significant implementation challenges. The most conspicuous barrier is related to educator competency and preparedness. Zidhan et al. (2024) clearly stated that the application of GDevelop in education is still a small area, and the challenges faced in SMA

Negeri 1 Pekanbaru, such as a lack of knowledge and skills of teachers related to the use of GDevelop as a learning tool, were observed. This highlights the need to have new methods of interactive learning. Other issues include the necessity to develop curriculum-related content and instructional methods to meet the technological changes (Akmalia and Farisi, 2024), and the fact that most of the games that students prefer are more of entertainment than learning goals (Swandi et al., 2023).

When placed in the greater context of the educational game development platform and its platforms, a peculiar viewpoint is gained on GDevelop. GDevelop provides a more direct route to publication (to Android/Web) and the ability to implement more complex gameplay, compared to Scratch, which has been widely studied and is better adapted to introducing visual programming, which makes it a better option in standalone development of learning-media. On the other hand, in comparison to professional engines like Unity, GDevelop has a less steep learning curve, since it is a no-code/low-code engine, which makes it more accessible to teachers with no background in programming. This middle-ground positioning gives GDevelop a niche in GBL research and practice, specifically in the creation of educational games by teachers or teacher-student partnerships which need to be simple enough and publishable enough.

The above thematic synthesis provides detailed information. To begin with, empirical conditions under which GDevelop use is carried out show that the tool can be used to create both feasible and effective learning media as per the standards of validation and field trials. Second, its application has practical pedagogical advantages, particularly in enhancing student engagement and understanding, which are based on constructivist and GBL theories of learning. Third, the general feasibility of implementation is mainly undermined by non-technical aspects, which are mainly teacher capacity, and not platform-specific constraints. The consequences of these results are obvious. In order to achieve the potential of GDevelop, the emphasis should shift to the development of teacher capacity, instead of just showing the effectiveness of the product. Teacher training on a large scale is necessary. Moreover, the creation of libraries of ready-to-use templates and curriculum-based resources may help a lot to minimize the initial barriers. Comparing it to Scratch and Unity, this review does not only provide the answers to the research questions but also helps to map the educational game-development-tool landscape, where GDevelop has a unique value proposition that could be further investigated both academically and practically.

CONCLUSION

The systematic literature review used empirical data of thirteen studies published in 2020-2025 to explore the use of GDevelop as a medium of game-based learning. The results of the analysis provided three major conclusions which were directly related to the pre-established research questions. To begin with, in terms of factual circumstances and feasibility, the studies reviewed all indicated that GDevelop-based educational games are technically feasible and are positively accepted by experts and users. The media and material validation scores are high, and the results of student testing are positive, which proves the usefulness of this tool in the teaching process. Second, regarding the pedagogical application, the synthesis shows that the games developed on GDevelop have a high potential in improving the core learning outcomes. Most of the studies were found to have enhanced the mathematical reasoning and conceptual understanding as well as learning motivation of students especially in the STEM environment. These advantages are in line with the principles of constructivist and game-based learning because the games provide active, interactive, and engaging learning processes. Third, regarding the viability of implementation as a whole, the review found that there is a significant discrepancy between the potential that the tool can demonstrate and its general adoption. The technical ability of GDevelop was not the main limitation but the lack of teacher training and integration into the curriculum. Therefore, although GDevelop has positive empirical evidence to support its effectiveness as a medium of learning, its scalability depends on the need to overcome these human and systemic barriers. The research contributes to the scholarly discussion by providing the first systematic review of the educational uses of GDevelop, putting it in the context of the overall game development tools, including Scratch and Unity. According to these evidence-based results, the policy and practice implications include the need of institutional assistance in teacher professional development related to educational game design and strategic development of open-access, curriculum-oriented game templates to ease the adoption process. To further develop this research, we suggest that

more rigorous experimental and longitudinal studies should be performed to determine causal effects, meta-analytic methods should be used to synthesize quantitative evidence as the literature grows, and exploratory research should be conducted to determine the full range of GDevelop applicability and limitations to a broader range of subjects and educational settings.

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