JURNAL INOVASI

Teknologi Pendidikan

Volume 10, No 4, December 2023

Meta analyzing the ease of use of e-modules in learning
Yogi Irdes Putra, Radinal Fadli, Sundahry Dahry

Utilization of the Canva application on the Belajar.Id site as a learning media at SMK Bina Nusa Mandiri Jakarta
Indira Putri, Jumardi Jumardi

Validity of interactive learning media in computer basics course
Muh. Putra Pratama, Simon Ruruk, Perdy Karuru

The implementation of graphic motion-based communication technology material learning videos for 3rd grade elementary students
Azmi Fauziah Hamidah, Feri Hidayatullah Firmansyah, Fahmi Candra Permana, Ahamad Tarmizi Azizan

Development of Android application-based digital literacy media to improve the reading ability of ADHD students
Abdul Khoir, Murtadlo Pahrurrozi, Endang Purbaningrum, Ahmad Yudi Saputra

Implementation of flipped learning with flipbook media assistance on learning outcomes and critical thinking abilities
Diah Sudiarti, Nashlul Muflihatul Ashilah, Umi Nurjanah

The effectiveness of video-assisted asynchronous learning on students' learning outcomes in the subject of akidah akhlak
Alvian Nur Jamil, Muhammad Thohir

Developing augmented reality novel games as English learning media for reading narrative texts
Hajar Khoirunisa, Tri Wahyuni Floriasti

Influence of play-based learning on socio-emotional development among early childhood children in Afijio Local Government Area of Oyo State, Nigeria
Elizabeth Olaoluwa Adubuola, Taofeek Akolade Gbadeyanka, Baniyaminu Opeyemi Hamzat, Nasimot Opeyemi Oyewumi

Systematic review of multiliteracies skills, multimodal tools to facilitate learning in early childhood classroom
Francis Moodu Yakubu, Kayode Ezechael Obafemi

JURNAL INOVASI Teknologi Pendidikan

Volume 10, No. 4, December 2023

JURNAL INOVASI

TEKNOLOGI PENDIDIKAN

9 772460 717002

9 772407 096009

IPTPI APS-TPI

JURNAL INOVASI
TEKNOLOGI PENDIDIKAN

Meta analyzing the ease of use of e-modules in learning

Yogi Irdes Putra * ID, **Radinal Fadli** ID, **Sundahry Dahry**
Universitas Muhammadiyah Muara Bungo, Indonesia.
* Corresponding Author. E-mail: yogiip28@gmail.com

ARTICLE INFO

ABSTRACT

Technological innovation in education is necessary to increase the quality of learning by utilizing specialized media. One of the efforts made by educators is to use e-modules in learning. E-modules are digital media containing text, video, audio, and animation, which are combined according to the learning needs of students/students. This research was conducted to describe the practicality of using e-modules for teachers/lecturers and students/students. In this study, ten articles were sampled regarding the use of e-modules. Based on the research results, it is known that the average practical value of using e-modules for teachers is 90.63 in the convenient category, while the average practical value of students is 87.09 in the applicable category. Based on the results of a review of the use of the developed e-module, it is included in the practical category so that the e-module can be used in learning activities.

INTRODUCTION

Efforts to improve human resources are carried out by advancing the quality of Education. Education is an activity to change students to adapt to their environment and develop positive things in students (Pitasari et al., 2022). Education can advance and improve the condition of society in a more advanced direction through changes in science and technology (Sidiq, 2020).

Changes in science and technology in the world of Education have led to appropriate innovations, especially in the learning process (Fadhillah & Andromeda, 2020). Changes in science and technology in the world of Education have led to appropriate innovations, especially in the learning process (Zahwa & Syafi'i, 2022). Learning Media are tools that are used to convey messages or knowledge from teachers (communicants) to learners (communicators) (Kimianti & Prasetyo, 2019). Learning Media is used in the form of hardware (hardware) and software (software) (Hakiki et al., 2022), thus influencing the motivation to learn, attention, thoughts, and feelings of learners toward achieving learning goals (Widiana & Rosy, 2021).

The Learning Media integrated with technology and developed today is the e-module (Rahmadhani & Efronia, 2021). E-module is a self-learning media packaged in digital form (Laraphaty et al., 2021); this aims to realize the learning skills that will be achieved and make students more interactive by using the e-module (Rahmi, 2019). E-modules can also be interpreted

as electronic-based learning media, with animations, texts, images, videos, and graphics (Triyono, 2021). E-modules are expected to be a new learning place for learners and can improve their understanding of learning materials (sa'diyah, 2021).

Based on the results of literature studies in accredited journals, the development of e-modules for learning is very much. However, it is still not seen how much practicality of e-modules that various researchers have developed, so there needs to be the most substantial scientific evidence about the effects of using e-modules on learning. Then, it is essential to meta-analysis the practicalities of using e-modules by lecturers/teachers and students/students. So, it can be found whether the e-module that has been developed is feasible to use in learning activities. The study aims to increase the evidence of the application of e-modules in learning and facilitate practitioners in using e-modules as research and development topics. Furthermore, this research can also motivate further advancements in designing more efficient and relevant e-modules, as well as provide practical guidance for educators and curriculum developers to optimize the use of e-modules in the learning process.

METHOD

Determined this type of research is a meta-analysis. Meta-analysis reviews several research results on similar problem topics (Zaputra et al., 2021). Meta-analysis is research conducted by analyzing, reviewing, and collecting data from a previous study that already exists (Anugraheni, 2018). The stages in this study (1) formulate the research problem, (2) identify the relevant study full-text Article, (3) assess the quality of the study, (4) data analysis and evidence summary, (5) interpret the findings. The data collection technique in this study is to collect several similar articles that discuss the use of e-modules obtained through Google Scholar (Utama, 2022). The Data used in this study is secondary data obtained from previous research.

Stages in data collection as follows: (1) Identify research variables; (2) Identify the average practicality for each article analyzed/ research subject;(3) Identify the average practicality of educators for each article or research subject;(4) identify the average practicality of students each article; (4) Calculate the final average practicality.

Articles collected in this study with the following criteria:
1. Literature that discusses the ease or practicality of using e-modules in learning has as many as ten articles;
2. Literature published in the period from 2021 to 2023;
3. Literature using English and Indonesian;
4. Literature published in accredited national journals.

There are ten articles from several national journals sampled in this study. The information needed to calculate the practicality level of using e-modules is the year of research, the researcher's name, the percentage of the practicality, and the title (Wahyuni & Yerimadesi, 2021). Practicality is the ease of use of the product produced when used (Zaputra et al., 2021). Data analysis techniques using the formula of Percentage = X/Y. Y is lots of data and X is total percentage (Haspen & Festiyed, 2019).

RESULTS AND DISCUSSION

Research Results

Based on the analysis of ten (10) articles on using e-modules from accredited national journals, the data is found in Table 1. Table 1 shows that two components are the guidelines in this study, namely teachers/lecturers and students/students. The average practicality score by teachers/lecturers is 90.63, classified as very practical, while the average practicality score by students is 87.09, classified as valid. The average score of practicalities by teachers is greater than the score of practicalities by students.

Table 1. Practical Evidence of e-Module.

No.	Title	Practicality		Source
		Gr	Pd	
1	Development of e-modules on row and series material using sigil software	86.67	89.72	(Sari et al., 2023)
2	Development of Thematic E-Module Curriculum 2013 Theme 2 Subtheme 1 Grade III Elementary School Based on Flipbook Maker	88.03	92.39	(Pitasari et al., 2022)
3	Development of flipbook-based contextual electronic modules towards understanding mathematical concepts of grade XI MA students	89	72	(Surtini et al., 2023)
4	Development of E-Modules with Canva Applications and Flipbooks on Economist Learning	86.6	86.6	(Sofya & Adzkia, 2023)
5	Development of Smartphone-Based E-Module on Human Excretory System Material for Class XI High School Students	93.83	90.71	(Rambe & Ristiono, 2022)
6	Development of Flipbook Maker Based Sociology Learning E-Module for Class XI High School Social Studies Students	85	80	(Rahayu & Erianjoni, 2021)
7	Development of interactive e-modules based on Kvisoft Flipbook with discoery learing model on arthropod material	87.22	85.8	(Hasibuan, Zulfarina, & Putra 2023)
8	Development of Interactive E-Modules for Electric Lighting Installations in Vocational Education	91	87,.63	(Taali et al., 2023)
9	Development of Character-Based AUD Social Development Learning E-Module Using Flipbook Maker Software	100	98.3	(Susilawati, 2021)
10	Development of e-modules using the professional flip pdf application in the basic education curriculum analysis course	98.95	87.76	(Rama et al., 2022)
		90.63	**87.09**	

Discussion

This study has found the practicality or ease of use of e-modules in learning by teachers/lecturers and students/students from various research results. Here are the details of the explanation.

a. Practicality of e-module by Teacher/Lecturer

Based on ten articles in Table 2, the practicality of using e-modules by teachers in the 9th article proves that the average value of the highest practicality score is 100. The lowest suitability is found in the 6th article, with a score of 85. The results of product development are said to be practical if: (1) the developed product can be implemented in the field or school; (2) the developed product can attract students to learning activities; (3) the subject matter of the developed product is easy to understand (Fitria, 2017).

b. Practicality of E-module students

Based on Table 2, the practicality of the use of e-modules by students from 10 articles analyzed data obtained that the highest level of practicality by students in the 9th article is 98.3. In comparison, the lowest practicality score in the 3rd article is 72. The story of product practicality is seen from the ease of use of the developed Learning media, ease of interpretation, attractiveness, time efficiency, can be used as an independent learning media, and suitability to the material (Yanto, 2019). The results of the calculation of the practicality of the use of e-modules by students prove that the e-modules developed include practical categories because they can attract students ' interest in learning activities. The development of e-modules in learning is a form of technology-based innovation (Triyono, 2021). Various conveniences are offered by the e-module so that the learning process is more flexible.

CONCLUSION

Based on the results of calculations that have been carried out, it is concluded that using e-modules during the learning process includes practical criteria with an average score of practicality by teachers/lecturers of 90.63 in the convenient category and the average score of the level of

practicality by Students/Students of 87.09 practical types. This shows that the e-module developed is well used by teachers/lecturers and learners/students in the learning process to help students/students understand the concept of the material and can improve the value of learning outcomes. The implications of this study are to provide the most substantial scientific evidence against the application of e-modules in learning and facilitate practitioners in using e-modules as a topic of research development.

REFERENCES

Anugraheni, I. (2018). Meta Analisis Model pembelajaran problem based learning dalam meningkatkan keterampilan berpikir kritis di sekolah dasar (a meta-analysis of problem-based learning models in increasing critical thinking skills in elementary schools). *Polyglot: Jurnal Ilmiah*, *14*(1), 9–18. http://dx.doi.org/10.19166/pji.v14i1.789

Fadhillah, F., & Andromeda, A. (2020). Validitas dan praktikalitas e-modul berbasis inkuiri terbimbing terintegrasi laboratorium virtual pada materi hidrolisis garam kelas XI SMA/MA. *JEP/ Volume 4 Nomor 1 Mei 2020*, *4*(2), 179–188. https://doi.org/10.24036/jep/vol4-iss2/516

Fitria, A. D. (2017). Pengembangan media gambar berbasis potensi lokal pada pembelajaran materi keanekaragaman hayati di kelas X SMAN 1 Pitu Riase Kab. Sidenreng Rappang. Universitas Islam Negeri Alauddin Makassar. http://repositori.uin-alauddin.ac.id/id/eprint/8473

Hakiki, M., Sabir, A., & Maryana, A. (2022). Efektivitas modul digital berbasis e-learning pada matakuliah pendidikan karakter di STKIP Muhammadiyah Muara Bungo. *Jurnal Muara Pendidikan*, *7*(2), 269–278. https://doi.org/10.52060/mp.v7i2.901

Hasibuan, S. H., Zulfarina, Z., & Putra, R. A. (2023). Pengembangan E-Modul Interaktif Berbasis Kvisoft Flipbook dengan Model Discoery Learing pada Materi Arthropoda. *saintifika*, 24(2), 109-121. https://doi.org/10.25037/saintifika.v24i2.135

Haspen, C. D. T., & Festiyed, F. (2019). Meta-analisis pengembangan e-modul berbasis inkuiri terbimbing pada pembelajaran fisika. *Jurnal Penelitian Pembelajaran Fisika*, *5*(2). https://doi.org/10.24036/jppf.v5i2.107442

Ilhami, S., Fitri, R., Rahmawati, D., Atifah, Y., & Fajrina, S. (2022). Meta-Analisis Praktikalitas media pembelajaran puzzle. *Journal on Teacher Education*, *4*(2), 611–619. https://doi.org/10.31004/jote.v4i2.8482

Kimianti, F., & Prasetyo, Z. K. (2019). Pengembangan e-Modul IPA Berbasis problem based learning untuk meningkatkan literasi sains siswa. *Kwangsan: Jurnal Teknologi Pendidikan*, *7*(2), 91–103. https://doi.org/10.31800/jtp.kw.v7n2.p91--103

Laraphaty, N. F. R., Riswanda, J., Anggun, D. P., Maretha, D. E., & Ulfa, K. (2021). Pengembangan media pembelajaran modul elektronik (e-Modul). *Prosiding Seminar Nasional Pendidikan Biologi*, *4*(1), 145–156. http://103.84.119.236/index.php/semnaspbio/article/view/676

Pitasari, S., Subhan, M., & Ratnawati, R. (2022). Pengembangan E-modul tematik kurikulum 2013 pada tema 2 subtema 1 kelas III Sekolah Dasar berbasis flipbook maker. *Jurnal Pendidikan Dan Konseling (JPDK)*, *4*(4), 4155–4162. https://doi.org/10.31004/jpdk.v4i4.5929

Rahayu, Y. W., & Erianjoni, E. (2021). Pengembangan e-modul pembelajaran sosiologi berbasis flipbook maker untuk peserta didik kelas XI IPS SMA. *Jurnal Sikola: Jurnal Kajian Pendidikan dan Pembelajaran*, *3*(1), 1–12. https://doi.org/10.24036/sikola.v3i1.142

Rahmadhani, S., & Efronia, Y. (2021). Penggunaan e-modul di sekolah menengah kejuruan pada mata pelajaran simulasi digital. *Jurnal Vokasi Informatika*, 6–11. https://doi.org/10.24036/javit.v1i1.16

Rahmi, L. (2019). Perancangan e-module perakitan dan instalasi personal komputer sebagai media pembelajaran siswa SMK. *Ta'dib*, *21*(2), 105–112. http://dx.doi.org/10.31958/jt.v21i2.1190

Rama, A., Putra, R. R., Huda, Y., & Lapisa, R. (2022). Pengembangan e-modul menggunakan aplikasi flip pdf professional pada mata kuliah analisis kurikulum pendidikan dasar. *JRTI (Jurnal Riset Tindakan Indonesia)*, *7*(1), 42–47. http://dx.doi.org/10.29210/30031473000

Rambe, K., & Ristiono, R. (2022). Pengembangan Modul elektronik (e-modul) berbasis smartphone tentang materi sistem ekskresi pada manusia untuk peserta didik kelas XI SMA. *Biodidaktika: Jurnal Biologi dan Pembelajarannya*, *17*(2). http://dx.doi.org/10.30870/biodidaktika.v17i2.16492

Sa'diyah, K. (2021). Pengembagan E-Modul Berbasis Digital flipbook untuk mempermudah pembelajaran jarak jauh di SMA. *Edukatif: Jurnal Ilmu Pendidikan*, *3*(4), 1298–1308. https://doi.org/10.31004/edukatif.v3i4.561

Sari, A. P., Mardiyah, A., Anggraini, V., & Muslim, A. P. (2023). Pengembangan e-modul pada materi barisan dan deret dengan menggunakan sigil software. *Jurnal Pembelajaran dan Matematika Sigma (JPMS)*, *9*(1), 1–9.

Sidiq, R. (2020). Pengembangan e-modul interaktif berbasis android pada mata kuliah strategi belajar mengajar. *Jurnal Pendidikan Sejarah*, *9*(1), 1–14. https://doi.org/10.21009/JPS.091.01

Sofya, R., & Adzkia, S. F. (2023). Pengembangan e-modul dengan aplikasi canva dan flipbook pada pembelajaran ekonomi. *Jurnal Ecogen*, *6*(1), 74–81. http://dx.doi.org/10.24036/jmpe.v6i1.14430

Surtini, S., Junedi, B., & Tabrani, M. B. (2023). Pengembangan modul elektronik kontekstual berbasis flipbooks terhadap pemahaman konsep matematis siswa kelas XI MA. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, *12*(1), 332–341. http://dx.doi.org/10.24127/ajpm.v12i1.6045

Susilawati, W. O. (2021). Pengembangan E-modul pembelajaran perkembangan sosial aud berbasis karakter menggunakan software flipbook maker. *Jurnal Inspiratif Pendidikan*, *10*(2), 1–18. https://doi.org/10.24252/ip.v10i2.23519

Taali, T., Mukhaiyar, R., & Islami, S. (2023). Pengembangan e-modul interaktif instalasi penerangan listrik di pendidikan vokasi. *Jurnal Pendidikan Teknik Elektro*, *4*(1), 110–116. https://doi.org/10.24036/jpte.v4i1.271

Triyono, S. (2021). *Dinamika penyusunan e-modul*. Penerbit Adab. https://books.google.co.id/books/about/Dinamika_Penyusunan_E_Modul.html?id=1dMeEAAAQBAJ&redir_esc=y

Utama, N. (2022). Meta-Analisis praktikalitas penggunaan e-modul oleh guru dan peserta didik dalam pembelajaran. *Jurnal Biologi dan Pembelajarannya (JB&P)*, *9*(1), 27–33. https://doi.org/10.29407/jbp.v9i1.17671

Wahyuni, Z. A., & Yerimadesi, Y. (2021). Praktikalitas e-modul kimia unsur berbasis guided discovery untuk siswa sekolah menengah atas. *Edukatif: Jurnal Ilmu Pendidikan*, *3*(3), 680–688. http://repository.unp.ac.id/id/eprint/32080

Widiana, F. H., & Rosy, B. (2021). Pengembangan e-modul berbasis flipbook maker pada mata pelajaran teknologi perkantoran. *Edukatif: Jurnal Ilmu Pendidikan*, *3*(6), 3728–3739. https://doi.org/10.31004/edukatif.v3i6.1265

Yanto, D. T. P. (2019). Praktikalitas media pembelajaran interaktif pada proses pembelajaran rangkaian listrik. *INVOTEK: Jurnal Inovasi Vokasional dan Teknologi*, *19*(1), 75–82. https://doi.org/10.24036/invotek.v19i1.409

Zahwa, F. A., & Syafi'i, I. (2022). Pemilihan pengembangan media pembelajaran berbasis teknologi informasi. *Equilibrium: Jurnal Penelitian Pendidikan dan Ekonomi*, *19*(01), 61–78. https://doi.org/10.25134/equi.v19i01.3963

Zaputra, R., Festiyed, F., Adha, Y., & Yerimadesi, Y. (2021). Meta-Analisis: validitas dan praktikalitas modul IPA berbasis saintifik. *Bio-Lectura: Jurnal Pendidikan Biologi*, *8*(1), 45–56. https://doi.org/10.31849/bl.v8i1.6039

Utilization of the Canva application on the Belajar.Id site as a learning media at SMK Bina Nusa Mandiri Jakarta

Indira Putri Fauhan* , Jumardi
Universitas Muhammadiyah Prof. Dr. Hamka, Indonesia.
* Corresponding Author. E-mail: putrifhn@gmail.com

ARTICLE INFO

ABSTRACT

This study aims to discover the use of the Canva Education Application as a learning medium accessed through web learning. id for teachers at SMK Bina Nusa Mandiri Jakarta. This research is a type of qualitative research with a literature study approach. Literature study qualitative research consists of 4 stages: making interview instruments, looking for reading material, recording, and analyzing research material obtained. The results of interviews conducted with teachers at SMK Bina Nusa Mandiri show that the Canva Education application is handy because it can help teachers create engaging learning media for students. The Canva Education application has various features teachers can use to create learning media, such as PPTs, learning videos, infographics, etc. The research results show that the Education Canva Application facilitated by the Ministry of Education and Culture allows teachers at Bina N`usa Mandiri Vocational School to create learning media using only the learn quickly. Id website and can already get the Canva Application for free. The meaning of using the Canva application on learning.id website for history teachers at Bina Nusa Mandiri Vocational School is to be an exciting learning medium because history lessons are famous for lessons that only focus on books. The Canva application learning media has various templates and can also be used to make history-learning videos look interesting. The Canva App can vary in history lessons.

INTRODUCTION

In this modern era, all activities are related to technological tools; in human life, technology is needed to facilitate its activities. One of the activities that require technology is the world of education. Education must utilize and use technological tools as a medium carried out during the learning process (Miftah, 2013). The benefit of this technology is that it can provide an attractive display so that students are interested in learning it. In modern times, students receive information provided by teachers and as messengers. This research is associated with history subjects because history subjects are known as boring subjects. At the time of history lessons, the teacher only reads material from books such as reading texts, which does not involve technological tools in the learning process. Teachers must use technological tools so that learning occurs conducive and that history

subjects do not seem boring. History is no longer boring but a subject that has an exciting appearance using technology. Teachers must be creative in carrying out the learning process.

In this 21st century, education can combine knowledge skills and use advanced information and communication technology. So that students can become young people who not only understand science but can collaborate between science and technology so that in the future, the younger generation can make good use of technology (Rahmawati & Atmojo, 2021). The Ministry of Education and Culture focuses on developing learning and training applied in the industrial era 4.0. That era requires each generation to have good quality and creativity in creating bright ideas (Raksa, 2020). The generation that lives during the development of sophisticated technology must have or innovate in making learning media, from how it is made to how to deliver information.

Media is a supporting tool used in the learning process to help run learning process activities between teachers and students. If there is no learning media, the learning process will not take place properly, so the media's role is vital in the learning process (Nurseto, 2012). Learning media is a tool that cannot be separated from learning activities. To be able to determine the achievement of a successful teaching and learning process is from learning media. Learning media is used in learning activities because it functions as a visual tool in the learning process and can provide learning motivation to students. Students are motivated to learn if they see the learning media used as attractive, increasing student understanding of the material given by the teacher (Jennah, 2009).

Teachers must design learning media well so that students understand the purpose of the material that the teacher has delivered during the learning process. Creating learning media must know the characteristics of students so that the learning media used can be carried out correctly (Miftah, 2013). Teachers must have innovation and creativity in making learning media using technology proliferating today. In this sophisticated era, many foam platforms provide various applications that can be used as tools for making engaging learning media (Idawati et al., 2022).

One application that is widely used is Canva. This Canva feature provides a variety of designs; some are free, and some are paid. The features provided are exciting and can be used to create learning materials. Canva can display text, video, animation, images, and attractive templates to create power points, posters, infographics, and percentage videos. The Ministry of Education and Culture has provided a particular Canva Application for teachers, free of charge. This Canva Education or *Canva for Education* application is accessed through a Belajar—ID account. The Ministry of Education and Culture provides this Canva foam platform to provide suitable facilities for making learning media so that teachers can pour their creativity into making learning media through the Canva Education Application (Rizanta & Arsanti, 2022).

The Canva Education Application with the Canva Application that other people usually use is very different because by using the Canva Education Application, all the features in the Canva Application can be accessed for free. In contrast, for the usual Canva Application, not all features are provided for free because some features are paid. Based on observations and interviews with SMK Bina Nusa Mandiri Jakarta teachers, not all teachers use the Canva Education Application because they still use the templates provided in the regular Canva Application.

An alternative solution to the problem is to use the Canva Pendidikan Application created by the Ministry of Education and Culture specifically for teachers. The Canva Pendidikan application has benefits as a tool for creating learning media that can be used because it provides a variety of exciting features and is free to use in making learning media. This learning media was developed with the hope that teachers will take advantage of programs from the Ministry of Education and Culture. The learning process runs well if teachers create learning media that attracts students' attention. Especially in history learning, because it is known that history learning is famous for boring learning; therefore, to change such a way of thinking, teachers are expected to be able to create learning media by utilizing the technology that has been provided by pouring their ideas and creativity by making learning media make the learning atmosphere fun.

This study aims to determine the use of the Canva Education Application in making learning media. It can make it easier for teachers to make learning media; teachers can make PPTs, learning videos, infographics, animations, graphics, images, etc. This media development is supported by

previous research relevant to research conducted by Idawati et al. (2022) from Universitas Pahlawan Taunku Tambusai entitled Utilization of Canva as a Science Learning Media at the Elementary Level in his research stated that the Canva application media as a learning medium can facilitate teachers in teaching and learning activities. The difference lies in the Canva Application described in . Research, explained that the Canva Application that other people usually use is not a special educational one, while researchers explain the use of the Canva Education Application accessed through the bell jar. Id site as a learning medium, and the Canva Education Application is all elements features can be accessed for free.

The results of this research and observation are to produce another alternative in the world of education in utilizing learning media so that teaching and learning activities run effectively. The Canva Pendidikan application made by the Ministry of Education and Culture is made specifically for teachers to make learning media so that teachers can hone their creativity. Based on a preliminary study conducted by researchers at SMK Bina Nusa Mandiri Jakarta, teachers need to use the Canva Pendidikan Application on the belajar.id site in making learning media. The Canva Education Application has a variety that can be used to create learning media so that teachers can use it so that learning can take place effectively and effectively. This research is expected to provide further insights into how the use of the Canva Application in an educational context can enhance the quality of teaching and contribute positively to the students' learning experience.

METHOD

The research method used in this study uses qualitative research with a type of qualitative research case study. Qualitative research using case studies is a case to be studied in depth to analyze what happens behind the phenomenon. Researchers conduct interviews and observations to get the information needed (Assyakurrohim et al., 2022). The data collection characteristics are carried out directly to sources who can provide information according to the needs of researchers. The intended research place is SMK Bina Nusa Mandiri Jakarta, the target of teachers at SMK Bina Nusa Mandiri Jakarta. This study's subjects were eight SMK Bina Nusa Mandiri Jakarta teachers.

Researchers use qualitative models of case studies because researchers make observations, direct interviews with the field, and documentation. The instrument used in this study is an interview instrument that contains questions that must be answered and observations. More detailed steps can be seen in Figure 1.
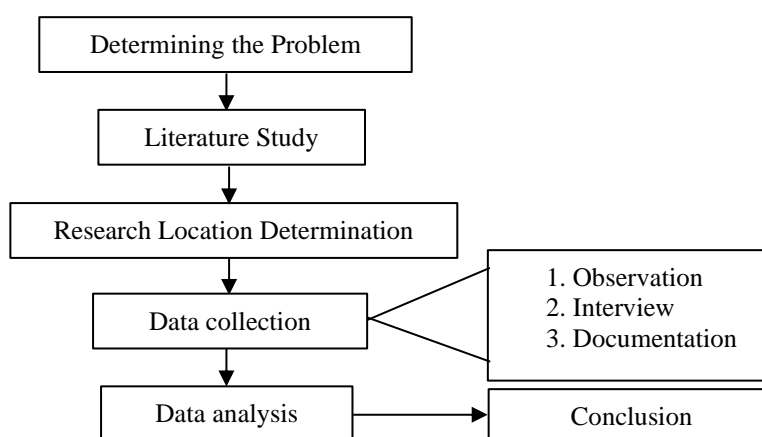

Figure 1. Process of Data Analysis

1. The interview instrument has 12 questions that must be answered, namely:
2. What is the teacher's name?
3. The origin of the teacher's school?
4. How long have you been teaching at SMK Bina Nusa Mandiri?
5. What is the teacher's parent number?
6. Do you know about the Canva application?

7. Do teachers use the Canva application to create learning media?
8. The Ministry of Education created a unique canvas for teachers, accessed through the bell jar. Id web. Do you know about this news and whether you already have an educational Canva account?
9. Have you used the educational Canva application, and how long have you been using the Canva application?
10. What are the benefits of using the Canva Pendidikan application?
11. What is the difference between creating learning media using the regular Canva application and Canva made by the Ministry of Education?
12. What are teachers' disadvantages and advantages when using regular Canva and educational Canva?
13. How do you respond to the teacher's canvas application?

Before being given to the interviewees, this interview instrument is consulted on whether it is feasible to use as a question. After being consulted, this instrument is feasible, given to the resource person for the interview process, then observation by looking at the school environment of SMK Bina Nusa Mandiri Jakarta and taking some documentation for data purposes. The technique of obtaining subjects is observation, interviews, and documentation conducted at SMK Bina Nusa Mandiri Jakarta. This observation activity will be carried out on May 2, 2023.

In this observation activity, researchers looked at the school environment. They asked the Curriculum Representative of SMK Bina Nusa Mandiri Jakarta about teachers who have used the Canva Application on the Belajar.id website. The interview was conducted on May 8 at SMK Bina Nusa Mandiri Jakarta. Researchers interviewed eight teachers using the Canva App on the Bajar-id website. So, in conducting interviews, tools are needed, such as questions that have been prepared and mobile phones to record sound and take documentation at the Bina Nusa Mandiri Vocational School and photos of teachers using the Canva Application using a digital camera.

The data analysis technique carried out by researchers is to collect data; at this stage, researchers look for data related to the topic to be discussed and prepare interview instruments that will be given to the resource persons, and then the results of interviews and observations are recorded. The observation protocol was carried out to observe teachers at SMK Bina Nusa Mandiri Jakarta who used the Canva Application on the Belajar.id website to create learning media. The goal is to obtain the necessary information and data. The aspects observed are the school environment and SMK Bina Nusa Mandiri teachers.

The interview protocol is part of the final project by researchers on "Utilization of the Canva Application on the Belajar.id Website as a Media for Learning History at SMK Bina Nusa Mandiri Jakarta (Case Study: SMK Bina Nusa Mandiri). I am interested in researching the Canva Application in Bajar.id website because this Canva Application can be used to create learning media because it has exciting features and templates and provides convenience for teachers. Researchers will interview eight teachers who will then answer 12 questions. Furthermore, researchers write down the essential points from observations and interviews after obtaining data. Then presenting the data, researchers will present the data obtained from the resource persons through interviews conducted with teachers at SMK Bina Nusa Mandiri. Finally, after all the data is presented, the researcher makes an overall conclusion from observations, interviews, and documentation.

The validity of data in qualitative research conducted by researchers to find out the research conducted by researchers in scientific research. The validity test of data includes *Credibility* (readability). This stage is a test of trust in research made by researchers so as not to doubt it as scientific research. *Tranferability* is external validity in qualitative research and, at this stage, accounts for the results of the populace and samples taken. *Dependability* is done by researchers, from determining the problem's topic to compiling overall conclusions; confirmability of this technique if it has been agreed upon and meets the standards.

RESULTS AND DISCUSSION

Result

Canva Application as a Learning Media

Researchers conducted observations and interviews at SMK Bina Nusa Mandiri Jakarta, located on Jl. Penganten Ali No.4, Rt.01 Rw.06, Ciracas, East Jakarta. Observations were made by observing teachers in making learning media. This observation was made to find out how teachers make learning media. Interviews were conducted by collecting information related to learning media teachers use during learning. The results of observations and interviews at SMK Bina Nusa Mandiri show that eight teachers have used the Canva Application on the bell jar. Id and some teachers still have not used the Canva Application on the Belajar.id website, as shown in Figure 2.

Figure 2. School of SMK Bina Nusa Mandiri Jakarta.

The use of learning media that does not innovate can cause boredom in students, so that learning does not run well. Teachers at SMK Bina Nusa Mandiri revealed that using innovative learning media will help students concentrate on learning and increase learning motivation. Student learning motivation is a process of achieving success; if students are motivated to follow learning well, success will be achieved (Resmini et al., 2021). Therefore, teachers are required to be able to take advantage of technological tools that are sophisticated today and can plan, implement, and evaluate every learning process carried out. Learning media has a vital role in carrying out a good learning process because the presence of learning media can achieve the success educators have designed. Learning media functions as a facilitator and can convey messages to students so that the information the teacher has provided can be conveyed well to students and the learning process takes place effectively and efficiently in a planned manner (Mahardika et al., 2021). Teachers can create excellent and comfortable learning media to convey the information provided well to students (Junaedi, 2021). Learning media also has a role as motivation for students and brings psychological influences to students. It should be considered when choosing suitable learning media for students. Learning can be carried out if teachers can prepare learning carefully. Moreover, what must be considered is the selection of learning media suitable for students; teachers must first know the characteristics of each student (Moto, 2019).

The rapid development of technology and information is very influential for the world of Education; the world of Education must constantly adjust to technological developments, especially in learning activities. Technology can provide convenience for everyone, from children to adults, who are all already using technology as a necessity. Teachers can use technology to create learning media. Learning objectives can be achieved by utilizing technology and learning activities run effectively. Technology in the world of education is not only a tool but also an introduction to information that can facilitate learning (Agustian & Salsabila, 2021). In this sophisticated era, many platforms can be used to create more exciting learning media so that students are interested in following the learning process. Teachers can use existing technology to express their ideas and creativity in making learning media.

One application that can help teachers make learning media is the Canva Application; Canva is used to create graphic designs. The Canva application provides a variety of attractive templates and can be used to create PPTs, posters, pamphlets, infographics, learning videos, and so on (Fauziah et al., 2022). By using the Canva App, teachers can express ideas and creativity and explore themselves to create learning media that have an attractive appearance (Sholeh et al., 2020).

Because this Canva application can only be accessed by teachers, it cannot be accessed by others. By utilizing the Canva Application, teachers can continue to create learning media so that students are interested in following the learning process well even though the COVID-19 pandemic is not an obstacle for teachers to carry out the learning process and make engaging learning media using the Canva Application (Irkhamni et al., 2021).

Discussion

Utilization of the Canva application as a historical learning medium

The results of interviews conducted by teachers at SMK Bina Nusa Mandiri Jakarta show in Figure 3 who have used the Canva Pendidikan Application said that many benefits are felt when using the Canva Pendidikan Application because this application for people who do not understand the world of design is beneficial because of its accessible features, the templates provided vary so that this provides convenience for teachers.

Figure 3. Interview with the teacher.

The Canva application that other people usually use does not have all the features that the template can use in contrast to the Canva Education Application, which is very useful and convenient because it can download templates and features for free. The Canva application can be used on laptops or smartphones; with this, the Canva Application users become easy because it can be used wherever and whenever they want (Poerna Wardhanie et al., 2021). The Canva Education application and educational needs can also be used for daily needs. Teachers can create PPTs, learning videos, animations, and others using the Canva Education App. Teachers make engaging learning media so students feel happy participating in learning activities. The purpose of the teacher making learning media is so that what is conveyed by the teacher can be conveyed well to students so that the material provided can be absorbed by students (Alfian et al., 2022). In this sophisticated era, the world of education must have good quality, be able to produce professional teachers and be able to utilize existing technology so that teachers not only teach and read books but teachers can also update about technology that is developing at this time so that it can be used during the learning process. Teachers can use technological developments to create learning media so that learning is not boring (Firmadani, 2020). Teachers who use the Canva Education Application have felt the benefits of creating learning media, as shown in Figure 4. It becomes easy to enter the material into the template already available in the Canva Application on the Belajar website. Using the Canva Application can

attract students' attention by presenting exciting teaching materials (Tri Wulandari & Adam Mudinillah, 2022).
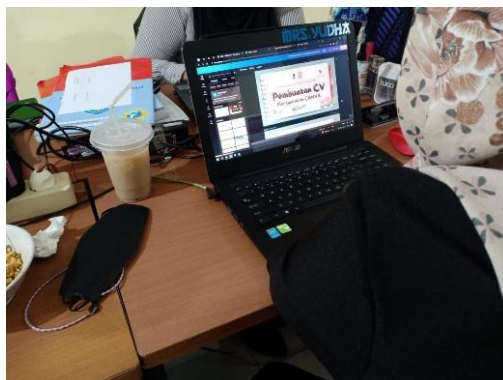
Figure 4. Teachers who use the Canva Education App.

According to Talizaro Tafonao (Tafonao, 2018), Learning media has a role in helping students understand the material given by the teacher so that what is explained by the teacher can be channeled properly. Learning media is also a tool used by teachers when teaching. With the existence of learning media, learning activities will run effectively. History learning is known for its boring lessons and only focuses on books. Different learning media will make innovative, exciting learning activities fun and practical. History learning, a science that studies historical events that occurred in the past, contains values that can be applied in everyday life, can shape social attitudes and dispositions, has high curiosity and critical thinking in students, and fosters a sense of nationalism (Herdin et al., 2020).

History lessons have an essential role because by studying history, the younger generation will know the histories that have happened and become the identity of a nation. Teachers at SMK Bina Nusa Mandiri also feel that using the Canva Application can make it easier for them to create learning media so that the display of the material given to students looks attractive. Using technology, history learning can be more varied, and communication occurs between teachers and students during the learning process so that students receive the information the teacher conveys well. To create learning media, teachers must know the characteristics of students so that the learning media used can be carried out correctly and achieve the desired goals.

This Canva Pendidikan application allows teachers to easily explore all the elements that have been provided and many menu options. Teachers are very receptive and enthusiastic about the program that the Ministry of Education and Culture has made because this is a good program that has many benefits for teachers in the modern era like now, who are always required to innovate, be creative in making learning media by utilizing the facilities that have been made.

CONCLUSION

The results of observations and interviews can conclude that teachers at SMK Bina Nusa Mandiri Jakarta have taken advantage of the Canva Pendidikan Application that the Ministry of Education and Culture has created. The Canva Pendidikan application is accessed through Belajar.id website can provide convenience and benefits for SMK Bina Nusa Mandiri Jakarta teachers in creating learning media. The Canva Pendidikan application allows teachers to explore and express their creative ideas in making learning media that will be given to students to motivate them to follow learning activities well. Because the role of learning media is vital in the learning process, the Canva Pendidikan application is not only used for the world of education but can be used for daily purposes. Researchers suggest teachers can better utilize technology that is already sophisticated in the learning process because by utilizing technology, teachers easily create learning media that are what is needed by students. It is not only focused on books but involves technology in the world of Education. So that students will be interested in following the learning process and the information conveyed by the teacher can be conveyed well to the students. For the next researcher, it can be used as research

material by utilizing existing foam platforms to make learning media; in this modern era, there are already many foam platforms such as Canva Applications, Quizizz, and Kahoot as tools to create learning media, so that students are interested in participating in learning activities.

REFERENCES

Agustian, N., & Salsabila, U. H. (2021). Peran teknologi pendidikan dalam pembelajaran. *Islamika*, *3*(1), 123–133. https://doi.org/10.36088/islamika.v3i1.1047

Alfian, A. N., Putra, M. Y., Arifin, R. W., Barokah, A., Safei, A., & Julian, N. (2022). Pemanfaatan media pembelajaran audio visual berbasis aplikasi canva. *Jurnal Pengabdian Kepada Masyarakat UBJ*, *5*(1), 75–84. https://doi.org/10.31599/jabdimas.v5i1.986

Assyakurrohim, D., Ikhram, D., Sirodj, R. A., & Afgani, M. W. (2022). Metode studi kasus dalam penelitian kualitatif. *Jurnal Pendidikan Sains dan Komputer*, *3*(01), 1–9. https://doi.org/10.47709/jpsk.v3i01.1951

Fauziah, Z., Shofiyuddin, A., & Rofiana, H. (2022). Implementasi media pembelajaran interaktif berbasis aplikasi canva pada mata pelajaran sejarah kebudayaan islam. *Madinah: Jurnal Studi Islam*, *9*(1), 7–18. https://doi.org/10.58518/madinah.v9i1.1356

Firmadani, F. (2020). Media Pembelajaran berbasis teknologi sebagai inovasi pembelajaran era revolusi industri 4.0. *Prosiding Konferensi Pendidikan Nasional*, *2*(1), 93–97. http://ejurnal.mercubuana-yogya.ac.id/index.php/Prosiding_KoPeN/article/view/1084/660

Herdin M., Dora. K. & Andi, A. (2020). Pembelajaran sejarah yang aktif, kreatif dan inovatif melalui pemanfaatan teknologi informasi dan komunikasi. *Bihari: Pendidikan Sejarah dan Ilmu Sejarah*, *3*(1), 29–36. http://publikasi.unsil.ac.id/index.php/bihari/article/view/1827

Idawati, Maisarah, Muhammad, Meliza, Arita, A., Amiruddin, & Salfiyadi, T. (2022). Pemanfaatan canva sebagai media pembelajaran sains jenjang SD. *Jurnal Pendidikan dan Konseling*, *4*(4), 745–751. https://dx.doi.org/10.31004/jpdk.v1i2.601

Irkhamni, I., Izza, A. Z., Salsabila, W. T., & Hidayah, N. (2021). Pemanfaatan canva sebagai e-modul pembelajaran matematika terhadap minat belajar peserta didik. *Konferensi Ilmiah Pendidikan Universitas Pekalongan 2021*, *ISBN: 978-602-6779-47-2*, 127–134. https://proceeding.unikal.ac.id/index.php/kip/issue/view/12

Jennah, R. (2009). *Media Pembelajaran*. Antasari Press, Banjarmasin. http://digilib.iain-palangkaraya.ac.id/2204/1/Rodhatul.pdf

Junaedi, S. (2021). Aplikasi canva sebagai media pembelajaran daring untuk meningkatkan kemampuan kreatifitas mahasiswa pada mata kuliah english for information communication and technology. *Bangun Rekaprima*, *7*(2), 80–89. http://dx.doi.org/10.32497/bangunrekaprima.v7i2,%20Oktober.3000

Mahardika, A. I., Wiranda, N., & Pramita, M. (2021). Pembuatan media pembelajaran menarik menggunakan canva untuk optimalisasi pembelajaran daring. *Jurnal Pendidikan dan Pengabdian Masyarakat*, *4*(3), 275–281. https://doi.org/10.29303/jppm.v4i3.2817

Miftah, M. (2013). Fungsi, dan peran media pembelajaran sebagai upaya peningkatan kemampuan belajar siswa. *Jurnal Kwangsan*, *1*(2), 95. https://doi.org/10.31800/jkwangsan-jtp.v1n2.p95--105

Moto, M. M. (2019). Pengaruh penggunaan media pembelajaran dalam dunia pendidikan. *Indonesian Journal of Primary Education*, *3*(1), 20–28. https://doi.org/10.17509/ijpe.v3i1.16060

Nurseto, T. (2012). Membuat media pembelajaran yang menarik. *Jurnal Ekonomi Dan Pendidikan*, *8*(1), 19–35. https://doi.org/10.21831/jep.v8i1.706

Poerna Wardhanie, A., Fahminnansih, F., & Rahmawati, E. (2021). Pemanfaatan aplikasi canva untuk desain grafis dan promosi produk pada sekolah islami berbasis kewirausahaan. *Society : Jurnal Pengabdian dan Pemberdayaan Masyarakat*, *2*(1), 51–58. https://doi.org/10.37802/society.v2i1.170

Rahmawati, F., & Atmojo, I. R. W. (2021). Analisis media digital video pembelajaran abad 21 menggunakan aplikasi canva pada pembelajaran IPA. *Jurnal Basicedu*, *5*(6), 6271–6279. https://doi.org/10.31004/basicedu.v5i6.1717

Raksa, M. (2020). Implementasi Workshop Pengembangan keprofesionalismean berkelanjutan pendidikan abad 21 untuk meningkatkan kinerja guru. *Jurnal Pedagogi dan Pembelajaran*, *3*(1), 9. https://doi.org/10.23887/jp2.v3i1.24355

Resmini, S., Satriani, I., & Rafi, M. (2021). Pelatihan penggunaan aplikasi canva sebagai media pembuatan bahan ajar dalam pembelajaran bahasa Inggris. *Abdimas Siliwangi*, *4*(2), 335–343. https://doi.org/10.22460/as.v4i2p%25p.6859

Rizanta, G. A., & Arsanti, M. (2022). Pemanfaatan aplikasi canva sebagai media pembelajaran masa kini. *Prosiding Seminar Nasional Daring*, *2*, 560–568. https://prosiding.ikippgribojonegoro.ac.id/index.php/SPBSI/article/view/1381

Sholeh, M., Rachmawati, R. Y., & Susanti, E. (2020). Penggunaan aplikasi canva untuk membuat konten gambar pada media sosial sebagai upaya mempromosikan hasil produk UKM. *SELAPARANG Jurnal Pengabdian Masyarakat Berkemajuan*, *4*(1), 430. https://doi.org/10.31764/jpmb.v4i1.2983

Tafonao, T. (2018). Peranan media pembelajaran dalam meningkatkan minat belajar mahasiswa. *Jurnal Komunikasi Pendidikan*, *2*(2), 103. https://doi.org/10.32585/jkp.v2i2.113

Tri Wulandari, & Adam Mudinillah. (2022). Efektivitas penggunaan aplikasi Canva sebagai media pembelajaran IPA MI/SD. *Jurnal Riset Madrasah Ibtidaiyah (JURMIA)*, *2*(1), 102–118. https://doi.org/10.32665/jurmia.v2i1.245

IPTPI
Ikatan Profesi Teknologi
Pendidikan Indonesia
APS-TPI

Validity of interactive learning media in computer basics course

Muh. Putra Pratama * (ID)**, Simon Ruruk, Perdy Karuru** (ID)
Universitas Kristen Indonesia Toraja, Indonesia.
* Corresponding Author. E-mail: mputrapratama@ukitoraja.ac.id

ARTICLE INFO

ABSTRACT

This study aims to determine the validity and practicality of interactive media in computer basics courses in the educational technology study program at Universitas Kristen Indonesia Toraja. This type of development research uses the ADDIE research model (Analysis, Design, Development, Implementation, and Evaluation). The results of the validity and practicality tests can be used as a reference for assessing the media that has been developed. This research has conducted a content validity test; the quality of interactive media based on the assessment by teaching material expert lecturers shows an average of 3.77 from a maximum average score of 4.00. Thus, interactive media shows criteria worth using. The results of the media validity test that the quality of interactive media based on the assessment by media expert lecturers shows an average of 3.58 from a maximum average score of 4.00; thus, the module indicates very feasible criteria. The interactive media practicality test results showed that the interactive media developed an average of 3.46 from an average score of 4.00. Thus, the module showed efficient criteria.

INTRODUCTION

Technology development is getting faster and faster, especially information and communication technology. This makes humans seem inseparable by distance, space, and time. With the development of increasingly advanced technology, humans can make various kinds of equipment as tools in multiple activities to support productivity. The existence of rapid technological growth today will continue to produce new patterns in learning and encourage rapid adaptation. In the learning process, the use and utilization of technology in the classroom have become a necessity and a demand in the global era (Rijal, 2021). This era is often called the digital era (Alami, 2020). Along with these developments, in this case, smartphones. Indonesia is one of the countries with the world's most significant active smartphone users. Educators can use the high number of smartphone users as a medium for delivering learning. Learning media is an intermediary that can convey messages or information.

They are learning to students from an educator. One of them, an essential element of education in the learning process that must follow the flow of technological developments, is

learning media (Salsabila & Aslam, 2022). In connection with that, teaching media is also a tool that explains part of the entire learning program that is difficult to explain verbally (Aroni, 2019). Technological advances to support education like this can make it easier for anyone, both students and educators, to increase knowledge without limits (Cecep et al., 2019; Chen & Tsai, 2021; Rorita et al., 2018). Educators and students can directly feel the positive things of optimizing smartphones in education: supporting educational development (H. et al., 2021; Sunismi, 2015). One of the efforts to increase the effectiveness of the learning process and delivery of lesson content is using learning media (Lestari et al., 2019). Several studies have generally focused on teaching models, methods, activities, and evaluations of specific teaching and learning subjects (Zheng & Xie, 2016).

Technology has been applied to daily life, especially in education. Now, technology is used to help their work and efforts to be more effective and efficient (Pratama et al., 2022). So, in this digital era, using technology is an additional competency that must be owned and mastered by an educator (Purnasari & Sadewo, 2021). Along with information and communication technology, learning media has also developed. One of the technology-based media is mobile learning. Mobile learning developed due to the development of communication technology, namely smartphones. Android is a smartphone operating system that is currently popular (Ardiansyah & Nana, 2020). Seeing the development of technology among students, especially in the relatively high use of smartphones, it is just that educators still need to fully utilize it in the learning process (H. et al., 2021). In the 21st century, learning media, commonly called digital media, is needed along with technological developments to support teaching and learning (Shoffa et al., 2021). Educators can use many Android-based software to make supporting media in the classroom learning process, including the SAC (Smart App Creator) software. Smart App Creator (SAC) is one of the software to create androiAndroidOS- bIOS-based cations without using programming code, and the output is HTML5, .exe, and .apk. The use of software in making learning media without programming code makes it easy for anyone to create applications quickly, readily ally for educators who want to make applications related to learning media.

The findings show that using technology as a learning medium is limited to using presentation media to deliver material. Computer basics is a course with a structure that must be described and the concrete form of computer elements. The media used by educators in providing learning materials are whiteboards, markers, printed modules, and PowerPoint. Ed, educators have used information and communication technology-based media, but the use of these media still needs to be improved because the PowerPoint used only contains material delivery in the form of images and text; there is no time, simulation, or evaluation. So, learning media is required to display text, photos, videos, animations, simulations, and assessments to improve student understanding. With the variation in the use of various media in the learning process, it is intended to carry out an effective and efficient learning process. Classroom learning time is also limited while the speed of student learning varies from one to another, the condition of the learning process. This can undoubtedly hinder the learning process, so supporting learning media is needed that can be used by students with different learning speeds (Fadli & Hakiki, 2020). Learning media can help the process of learning activities that aim to clarify the delivery of learning meaning so that learning objectives can be delivered more perfectly and well (Temitayo et al., 2013).

Educators must design media covering course concepts in theory, illustrations, and concrete examples. Learning media can also improve the quality of learning for educators to help deliver innovative, creative, comprehensive learning materials, attract students' enthusiasm, and create a pleasant learning situation. Educators must be able to start learning conditions to make students easily understand the material by utilizing technology that can produce learning media, especially for computer basics courses. It is necessary to encourage renewal in learning so that learning is easy to use, interactive, packaged more interestingly, and becomes something new for students by utilizing technology (Muttaqin et al., 2021). Therefore, there is a need for innovation in learning to increase students' interest in learning and motivation to learn. Many types of media can be used by educators in the teaching and learning process, but educators must be selective in choosing these types of media (Hasan, 2021). There is a need to develop interactive learning media based on Android applications to optimize popular smartphone features among students.

Interactive media is designed to provide feedback quickly as the media allows interaction with users so that users can choose what they want for the next step (Myori et al., 2019). Researchers chose Smart App Creator (SAC) software because creating learning media, especially interactive media, is more accessible. It can add animation and sound backgrounds to make media content more engaging. Android is an operating system for Linux-based mobile devices, including an operating system, middleware, and applications. Android provides an open platform for developers to create their applications. Android is the operating system that powers over one billion smartphones and tablets (Putra et al., 2016). So, android-based interactive media can overcome the problem of differences in students' level of understanding because students can choose the material they will learn. The ability of Android to display multimedia, such as images, photos, videos, sound, and text simultaneously, can be utilized to display learning material more concretely so that learning is not boring (Ahyar et al., 2014; Aina, 2013). Computer utilization is often used in interactive multimedia because it contains several media such as text, graphics, audio, animation, and video. It is equipped with user control tools as controllers to adjust elements according to user needs (Dewi, 2018). Interactive means mutual influence with a reciprocal relationship between the user and the program, with the user responding to the program request/display, then the program presents the desired information (Ananta & Waryanto, 2018).

Interaction by students through the buttons available in the program can provide a direct learning experience (Anggraini & Sartono, 2019). Interactive multimedia is a technological innovation that can be tailored to learning needs (Arham & Dwiningsih, 2016). Interactive education can make students more interested in learning from anywhere and anytime. Android-based interactive media, as an innovative media, has the potential to become a learning trend in today's digital era. Interactive multimedia like this can provide a pleasant learning atmosphere and foster student independence, making the learning process more meaningful than the lecture method (Monemi et al., 2017). Based on the phenomena described, the researcher is interested in researching Interactive Learning Media Development in Computer Basics courses. Validity testing and interactive media practice contribute to how feasible, effective, and efficient it is in helping students take computer basics subjects.

METHOD

This research is a type of development research. The accuracy of the selection of the development model makes the right product. One of the characteristics of the developed product is that it can be appropriately applied and provide benefits to its users. One of the media that considers the primary stages of media development design that is simple and easy to understand is the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) (Branch, 2010). The ADDIE model is the suitable model for media development in this study because the ADDIE model is most commonly used for media development (Cahyadi, 2019). The research procedure on the ADDIE model is as follows:

Analysis

The first stage is the Analysis stage. This stage is carried out using observation and interview methods.

Design

This stage is known as creating a product design (blueprint). This stage will produce the user interface of the product design. The researcher determines the media elements by collecting supporting materials such as images, animations, sounds, and videos. The collection can be done by searching the internet or making your own media if you master it.

Development

The stage of producing the design that has been made is realized in natural form. The products are arranged according to the invention made in the previous step. This means that this stage is the stage in making the product. The product design is designed with SAC (Smart App

Creator) software. Elements collected in the design stage are assembled into a complete product unit per the user interface created in the design stage.

Implementation

The fourth stage is implementation. This stage tests the product made in terms of product appearance or functionality.

Evaluation

Evaluation checks whether the developed product is successful and as expected based on existing needs. If there are things that need to be improved, they need to be identified and then refined. The goal is to produce a quality product.

The data collection techniques used in this research are questionnaires, documentation, and interviews. An interview, often called an interview or oral questionnaire, is a dialog conducted by an interviewer to collect information from sources (Arikunto, 2006). The documentation method in this research is used to complement data from interviews and observations. The documentation method is a data collection technique by studying data that has been documented. From the origin of the word, documentation, namely documents, means written items (Arikunto, 2006).

The subjects of this research were students of the educational technology study program in the first semester of the 2022/2023 academic year at the Indonesian Christian University of Toraja. The instrument consists of questionnaires for media experts, material/content experts, and users (lecturers and students). Questionnaires were given to media experts and material/content experts to determine the feasibility of interactive media. Questionnaires are also provided to users (students) to find out the user's response to the interactive media that has been developed (Riduwan, 2012). They are using scoring, which can be seen in Table 1.

Table 1. Validity Scoring

No.	Score	Criteria
1	4	Strongly Agree
2	3	Agree
3	2	Disagree
4	1	Strongly Disagree

The validator provides advice on the assessment given to developing interactive media based on the items in the validity test with score criteria, which can be seen in Table 1. Suppose many things still need to be corrected in developing printed and non-printed teaching materials. In that case, revising them to make them valid for the teaching materials developed is necessary.

Table 2. Criteria for assigning validity scores

No.	Average Score	Criteria	Category
1	$3.0 < M < 4.0$	Very Feasible	Very Practical
2	$2.0 < M < 3.0$	Worth	Practical
3	$1.0 < M < 2.0$	Less Feasible	Less Practical
4	$0.0 < M < 1.0$	Not Feasible	Not Practical

Validity testing by validators who are experts in their fields so that they can measure the level of feasibility of interactive media that has been created (Nurdin, 2007). User response data is obtained from a response questionnaire to the interactive media that has been developed which can be seen in Table 2. The analysis was conducted to determine the response to the Android-based interactive press. The results of user response observations were analyzed to determine the frequency of practicality (Azwar, 2012).

RESULTS AND DISCUSSION

Results

Based on several research models that have been mentioned, the ADDIE research model. Branch felt that it was more suitable for developing this interactive media product. Analysis of a Problem and Needs in Learning Based on the results of the literature study conducted by researchers, data related to learning problems in computer basics courses were obtained, including limited learning media, monotonous delivery of computer basics material, and student's involvement in the learning process that has not been maximized. The results of this study indicate that the computer basics course requires interactive media that can provide concrete evidence related to learning material.

Developing a learning product goes through systematic stages and several feasibility tests to produce valuable user outcomes. It is a very complex and complete model (Branch, 2010). The ADDIE model can be used for various forms of product development in learning activities, such as models, learning strategies, learning methods, media, and teaching materials (Mulyatiningsih, 2016). Interactive media is a media equipped with a controller the user can operate to choose what is desired for the following process (Daryanto et al., 2014). One of the stages in developing media is validating to determine the feasibility level of the media that has been created.

Content Validity

The validity test is carried out to determine the extent of the feasibility of the media that has been designed. After obtaining a feasibility assessment, the learning media is revised according to the validator's criticisms and suggestions. Material expert validators are experts in their fields; material expert validation is a validator who is a lecturer in the Educational Technology Study Program who has expertise in the area or material raised by researchers in the research conducted. The following are the results of material validation by material expert validators:

Table 3. Material Expert Validation Results

No.	Description	Score
1	Clarity of Purpose	4
2	Accuracy of Chapter Titles With Material Content in Each Chapter	4
3	Encourage Students to be actively Involved	4
4	Appropriateness of Learning Objectives with Material Exposure	4
5	Clarity of Material Description	4
6	Clarity of The Examples Provided	3
7	Appropriateness Between Images/Illustrations and Material	4
8	Clarity of Tasks and Exercises Provided	4
9	Congruence Between Tasks and Exercises and Material	4
10	Appropriateness of visual and Audio Impressions and Material	4
11	Suitability of end-of-chapter Tests with Learning Objectives	4
12	Language use in terms of use of Indonesian language methods	3
13	Simplicity of sentence structure	3
	Average	**3.77**

Based on the data in Table 3, it can be seen that the quality of interactive media based on the assessment by expert lecturers of teaching materials shows an average of 3.77 from a maximum average score of 4.00. Thus, interactive media shows very feasible criteria.

Media Validity

The next stage after designing interactive media is to conduct a validity test. The validity test is carried out to determine the extent of the feasibility of the press that has been created. Information regarding the suitability of learning animation media is applied to two main aspects: the material and the media aspects. After obtaining a feasibility assessment, the learning media is revised according to the validator's criticisms and suggestions. Media expert validators are experts

in their fields; material expert validation is a validator who is a lecturer in the Educational Technology Study Program who has expertise in the area of learning media by interactive media research raised by researchers in the study conducted. Opinions, criticism, suggestions, assessments, and comments from media and material experts will help improve and increase the quality of the learning media being developed. The following are the results of material validation by media expert validators.

Table 4. Media Expert Validation Results

No.	Aspect	Description	Score
1		The App is Easy to Operate	4
2	Physical	Ease of Access to Each Menu	3
3		Installation of Applications on Android Devices is Very Easy	4
	Total		**11**
	Average		**3.67**
4	Compatibility	The font used is Easy	4
5	Selection Font	Selection of Font Size	4
6	Type	Not Using Too Many Font Combinations	3
	Total		**11**
	Average		**3.67**
7		Proper Menu Placement	4
9	View	Proportional Front Layout (Text and Image Layout)	4
10		App Design Gives a Positive Impression	4
	Total		**12**
	Average		**4**
11	Linguistics	The Use of Language in The Application is Standardized	3
	Total		**3**
	Total Score		**14.34**
	Average		**3.58**

Based on the data in Table 4, it can be seen that the quality of interactive media based on the assessment by media expert lecturers shows an average of 3.58 from a maximum average score of 4.00. Thus, the module indicates very feasible criteria.

Practicality of Media

After analyzing the results obtained from the two validators, user trials were then carried out to obtain data on the assessment of the interactive media that had been developed. At this stage, students of the educational technology study program were involved. Based on Figure 1, it can be concluded that the user's response after using the interactive media and filling out the assessment questionnaire obtained an average score of 3.46, meaning that the user's answer is efficient. So, the user's response is very agreeable (VA) to using interactive media in learning.
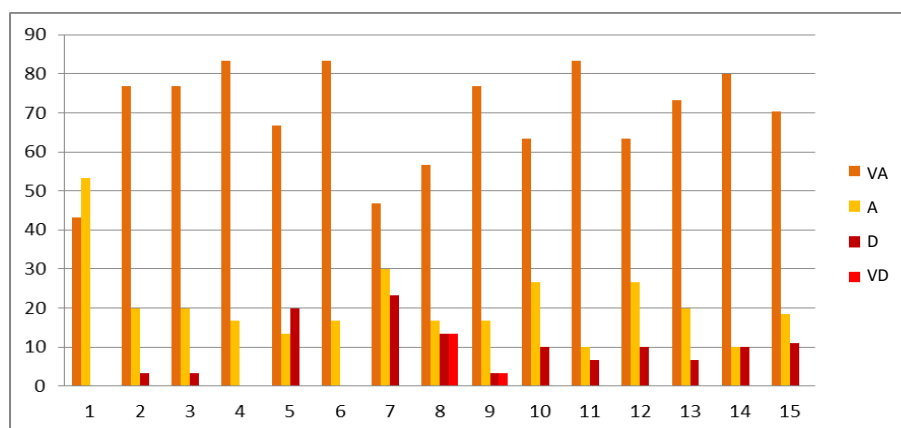

Figure 1. User Response Results

Discussion

This type of development research uses the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). This study only focused on testing the validity and practicality of the interactive media that had been developed. This research is development research with the results of interactive media, which is then carried out several tests to determine the level of feasibility and practicality of the interactive media that has been developed. This study's interactive media development uses Smart App Creator (SAC) software. This feasibility test and suitability of use are carried out to produce interactive media that users can later use according to their learning needs. The subjects of this research were students of the educational technology study program in semester 1 of the 2022/2023 academic year at the Indonesian Christian University of Toraja. The instrument consists of questionnaires for media experts, material/content experts, and users (lecturers and students). Questionnaires were given to media experts and material/content experts to determine the feasibility of interactive media. Questionnaires are also provided to users (students) to find out the user's response to the interactive media that has been developed.

The results of the feasibility test go through two stages, namely, the media feasibility test and the content/material feasibility test. The quality of interactive media based on the assessment by teaching material expert lecturers shows an average of 3.77 from a maximum average score of 4.00. Thus, interactive media shows very feasible criteria. The quality of interactive media based on the assessment by media expert lecturers shows an average of 3.58 from a maximum average score of 4.00; thus, the module indicates very feasible criteria. Based on the results of the practicality test of using interactive media, it can be concluded that the user's response after using interactive media and filling out the assessment questionnaire is 3.46, which means that the user's answer is in a convenient category. So, the user's response is very agreeable to using interactive media in learning. The results of the feasibility and practicality test of the interactive media that has been developed can be a reference to be continued to a broader stage and, in terms of development, can be a reference to grow both in terms of content/material or appearance.

CONCLUSION

Interactive media development uses the ADDIE research model (Analysis, Design, Development, Implementation, Evaluation). The ADDIE model is one of the most complex and complete models for developing interactive media. Interactive media development in this study uses Smart App Creator (SAC) software. This research is development research with the results of interactive media, which is then carried out several tests to determine the level of feasibility and practicality of interactive media that has been developed. The results of the validity test and Practicality can be used as a reference for assessing the press that has been created. This study has conducted a content validity test; the quality of interactive media based on the assessment by teaching material expert lecturers shows an average of 3.77 from a maximum average score of 4.00. Thus, interactive media shows criteria worth using. The results of the media validity test that the quality of interactive media based on the assessment by media expert lecturers shows an average of 3.58 of the maximum average score of 4.00; thus, interactive media shows criteria worth using. The results of the Validity Test of interactive media in computer basics courses regarding material/content and media are very relevant to be developed. Still, some minor revisions must be made for the sake of perfection of the media that has been created. The interactive media practicality test results show that interactive media development leads to 3.46 from an average score of 4.00. Thus, the module shows efficient criteria. The test results in this study can be a reference to be continued to a broader stage and can be developed in terms of content or appearance.

ACKNOWLEDGMENTS

REFERENCES

Ahyar, R., Lufri, & Ramadhan, S. (2014). Pengembangan multimedia pada materi struktur dan fungsi organ manusia untuk siswa kelas xi sekolah menengah atas. *Jurnal Kolaboratif*, *2*(1), 20–30. https://ejournal.unp.ac.id/index.php/kolaboratif/article/view/4957

Aina, M. (2013). Efektivitas pemanfaatan multimedia interaktif pembelajaran IPA biologi dalam meningkatkan motivasi belajar siswa pria dan wanita SMP 9 Kota Jambi. *Prosiding Semirata FMIPA Universitas Lampung*, *1*(1), 125–130. https://jurnal.fmipa.unila.ac.id/semirata/article/view/597

Alami, Y. (2020). Media pembelajaran daring pada masa covid-19. *Tarbiyatu Wa Ta'lim: Jurnal Pendidikan Agama Islam*, *2*(1), 49–56. https://ejournal.staisyamsululum.ac.id/index.php/jtt/article/view/71%0A

Ananta, A. R., & Waryanto, N. H. (2018). Pengembangan media pembelajaran berbasis multimedia interaktif dengan pendekatan kontekstual materi lingkaran kelas Viii SMP. *Jurnal Pedagogi Matematika - S1*, *7*(4), 1–9. https://doi.org/10.21831/jpm.v7i4.11180

Anggraini, M. S. A., & Sartono, E. K. E. (2019). Kelayakan pengembangan multimedia interaktif ramah anak untuk meningkatkan kemampuan pemahaman konsep dan karakter cinta tanah air siswa kelas iv SD. *Kwangsan*, *7*(1), 57–77. https://doi.org/10.31800/jtp.kw.v7n1.p57--77

Ardiansyah, A. A., & Nana. (2020). Peran Mobile learning sebagai inovasi dalam meningkatkan hasil belajar siswa pada pembelajaran di Sekolah. *Indonesian Journal Of Educational Research and Review*, *3*(1), 47–56. https://doi.org/10.23887/ijerr.v3i1.24245

Arham, U. U., & Dwiningsih, K. (2016). Keefektifan multimedia interaktif berbasis blended learning. *Kwangsan*, *4*(2), 111–118. https://doi.org/10.31800/jtp.kw.v4n2.p111--118

Arikunto, S. (2006). *Prosedur penelitian suatu pendekatan praktek*. PT. Rineka Cipta.

Aroni, H. (2019). Pengembangan Komik sebagai media pembelajaran untuk meningkatkan pengetahuan pesan gizi seimbang (PGS) pada siswa SMP di Kabupaten Malang. *Ilmu Informasi Kesehatan Indonesia (JIKI)*, *5*(1), 33–38. https://doi.org/10.31290/jiki.v5i1.929

Azwar. (2012). *Reliabilitas dan validitas*. Pustaka Pelajar

Branch, R. M. (2010). *Instructional design: The ADDIE approach*. Springer US. https://dx.doi.org/10.1007/978-0-387-09506-6

Cahyadi, R. A. H. (2019). Pengembangan Bahan Ajar Berbasis Addie Model. *Halaqa: Islamic Education Journal*, *3*(1), 35–42. https://doi.org/10.21070/halaqa.v3i1.2124

Cecep, C., Mutaqin, A., & Pamungkas, A. S. (2019). Pengembangan modul Quick Math berbasis Mobile learning sebagai penunjang pembelajaran matematika di SMA. *Prisma Sains: Jurnal Pengkajian Ilmu dan Pembelajaran Matematika*, *7*(2), 148–159. https://doi.org/10.33394/j-ps.v0i0.1761

Chen, C. H., & Tsai, C. C. (2021). In-service teachers' conceptions of Mobile technology-integrated instruction: Tendency towards student-centered learning. *Computers and Education*, *170*(1), 1–13. https://doi.org/10.1016/j.compedu.2021.104224

Daryanto, Dwicahyono, A., & Purwanto, D. (2014). *Pengembangan perangkat pembelajaran (silabus, RPP, PHB, bahan ajar)* (Cet. 1). Yogyakarta Gava Media.

Dewi, C. C. (2018). Pengembangan modul pembelajaran pada kompetensi dasar menerapkan komunikasi bisnis Kelas X Pemasaran di SMK Negeri 1 Jombang. *Jurnal Pendidikan Tata Niaga (JPTN)*, *6*(3), 159–164. https://doi.org/10.26740/jptn.v6n3.p%25p

Fadli, R., & Hakiki, M. (2020). Validitas media pembelajaran interaktif berbasis Android pada mata pelajaran komputer dan jaringan dasar di sekolah menengah kejuruan. *Jurnal Inovasi Pendidikan dan Teknologi Informasi (JIPTI)*, *1*(1), 9–15. https://doi.org/10.52060/pti.v1i1.302

H., N., Gani, H. A., Pratama, M. P., & Wijaya, H. (2021). Development of an Android-based computer based test (CBT) in middle school. *Journal of Education Technology*, *5*(2), 272–281. https://doi.org/10.23887/jet.v5i2.33527

Hasan, M. (2021). *Media pembelajaran*. Tahta Media Group.

Lestari, D., Musadad, A. A., & Wahyuni, S. (2019). Penggunaan Computer based test (CBT) sebagai sarana evaluasi dan pengaruhnya terhadap efektivitas penilaian pada mata pelajaran sejarah Di SMA Negeri 1 Boyolali tahun ajaran 2015/2016. *Candi: Jurnal Penelitian dan Pendidikan Sejarah*, *19*(1), 29–39. https://jurnal.uns.ac.id/candi/article/view/35584/23116

Monemi, R., Lufri, & Leilani, I. (2017). Pengembangan multimedia interaktif berbasis Power Point disertai Games kuis course Maza pada materi sistem ekresi untuk peserta didik kelas Viii SMP. *Journal Biosains*, *1*(2), 252–260. https://ejournal.unp.ac.id/students/index.php/bio/issue/download/355/56

Mulyatiningsih, E. (2016). *Pengembangan model pembelajaran* (pp. 1–8). https://staffnew.uny.ac.id/upload/131808329/pengabdian/7cpengembangan-model-pembelajaran.pdf

Muttaqin, H. P. S., Sariyasa, & Suarni, N. K. (2021). Pengembangan media pembelajaran interaktif berbasis Android pada mata pelajaran IPA untuk siswa kelas vi SD. *Jurnal Teknologi Pembelajaran Indonesia*, *11*(1), 1–15. https://doi.org/10.23887/jurnal_tp.v11i1.613

Myori, D. E., Hidayat, R., Eliza, F., Fadli, R., & Chaniago, K. (2019). Peningkatan kompetensi guru dalam penguasaan teknologi informasi dan komunikasi melalui pelatihan pengembangan media pembelajaran berbasis Android. *JTEV: Jurnal Teknik Elektro dan Vokasional*, *5*(2), 102–109. https://doi.org/10.24036/jtev.v5i2.106832

Nurdin. (2007). *Pengantar komunikasi massa*. PT. Raja Grafindo Persada.

Pratama, M. P., Al-gifari, M. K. G., Ervianti, Sofyan, & Pertiwi, A. (2022). Aplikasi notifikasi tagihan penggunaan air pelanggan PDAM Kota Makassar berbasis SMS gateway menggunakan metode FIFO (first in first out). *PATJou: Patria Artha Technological Journal*, *6*(2), 168–173. https://docplayer.info/231177677-Aplikasi-notifikasi-tagihan-penggunaan-air-pelanggan-pdam-kota-makassar-berbasis-sms-gateway-menggunakan-metode-fifo-first-in-first-out.html

Purnasari, P. D., & Sadewo, Y. D. (2021). Strategi pembelajaran pendidikan dasar di perbatasan pada era digital. *Jurnal Basicedu*, *5*(5), 3089–3100. https://doi.org/10.31004/basicedu.v5i5.1218

Putra, D. W., Nugroho, A. P., & Puspitarini, E. W. (2016). Game edukasi berbasis Android sebagai media pembelajaran untuk anak usia dini. *JIMP: Jurnal Informatika Merdeka Pasuruan*, *1*(1), 46–58. http://dx.doi.org/10.51213/jimp.v1i1.7

Riduwan. (2012). *Skala pengukuran variabel-variabel penelitian*. Alfabeta.

Rijal, A. S. (2021). Pengembangan media pembelajaran berbasis Web untuk meningkatkan kreativitas guru. *Jurnal Ideas: Pendidikan, Sosial dan Budaya*, *6*(1), 81–96. https://jurnal.ideaspublishing.co.id/index.php/ideas/article/view/238#google_vignette

Rorita, M., Ulfa, S., & Wedi, A. (2018). Pengembangan multimedia interaktif berbasis Mobile learning pokok bahasan perkembangan teori atom mata pelajaran kimia Kelas X SMA Panjura Malang. *JINOTEP (Jurnal Inovasi dan Teknologi Pembelajaran)*, *4*(2), 70–75. http://dx.doi.org/10.17977/um031v4i22018p076

Salsabila, F., & Aslam, A. (2022). Pengembangan media pembelajaran berbasis Web Google Sites pada pembelajaran IPA sekolah dasar. *Jurnal Basicedu*, *6*(4), 6088–6096. https://doi.org/10.31004/basicedu.v6i4.3155

Shoffa, S., Holisin, I., F, J., Palandi, Cacik, S., Indriyani, D., Supriyanto, E. E., Basith, A., & Giap, Y. C. (2021). *Perkembangan media pembelajaran di perguruan tinggi* (M. I. A. Fathoni (ed.)). CV. AGRAPANA MEDIA.

Sunismi. (2015). Developing guided discovery learning materials using mathematics Mobile learning application as an alternative media for the students calculus ii. *Cakrawala Pendidikan*, *34*(3), 334–346. https://doi.org/10.21831/cp.v3i3.7340

Temitayo, M., Adebis, A., & Alice, O. (2013). Computer-based test (CBT) system for university academic enterprise examination. *International Journal of Scientific & Technology Research*, *2*(8), 336–342. https://www.ijstr.org/

Zheng, Y., & Xie, Y. (2016). Metamodel for evaluating the performance of ICT in education. In *Springer Link* (Vol. 9757). Springer. https://doi.org/10.1007/978-3-319-41165-1_19

The implementation of graphic motion-based communication technology material learning videos for 3rd grade elementary students

Azmi Fauziah Hamidah [1] *, **Feri Hidayatullah Firmansyah [2]** (ID)**, Fahmi Candra Permana[2]** (ID)**, Ahamad Tarmizi Azizan [3]** (ID)

[1] Institut Teknologi Bandung, Indonesia.
[2] Universitas Pendidikan Indonesia, Indonesia.
[3] Universiti Malaysia Kelantan, Malaysia.
* Corresponding Author. E-mail: 27123012@mahasiswa.itb.ac.id

ARTICLE INFO

ABSTRACT

Motion graphic-based learning videos are a digital learning medium that clarifies material, increases student learning independence, can be accessed quickly, and is not limited in time. This study aimed to determine the implementation and feasibility of motion graphic-based learning videos on the material 'Communication Technology' for third-grade students of Luqmanul Hakim Integrated Islamic Elementary School, Bandung City. This research uses the Design and Development (D&D) model. This research went through five stages, namely (1) problem identification, (2) Determining goals and solutions, (3) Product design and development, (4) Trials, and (5) Communication. Data collection techniques used were interviews and questionnaires. Two experts are involved in this study: material and media experts. The sampling technique used is saturated sampling. Namely, the total number of grade 3 students is 24 students. The validation results by the material experts showed a percentage of 100% with the qualification "Very Good." In comparison, the results of the confirmation by the media experts showed a rate of 98%, and the effects of student assessments showed that the percentage showed 92.4% with the qualification "Very Good." Based on the results of validation by experts and reviews by teachers and students, it can be concluded that motion graphic-based learning videos are appropriate for use as learning media.

INTRODUCTION

The rapid advancement of technology has a profound impact on human life, particularly in the realms of daily living and education (Jamun, 2018; Lestari, 2018; Maghfiroh, 2020). Technology plays a pivotal role in providing innovations that facilitate the achievement of educational objectives through instructional media. The ongoing COVID-19 pandemic in Indonesia, which has persisted since the beginning of 2020, has transformed traditionally face-to-face Teaching and Learning Activities (KBM) into online learning experiences. Consequently, educators must possess the skills to develop instructional media that are easily comprehensible by students, whether in face-to-face or

online learning settings. The role of instructional media is of paramount importance in supporting the learning process as it serves as a tool to clarify the subject matter, as a means to present challenges that students can investigate during their learning journey, and as a learning resource for students to engage with independently (Mustika, 2015).

One of the efforts to enhance students' self-directed learning is by utilizing digital learning media (Alperi, 2019; Maurisa & Rahayu, 2021; Permansah & Murwaningsih, 2018). Educators can harness various types of digital learning media to support learning activities for optimal outcomes, including interactive learning applications, augmented reality, virtual reality, game-based learning, and digital animation videos such as motion graphics. Primary school (SD) students often need help comprehending more complex learning contexts through conventional methods (Efendi et al., 2020). Moreover, elementary school students tend to be drawn to dynamic and highly engaging content driven by their innate curiosity (Sukarini & Manuaba, 2021). Consequently, digital learning media suitable for delivering instructional content in primary schools are motion graphic-based instructional videos. According to Betancourt (2012), a film theory expert, motion graphics is one of the animation media types that combines audio elements to convey a sense of movement, particularly in multimedia outputs (Bermana, 2020; Kharishma et al., 2018; Pratama et al., 2022; Soenarjo, 2014).

The issues encountered in this research, based on interviews with third-grade thematic teachers at the Luqmanul Hakim Integrated Islamic Elementary School in Bandung City during the online learning process, revolve around challenges related to internet connectivity and cognitive disparities among students. These mental disparities manifest as reduced student concentration during the learning process, necessitating repetitive questioning and reminders to ensure comprehension of the material being presented. Furthermore, these cognitive disparities are also attributed to a lack of student motivation and limited access to engaging informational resources. These issues align with the challenges identified in the studies conducted by Annisa et al. (2023), Samosir & Boiliu (2021), and Sainab et al. (2022) concerning online learning, including (a) inadequate communication tools such as smartphones and computers, and internet packages, (b) teachers not fully proficient in IT and facing limitations in monitoring students, (c) students struggling to maintain total concentration during learning, and (d) parents' lack of supervision over their children's learning, coupled with limited collaboration between teachers and parents.

Thematic learning is one of the concepts introduced in the 2013 Curriculum. The implementation of the 2013 Curriculum for Elementary Schools/Madrasah Ibtidaiyah, as outlined in Minister of Education and Culture Regulation No. 67 of 2013, employs an integrated thematic approach from grades I to IV. Therefore, thematic learning should be taught with the utmost care to ensure that students comprehend the materials presented and establish a foundational knowledge base for their subsequent academic journey. To optimize the learning process and outcomes in thematic learning, the use of engaging instructional media such as motion graphic-based instructional videos is essential. Saputra and Wibawa (2020) in their literature review, found that motion graphic-based instructional videos have a positive impact on student learning outcomes. Rusdiansyah and Leonard (2021) conducted a similar study in the field of mathematics. Their research indicated that students exhibit increased interest when using motion graphic-based Android learning media during the learning process. This enhances student engagement and facilitates a better understanding of the presented material. Additionally, students can access and learn from this medium at their convenience, resulting in overall test scores averaging 95%, categorized as "Excellent," in the trial assessments.

Another study conducted by Efendi et al. (2020) at SDN Pandanrejo 1 found that students needed more motivation during learning and struggled to comprehend the presented course material. This had a detrimental impact on students' learning outcomes, which were below the Minimum Competence Criteria (KKM). After implementing motion graphic-based instructional videos, the researchers conducted post-tests with 43 students from SDN Pandanrejo 1, and the results showed an achievement rate of 81.39% against the KKM. It can be concluded that the media developed by the researchers effectively improved student learning outcomes and falls into the category of practical instructional tools for teaching. Additionally, a study conducted by Sitio et al. (2022) aimed at developing Bible story-based instructional media for Sunday school children using motion graphics. Their research revealed that media created with motion graphics effectively conveyed content, easily

understandable, visually, and auditorily engagingly, thus enhancing the efficiency of direct learning time.

Nugraha (2022) developed digital media based on motion graphics for the subject of Social Studies in primary schools. Their research indicated that students needed motion graphics-based videos to access digital media. Their developmental findings concluded that motion graphic-based digital media is indeed suitable and effective as a digital learning tool. Furthermore, Rafif et al.'s (2021) study discovered that the media used for graphic design subjects needed to be more suboptimal. The prevailing media consisted of PowerPoint presentations or modules featuring extensive text without supporting images or animations. This led to students needing to pay more attention during the teacher's explanations, potentially affecting their long-term retention of the material. Motion graphic-based instructional videos were developed to address this issue, which captured the students' attention and facilitated a better understanding of the subject concepts. The movement graphic-based instructional videos produced was deemed highly suitable, with a suitability rating of 94.67%, falling into the "excellent" category.

Therefore, to utilize motion graphic-based instructional videos, it is essential to undergo a media feasibility assessment process to ensure their effectiveness in the learning process. The objectives of this research are to outline the stages in designing motion graphic-based instructional videos for the subject of Communication Technology for third-grade students at the Luqmanul Hakim Integrated Islamic Elementary School in Bandung City and assess the suitability of these videos for instructional purposes. I hope this research can be a reference source for creating high-quality and effective motion graphic-based instructional videos. The emphasis on the Communication Technology subject is intended to provide students with knowledge about the evolution of communication technology throughout history. The theoretical contribution of this research lies in expanding the scholarly understanding of developing motion graphic-based instructional media. On a practical level, the findings of this research can serve as a guide and reference for developing information technology instructional media through motion graphic videos.

METHOD

This research employs the Design and Development (D&D) model, also known as the design and development model. It encompasses activities such as designing, developing, and evaluating the produced product with the intention of establishing empirical foundations for product development. The steps involved in this model include problem identification, setting objectives, product design and development, product testing, evaluation of test results, and communication of the test results. The research focuses on the 'Communication Technology' subject for third-grade students at the Luqmanul Hakim Integrated Islamic Elementary School in Bandung City during the second semester of the 2022 academic year, conducted in May 2022. The population in this study comprises all 24 third-grade students at the Luqmanul Hakim Integrated Islamic Elementary School in Bandung City. A saturated sampling technique was used, meaning the entire population was included as samples, resulting in a sample size of 24 students. The data collected for this research is primarily sourced from interviews and questionnaires administered to thematic teachers to obtain validation related to the created motion graphic video. In the questionnaire section, responses to questions are measured using a rating scale for analysis purposes. The scale used is a Likert scale with scores 1 (Strongly Disagree), 2 (Disagree), 3 (Slightly Disagree), 4 (Agree), and 5 (Strongly Agree).

For further analysis, researchers utilized the descriptive analysis method developed by Sugiyono (2019) which involves equation in Formula 1.

$$P = \frac{F}{N} \; x \; 100$$

(1)

Description:
P: Percentage
F: Respondent Frequency
N: Number of data/samples

The results of these calculations are subsequently employed as the foundation for assessing the feasibility of implementing motion graphic-based instructional videos. The decision-making criteria for feasibility see Table 1.

Table 1. Likert Scale Feasibility Percentage

Percentage	Description
81%-100%	Excellent
61%-80%	Good
41%-60%	Satisfactory
21%-40%	Poor
1%-20%	Very Poor

RESULTS AND DISCUSSION

Results

The research on the creation of motion graphic-based instructional videos aims to generate a product that can solve the challenges encountered during the learning process, particularly within the thematic subject of Communication Technology. Motion graphic-based instructional videos are designed for third-grade elementary school students, explicitly addressing the thematic content of Theme 7, "Technological Advancements," Subtheme 3, "Communication Technology." The present-day generation of children directly experiences the recent advancements in technology. It is essential to recognize that communication tools are not inherently easy to use in today's context; there is a process of technological development orchestrated by experts that has made them user-friendly. Therefore, it is crucial to deliver instructional content on the evolution of communication technology to students, enabling them to comprehend the historical development of technology from the past to the present.

Figure 1 is a visualization of the motion graphic-based instructional video on Communication Technology that has been tested with 24 students and two teachers in the third-grade class at Luqmanul Hakim Integrated Islamic Elementary School in Bandung City.

Figure 1. Visualization of motion graphic-based learning video

The results of the motion graphic-based instructional video trial on Communication Technology material, assessed by two expert teachers specializing in the subject matter and media, are presented in Table 3 and Table 4. The assessment results are as follows:

Table 3. Effects of Teacher Assessment of Content

Question Codes	1	2	3	4	5	6	Total
Teacher 1	5	5	5	5	5	5	30
Teacher 2	5	5	5	5	5	5	30
Total Score Obtained							**60**
Total Score Maximum							**60**

Source: Data processed 2022

Based on Table 3 above, we obtained the values F=60 and N=60. Thus, the percentage score using equation 1.

$$P = \frac{60}{60} \; x \; 100 = 100\%.$$

Based on these results, it can be concluded that the teacher's assessment of the content of the motion graphic-based instructional video is 100%. This score indicates that the content of the instructional video is "Excellent." Next, the media quality within the instructional video was evaluated. The results of this assessment are presented in Table 4.

Table 4. Results of Teacher Assessment of Media Quality

Question Codes	1	2	3	4	5	6	7	8	9	Total
Teacher 1	5	5	5	5	5	4	5	4	5	43
Teacher 2	5	5	5	5	5	5	5	5	5	45
Total Score Obtained										**88**
Total Score Maximum										**90**

Source: Data processed 2022

Based on Table 4 above, we obtained the values F=88 and N=90. Thus, the percentage score using equation 1 is as follows:

$$P = \frac{88}{90} \; x \; 100 = 98\%$$

Based on these results, it can be concluded that the teacher's assessment of the media quality in the motion graphic-based instructional video is 98%. This score indicates that the media quality in the instructional video is "Excellent." After validation by subject matter and media experts, the next step was to assess the students as the subjects of the motion graphic-based instructional video implementation. This assessment is presented in Table 5 and Table 6.

Table 5. Student Assessment Results Based on Score

Question Codes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
Students	110	117	110	116	105	115	113	105	109	112	114	105	116	107	110	1664
Total Score Obtained																**1664**
Total Score Maximum																**1800**

Source: Data processed 2022

Based on Table 5 above, we obtained the values F=1664 and N=1800. Thus, the percentage is as follows:

$$P = \frac{1664}{1800} \; x \; 100 = 92.4\% \, .t$$

Table 6. Student Assessment Results Based on Percentage

Question Codes	%	Question Codes	%	Question Codes	%	Question Codes	%
1	91.6	5	87.5	9	90.8	13	96.6
2	97.5	6	95.8	10	93.3	14	89.2
3	91.6	7	94.1	11	95	15	91.6
4	96.6	8	87.5	12	87.5	**Average**	**92.4**

The results presented in Table 6 are the outcomes of calculations for each of the 15 questions using equation 1. Therefore, the average score is needed to draw conclusions from this assessment. Based on the data in Table 6, the total percentage is 1.386.2%, and the total number of questions is 15. Consequently, the average score is calculated as follows:

$$Average = \frac{1.386.2\%}{15} = 92.4\%$$

Based on these results, it can be concluded that the student assessment of the motion graphic-based instructional video is 92.4%. This score indicates that the media quality in the instructional video is "Excellent."

Discussion

Creating motion graphic-based instructional videos for the thematic subject in the third-grade class at Luqmanul Hakim Integrated Islamic Elementary School in Bandung has proven to be highly beneficial in learning. This assertion is substantiated by the research findings, which indicate that both subject matter experts and media experts assessed the content of the instructional video at 100%, and the evaluation of media quality scored 98%. These scores collectively signify that the quality of the video presented is "Excellent," according to expert assessments. Furthermore, after testing the video with students, the implementation assessment yielded a score of 92.4%, categorizing it as "Excellent." The examinations conducted by teachers in the subject matter and media fields and by students collectively indicate that the motion graphic-based instructional video implemented in the third-grade class at Luqmanul Hakim Integrated Islamic Elementary School in Bandung is suitable for further development and implementation.

The success of the learning process using motion graphic-based instructional media is more comprehensive than this research. The findings of this study align with the research conducted by Rusdiansyah and Leonard (2021) in mathematics. Their study showed that using motion graphic-based instructional media increased students' interest in learning, with a trial implementation scoring 95% and falling under the "Excellent" category. Furthermore, research conducted by Rafif et al. (2021) in graphic design found that using motion graphic-based instructional media made students more interested and enhanced their understanding of the subject's concepts. The movement graphic-based instructional video they developed received a feasibility rating of 94.67%, categorizing it as "Excellent." Similar research conducted by Nugraha (2022) on social studies material in elementary schools found that digital media based on motion graphics is suitable and effective as a digital learning media. Additionally, research conducted by Sari (2021) demonstrated that the application of motion graphic animation in introducing Garuda Pancasila improved students' learning outcomes.

Motion graphic-based instructional media implementation extends beyond elementary schools and is also carried out at the higher education and secondary education levels. Sutrisman (2022) examined the application of motion graphics as Augmented Reality learning media. The study's findings revealed that the animated motion graphic videos provided easily comprehensible information, making them suitable for instructional purposes. Research conducted by Nugrohadi & Susilana (2018) found that implementing motion-visual instructional media effectively improved the cognitive learning outcomes of junior high school students in the subject of Social Studies. Additionally, Tertiasusman and Setyawan (2022) proved that using motion graphics in videos is effective.

CONCLUSION

The assessments conducted by subject matter experts, media experts, and students collectively indicate that the motion graphic-based instructional video implemented in the third-grade class at Luqmanul Hakim Integrated Islamic Elementary School in Bandung is suitable for further development and implementation. This conclusion is supported by the findings of this research, which reveal that the expert's assessment of the content of the instructional video is 100%, and the assessment of media quality is 98%. Both of these scores indicate that the quality of the presented video is "Excellent," according to expert evaluations. Furthermore, after being tested with students, the implementation assessment yielded a score of 92.4%, falling into the "Excellent" category. The results of this research have implications for expanding scholarly insights into the development of motion graphic-based instructional media. On a practical level, the findings can serve as a reference and guide for developing information technology instructional media through motion graphic videos in elementary schools.

REFERENCE

Alperi, M. (2019). Peran bahan ajar digital sigil dalam mempersiapkan kemandirian belajar peserta didik. *Jurnal Teknodik*, 99-110. https://doi.org/10.32550/teknodik.v0i1.479

Annisa, A., Radhini, N., Putra, S. D., Tiskhania, Z. A., & Fu'adin, A. (2023). Pengaruh pembelajaran dalam jaringan terhadap minat dan pemahaman peserta didik dalam pelajaran matematika. inspirasi dunia: *Jurnal Riset Pendidikan dan Bahasa,* 2(1), 98-110. https://doi.org/10.58192/insdun.v2i1.419

Bermana, A. L. (2020). Perancangan media promosi pariwisata kota bukittinggi. *Artchive: Indonesia Journal of Visual Art and Design*, *1*(1). https://doi.org/10.53666/artchive.v1i1.1558

Betancourt, M. (2012). *The origin of motion graphics*. Www.Cinegraphic.Net. https://www.cinegraphic.net/article.php/20130306203217744

Efendi, Y., Adi, E., & Sulthoni, S. (2020). Pengembangan media video animasi motion graphics pada mata pelajaran IPA di SDN Pandanrejo 1 Kabupaten Malang. *JINOTEP (Jurnal Inovasi dan Teknologi Pembelajaran): Kajian dan Riset dalam Teknologi Pembelajaran*, *6*(2). https://doi.org/10.17977/um031v6i22020p097

Jamun, Y. M. (2018). Dampak Teknologi Terhadap Pendidikan. *Jurnal Pendidikan dan Kebudayaan Missio*, *10*(1), 48-52. https://doi.org/10.36928/jpkm.v10i1.54

Kharishma, V., Firnandi, R., Iqbal, M., & Krishnasari, E. D. (2018). Perancangan motion graphic untuk iklan layanan masyarakat berjudul go green dengan rumah ekologis. S*emnasteknomedia Online*, 6(1), 2-1. https://ojs.amikom.ac.id/index.php/semnasteknomedia/article/view/1952

Lestari, S. (2018). Dampak teknologi terhadap pendidikan. Jurnal Pendidikan dan Kebudayaan Missio. *Jurnal Pendidikan dan Kebudayaan Missio*, *10(1)*(1). https://doi.org/10.36928/jpkm.v10i1.54

Maghfiroh, W. U. (2020). Dampak Teknologi Informasi (IT) terhadap dunia pendidikan. *Prosiding Pascasarjana IAIN Kediri*, 3, 241-254. https://prosiding.iainkediri.ac.id/index.php/pascasarjana/article/view/56

Maurisa, Z. A., & Rahayu, P. (2021). Meningkatkan Kemandirian Dan Hasil Belajar Siswa Melalui Pengembangan Mobile Learning Berbasis Android Berbantuan Ispring Suite 9. *Jurnal Ekonomi, Bisnis dan Pendidikan*, *1*(6), 546–558. https://doi.org/10.17977/um066v1i62021p546-558

Mustika, Z. (2015). Urgenitas media dalam mendukung proses pembelajaran yang kondusif. *CIRCUIT: Jurnal Ilmiah Pendidikan Teknik Elektro*, *1*(1). https://doi.org/10.22373/crc.v1i1.311

Nugraha, D. (2022). Pengembangan Media Digital Berbasis Motion Graphic pada Pendalaman Materi IPS Sekolah Dasar. *Jurnal Basicedu*, *6*(3), 3649–3656. https://doi.org/10.31004/basicedu.v6i3.2642

Nugrohadi, F., & Susilana, R. (2018). Efektivitas penggunaan media motion graphic pada pembelajaran saintifik untuk meningkatkan hasil belajar domain kognitif. *Educational Technologia*, *2*(1), 45-53. https://ejournal.upi.edu/index.php/edutechnologia/article/view/19659

Permansah, S., & Murwaningsih, T. (2018). Media pembelajaran digital: kajian literatur tentang dampak penggunaan media pembelajaran digital di SMK. *Prosiding Seminar Nasional Pendidikan Administrasi Perkantoran*, *3*(2). https://jurnal.uns.ac.id/snpap/article/view/27906

Pratama, A. G., Yusuf, R., & Sutomo, B. (2022). Penerapan motion flat design pada object video promosi case studi stmik dharma wacana. *Journal Computer Science and Information Systems : J-Cosys*, *2*(1). https://doi.org/10.53514/jc.v1i1.49

Rafif, G. N., Ajie, H., & Sastrawijaya, Y. (2021). Pengembangan video pembelajaran berbasis motion graphic pada mata pelajaran ddg untuk peserta didik di smk program keahlian multimedia. *PINTER : Jurnal Pendidikan Teknik Informatika dan Komputer*, *5*(2), 37–41. https://doi.org/10.21009/pinter.5.2.6

Rusdiansyah, S., & Leonard, L. (2021). Pengembangan media pembelajaran motion graphic matematika berbasis android pada siswa kelas V SD semester 1. *TERAMPIL: Jurnal Pendidikan dan Pembelajaran Dasar*, *7*(2), 135–143. https://doi.org/10.24042/terampil.v7i2.6996

Sainab, S., RH, N. I., & Firdaus, F. (2022). Kendala dan Solusi Pembelajaran Daring Selama Masa Pandemi Covid-19 SMA Negeri 3 Polewali. *J-HEST Journal of Health Education Economics Science and Technology*, *5*(1). https://doi.org/10.36339/jhest.v5i1.78

Samosir, C. M., & Boiliu, F. M. (2021). Pembelajaran pendidikan agama kristen berbasis daring di masa pandemi covid 19. *Jurnal Basicedu*, *5*(4). https://doi.org/10.31004/basicedu.v5i4.1257

Saputra, R. D., & Wibawa, S. C. (2020). Studi literatur pengembangan motion graphic video sebagai tren media pembelajaran untuk meningkatkan hasil belajar. *IT-Edu : Jurnal Information Technology and Education*, *5*(01), 371–379. https://ejournal.unesa.ac.id/index.php/it-edu/article/view/37568

Sari, N. W. (2021). Pengembangan animasi motion graphic materi mengenal garuda pancasila untuk kelas 3 SD Negeri 1 Kadipiro. *E-Jurnal Skripsi Program Studi Teknologi Pendidikan*, 10(9), 929-941. https://journal.student.uny.ac.id/index.php/fiptp/article/view/17641

Sitio, S. O., Sutrisman, A., Program,), Teknologi, S., Digital, I. M., Negeri, P., Jalan, S., Negara, S., Satu, B., & Selatan, S. (2022). Penerapan media pembelajaran cerita alkitab untuk anak sekolah minggu berbasis video motion graphic. In *Jurnal Laporan Akhir Teknik Komputer* (Vol. 2, Issue 1).

Soenarjo, H. (2014). Perancangan model 3d holographic reflection dan penerapannya pada karya visual motion graphic 3d holographic. *Jurnal Desain*, *02*(02). http://dx.doi.org/10.30998/jurnaldesain.v2i02.573

Sugiyono. (2019). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Alfabeta. https://opac.perpusnas.go.id/DetailOpac.aspx?id=1543971

Sukarini, K., & Manuaba, I. B. S. (2021). Pengembangan video animasi pembelajaran daring pada mata pelajaran IPA Kelas VI Sekolah Dasar. *Jurnal Edutech Undiksha*, *9*(1). https://doi.org/10.23887/jeu.v9i1.32347

Sutrisman, A. (2022). Efektivitas Penggunaan motion graphic sebagai media pembelajaran augmented reality pada program studi teknologi informatika multimedia digital politeknik negeri sriwijaya. *JUPITER (Jurnal Penelitian Ilmu dan Teknik Komputer)*, *14*(2). https://doi.org/10.5281./5880/5.jupiter.2022.10

Tertiasusman, A., & Setyawan, T. (2022). Analisis efektivitas video "good health and well-being-nory" berbasis motion graphic menggunakan epic model. *Journal Of Applied Multimedia And Networking*, *6*(1). https://doi.org/10.30871/jamn.v6i1.4069

Development of Android application-based digital literacy media to improve the reading ability of ADHD students

Abdul Khair[1]* ID**, Murtadlo Pahrurrozi[1], Endang Purbaningrum[1], Ahmad Yudi Saputra[2]**
[1] Universitas Negeri Surabaya, Indonesia
[2] Universitas Pendidikan Sultan Idris, Malaysia
* Corresponding Author. E-mail: abdul.21010@mhs.unesa.ac.id

ABSTRACT

This study aims to help kids with Attention Hyperactivity disorder (ADHD) in inclusive classrooms become better readers. The ADDIE model, which stands for Analysis, Design, Development, Implementation, and Evaluation, is used in this study's R&D (Research and Development) research. The study was conducted between 11 February and 12 April 2023. Eight kids with ADHD from 4 primary school classes at UNESA 2 Labschool participated in this study. Of these, two were in class 3, two were in fourth grade, two were in fifth grade, and two were in sixth grade. Ways for gathering data via a questionnaire. It is claimed that the outcomes of enhancing students' reading abilities with digital literacy media built on Android applications are reliable, applicable, and efficient. This study used a questionnaire as the data collection tool to assess its validity, usefulness, and efficacy. The Aiken's V validation result for digital literacy media was 0.89, deemed legitimate and highly acceptable for usage by material specialists. Experts in the media estimate Aiken's V average to be 0.93. The average percentage result for Android application-based digital literacy media is 89%, making it extremely practical. 91% of the time, it works. Media promoting digital literacy is therefore deemed effective. It is legitimate, practical, and efficient to use Android applications-based digital literacy media to help ADHD pupils with their reading abilities in inclusive schools.

INTRODUCTION

A nation can face the problems of the times during the Industrial Revolution 4.0 and society in the 5.0 era; education is a fundamental need that all people in the world own. This condition requires a learning process that is adaptive to the current situation, including learning related to 21st-century education or learning that combines technological abilities, scientific abilities, and literacy skills. Advances in technology and information positively impact the progress of digital information (Kurnianingsih, Rosini, et al., 2017). Education is the main factor determining the success of the demographic bonus, which is one of the reasons why Indonesia is currently

transitioning to a new phase of the demographic bonus. This is because education is the main factor determining success in dealing with demographic bonuses (Parwodiwiyono & Witono, 2022). To answer the challenges of the times in the world of education in the current era of globalization, a basic need that must be mastered and developed is the ability to master digital technology.

Digital technology is continuously experiencing growth until it has penetrated family life at this time without being stopped (Fatmawati & Sholikin, 2019). The growth of digital technology as a support system, knowledge source, and communication channel has changed how individuals think about learning, gathering, and hiding information. Human resources (HR) and the growth of a nation can be increased through education (Hidayat & Syafe'i, 2018). The sophistication of education and technological advances present a big challenge for educators to continue to play an essential role in educating the country's young generation. The growth of information and communication technology (ICT) has sparked innovation in many industries, including education, which is marked by the emergence of electronic learning (E-learning). A new idea in education, electronic learning (often known as "E-learning") combines knowledge acquisition with rapidly evolving information and communication technologies. Based on survey results, information technology has a positive impact on child development and is helpful in learning activities (Rakimahwati & Roza, 2020). Digital learning is essential and must be mastered because digital-based information narratives are currently numerous and abundant due to advances in information technology and the internet (Kurnianingsih et al., 2017).

Learning using digital media continues to develop and advance, and students and teachers must continue improving their understanding of the subject matter to make it more inventive and collaborative (Indarta et al., 2022). Unique learning materials for students are packaged in software or applications and the Android operating system. This program is made by integrating and combining various elements, such as images, colors, audio, and animation, into content that is packaged in the form of reading or literacy learning according to the characteristics of students to arouse their interest in doing so. The existence of this innovation can contribute to students exploring knowledge and accessing information in the form of digital literacy. The benefits of digital literacy are felt not only by regular students but also by students with learning difficulties or children with special needs (ABK), which is very clear in obtaining information because reading is one of the essential components of learning (Akbar, 2017). Another benefit of literacy skills for students is that when they enter college, they can process information and effectively use library facilities on their campus (Kurnianingsih et al., 2017).

Children with special needs (ABK) often behave maladaptively, hurting them and their surroundings (Rapisa & Kusumastuti, 2022). Attention deficit hyperactivity disorder (ADHD) is a term used to describe students who exhibit an attention deficit condition and high impulsivity (excessive behavior). Hyperactive behavior states individual behavior that shows an attitude of being unable to be silent, not paying attention, and being impulsive (Akbar, 2017). Initially, ADHD was known as minimal brain damage (minimum brain dysfunction) or hyperkinesis (Purwandari, 2006). Generally, ordinary children can control their attitudes and social behavior when interacting with other people, while children with ADHD tend to be restless and very active (Wibowo, 2020). Children with ADHD are easier to identify when the sufferer has entered elementary school age, starting around 6 (Ng, N., Bangsa, P. G., & Christianna, A.., 2016). School-aged children with ADHD who have reading difficulties should receive reading interventions with evidence of support and interventions that address the symptoms and challenges associated with ADHD (Adhd et al., 2015).

Someone with ADHD shows brain dysfunction when they struggle to regulate their impulses, restrain their behavior, pay attention for a long time, or are easily distracted (Mariyah, et al., 2017). ADHD children are among children with special needs who need special services to meet their needs. ADHD children need it for formal education (Sari, 2022). Learning methods in the form of digital literacy media can be implemented by educators who can accommodate hyperactive children with special needs, especially in beginning reading material (Susanto & Nugraheni, 2020). Hyperactive children will very likely show developmental delays and delays, as well as the ability to learn how to focus attention, take care of themselves, and get along with their

friends (Akbar, 2017). Students with this disease will struggle academically, socially, and especially with reading and literacy skills. Every student, even with ADHD, needs strong reading skills to overcome difficulties (Putra, 2018). Delays in social interaction in children with ADHD make children rarely communicate and interact with their peers (Sari & Sukerti, 2020).

In the current era of globalization, Indonesian education is experiencing a literacy crisis; the literacy crisis that has occurred over the past three years has caused the condition of education in Indonesia to experience or decrease the ability to understand reading or literacy, according to data released from the results of the International Students Assessment Program study. (PISA) 2019, which was released on 03 December 2019 in France, and the latest PISA score will be released in 2023, which should have been released in 2022, was delayed because, at that time, the Covid-19 pandemic hit the whole world, Indonesia's position was shallow in literacy or literacy. As seen from the results of the 2018 PISA observations, Indonesian students are ranked 74th out of 79 countries with a total score of 371. These results show that literacy skills have not yet increased, and it is necessary to hold breakthroughs to overcome these problems, especially regarding literacy. In the Progress In International Literacy Study (PIRLS) 2019 ranking, Indonesia is at level 41 out of 45 PIRLS participants with a score of 405. PIRLS 2019 data collection, especially in the field of reading skills, shows that the competency level of students in Indonesia is relatively low. Reading ability is a multifaceted process that combines mastery of recognition and understanding of language (Gray & Climie, 2016). Language skills are needed because, through language, children can fulfill their needs by interacting with their environment, acquiring knowledge, and so on (Rakimahwati & Roza, 2020). The PISA and PIRLS 2019 results above, especially regarding reading or literacy skills, show the low ability of Indonesian students.

The existence of this android application is a medium to help students or children read and understand texts better (Amarulloh et al., 2019). Claims that by adopting digital learning, students gain knowledge about various current technological advances and information about emerging advances. Students will easily understand and absorb this application because it is made with different color displays, is equipped with illustrations that attract students' interest in reading, and is equipped with sound because the simplest way to read is to look at pictures (Widyastuti, 2017). ADHD children have a tendency to get bored quickly but can focus on something that interests them; it is necessary to design an interactive visual communication media strategy so that it can attract their interest in interacting (Ng et al., 2016). In general, children with ADHD have relatively high motor activity compared to children of their age, find it challenging to follow sequential instructions, and forget easily (Roshinah et al., 2014). Children with ADHD may exhibit centrality deficits when listening to glances due to the auditory nature of receiving fleeting information (Manuscript, 2014).

In this study, the researcher refers to previous studies related to the research being carried out, such as research conducted by children. Initial research was conducted by Amarulloh et al. (2020). Based on the findings of this study, it can be concluded that the use of an Android-based media application called Indonesian Digital Literacy (LDI) impacts the abilities and learning outcomes of students with ADHD. This is indicated by the increase in the pretest value of the experimental group after the post-test, which is greater than the increase in the pretest value of the control group. The second investigation was conducted by Umroh et al. (2019). In his research at the University of Maryland SLB Laboratory, he holds the title Multimedia Tutorial Growing Interest in Reading for Students with ADHD. The validity level of digital literacy tutorials as learning media is 95.5% for material experts, 82.1875% for media experts, and 92.5% for practitioner experts. When it comes to helping children with ADHD become interested in reading, multimedia resources are essential. This multimedia lesson has proven to be a very effective teaching tool for children with ADHD, as seen from the pre-test and post-test scores, which increased from 70 on the pre-test to 90 on the post-test. One similarity between the studies featured here and those presented previously is that both investigated the interest levels of children with ADHD in reading. In the third study conducted by Rizki (2019). With the title "Development of Android Application-Based Mobile Learning Media for Students with ADHD," Rizki (2019) looks at students with ADHD. The results of the evaluation of Android application-based mobile learning media obtained a very high-quality score of 87.8% from all reviewers and peer reviewers who took part in the assessment. The findings from the questionnaire

show that the mobile learning media has a satisfactory quality (79.71%). The data collection findings show that mobile learning media built on Android applications is feasible to use as a learning resource. These findings are based on research findings. Learning research conducted by Sambodo for children with ADHD is a form of development research and application-based learning media.

Based on initial observations made by SD Labschool UNESA 2 regarding online reading learning activities during the previous pandemic, it is known that 60% of students spend more time at home playing and hanging out with family. Children tend to use cell phones to watch YouTube and play games. Moreover, based on interviews with several SD Labschool UNESA 2 parents, around 45% of parents said "often" or "sometimes" let their children play on digital devices while doing assignments. Learning provided by the school is in the form of worksheets. While the use of other learning media still uses animated videos only. Nothing combines learning to read with exciting reading designs that interest children. Thus, digital literacy media is an exciting solution and can improve the intelligence and abilities of students. This research is necessary because reading is a language skill that students must improve to become proficient in languages. One of the learning methods that attracts children's attention in understanding the meaning of a word and the context of its use is to teach them to read through the use of Android application-based digital literacy media.

Hyperactive children look busy, but their activities seemingly have no purpose. The symptoms of children with ADHD are similar to those of autism but have much better communication and social interaction skills (Soegito, 2006). So that through digital literacy media, students can play while learning, and this can improve the reading skills of regular students and those with disabilities. In literacy in elementary schools in the current digital era. Stimulation or stimulation is given to help the process of physical and spiritual growth and development according to the stage of development of the child's age (Nurhazizah et al., 2019). This is important for research on developing Android application-based digital literacy media to improve the reading skills of students with ADHD in inclusive schools. This research is expected to provide valuable insights into how technology can be used as a learning support tool for students with ADHD and, overall, contribute significantly to the inclusive education community.

METHOD

The Learning Media Development Research Method, also known as the Research and Development (R&D) Method, was used in this study to improve the reading skills of children diagnosed with ADHD while they participate in classroom activities. According to Sugiyono (2016). The research technique known as research and development is what is done to create a particular item and evaluate how effective it is. The strategy used in this research is to make sure products. Developments resulting from this research are in the form of software and application programs. These programs are produced with the help of Figma design tools. They are supported by the Android Studio editing tools and the Flutter application framework, which can be used to execute applications on Android smartphones, laptops, and desktop computers. The ADDIE Model, which stands for Analysis, Design, Development, Implementation, and Evaluation, is the development (R&D) methodology used in this work.

In this study, the research procedure uses the ADDIE model. Done gradually starting from (Sugiyono, 2016). Analysis, Design, Development, Implementation, and Evaluation (ADDIE) steps are presented in Figure 1.

Researchers use the ADDIE development because it makes an innovation from the development of technology and learning of students in elementary schools to improve reading skills. The research lasted for about two months, from February to April 2023. This game was tried out at SD Labschool UNESA 2 in Classes 3, 4, 5, and grade 6, which consisted of class 3 having two students, class 4 having two students, class 5 there are two students, and in grade 6 there are two students the total becomes eight students with special needs (ADHD). The data collection method used in this study was to gather the necessary information to provide an overview of the validity, practicality, and effectiveness of digital media literacy based on Android applications.

Three validation instruments are used, namely validation from media experts, material experts, and learning feasibility tests.
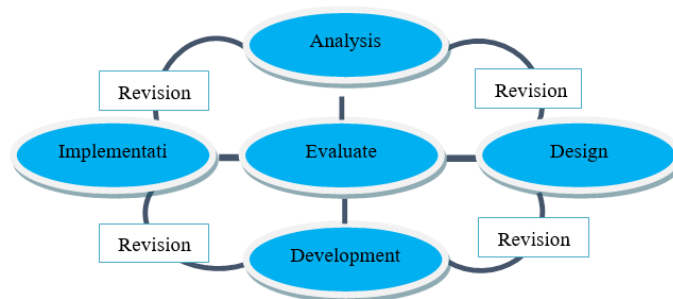
Figure 1. Stages of Development of the ADDIE Model

The researcher examines the data collected in this study by going through the following stages according to the method that will be used to evaluate the data.

Analysis of the Validity of Digital Literacy Media

Completed product validation sheets by instructors, media professionals, and content experts provide evidence of data reliability. Digital media literacy validation data is assessed according to the assessment criteria in Figure 2 below to assess digital media literacy's validity.
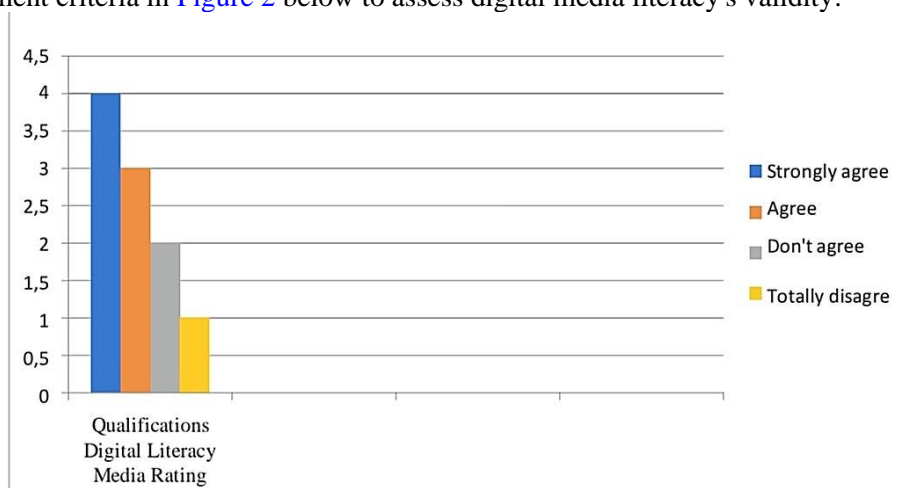
Figure 2. Assessment of the validity of digital literacy media

Furthermore, the collected data was analyzed with Aiken's V Validation using the formula 1.

$$V = \sum s / [n (c - 1)] \tag{1}$$

s is r – lo; n is number of appraisers; lo is lowest validity rating score (in this case = 1); c is the highest validity rating score (in this case = 4); and r is the number given by the validator.

The results of Aiken's V calculations range from 0 to 1. After the results of Aiken's V calculations, the media eligibility criteria are grouped into "Very worth it" (0.76 – 1), "Worthy" (0.51-0.75), "Not worth it" (0.26-0.50), and "Not feasible" (<0.25).

Practical Analysis of Digital Literacy Media

To find out the practicality of digital literacy media, some aspects must be met, namely practicality in theory. Practical analysis of theoretical aspects Practical analysis of educational digital literacy media against theoretical aspects contains four general assessment criteria with value codes. In addition, if the validator shows that digital media literacy can be used with at least some adjustments.

3. Effectiveness Test Analysis

Obtaining an efficiency analysis involves counting the number of students participating in the activities detailed on the observation sheets. The data is broken down and checked using Sugiyono's (2016) detailed proposal of proportions in Formula 2.

Effectiveness Percentage = Ideal Score / Maximum Score x 100 % (2)

To determine the effectiveness of digital literacy media, it can be adjusted to the criteria in the following figure 3. Based on the criteria above, digital literacy media is said to be effective if there is an increase in the ability to read and understand the contents of the reading for students and obtain a percentage of > 51%.
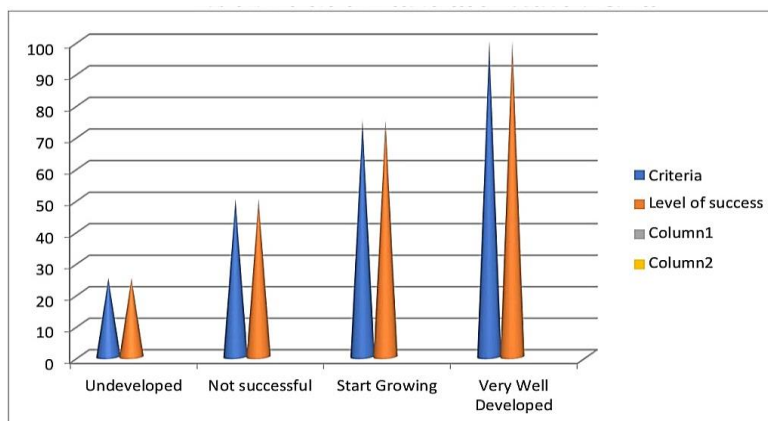
Figure 3. The level of effectiveness of digital literacy media

RESULTS AND DISCUSSION

Result

The information will be analyzed after completing tasks such as making observations, running experiments, and collecting and storing data. After the researcher processes the data using data analysis, a description of the research data is then given, and the data collected for this research will be studied using the following stages:

Analysis Stage

This stage analyzes the importance of developing digital literacy media products that researchers innovate. The development of this product begins with observations in the field where the high use of electronic media in the form of smartphones for students, as stated by the UNESA Labschool 2 elementary school principal, about 99% of students from grades 3, 4, 5 and grade 6 According to reports provided by the guardian instructor class, the average student already has an android smartphone. Most students exclusively use their smartphones to make phone calls, send and receive texts, play music and movies, and access various social media networks (including WhatsApp, Facebook, Twitter, and others). Students even spend more time playing online games such as PUBG and mobile legends. This causes a low interest in reading students, which results in a decrease in the ability of student learning outcomes. So, researchers create a media that can attract students' enthusiasm and provide innovative digital literacy media based on Android applications to help improve students' reading skills in elementary schools.
1. Curriculum Analysis

The curriculum analyzed refers to the 2013 Curriculum of the Minister of Education and Culture No. 146 of 2014 relating to language in the aspect of developing literacy, namely reading.
2. Student and Teacher Analysis

SD Labschool UNESA 2 has six teaching staff, including HR a class III teacher. AK is a class IV teacher, SA is a class V teacher, MP is a class VI teacher, and SR and NL are

accompanying teachers. Analysis of ADHD students attending SD Labschool UNESA 2 totaling eight students from grades 3, 4, 5, and 6. Researchers designed an Android application-based digital literacy media product for ADHD students at this stage. In this digital literacy media, researchers want to improve the reading skills of students with ADHD. According to the analysis of the elementary school education curriculum, this stage designs digital literacy media based on Android applications. At this stage, the first step is to make a lesson plan. The design of digital literacy media is by the curriculum and is supported by several theories. The following is a design according to the developmental stages of ADHD students. It is an Android application-based digital literacy media development design presented in Figure 4 until Figure 12.

Figure 4. Initial display of digital literacy applications based on Android applications

Figure 5. Display of menu options and books in digital literacy applications base on Android applications

Figure 6. Display of settings in digital literacy applications based on Android applications

Figure 7. Display of a selection of children's fairy tale books in digital literacy applications   based on Android applications

Figure 8. Display of a selection of folklore books in digital literacy applications based on Android applications

Figure 9. Display of practice questions or evaluation of reading on digital literacy applications based on Android applications
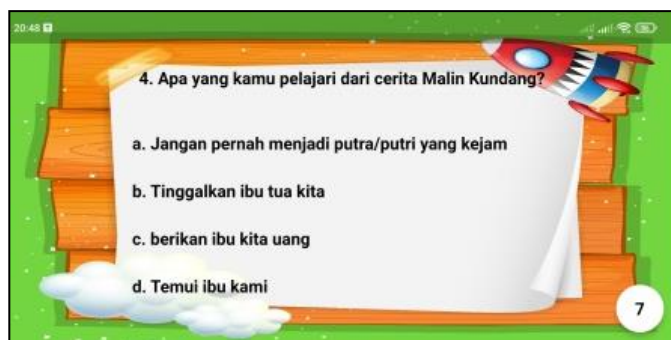

Figure 10. Display of sample questions in digital literacy applications based on Android applications

Figure 11. Display if the answer is **correct** in practice questions on the digital literacy application based on the Android application

Figure 12. Display if the answer is Wrong in practice questions on the digital literacy application based on the Android application

In validating digital literacy media, two experts are from universities. The validator was asked to assess the material and media that the researcher had made. The assessment of digital literacy media includes material/content and media/views. Namely Dr. MS M. Pd as a material expert and Dr. H. AM, S. Pd., M. Pd as media experts. Experts were asked to correct media and materials before researchers entered the field. After the expert stated that it was ready for use, the researcher proceeded to the implementation part. After the Android application-based digital literacy media has been created, the digital literacy media validation process is carried out by an expert, MS, as a material expert on February 8, 2023. The expert views and comments on the designs that have been made and revised according to expert advice to improve digital literacy media content android application based to improve the reading ability of students with ADHD. The V value for item 1 is obtained from $V = 2/1(4-1) = 0.67$ and V for items 5, 7, 10, 14, and item 2, we get $V = 3/1(4-1) = 1$, as well as items 3, 4, 6, 8, 9, 11, 12, 13, 15, 16. Aiken's coefficient values range from 0-1. Aiken 1 coefficient values are found in points 2, 3, 4, 6, 8, 9, 11, 12, 13, 15, 16. As for item values 1, 5, 7, 10, and 14, the Aiken coefficient value is 0.67. So that the average value of the Aiken V coefficient = 0.89 can be declared valid.

After the material expert, the media expert assesses that the V value for item 1 is obtained from $V = 3/1(4-1) = 1$, which is the same as items 3, 4, 5, 7, 8, 9, 11, 12, 13, 14, 15, 17, 18, 19, 20 and for V item 2 it is obtained $V = 2/1(4-1) = 0.67$ which is the same as item 6,10,16. Aiken's coefficient values range from 0 to 1. One Aiken's coefficient values are found in 1, 3, 4, 5, 7, 8, 9, 11, 12, 13, 14, 15, 17, 18, 19, 20, and the coefficient values are 0.67 in items 2, 6, 10, 16. So, the average value of Aiken's coefficient is $V = 0.93$; it can be stated that it has valid item validation and is declared suitable for use with revisions.

A limited trial was conducted at SD Labschool UNESA 2, held on February 11, 2023, in class III with two students. The total score obtained is 48, and the average percentage for each

assessment aspect is 85%, which is very practical so that with limited trial results, digital literacy media can proceed to the next stage, namely implementation.

Application

The implementation stage is carried out by developing digital literacy media for ADHD students based on Android applications, which experts have considered practical and tested on students. This application can be found in the Google Play store. The second step requires instructors to analyze digital media literacy to determine whether students successfully utilize media or not, as well as how students react after using digital media literacy. The implementation of Android application-based digital literacy media to improve the reading ability of ADHD students was carried out at SD Labschool UNESA 2 class III, consisting of 8 children. Furthermore, the teachers assessed the media in the FGD (Forum Group Discussion) activity on Wednesday, April 12, 2023.

The practicality questionnaire given to the teacher was filled in after the media had been applied to students. The teachers who assessed the questionnaire were Trisya Maritaria S.Pd from class III and Nita Dwi Rahmawati S.Pd (coaching teacher). The average practicality percentage of the two teachers is 95%. From the results of the practicality test, it was stated that digital literacy media based on Android applications to improve the reading skills of students with ADHD were practical. Furthermore, the assessment of the game media was also assessed by six teachers from Bakti Asih Surabaya SLB. Based on the assessment results in the FGD (Focus Group Discussion) activities at SLB Bakti Asih Surabaya, as many as six teachers with an average result of 85% were stated to be very practical.

Discussion

Development of Android Application-Based Digital Literacy Media to Improve Reading Ability in Attention Deficit Hyperactivity Disorder (ADHD) Students. The creation of educational media is a continuous innovation planned and implemented to enhance educational experiences and outcomes. To answer the demands of education that are developing along with advances in media and technology in the era of globalization, so far, digital literacy has only been known on social media, which can convey information related to things needed by citizens, but it is still not optimized to support the increasing quality in learning (Masitoh, 2018). Various types of media development continue to be carried out (Pakpahan et al., 2020). They claim that the media is a teaching instrument that should be able to improve student learning. Learning media must be created by educational needs to help distribute knowledge to students in a way that is easy to understand and understand. Learning becomes fun and not dull. Clarifying the teacher's message is one of the uses of media in education. Media can also be used for individual learning when placed in a way that fully meets students' needs. In this scenario, the media is used as a tool for educational activities, namely as a teaching resource (visual aid) for teachers (Arwani, 2011).

The development of digital literacy media based on Android applications is one of the renewable innovations that collaborates between technological advances and the demands of the times in the current digital era. The digital literacy skills in question consist of basic skills, including reading, writing, and understanding symbols to represent language and performing numerical calculations (Nurjanah et al., 2017). to improve the reading or literacy skills of attention deficit hyperactivity disorder (ADHD) students in inclusive schools. Given the importance of literacy skills for everyone, including those with special needs, Minister of National Education Regulation No. 70 of 2009 Article 3 Paragraph 1 states that all children, regardless of their needs or abilities, who have physical, emotional, mental, or social disabilities or who have the potential for intelligence or extraordinary skills, attend education, including in specific educational units. These students may have physical, emotional, mental, or social disabilities and have the potential for extraordinary intelligence or talent.

Smartphones are now a primary need for middle and upper-class people rather than just a secondary one. Smartphones come in many different styles and prices and are accessible to the general public. According to the needs of smartphone users, smartphones provide a variety of

exciting features. Learning outside the classroom is simpler by using your phone anytime, anywhere. Smartphones can be used as learning tools and infrastructure for their users, even though now they are only used to access social media and business. With the help of this research, Attention Deficit Hyperactivity Disorder (ADHD) children at school can improve their reading skills by building digital media literacy based on Android applications that can be accessed on smartphones.

Researchers have built a new Android-based media platform called digital literacy. This form of educational media is available to users as an Android application that can be used online and offline. This means that even if users do not have access to the internet, they can still use this form of educational media whenever they want and wherever they are. This makes learning more straightforward and efficient because educational materials can be carried anywhere and accessed whenever students want—individuals who own smartphones and have downloaded digital literacy apps. Android application-based digital literacy media is an alternative to improve the literacy or reading skills of ADHD students. The benefits of developing Android application-based digital literacy media are to improve the reading skills of attention deficit hyperactivity disorder (ADHD) students.

CONCLUSION

The findings of the analysis of hypothesis testing data and discussion of research on digital media literacy can be interpreted that digital media literacy based on Android applications to improve the reading skills of students with ADHD is claimed to be valid, practical, and successful. This conclusion can be reached based on hypothesis testing data analysis results. The reading ability of children, especially students with special needs, can be improved through the development of digital media literacy, a relatively innovation (ABK), one of which is Attention Hyperactivity Deficit Disorder (ADHD) students. This digital literacy media can be used on Android applications, smartphones or mobile phones, notebooks, and PCs. This digital literacy media is made in a way that is easy for students to understand and is expected to improve student's reading skills and can be used at school or when they are at home. Researchers carried out several stages of development, including analysis, design, development, implementation, and evaluation or assessment. Android application-based digital literacy media provides direct learning to students where students learn to read quickly and are accompanied by pictures that interest them when reading. It is hoped that this research will become a reference for further research to develop research in digital literacy based on Android applications.

REFERENCES

Adhd, T. T., Reading, G., & Language, G. (2015). Overlap of ADHD, reading disorders, and language disorders.

Akbar, S. N. (2017). Terapi Modifikasi Perilaku untuk penanganan hiperaktif pada anak retardasi mental ringan. *Jurnal Ecopsy*, 4(1), 41-51. https://doi.org/10.20527/ecopsy.v4i1.3414

Amarulloh, et al. (2020). Use of media applications based on the Indonesian Digital Literacy (LDI) android application. Affects the ability of learning outcomes of students with ADHD.

Amarulloh, A., Surahman, E., & Meylani, V. (2019). Refleksi peserta didik terhadap pembelajaran berbasis digital. *Metaedukasi*, 1 (1), 1323. https://doi.org/10.37058/metaedukasi.v1i1.977

Arwani, A. (2011). Pembelajaran Pendidikan agama islam berbasis multimedia. *In Forum Tarbiyah* (Vol. 9, No. 2). https://www.neliti.com/publications/69445/pembelajaran-pendidikan-agama-islam-berbasis-multimedia

Departemen Pendidikan Nasional. (2009). *Peraturan Menteri Pendidikan Nasional Nomor 70 Tahun 2009, pasal 3 ayat 1*, tentang semua anak, tanpa memandang kebutuhan atau kemampuannya yang memiliki disabilitas fisik, emosional, mental atau sosial berhak

mengikuti pendidikan, termasuk di satuan pendidikan tertentu. https://jdih.kemdikbud.go.id/detail_peraturan?main=1697

Fatmawati, N. I., & Sholikin, A. (2019). Literasi Digital, mendidik anak di era digital bagi orang tua milenial. *Madani Jurnal Politik dan Sosial Kemasyarakatan*, 11(2), 119-138. https://doi.org/10.52166/madani.v11i2.3267

Gray, C., & Climie, E. A. (2016). Children with attention deficit/hyperactivity disorder and reading disabilities: A review of the efficacy of medication treatments. *Frontiers in Psychology*, 7(JUL), 1–6. https://doi.org/10.3389/fpsyg.2016.00988

Hidayat, T., & Syafe'i, M. (2018). Filsafat perencanaan dan implikasinya dalam perencanaan pembelajaran pai di sekolah. Lentera Pendidikan: J*urnal Ilmu Tarbiyah dan Keguruan*, 21(2), 188-205. https://doi.org/10.24252/lp.2018v21n2i5.

Indarta, Y., Jalinus, N., Waskito, W., Samala, A. D., Riyanda, A. R., & Adi, N. H. (2022). Relevansi kurikulum merdeka belajar dengan model pembelajaran abad 21 dalam perkembangan era society 5.0. Edukatif: *Jurnal Ilmu Pendidikan*, 4(2), 3011-3024. https://doi.org/10.31004/edukatif.v4i2.2589

Kementerian Pendidikan dan Kebudayaan. (2014). *Peraturan Menteri Pendidikan dan Kebudayaan Kurikulum 2013 No. 146 Tahun 2014*, tentang bahasa dalam aspek pengembangan literasi, yaitu membaca. Permendikbud Nomor 146 Tahun 2014.pdf (kemdikbud.go.id)

Kurnianingsih, I., Ekadiana, N., & Deliasari, A. (2017). Prototipe literasi informasi berbasis web sebagai upaya peningkatan kemampuan literasi siswa MAN Insan Cendekia. *Edulib*, 7(1). https://doi.org/10.17509/edulib.v7i1.7542

Kurnianingsih, I., Rosini, R., & Ismayati, N. (2017). Upaya peningkatan kemampuan literasi digital bagi tenaga perpustakaan sekolah dan guru di wilayah Jakarta pusat melalui pelatihan literasi informasi. *Jurnal Pengabdian Kepada Masyarakat*, 3(1), 61-76. https://doi.org/10.22146/jpkm.25370

Manuscript, A. (2014). *Underpinnings of the Centrality Deficit*. 41(3), 473–483. https://doi.org/10.1007/s10802-012-9686-8.Reading

Masitoh, S. (2018). Blended Learning berwawasan literasi digital suatu upaya meningkatkan kualitas pembelajaran dan membangun generasi emas 2045. *Proceedings of the ICECRS*, 1(3), v1i3-1377. https://doi.org/10.21070/picecrs.v1i3.1377

Mariyah, M., Aprinastuti, C., & Anggadewi, B. E. T. (2017). Pengembangan alat peraga untuk meningkatkan kemampuan belajar matematika pada anak dengan ADHD. *Prosiding Temu Ilmiah Nasional X Ikatan Psikologi Perkembangan Indonesia*, 1. https://jurnal.unissula.ac.id/index.php/ippi/article/view/2195

Ng, N., Bangsa, P. G., & Christianna, A. (2016). Perancangan buku interaktif sebagai media pendukung terapi anak-anak ADHD usia 6-8 tahun. *Jurnal DKV Adiwarna*, 1(8), 11. https://publication.petra.ac.id/index.php/dkv/article/view/4358

Nurhazizah, N., Pransiska, R., & Saridewi, S. (2019). Peningkatan kemampuan membaca anak melalui permainan bengkel kata di taman kanak-kanak smart kids Padang Panjang. Aulad: *Journal on Early Childhood*, 2(2), 51-60. https://doi.org/10.31004/aulad.v2i2.34

Nurjanah, E., Rusmana, A., & Yanto, A. (2017). Hubungan literasi digital dengan kualitas penggunaan e-resources. Lentera Pustaka: *Jurnal Kajian Ilmu Perpustakaan, Informasi Dan Kearsipan*, 3(2), 117-140. https://doi.org/10.14710/lenpust.v3i2.16737

Pakpahan, A. F., Ardiana, D. P. Y., Mawati, A. T., Wagiu, E. B., Simarmata, J., Mansyur, M. Z., ... & Iskandar, A. (2020). *Pengembangan media pembelajaran*. Yayasan Kita Menulis. https://scholar.google.com/scholar?cluster=6292325207851984526&hl=en&oi=scholarr

Parwodiwiyono, S., & Witono, W. (2022). Analisis kaitan angka beban ketergantungan dengan indeks pembangunan manusia dalam pemanfaatan bonus demografi (studi 6 provinsi indonesia). *PANCANAKA Jurnal Kependudukan, Keluarga, dan Sumber Daya Manusia*, 3(1), 44-54.. https://doi.org/10.37269/pancanaka.v3i1.121

Purwandari, P. (2006). Identifikasi Anak Tunalaras yang mengalami ADHD (attention defisit-hyperactivity) berdasarkan DSM IV (diagnostic and statistical manual of mental disorders). *JPK (Jurnal Pendidikan Khusus)*, 2(1). https://doi.org/10.21831/jpk.v2i1.6038

Putra, A. P. (2018). Meningkatkan kreativitas anak dengan ADHD melalui literasi. Abdau: Jurnal Pendidikan Madrasah Ibtidaiyah, 1 (1), 354–370.https://dx.doi.org/10.36768/abdau.v1i2.20

Rakimahwati, R., & Roza, D. (2020). Developing of interactive game based on role play game to improve the reading abilities. *Journal of Nonformal Education*, 6(2), 193-201. https://doi.org/10.15294/jne.v6i2.25574

Rapisa, D. R., & Kusumastuti, D. E. (2022). Implementation of Behavior Modification Techniques in Overcoming Maladaptive Behavior of Children with Special Needs. *Journal of Research and Development for Special Education*, 9(2), 51. https://doi.org/10.17977/um029v9i22022p51-55

Rizki, A. S. (2019). Development of mobile learning media (m-learning) based on android applications for students with ADHD. https://digilib.uin-suka.ac.id/id/eprint/13011/

Roshinah, F. R., Nursaliha, L., & Amri, S. (2014). Pengaruh terapi murottal terhadap tingkat hiperaktif–impulsif pada anak attention deficit hyperactive disorder (ADHD). *Pelita-Jurnal Penelitian Mahasiswa UNY*, 9(02). https://journal.uny.ac.id/index.php/pelita/article/download/4017/3473

Sari, H. Y. (2022). Peningkatan kemampuan literasi melalui media komik kartun bersambung dengan pendekatan kontekstual pada anak adhd (attention deficit hyperactivity disorder). Berajah Journal: *Jurnal Ilmiah Pembelajaran dan Pengembangan Diri*, 2(4), 889-898. https://doi.org/10.47353/bj.v2i4.176

Sari, V. F., & Sukerti, N. W. (2020). PECS (Picture Exchange Communication System) terhadap Interaksi Sosial anak ADHD (Attention Deficit-Hyperactive Disorder). JPK (Jurnal Pendidikan Khusus), 6(1), 28-34. https://doi.org/10.21831/jpk.v16i1.30797

Soegito. (2006). 6039-15792-1-SM. pdf. https://opac.perpusnas.go.id/DetailOpac.aspx?id=604348

Sugiyono. (2016). *Metode penelitian kuantitatif, kualitatif dan R&D*. Bandung: Alphabet. https://opac.perpusnas.go.id/DetailOpac.aspx?id=133467

Susanto, E., & Nugraheni, A. S. (2020). Metode vakt solusi untuk kesulitan belajar membaca permulaan pada anak hiperaktif. *Jurnal Madrasah Ibtidaiyah*, 6(1), 13-20. https://doi.org/10.31602/muallimuna.v6i1.2506

Umroh, N. S., Adi, E. P., & Ulfa, S. (2019). Multimedia tutorial untuk menumbuhkan minat baca anak ADHD (Attention Deficit Hyperactivity Disorder). *JKTP: Jurnal Kajian Teknologi Pendidikan*, 2(1), 45-52. http://dx.doi.org/10.17977/um038v2i12019p045

Wibowo, E. W., & Mumpuniarti, M. (2019). Application of inquiry methods to academic achievement of children with attention deficit hyperactivity disorder in inclusive schools. *Jurnal Penelitian dan Pengembangan Pendidikan Luar Biasa*, 6(1), 9-12. http://dx.doi.org/10.17977/um029v6i12019p9-12

Widyastuti, A. (2017). *Kiat jitu anak gemar baca tulis*. Elex Media Komputindo. https://opac.perpusnas.go.id/DetailOpac.aspx?id=1040812

Implementation of flipped learning with flipbook media assistance on learning outcomes and critical thinking abilities

Diah Sudiarti *, **Nashlul Muflihatul Ashilah, Umi Nurjanah**
Universitas Islam Jember, Indonesia.
* Corresponding Author. E-mail: diah.sudiarti23@gmail.com

ARTICLE INFO

ABSTRACT

This research was conducted as a sort of classroom action research with two learning cycles to examine whether flipped learning aided by flipbook media may enhance students' cognitive learning outcomes and critical thinking skills. This research's population consisted of tenth-grade Madrasah Aliyah Al Misri Curahmalang students for the academic year 2021-2022. Methods for collecting data include interviews, tests, observations, and documentation. The classical completeness of cognitive learning outcomes increased from 19% in the first cycle to 97% in the second cycle, according to the research findings. Whereas critical thinking abilities were acquired in the first cycle, just one student met critical criteria. In contrast, six students exceeded crucial criteria, and twenty students exceeded critical criteria in the second cycle. Based on the analyzed research findings, it is possible to conclude that flipped learning aided by flipbook media can enhance students' cognitive learning outcomes and critical thinking skills.

INTRODUCTION

Flipped learning is an instructional approach that integrates technology-based learning strategies. Flipped learning is a method in the teaching and learning process that deviates from the usual approach. Specifically, in this learning system, students focus on researching the lesson topic before the class begins, and classroom activities involve completing assignments and discussing materials or issues that students have yet to comprehend. It aligns with Ahmed's perspective Ahmed (2016) that flipped learning is a learning style that shifts from classroom lectures to engaging in various activities. This activity is self-directed learning, resulting in a shift in the educator's role from being a communicator to that of a coach and facilitator. This method has garnered the attention of educators and observers due to its potential benefits. Flipped learning empowers students to adapt independently inside and outside the classroom (Julinar & Yusuf,

2019). Flipped learning can be implemented through online learning platforms such as Personal Computers and Android devices.

One learning media that can be utilized is the flipbook media, which both students and researchers will use. According to Parlin et al. (2015), flipbook learning media is a medium that presents information by displaying a sequence of materials in the form of a digital electronic book that can be flipped, resembling a physical book. This flipbook media is software for converting PDF files, images, and text into a book-like format (Susanti, 2020). This media can be utilized individually or in small groups but limited to 4-5 individuals. The flipbook to be created is an interactive form that allows for a correlation between it and students through its elements. It can transition from one image page to the next, so when the pages are flipped quickly, the images appear animated, turning into a simple yet captivating book (Damayanti & Raharjo, 2020).

Cognitive learning outcomes are students' skills after acquiring knowledge (Muga et al., 2018). Cognitive learning outcomes are also the skills students acquire after engaging in learning activities. Typically, the success of learning is assessed based on its outcomes. Successful learners achieve the learning objectives (Hidayah & Pujiastuti, 2016). Therefore, cognitive learning outcomes play a significant role in the educational system, given that a central portion of learning activities involves thinking and remembering exercises.

Critical thinking ability is a fundamental skill that students should possess. Having critical thinking skills will aid in addressing both simple and complex problems (Setiana & Purwoko, 2020). Critical thinking skills are necessary for individuals to manage various challenges encountered in communal and individual life (Fithriyah et al., 2016). Therefore, critical thinking skills are crucial to implement within the educational system. Given that through critical thinking, students can think logically and make informed decisions and choices based on acquired data.

Several issues were identified based on the interview results with the science teacher. These include the incomplete achievement of the minimum competency criteria as indicated by the scores in the mid-semester assessment, where many students received scores below the minimum competency criteria. Another issue is the educator's limited guidance for students to think critically. Educators have requested students to pay more attention to lessons, and due to minimal guidance in expressing ideas, students appear passive and are not accustomed to critical thinking. Lack of understanding during the learning process has led to the intended learning outcomes not being achieved. Furthermore, the knowledge imparted by the teacher remains conveyed straightforwardly. In such cases, a difference and modification in the learning process are necessary to make it more creative and engaging for students.

Based on the description above, this research aims to determine whether flipped learning with flipbook media assistance can enhance students' cognitive learning outcomes and critical thinking abilities. This research also provides learning media suitable for the flipped learning strategy. Indirectly, flipbooks also contribute to helping improve learning outcomes and critical thinking.

METHOD

Type of Research

The type of research conducted is classroom action research, which consists of two cycles. Each cycle comprises planning, action, observation, and reflection phases. The term classroom action research refers to a form of action research applied in teaching and learning activities in the classroom to improve the teaching and learning process to enhance or refine teaching practices to be more effective (Farhana et al., 2019).

Research Subjects

The research subject is the research boundaries where the researcher can determine the objects, things, or people to which the research variables are attached. The entire object where several sources or informants can provide information about problems related to the research to be carried out is called the research subject. The subjects of this research were class X students at Al Misri Curahmalang Rambipuji High School for the 2021-2022 academic year. The research sample taken was 32 students.

Data Analysis

The data obtained is analyzed using quantitative and qualitative data analysis techniques. Quantitative analysis is employed to analyze the data obtained from students' cognitive learning outcomes in each cycle. Quantitative analysis is calculated using the following formula. The average cognitive learning outcomes of students are calculated using Formula 1 (Harefa, 2020), and classical achievement percentage is calculated using Formula 2 (Putri & Hasbiyati, 2019):

$$\bar{X} = \frac{\sum x}{N} \tag{1}$$

$$P = \frac{f}{n} \times 100\% \tag{2}$$

Meanwhile, qualitative analysis is conducted on the student's critical thinking abilities obtained from the observation sheet, which encompasses eight indicators of critical thinking. Thus, the maximum score that each student can achieve is 32. Formula 3 analyzes the data (Ramadhanti & Agustini, 2021).
.

$$Critical\ Thinking\ Skills\ = \frac{The\ obtained\ score}{The\ maximum\ score} x\ 100\% \tag{3}$$

RESULTS AND DISCUSSION

Results of Cycle I Research

Planning

During the planning phase of Cycle I, activities for the instructional action are designed. The following is the proposed activity plan to be implemented in Cycle I: (1) The researcher utilizes flipped learning with the assistance of flipbook media in biology instruction; (2) Creating a Lesson Implementation Plan; (3) Preparing observation sheets for use during group discussions to assess students' critical thinking abilities; (4) Formation of groups is done through a counting method; (5) Developing and preparing instructional materials, including student worksheets and individual post-test questions.

Implementation of Action

1. Initial Activity
   At the beginning of the learning session, the researcher greets the students and then guides them to pray. Subsequently, the researcher takes attendance, provides an introduction, and communicates the learning objectives or fundamental competencies to be achieved—the scope of the material to be studied is outlined in the previously distributed flipbook.
2. Core activity
   The steps of biology learning using flipped learning with the assistance of flipbook media can be described as follows:
   a. The researcher provides a brief explanation to the students about the discussed material.
   b. The researcher provides Worksheets for each group.
   c. The researcher facilitates students and guides them in group discussions.
   d. The researcher guides students in presenting the discussion results and allows other students to respond.
3. Final Activity
   After all the learning processes concluded, the researchers and the students summarized the material studied. Students were administered a pre-prepared post-test at the end of the second meeting in Cycle I. The following are the outcomes of the plant world learning in Cycle I, which can be observed in Table 1.

Table 1. Analysis of Cognitive Learning Outcome Data, Cycle I

No.	Category	Frequency
1	Number of Students	32
2	Total	1810
3	Average Cognitive Score	57
4	Classical Mastery Score	19%

The Implementation of Observation

The third stage of the research involves observing or monitoring students' critical thinking abilities conducted during the discussion activity using assisted media, namely flipbooks, within the context of flipped learning. This observation activity is facilitated by colleagues who act as observers. The observation sheet includes various aspects of critical thinking elements, comprising eight question items. The results of the students' critical thinking observation in Cycle I are presented in Table 2.

Table 2. Results of Critical Thinking Observation, Cycle I

No.	Category	Frequency
1	Very Critical	0
2	Critical	1
3	Fairly Critical	5
4	Less Critical	26

Reflection

There was an improvement based on the observation evaluated in Cycle I, but this improvement did not meet the predefined success criteria. Despite some students appearing hesitant, they began interacting with their peers within their groups and bravely expressed their opinions, enhancing the learning process. However, this improvement cannot be considered as optimal. The researcher continued the research in Cycle II to implement changes and improvements in the instructional approach.

Results of Cycle II Research

Planning

The planning activity is the initial step in Cycle II. The following is the instructional design that will be executed in Cycle II:

1. Groups will be formed heterogeneously based on the results of the post-test from Cycle I. Each group will consist of both high-achieving and lower-achieving students. It is expected that the high-achieving students can assist their peers in group collaboration.
2. Compiling and preparing observation sheets for monitoring the implementation of learning related to students' critical thinking abilities during group discussions.
3. Preparing and organizing student activity sheets.
4. Preparing the post-test questions for Cycle II.

Implementation of Action

1. Opening Activity
   In the introductory activity, the researcher starts the lesson with a greeting, takes attendance, provides an introduction, and communicates the learning objectives or fundamental competencies to be achieved, along with the scope of the material, per the previously distributed flipbook.
2. Core Activity
   In the second activity, the researcher forms four heterogeneous groups. Subsequently, the researcher distributes the learning activity sheet to each group and asks the students to pay attention to the steps of the work process. During the discussion time, the researcher guides the students and reminds them of the rules of discussion, which are as follows:

a. Students must bravely express their opinions.
b. When solving problems, collaborative work is needed to find solutions.
c. Willing to share thoughts and respect classmates' ideas.
d. If facing difficulties, students should ask questions.

In the subsequent activity, each representative of the dragon group presents the outcomes of their discussion while the other groups observe, respond, and provide input to other groups.

3. Final Activity

After this action is completed, the researcher and students conclude the material that has been studied. At the end of the second meeting in Cycle II, students are given a prepared post-test. The following are the results of the plant world learning in Cycle II, which can be observed in Table 3.

Table 3. Analysis of Cognitive Learning Outcome Data in Cycle II

No.	Category	Frequency
1	Number of Students	32
2	Total	2940
3	Average Cognitive Score	92
4	Classical Mastery Score	97%

The Implementation of Observation

The following are the results of observations on students' critical thinking in Cycle II during meetings 1 and 2, as presented in Table 4.

Table 4. Observations on Critical Thinking in Cycle II

No.	Category	Frequency
1	Very Critical	6
2	Critical	20
3	Fairly Critical	6
4	Less Critical	0

Reflection

Based on the post-test results of students in Cycle II, students' cognitive learning outcomes also showed improvement, as evident from the achieved percentage score of 97%, which was anticipated. Furthermore, based on the observations conducted in Cycle II, students' critical thinking abilities improved. Students could focus and analyze problems, find and present information, express their opinions, respect others' viewpoints, and select appropriate solutions in problem-solving. This improvement is considered quite substantial and has fulfilled the success criteria set by the researcher.

Discussion

Ahmed (2016) explains that flipped learning is a learning style that shifts from classroom lectures to engaging in various activities. This activity is characterized by independent learning, resulting in a shift in the educator's role from being a communicator to becoming a coach and facilitator. Meanwhile, the researcher's role involves providing a specific topic or material to be discussed as a prompt. This prompt can be delivered through online learning through flipbook media. The time required for teaching and learning activities becomes more effective and efficient through flipped learning. The material can be effectively conveyed, and students have ample time to delve into and explore the content. In the implementation phase, there were a total of four meetings conducted. During this stage, the researcher conveyed the material using flipbook instructional media for the topic of the plant world, aiming to enhance students' cognitive learning outcomes and critical thinking abilities.

The results of the responses from students in class X MA Al Misri regarding this flipped learning using flipbook media show that students are interested and motivated in the learning

activities. The teaching and learning activities become engaging and not monotonous. Students become more active in asking questions and responding to topics related to the plant world, making the material more accessible for them to comprehend. It aligns with Manullang et al. (2019) that implementing flipped learning in education holds advantages, such as fostering active learning within the classroom and cultivating students' self-confidence when speaking in front of the class. It is due to students gaining insights and mastering the material, allowing them to speak confidently.

The following is the analysis of students' cognitive learning outcomes and critical thinking abilities in Cycle I and II. Many students' learning activities are consistently tied to problem-solving and critical thinking. Consequently, cognitive learning outcomes play a crucial role in determining students' success in learning. An observable enhancement in students' cognitive learning outcomes can be observed by measuring the improvement in cognitive learning outcomes between Cycle I and II. The data collected by the researcher from the post-test results in each cycle, following the implementation of actions in each cycle, indicates that 97% of students completed Cycle II with a score above the minimum completion criteria of 75. Consequently, students' cognitive learning outcomes have significantly improved through flipped learning with the assistance of flipbooks. Figure 1 compares students' cognitive learning outcomes between the pre-, Cycle I, and Cycle II.
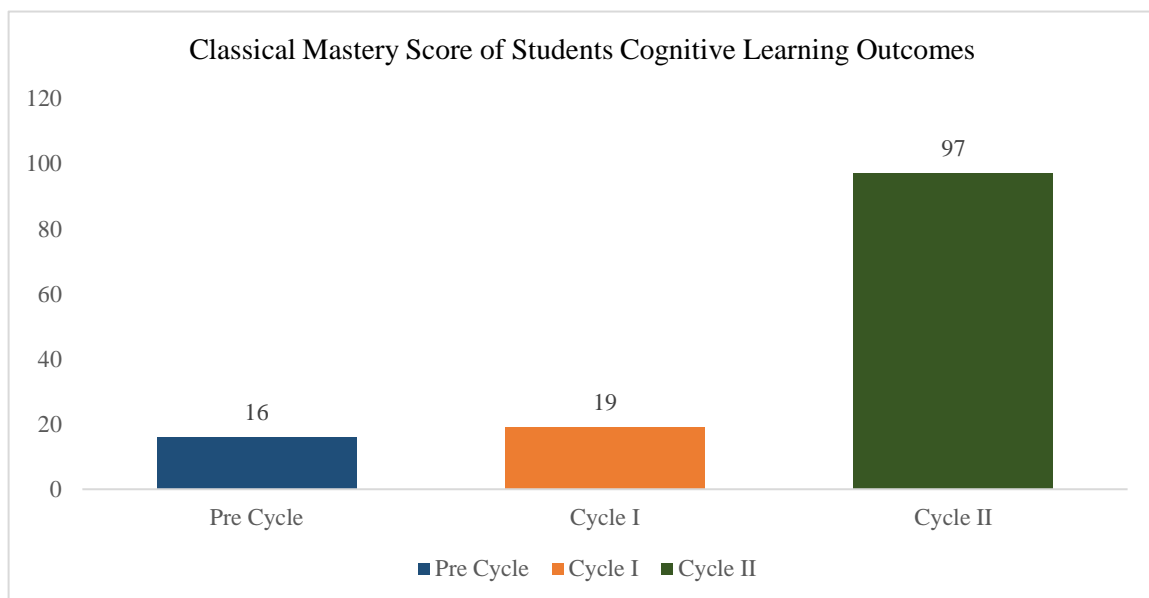
Figure 1. Graph of the Comparison of Students' Cognitive Learning Outcomes

Based on the graph in Figure 1 above, the classical mastery score for cognitive learning outcomes in the pre-cycle is 16%. However, in Cycle I, the classical mastery score for students' cognitive learning outcomes is 19%, while in Cycle II, it increases dramatically to 97%. The significant improvement between Cycle I and Cycle II results from the topic of the plant world covered in Cycle I. This topic involved comparing and explaining the characteristics of mosses, ferns, and angiosperms, which proved relatively challenging for students to comprehend. Only 19% of students achieved mastery, while 81% did not. On the other hand, the topic covered in Cycle II focused on the roles of mosses, ferns, and angiosperms, and it was considerably more accessible for students to understand. As a result, 97% of students achieved mastery, with only 3% falling short.

Based on the research outcomes by Wahyuni (2018) it is stated that several students scored below 60% because the questions provided by the teacher were never encountered by students previously. Students also perceived these questions as extremely difficult, believing the teacher had created them. Students are accustomed to questions at the remember and understand levels, so they face difficulties when encountering questions at the apply, analyze, or evaluate levels. Some students even struggle to understand the intention behind these questions. However, the difficulty

lies in the fact that the levels of questions provided by the teacher are aligned with the curriculum demands and the cognitive development of high school-level students.

Furthermore, the data obtained from Cycle I and Cycle II indicate an improvement in students' cognitive learning outcomes, with these results reaching the indicators of success. Hence, implementing flipped learning aided by flipbook media is deemed appropriate in contributing to the success of an instructional process. It aligns with the outcomes of research on the application of flipped learning for enhancing students' learning outcomes conducted by Triaji et al. (2022) which yielded results indicating that 61% of students did not meet the minimum completion criteria using conventional teaching methods in the first cycle. In contrast, in the second cycle, utilizing flipped learning, only 22% of students did not meet the minimum completion criteria. It signifies that flipped learning has a more favorable impact on students' learning outcomes than conventional teaching methods.

This research also demonstrates that using flipbook instructional media can enhance cognitive learning outcomes, consistent with several previous studies that have indicated how using electronic instructional materials in the form of flipbooks can improve cognitive learning results. Some of the previous studies include research conducted by (Andan & Yulian, 2018; Hayati et al., 2015; Wibowo et al., 2018; Yulaika et al., 2020). According to Yulaika et al. (2020), using flipbook learning media can enhance cognitive learning outcomes. This is because students perceive the material to be more comprehensible, aided by visual representations such as images and videos, both in the learning materials and practice questions. Using flipbook teaching materials is considered more effective and efficient, as students can use flipbooks anywhere and anytime according to their needs.

Furthermore, the ability of critical thinking is a fundamental skill that students should possess. By mastering this skill, students can be assisted in addressing simple and complex problems. The enhancement of critical thinking abilities is derived from the observations conducted by the researcher. A comparison of the obtained data regarding students' critical thinking abilities between Cycle I and Cycle II can be observed in Figure 2.
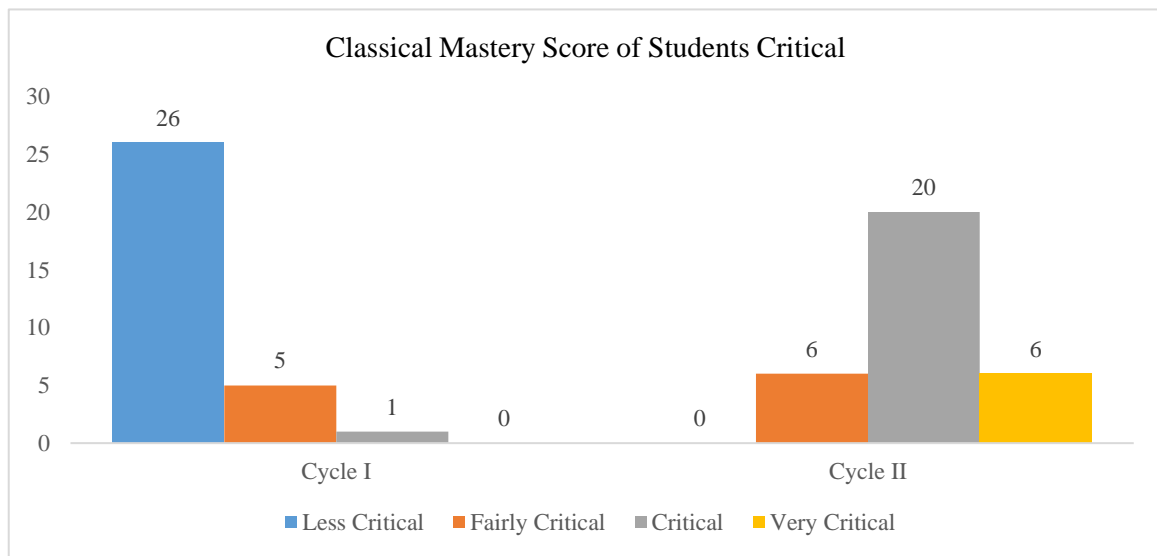
Figure 2. Graph of the Comparison of Students' Critical Thinking Abilities

The graph shows a decrease in data from Figure 2. It indicates the students' critical thinking abilities in implementing flipped learning assisted by flipbook media on the plant world. The results obtained in cycle I show only one student with the criteria 'critical,' 5 students with 'fairly critical' criteria, and 26 students with 'less critical' criteria. Due to the students' conditions, they are still less active during the learning activities, and the classroom atmosphere is not conducive enough. Therefore, the researcher made changes and improvements in the learning process. In Cycle II, there are six students with the criteria 'very critical,' 20 students 'critical,' and six

students with 'fairly critical' criteria. The data shows that this critical thinking ability has already achieved the predetermined success indicator and falls within the "critical" criteria. It aligns with the results of the flipped learning research in enhancing students' critical thinking abilities on photosynthesis conducted by Tresnawati et al. (2022), which found that effective implementation of flipped learning can enhance students' critical thinking abilities.

This research result also indicates that the instructional media in a flipbook can enhance students' critical thinking abilities, aligning with the research conducted by (Aprilia, 2021). The utilization of flipbook media in enhancing students' critical thinking abilities significantly influences both educators and students. Educators can facilitate the delivery of content in the science subject by employing flipbook media. Regarding students, it becomes easier for them to comprehend the taught material through flipbook media. Similarly, interactive and enjoyable content within the flipbook media, such as instructional recordings, text, and illustrative examples in images, tests, and various other exercises, proves to be highly efficient in training students' critical thinking abilities.

Based on the graphic from the learning outcomes of cognitive learning and critical thinking abilities, it can be said that the application of flipped learning aided by the media flipbook in the subject matter of the plant world has an impact on the cognitive learning outcomes and critical thinking abilities of students. Because learning using flipped learning, aided by the media flipbook, makes students more engaged in learning activities, they also become more enthusiastic about learning and feel motivated. The material becomes more accessible for students to understand, resulting in an improvement in students' cognitive learning outcomes and critical thinking abilities.

CONCLUSION

Based on the research results and discussion, it can be concluded that teaching using flipped learning with flipbook media can enhance cognitive learning outcomes. It can be demonstrated by achieving classical mastery in Cycle I, reaching 19%, and in Cycle II, reaching 97%. Flipped learning with the support of flipbook media also improves students' critical thinking abilities. It is evident from the results of students' critical thinking in Cycle I, where one student met the critical criteria. In Cycle II, six students were classified as having very critical criteria, while 20 were classified as having critical criteria.

REFERENCES

Ahmed, H. O. K. (2016). Flipped learning as a new educational paradigm: An analytical, critical study. *European Scientific Journal*, *12*(10), 417–444. https://doi.org/10.19044/esj.2016.v12n10p417

Andan, D. T., & Yulian, M. (2018). Pengembangan bahan ajar electronic book menggunakan software Kvisoft flipbook pada materi hukum dasar kimia di SMA Negeri 1 Panton Reu Aceh Barat. *JIPI: Jurnal IPA Dan Pembelajaran IPA*, *2*(1), 1–6. https://doi.org/10.24815/jipi.v2i1.10730

Aprilia, T. (2021). Efektivitas penggunaan media sains flipbook berbasis kontekstual untuk meningkatkan kemampuan berfikir kritis siswa. *Jurnal Penelitian Ilmu Pendidikan*, *14*(1), 10–21. https://doi.org/10.21831/jpipfip.v14i1.32059

Damayanti, A. N., & Raharjo. (2020). Validitas flipbook interaktif pada materi sistem pernapasan manusia untuk melatihkan kemampuan berpikir kritis siswa kelas xi sma. *Jurnal BioEdu*, *9*(3), 443–450. https://doi.org/10.26740/bioedu.v9n3.p443-450

Farhana, H., Awiria, & Muttaqien, N. (2019). *Penelitian tindakan kelas*. Harapan Cerdas.

Fithriyah, I., Sa'dijah, C., & Sisworo. (2016). Analisis kemampuan berpikir kritis siswa kelas ix-d SMPN 17 Malang. *Prosiding Konferensi Nasional Penelitian Matematika Dan Pembelajarannya*, *1*, 580–590. https://publikasiilmiah.ums.ac.id/handle/11617/7000

Harefa, D. (2020). Peningkatan prestasi belajar IPA siswa pada model pembelajaran learning cycle dengan materi energi dan perubahannya. *Trapsila: Jurnal Pendidikan Dasar*, *2*(1), 25–36. http://dx.doi.org/10.30742/tpd.v2i01.882

Hayati, S., Budi, A. S., & Handoko, E. (2015). Pengembangan media pembelajaran flipbook fisika untuk meningkatkan hasil belajar peserta didik. *Prosiding Seminar Nasional Fisika*, *4*, 49–54. https://journal.unj.ac.id/unj/index.php/prosidingsnf/article/view/4810/3587

Hidayah, R., & Pujiastuti, P. (2016). Pengaruh PBL terhadap keterampilan proses sains dan hasil belajar kognitif IPA pada siswa SD. *Jurnal Prima Edukasia*, *4*(2), 186–197. https://doi.org/10.21831/jpe.v4i2.7789

Julinar, J., & Yusuf, F. N. (2019). Flipped learning model: Satu cara alternatif untuk meningkatkan keterampilan berbicara siswa. *JPP: Jurnal Penelitian Pendidikan*, *19*(3), 366–373. https://doi.org/10.17509/jpp.v19i3.22330

Manullang, S., Harunasari, S. Y., & Chairiyati, I. (2019). Meningkatkan keterampilan berbicara siswa dengan pendekatan flipped learning menggunakan Whatsapp. *Prosiding Seminar Nasional Pendidikan STKIP Kusuma Negara*, 1–6. https://jurnal.stkipkusumanegara.ac.id/index.php/semnara2019/article/view/337/302

Muga, W., Oje, M. S., & Laksana, D. N. L. (2018). Hasil belajar kognitif siswa SD dalam pembelajaran kontekstual media Mazi (studi pada siswa SD kelas tinggi). *JET; Journal of Education Technology*, *2*(1), 20–25. https://doi.org/10.23887/jet.v2i1.13802

Parlin, I. D. P. L., Iswanto, B. H., & Budi, A. S. (2015). Pengembangan media pembelajaran berbasis Kvisoft untuk meningkatkan pemahaman konsep peserta didik pada materi medan magnet. *Prosiding Seminar Nasional Fisika*, *4*(1), 135–140. https://journal.unj.ac.id/unj/index.php/prosidingsnf/article/view/4685

Putri, L. S., & Hasbiyati, H. (2019). Pemanfaatan media pembelajaran berbasis Smartphone pada materi pencemaran lingkungan untuk meningkatkan hasil belajar siswa. *Jurnal Bioshell*, *8*(2), 58–60. https://doi.org/10.36835/bio.v8i2.916

Ramadhanti, A., & Agustini, R. (2021). Analisis keterampilan berpikir kritis peserta didik melalui model inkuiri terbimbing pada materi laju reaksi. *Jurnal Kependidikan: Jurnal Hasil Penelitian Dan Kajian Kepustakaan Di Bidang Pendidikan, Pengajaran Dan Pembelajaran*, *7*(2), 385–394. https://doi.org/10.33394/jk.v7i2.3458

Setiana, D. S., & Purwoko, R. Y. (2020). Analisis kemampuan berpikir kritis ditinjau dari gaya belajar matematika siswa. *Jurnal Riset Pendidikan Matematika*, *7*(2), 163–177. https://doi.org/10.21831/jrpm.v7i2.34290

Susanti, L. R. R. (2020). Pengembangan e-modul berbasis software flipbook makero materi peninggalan megalitik Pasemah dalam mata kuliah sejarah Indonesia kuno di FKIP Universitas Sriwijaya. *El-Buhuth: Borneo Journal of Islamic Studies*, *3*(1), 11–20. https://doi.org/10.21093/el-buhuth.v3i1.2790

Tresnawati, C., Aryanti, F., & Suhaerah, L. (2022). Flipped learning dalam meningkatkan berikir kritis mahasiswa pada materi fotosintesis dimasa pandemik covid-19. *Biosfer: Jurnal Biologi Dan Pendidikan Biologi*, *7*(1), 41–49. https://doi.org/10.23969/biosfer.v7i1.5752

Triaji, A. H., Fitrianna, A. Y., & Zanthy, L. S. (2022). Penerapan model flipped learning terhadap peningkatan hasil belajar siswa pada materi pertidaksamaan irasional. *JPMI: Jurnal Pembelajaran Matematika Inovatif*, *5*(3), 813–820. https://doi.org/10.22460/jpmi.v5i3.813-820

Wahyuni, S. (2018). Implementasi pendekatan sainstifik pada pelajaran biologi untuk meningkatkan hasil belajar kognitif dan keterampilan sains siswa kelas xi-IPA SMA

Negeri 2 Lambandia, Kab. Kolaka Timur-Sultra. *Jurnal Pendidikan Biologi*, *9*(2), 47–55. http://dx.doi.org/10.17977/um052v9i2p47-55

Wibowo, E., Pratiwi, D. D., Islam, U., Raden, N., Lampung, I., Endro, J., & Putra, Y. (2018). Pengembangan bahan ajar menggunakan aplikasi Kvisoft flipbook maker materi himpunan. *JDesimal: Jurnal Matematika Matematika*, *1*(2), 147–156. http://dx.doi.org/10.24042/djm.v1i2.2279

Yulaika, N. F., Harti, & Sakti, N. C. (2020). Pengembangan bahan ajar elektronik berbasis flipbook untuk meningkatkan hasil belajar peserta didik. *Jurnal Pendidikan Ekonomi, Manajemen dan Keuangan*, *4*(1), 67–76. https://doi.org/10.26740/jpeka.v4n1.p67-76

The effectiveness of video-assisted asynchronous learning on students' learning outcomes in the subject of akidah akhlak

Alvian Nur Jamil*, Muhammad Thohir [iD]

Universitas Islam Negeri Sunan Ampel Surabaya.

* Corresponding Author. E-mail: alvian.noe76@gmail.com

ARTICLE INFO

ABSTRACT

The role of technology in the education sector is increasing and has impacted the realm of learning activities. Technology-integrated learning is highly needed to facilitate both teachers and students in their activities. Using asynchronous learning models provides flexibility with easy and efficient access in terms of time. The research aims to describe the implementation of the asynchronous learning model assisted by videos in the subject of *akidah akhlak*, as well as the learning outcomes of the experimental and control groups, and the effectiveness of the asynchronous learning model assisted by videos in improving student learning outcomes. The research method used is quantitative with a proper experimental design. The experiment takes the form of a pretest-posttest control group design, with an experimental class receiving treatment in the form of asynchronous learning assisted by videos, and a control class implementing conventional methods. The research results show that the questionnaire on video implementation obtained a TCR score of 82.95% for variable X and 81.79% for variable Y, both falling within the 81-100% interval scale, indicating a "Very Good" category. The post-test results of the experimental class yielded a score of 86.43, while the control class scored 76.57. The paired sample t-test showed an average difference of 15.29 for the experimental class, while the control class had an average difference of 8.71, with a n-gain value of 0.27 for the control class, indicating a "low" category, whereas the experimental class had a n-gain value of 0.53, falling within the "middle" category. The implementation of engaging video learning media creates a non-monotonous learning atmosphere, and the questionnaire on video implementation received a "Very Good" rating. The use of the asynchronous learning model assisted by videos effectively improves student learning outcomes in Islamic creed and ethics, as evidenced by a larger difference in the experimental class compared to the control class.

INTRODUCTION

In the 4.0 industrial revolution era, technological advances are increasingly being incorporated into the education sector. Various schools or educational institutions are competing to enhance further technology's role in technical administration and learning activities. Syamsuar and

Reflianto (2019) say that technology can easily replace conventional mechanisms with more advanced human power. Similarly, Lestari et al. (2022) said that technology could also enhance the human role in automating information provision and reconstruction.

The next issue is the capacity of human resources to use technology. In other words, it is about teachers who can adapt technology to learning activities. Andina (2019) said that the teacher's competence should be further developed because it is very influential in determining the students' learning process. Sunarsi (2018) also said that the development of human resources is an activity that is carried out so that knowledge, ability, and skills are adapted to the demands of the job. When associated with educators, the aim is to meet the objectives of the educational institutions or, more broadly, the national educational objectives.

In addition to the development of teacher competence, there are aspects of teaching and learning activities that need to be developed, such as the use of learning content, the formulation of assessments, the formulation of learning objectives, the formulation of learning materials to identify the needs of students based on their character, in order to support good learning (Wardhana, 2020). In applying these aspects of learning, many methods can be used. One of them is e-learning, which is one of the methods that uses technology.

In its application, e-learning can be divided into different types. According to Putri and Setiawan (2020), two types of online learning can be applied: asynchronous and synchronous. Asynchronous learning has the characteristics of learning that can be done anywhere, and there are no time limits. Students can learn independently but still get material guidance from teachers. The most commonly used media platforms are Google Classroom, WhatsApp, email, YouTube, etc. Synchronous learning is a type of learning where the teacher and student interaction coincides in real-time.

Some studies say that asynchronous learning is more effective when it is set and has a good impact on students' values (Ronny et al., 2019). However, in another study, Arianto et al. (2022) say synchronous learning is better for learning because it is done in real time, as if it were face-to-face, and the real-time involvement or time presented can help avoid miscommunication. In addition, online learning has the added benefit of improving teachers' skills in using online learning tools and their supporting applications, and students feel they are better prepared and able to organize and manage their learning online (Jatmiko, 2022).

On the subject of *akidah akhlak*, the main focus is to inculcate Islamic values in behavior and action. Amin in Ginanjar & Kurniawati (2017) said that akhlak is a deliberate and planned effort to help students to know, understand, feel and believe in Allah Swt, which is achieved through the activities of guidance, teaching, and practice and the application of these values in daily life.

However, based on the researchers' observations of the application of academic learning, the reality is that there are still obstacles, especially in MAN 1 Lamongan where learning is monotonous in the use of methods or media. Thus, the learning process is less attractive and leads to low access to students' competence. The research also aims to uncover the impact of learning loss caused by the long-distance application of the Covid-19 pandemic time. According to the data, 50.9% of teachers believe that students experience a decline in access to learning in different subjects, and 37% even believe that there is a decline in student access across the subject. Only 12.1% believe student access will not decrease during the pandemic (Medcom.id, 2021).

The problem prompted the researchers to reveal the facts in the field, especially in MAN 1 Lamongan, and not found other researchers who revealed the same problem on the object of research. Specifically, this study wants to link the urgency of the subject of akidah akhlak, which often involves understanding the ethical and moral values in Islam. The researchers want to explore how asynchronous learning methods supported by video can help students understand and internalize the values of Islam, which has not yet been explored to integrate such methods and media in morality subjects.

In this case, educators must always be creative in their choice of media or teaching methods to improve and enhance the students' experience. The use of video media will be more helpful in improving students' memory of learning material. As they say Wisada et al. (2019), the video assistant has a lot of information and data that does not need to be printed, which can be moving

images with voice or can be added to a new dimension. In line with this, Yudha and Sundari (2021) said that in visual learning, presentations contribute 75%, hearing 13% and other senses remain. It does not matter the condition and ability of the students. Everyone has a difference.

Similar research was conducted by Nurwahidah et al. (2021) and Purwanti (2015), which showed that the choice of learning video media is very beneficial in delivering messages in the teaching-learning process. In this regard, Nuritha and Tsurayya (2021) said that video is effectively used as a student medium for learning activities that can improve independent learning. Atmawati (2021) said that implementing asynchronous learning with Google Classroom can make students 95% active and positively influence material mastery as learning results increase. With this, Siswanto et al. (2021) showed that the application of asynchronous learning positively impacts student motivation and learning outcomes.

The study aims to investigate video learning, the learning outcomes of experimental and control classes, and the effectiveness of the asynchronous model of video-supported learning in ethics. Students are introduced to flexible and interactive learning methods. The videos presented help students to better understand essential concepts and moral values through practical examples, visual illustrations, and engaging narratives. With an exciting learning experience and the ability to learn independently, students can deepen their understanding of morality, potentially improving their learning outcomes in these subjects.

Ultimately, this study seeks to explore how innovation in technology and education can affect student learning outcomes. The results of this research are expected to contribute to the development of education, especially in the use of learning media technology. Specifically, this research can be used as an alternative for MAN 1 Lamongan teachers in applying asynchronous learning using video learning media.

METHOD

The research method used is quantitative with a proper experimental form. The experimental form of the pretest-posttest control group design is shown in Table 1. Thus, in this study, experimental classes are given asynchronous learning treatments that support video and control classes that use conventional methods. The research was conducted at MAN 1 Lamongan from October 2021 to February 2022. As for the population in the study, there were 39 classes with a cumulated quantity of 1284 students, with a sample of 2 classes of 70 students.

Asynchronous learning uses Google Classroom platforms, e-learning madrasah, and YouTube, which are used to provide materials, collective tasks, and indirect comments between teachers and students. A pretest is given at the beginning of the lesson and a post-test at the end.

Table 1. Comparison Class Experiment and Control

Group	Pretest	Treatment	Post-test
Experiment	O_1	X	O_2
Control	O_2	-	O_4

Table 1 outlines the research subjects to be studied. The classification has designated class XI MIPA 5 as the experimental group and class XI MIPA 6 as the control group. Both groups underwent a pretest before treatment to determine their initial conditions. The experimental group (O1) received treatment (X) through video learning. In addition to the group undergoing conventional treatment (-) and the control group (O2), the research was carried out over five months at MAN 1 Lamongan. The following research plan was formulated based on the design.

Figure 1 demonstrates that the research commences with determining the learning materials employed. Additionally, a research tool was developed as a test question and evaluated by subject matter experts, media authorities, and experts in research materials involving Moh. Munari, an *akidah akhlak* teacher at MAN 1 Lamongan, and Agus Harianto, S.Ds, M.Kom, a product design teacher at MAN 1 Lamongan and a multimedia lecturer at a private university, served as validators

due to their expertise. The pretest and post-test were conducted online via Google Forms. The resulting data was analyzed using the paired sample t-test and the gain test to assess progress.
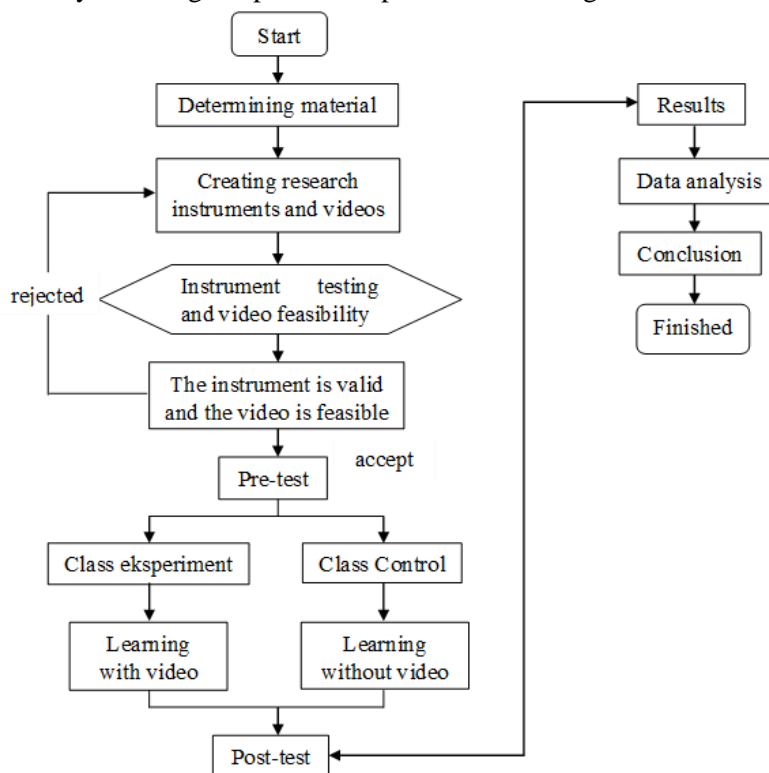
Figure 1. Research Design

Regarding the instrument's validity, the binary correlation coefficient formula indicates a table r result of 0.361, where n = 30 and α is 5%. Of the 25 questions in the test, 20 are deemed valid, and five are deemed invalid. Only 20 valid questions will be utilized for the research instrument, as the other five questions have been deemed invalid. The instrument's reliability has also been confirmed by calculating the r_{xy} coefficient, which yielded a value of 0.93 and the r_{11} value of 0.96. As per the coefficient classification table submitted by Guilford, these results place the instrument in the "Very High" category for reliability.

RESULTS AND DISCUSSION

Results

The results of the pretest and post-test among both experimental and control groups can be seen in Table 2. The average value of the pretest measurement for the experimental group was 71.14, compared to the control group's average pretest score of 67.86. In the post-test, the experimental group had an average score of 86.43, while the control group's average was 76.57. It should be noted that both classes had a total of 35 students.

Table 2. Learning Outcomes Class Experiment and Control

	Experiment	Control	
Students Quantity (N)	35	35	
Data Pretest	71.14	67.86	
Data Post-Test	86.43	76.57	
Gain Test	0.53		0.27

Table 3 illustrates normality data for the pretest and post-test in the experiment and control classes. The value of the experiment class is 0.085, whereas the control class is 0.065. Both values fall under the "sig. (2-tailed) > 0.05" category, demonstrating no deviation in data normality

Further, during the post-test, the "sig. (2-tailed)" value for the experimental group was 0.072, compared to 0.074 in the control group. Both values were found to be above the "sig.2 (tailed) > 0.05" level, indicating that (Ha) was rejected while (Ho) was accepted. It suggests that there is no significant difference in the post-test data's normality; therefore, we can assume that they are normally distributed.

Table 3. Pretest Normality

Data	Class	Sig. (2-tailed)	Description
Pretest	Experiment	0.085	Normal
	Control	0.065	Normal
Post-test	Experiment	0.072	Normal
	Control	0.074	Normal

Table 4. Pretest Homogeneity

Data	Sig.	Levene Statistic	Description
Pre-Test	0.417	0.667	Homogen
Post-Test	0.47	2.151	Homogen

In Table 4, the Levene Statistic is used to obtain values for the pretest sig. 0.417 and post-test sig. 0.147, both of which are not statistically significant ($p > 0.05$). It should be noted that the data was collected from populations with similar variations.

Table 5. Pretest Mean Difference

Pretest	Variances Assumed. Sig.(2-tailed)	Description
Experiment and Control	0.181	No Difference

Based on the statistical tests on the pretest experimental and control class, as shown in Table 5, the obtained sig. (2-tailed) level was 0.181, which is higher than the predetermined threshold of 0.05. It implies that the null hypothesis (Ho) should be accepted. Therefore, it can be deduced that there are no significant differences in the initial abilities of the control and experimental classes. Thus, the two groups can be equitably compared in this research.

To investigate discrepancies in the academic achievement of students in the experimental and control classes, a paired-sample t-test using parametric statistics was performed. The subsequent results are presented below.

Table 6. Paired Sample t-test

Class	Data	Average	Average Difference	Sig.(2-tailed)	Criteria
Experiment	Pretest	71.14	15.29	0.00	There are differences
	Post-Test	86.43			
Control	Pretest	67.86	8.71	0.00	There are differences
	Post-Test	76.57			

Table 6 shows that the significance (2-tailed) for the experimental and control groups is 0.00, below the 0.05 threshold. Hence, the null hypothesis (Ho) is rejected, and the alternative hypothesis (Ha) is accepted. It indicates a significant difference between the two classes when considering the difference in the initial and final test results on average. Specifically, the experimental class achieved an average difference of 15.29, while the control class obtained a mean difference of 8.71. The results demonstrate that the average differences in the experimental classes are more significant than those in the control classes.

Table 7 portrays the average improvement in the learning outcomes of both the experimental and control classes and the results of the gain test.

Table 7. Gain Test of Experimental and Control Classes

Class	Average Grade Pretest	Average Grade Post-Test	Increase (N Gain)	Criteria
Experiment	71.14	86.43	0.53	Middle
Control	67.86	76.57	0.27	Low

The gain test shows that the difference between the post-test and the pretest indicates increased learning outcomes for students in the experimental class compared to the control class. The N Gain score for the control class is 0.27, which meets the "low" criterion. However, the experimental class achieved an N Gain score of 0.53, which meets the criterion for "middle."

Additionally, in the experimental class at MAN 1 Lamongan, asynchronous learning-assisted videos were implemented to enhance academic lessons. To determine the results, the author conducts a respondent access rate test on variables (X) and (Y), as presented in Figure 2.
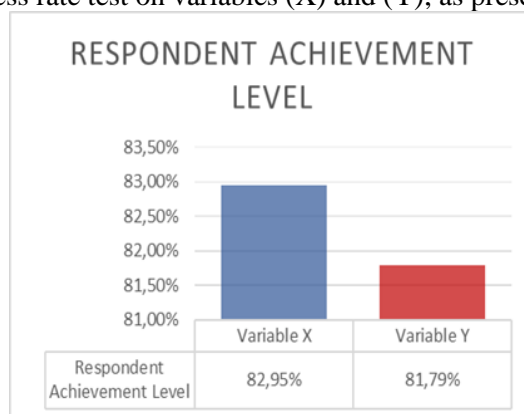

Figure 2. TCR Test Results

Figure 2 depicts the outcomes of implementing asynchronous learning with video assistance, which students receive following classroom activities in a test environment. According to the respondent's access rate test, video learning, denoted as variable (X), achieved an 82.95% score, whereas learning outcome, denoted as variable (Y), achieved 81.79%. Both scores were within the 81-100% category termed "Very Good."

The validation performed by subject matter and media specialists is displayed in the subsequent Table 8:

Table 8. Expert Team Validation Results

Validators	Score	Category
Content Expert	118	Very Worthy
Media Expert	64	

Table 8 displays the validity test outcomes, evidencing the very worthy status of the video media with a total score of 64 out of 70. The material expert rated it 118 out of 125. Furthermore, the validity of the video media, as evaluated by both media and material experts, is positioned lies on the scale $S_{min} + 4P \leq ST \leq S_{maks}$ between classified as "Very Worthy."

In the research phase aimed at determining students' learning outcomes, a pretest is required before the commencement of the learning activities. Subsequently, a post-test is conducted after the completion of the learning activities. The outcomes are presented in Figure 3.

According to Figure 3, the experimental class had an average pretest score of 71.14, while the control class achieved 67.86. In the post-test, the experimental grade increased to 86.43, while the control class recorded an average of 76.57, indicating that it did not meet the minimum limit. Moreover, the average post-test score of the experimental class, which is higher than the minimum satisfaction criterion established by the MAN 1 Lamongan, is 80.
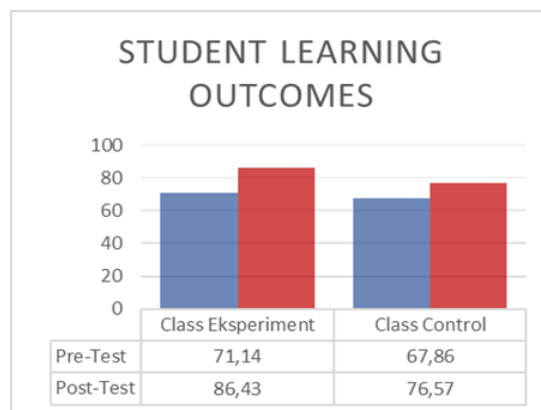
Figure 3. Student Learning Outcomes

To evaluate the effectiveness of the experimental class, normality, and homogeneity tests were conducted on both the experimental and control groups. The obtained data showed normal and homogenous distribution, following which the paired sample t-test was conducted. The results showed that the experimental class yielded a sig. (2-tailed) value of 0.00 and an average difference of 15.29 between the two pairs of samples. Meanwhile, the control group also obtained a sig. (2-tailed) of 0.00 and a mean difference of 8.71, indicating a statistically significant difference between the experimental and control groups in the pre-and post-test averages. Refer to Figure 4 and Figure 5 for further details.
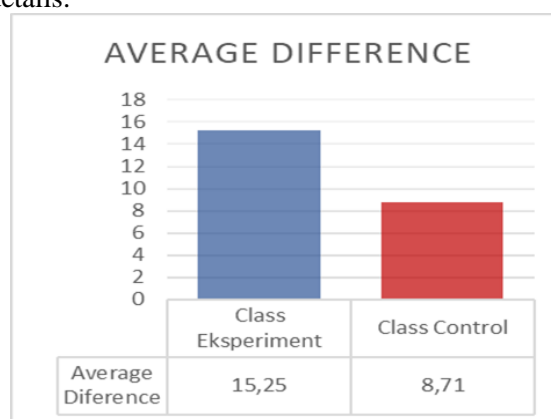
Figure 4. Average Difference
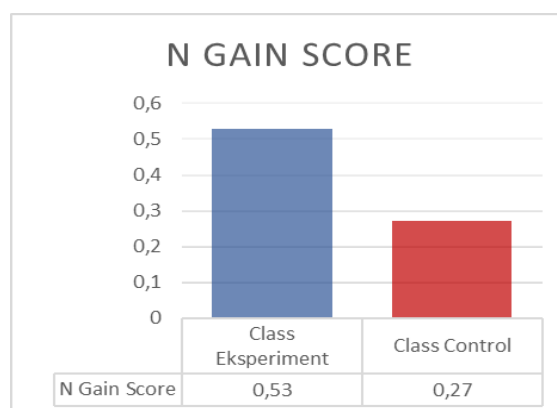
Figure 5. N Gain Score

sBased on the data, the average difference between the experimental and control groups indicates that the experimental classes have higher values. Specifically, experimental classes achieved a gain test score of 0.53, classifying them as "middle," while control classes achieved a

gain test score of 0.27, classifying them as "low." There is a significant difference in average learning outcomes between the experimental and control classes, with the experimental group exhibiting more significant improvement.

Discussion

The learning video was implemented in the experimental class during two class meetings, totaling 52 minutes. Both variables (X) and (Y) were rated excellent based on the respondents' access rate. The use of video media was well received by students, demonstrating high enthusiasm and strong support for participation in the learning process. Video-based learning is not a recent phenomenon. Although it is a medium employed by only a few educators at MAN 1 Lamongan, students should pay closer attention to this rarely utilized method. Supporting this notion, Qurrotaini et al. (2020) assert that video-based learning positively impacts student motivation and interest in learning. Similarly, Panggabean et al. (2021) stated that incorporating video learning media could enhance student comprehension and motivation.

Sitepu (2022) argues that utilizing various forms of media is crucial for successful learning and plays a central role in the learning system. Media utilization can create a more diverse and engaging learning experience, promoting student interest and contentment. For instance, media that incorporates captivating colors can be beneficial for students with a fascination for color, and media that cater to students' interests in objects or other subjects can be specifically designed and adapted to accommodate their preferences. Video learning media can enhance students' absorption and memory, facilitating their comprehension of the learning material (Khairani et al., 2019). Additionally, students benefit from the flexibility to review and reinforce the material via replaying the video content provided by the educator.

Validation is essential to ensure that the learning video content is appropriate. The results of material expert and media classification were excellent. Prior to product application, the input of a team of validation experts is necessary to advise and provide constructive criticism on product validity and conduct a thorough analysis of the same (Dewi & Handayani, 2021). Earlier on, video media creation, particularly in asynchronous learning, required an approach that could enhance the sense of student presence. It can be achieved by adding narratives that are fundamental in building student motivation, enabling students to represent their learning more realistically (Ribosa & Duran, 2023).

In referring to the results of the pretest and post-test, it was found that the average values obtained by experimental classes that used learning media were higher than those of the control classes that employed conventional methods. Other research has suggested that the instructor's choice of media characteristics plays a significant role in the success of asynchronous learning. Choosing the most appropriate media may boost student motivation. However, an incorrect choice of media could decrease learners' interest (PerryPerry et al., 2022). It highlights the crucial role of teachers in facilitating asynchronous learning as both guides to ensure progress and motivators for students to engage. This phenomenon puts the competence of teachers to the test.

Teacher competence has a significant impact on learning outcomes. Teachers who demonstrate mastery of the material and its approach can effectively support improving students' learning outcomes (Dakhi, 2020). Similarly, research conducted by Wahyuningtyas and Sulasmono (2020) showed that teachers' use of learning media can enhance student understanding of course material and ultimately improve learning outcomes. Teachers' use of learning media can aid comprehension of learning materials, leading to improved learning outcomes. When students attain satisfactory learning outcomes, the goals of learning can be accomplished. In addition, learning media offers other advantages, such as students not relying solely on teacher explanations. However, disregarding the application, for example, insufficiently synchronizing the content with the video display or poor time management, creates an unnatural learning experience and evokes a pessimistic response from students (Okabe-Miyamoto et al., 2022). It requires supporting strategies such as explicit instruction mentoring questions, which are necessary to trigger elaboration to improve student learning outcomes.

Further investigation revealed that implementing video-based learning had a positive impact on enhancing student learning outcomes. The experimental class demonstrated higher pretest and

post-test scores than the control group average. It supports our research hypothesis that integrating video-aided asynchronous learning would improve learning outcomes more effectively. Furthermore, the t-test sample results indicated significant positive differences between the initial and final test values. Learning results play a vital role in providing feedback to teachers on students' learning progress. According to Nabillah and Abadi (2020), learning results can inform educational policies and determine the continuation of the learning process. Similar to Rapono et al. (2019), the assessment results function as a means of ascertaining the students' ability to comprehend various aspects of the course material in alignment with the learning objectives.

Based on the gain test results, it is evident that the experimental class reached one classification level higher than the control class. It indicates a significant difference in the average learning outcomes between the experimental and control classes. Therefore, it can be concluded that video-assisted asynchronous learning is more effective in enhancing learning outcomes. Following these findings, Ridha et al. (2021) stated that video media is particularly effective in the asynchronous learning model, as it assists students in distance learning without any time constraints. Additionally, it spurs educators to generate and create innovative learning videos, thereby enhancing time efficiency. Similarly, Setiawan et al. (2019) concurred that using the appropriate model, supplemented with the appropriate materials, can lead to optimal learning outcomes.

In a previous study, Zeng and Liu (2021) discovered that using media in learning materials can enhance student cognition. The media aids students' comprehension and focus during the teaching and learning process. According to relevant theory, the significance of media extends beyond mere communication and plays an essential role in cognition. Relevant content can act as an external stimulus or internal representation contributing to the cognitive process (Bujang & Subset, 2022). According to another perspective, instructors can organize asynchronous learning for distance education. In contrast, self-paced learning scenarios utilize worksheets and instructional videos as guides to attract students' attention and provide solutions to distance learning difficulties (Flegr et al., 2023).

Regarding the study's contribution to designing educational videos, it is essential to adhere to design principles that ensure appropriateness for the material and activities that support cognitive processing and engage thinking activities (Waluyohadi & Lopatka, 2022). However, teachers need to take into account individual differences beyond cognitive activities. For instance, students will likely be more motivated to engage with educational videos and comprehend their content effectively if they employ supplementary learning tactics. This research suggests that student motivation and achievement goals can play a role in determining how students are incentivized to learn in multimedia environments. Students focus on mastering a subject are likely to gain from a multimedia learning environment with instructional videos. However, students prioritizing the outcome over attaining an in-depth understanding or knowledge may not receive the same advantages.

Therefore, it is suggested that practitioners and researchers explore methods to engage outcome-focused students in designing, creating, and implementing educational videos with supplementary techniques, including furnishing targeted remarks on personal learning objectives in comparison with general attainment criteria. Employing such an approach could prompt achievement-orientated scholars to reconsider their views and appreciate the instructional content delivered by the teacher.

Additionally, it is essential to note that this study has limitations. For example, the research sample may be limited in size and representativeness. It means that whether the research sample includes a variety of student backgrounds or is limited to specific groups may affect the generalisability of the research findings. Secondly, the research findings will have greater significance for cohorts of students who possess the required skills to utilize learning technology and have access to necessary facilities. In order to obtain more widely applicable results, future investigations must expand their sample size or include students from diverse backgrounds.

Thirdly, when planning lessons, it is necessary to consider external variables like family support, student motivation, or even video media quality, as students may have different interests.

Another limitation of this study is time, which may render it irrelevant in the long term. It is well known that technology and learning approaches will continue to evolve, and what is effective today may not be so in the future. Therefore, forthcoming research must align with the trends in technology development and applicable learning strategies.

Fourth, this is about assessing the effectiveness of students' learning based on the duration they spent watching the video. The time spent on a learning video may not guarantee that a student has grasped the comprehension of the content. Nonetheless, the study employed a multimedia learning video that adhered to multimedia design principles and was authenticated by professionals. It aligns with the research outcomes by Kuhlmann et al. (2023). Irrespective of the impact of the application of video learning media, students are more motivated to watch learning videos if the videos are relatively short. Therefore, teachers should provide content in learning videos that is meaningful but also short.

In addition, the research could use other data, such as digital footprint data, to better understand how students process the material presented in the video learning media. For information, digital footprints can provide insights into how often students use video interface features, pause, play, and scroll forward or backward through the video. These measures can enhance comprehension of the relationship between supporting the achievement of learning objectives and different student behaviors during video viewing.

CONCLUSION

The implementation of exciting learning video media has a positive impact on students' motivation and enthusiasm for the learning process. A varied and non-monotonous learning approach makes the learning atmosphere more colorful and students more motivated. The study results show that video learning applied to variables x and y achieved a "Very Good" rating on the 81% -100% scale. Implementing an asynchronous learning model has been instrumental in successfully enhancing student outcomes through video-mediated instruction, as demonstrated by experimental classes achieving significantly more significant improvement compared to their controlled counterparts. This effectiveness is further corroborated by the assessments of renowned material and media experts, categorized as "Very Worthy." However, further efforts towards enhancing the diversity of video media are necessary to provide comprehensive support to students' learning activities.

REFERENCES

Andina, E. (2019). Efektivitas Pengukuran Kompetensi Guru. *Aspirasi: Jurnal Masalah-Masalah Sosial*. https://doi.org/10.46807/aspirasi.v9i2.1103

Arianto, F., Bachri, B. S., & Mariono, A. (2022). Asynchronous dan Synchronous Learning pada Pendidikan Tinggi: Studi Komparasi. *Jurnal Ilmiah Mandala Education*, *8*(4), Article 4. https://doi.org/10.58258/jime.v8i4.4067

Atmawati, T. (2021). Pengaruh Forsway dalam Asynchronous Learning Berbasis Google Classroom Terhadap Keaktifan dan Penguasaan Materi Siswa. *JEMS: Jurnal Edukasi Matematika Dan Sains*, *9*(1), Article 1. https://doi.org/10.25273/jems.v9i1.8809

Bujang, G. R., & Subset, M. F. (2022). Pengajaran-Pembelajaran Bahan Seni Bahasa: Aplikasi Semantik Inkuisitif Dan Teori Relevans. *Practitioner Research*, *4*, 172–196. https://doi.org/10.32890/pr2022.4.10

Dakhi, A. S. (2020). Peningkatan Hasil Belajar Siswa. *Jurnal Education and Development*, *8*(2), 468–468. https://journal.ipts.ac.id/index.php/ED/article/view/1758.

Darma Wisada, P., Sudarma, I. K., & Yuda S, Adr. I. W. I. (2019). Pengembangan Media Video Pembelajaran Berorientasi Pendidikan Karakter. *Journal of Education Technology*. https://ejournal.undiksha.ac.id/index.php/JET/article/view/21735

Developer, medcom id. (2021, November 20). *Survei ?IDEAS Beberkan Fakta Penurunan Kualitas Pendidikan Selama PJJ*. medcom.id. https://www.medcom.id/pendidikan/news-pendidikan/ybJOvLWk-survei-ideas-beberkan-fakta-penurunan-kualitas-pendidikan-selama-

Dewi, F. F., & Handayani, S. L. (2021). Pengembangan Media Pembelajaran Video Animasi En-Alter Sources Berbasis Aplikasi Powtoon Materi Sumber Energi Alternatif Sekolah Dasar. *Jurnal Basicedu*, *5*(4), Article 4. https://jbasic.org/index.php/basicedu/article/view/1229

Flegr, S., Kuhn, J., & Scheiter, K. (2023). How to foster STEM learning during Covid-19 remote schooling: Combining virtual and video experiments. *Learning and Instruction*, *86*, 101778. https://doi.org/10.1016/j.learninstruc.2023.101778

Ginanjar, M. H., & Kurniawati, N. (2017). Pembelajaran Akidah Akhlak dan Korelasinya Dengan Peningkatan Akhlak al-Karimah Peserta Didik. *Edukasi Islami: Jurnal Pendidikan Islam*. http://jurnal.staialhidayahbogor.ac.id/index.php/ei/article/view/181

Jatmiko, B. (2022). Pelatihan Optimalisasi Media Pembelajaran Daring untuk Menunjang Synchronous dan Asynchronous Learning System. *International Journal of Community Service Learning*, *6*(1), Article 1. https://doi.org/10.23887/ijcsl.v6i1.43367

Khairani, M., Sutisna, S., & Suyanto, S. (2019). Studi Meta-Analisis Pengaruh Video Pembelajaran Terhadap Hasil Belajar Peserta Didik. *Jurnal Biolokus*, *2*(1), Article 1. https://doi.org/10.30821/biolokus.v2i1.442

Kuhlmann, S. L., Bernacki, M. L., Greene, J. A., Hogan, K. A., Evans, M., Plumley, R., Gates, K., & Panter, A. (2023). How do students' achievement goals relate to learning from well-designed instructional videos and subsequent exam performance? *Contemporary Educational Psychology*, *73*, 102162. https://doi.org/10.1016/j.cedpsych.2023.102162

Lestari, N. K. D., Kusumawati, N. P. A., & Nuratama, I. P. (2022). Peran Kompetensi Sumber Daya Manusia Dalam Memoderasi Hubungan Pemanfaatan Teknologi Informasi Dan Sistem Pengendalian Internal Terhadap Kualitas Laporan Keuangan LPD Se-Kecamatan Penebel. *Hita Akuntansi Dan Keuangan*, *3*(1), Article 1. https://doi.org/10.32795/hak.v3i1.2306

Nabillah, T., & Abadi, A. P. (2020). Faktor Penyebab Rendahnya Hasil Belajar Siswa. *Prosiding Sesiomadika*, *2*(1c), Article 1c. https://journal.unsika.ac.id/index.php/sesiomadika/article/view/2685

Nuritha, C., & Tsurayya, A. (2021). Pengembangan Video Pembelajaran Berbantuan Geogebra untuk Meningkatkan Kemandirian Belajar Siswa. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *5*(1), Article 1. https://doi.org/10.31004/cendekia.v5i1.430

Nurwahidah, C. D., Zaharah, Z., & Sina, I. (2021). Media Video Pembelajaran Dalam Meningkatkan Motivasi Dan Prestasi Mahasiswa. *Rausyan Fikr : Jurnal Pemikiran Dan Pencerahan*, *17*(1), Article 1. https://doi.org/10.31000/rf.v17i1.4168

Okabe-Miyamoto, K., Durnell, E., Howell, R. T., & Zizi, M. (2022). Video Conferencing During Emergency Distance Learning Impacted Student Emotions During COVID-19. *Computers in Human Behavior Reports*, *7*, 100199. https://doi.org/10.1016/j.chbr.2022.100199

Panggabean, F., Simanjuntak, M. P., Florenza, M., & Sinaga, L. (2021). *Analisis Peran Media Video Pembelajaran Dalam Meningkatkan Hasil Belajar Ipa Smp*. *2*(1). https://jurnal.unimed.ac.id/2012/index.php/JPPIPAI/article/view/24502

Perry, M., Bates, M. S., Cimpian, J. R., Beilstein, S. O., & Moran, C. (2022). Impacting Teachers' Reflection On Elementary Mathematics Classroom Videos In Online Asynchronous Professional Learning Contexts. *Teaching and Teacher Education: Leadership and Professional Development*, *1*, 100003. https://doi.org/10.1016/j.tatelp.2022.100003

Purwanti, B. (2015). Pengembangan Media Video Pembelajaran Matematika dengan Model Assure. *Jurnal Kebijakan Dan Pengembangan Pendidikan*, *3*(1), Article 1. https://ejournal.umm.ac.id/index.php/jkpp/article/view/2194

Putri, N. I. A. G., & Setiawan, R. (2020). Rancang Bangun Aplikasi Elearning. *Jurnal Sistem Informasi Dan Sains Teknologi*, *2*(1), Article 1. https://doi.org/10.31326/sistek.v2i1.672

Qurrotaini, L., Sari, T. W., Sundi, V. H., & Nurmalia, L. (2020). Efektivitas Penggunaan Media Video Berbasis Powtoon dalam Pembelajaran Daring. *Prosiding Seminar Nasional Penelitian LPPM UMJ*, *2020*(0), Article 0. https://jurnal.umj.ac.id/index.php/semnaslit/article/view/7869

Rapono, M., Safrial, S., & Wijaya, C. (2019). Urgensi Penyusunan Tes Hasil Belajar: Upaya Menemukan Formulasi Tes Yang Baik dan Benar. *JUPIIS: Jurnal Pendidikan Ilmu-Ilmu Sosial*, *11*(1), Article 1. https://doi.org/10.24114/jupiis.v11i1.12227

Ribosa, J., & Duran, D. (2023). Students' Feelings Of Social Presence When Creating Learning-By-Teaching Educational Videos For A Potential Audience. *International Journal of Educational Research*, *117*, 102128. https://doi.org/10.1016/j.ijer.2022.102128

Ridha, M., Firman, F., & Desyandri, D. (2021). Efektifitas Penggunaan Media Video pada Pembelajaran Tematik Terpadu di Sekolah Dasar Saat Pandemi Covid-19. *Jurnal Pendidikan Tambusai*, *5*(1), 154–162. https://doi.org/10.31004/jptam.v5i1.925

Ronny, C. C., Scuric, Z., Ethan, E., Cruser, S., Arndt, A., Cox, R., P. Toma, S., Sphiro, C., Fitzgerald, M. L., Barnes, G., & H. Crosbie, R. (2019). Student Satisfaction and Learning Outcomes in Asynchronous Online Lecture Videos. *CBE—Life Sciences Education*. https://www.lifescied.org/doi/full/10.1187/cbe.18-08-0171

Setiawan, R., Mardapi, D., Pratama, A., & Ramadan, S. (2019). Efektivitas Blended Learning Dalam Inovasi Pendidikan Era Industri 4.0 Pada Mata Kuliah Teori Tes Klasik. *Jurnal Inovasi Teknologi Pendidikan*, *6*(2), Article 2. https://doi.org/10.21831/jitp.v6i2.27259

Siswanto, S., Kartanagara, M. A. R., & Liu, S.-C. (2021). Pengaruh Penerapan Asynchronous Learning Dan Motivasi Belajar Terhadap Hasil Belajar. *Jurnal Kependidikan Penelitian Inovasi Pembelajaran*, *5*(1), Article 1. https://doi.org/10.21831/jk.v5i1.39420

Sitepu, E. N. (2022). Media Pembelajaran Berbasis Digital. *Prosiding Pendidikan Dasar*, *1*(1), Article 1. https://doi.org/10.34007/ppd.v1i1.195

Sunarsi, D. (2018). Pengembangan Sumber Daya Manusia Strategik & Karakterisrik Sistem Pendukungnya: Sebuah Tinjauan. *Jurnal Ilmiah MEA (Manajemen, Ekonomi, & Akuntansi)*, *2*(3), Article 3. https://doi.org/10.31955/mea.v2i3.461

Syamsuar, S., & Reflianto, R. (2019). Pendidikan Dan Tantangan Pembelajaran Berbasis Teknologi Informasi Di Era Revolusi Industri 4.0. *E-Tech : Jurnal Ilmiah Teknologi Pendidikan*, *6*(2), Article 2. https://ejournal.unp.ac.id/index.php/e-tech/article/view/101343

Wahyuningtyas, R., & Sulasmono, B. S. (2020). Pentingnya Media dalam Pembelajaran Guna Meningkatkan Hasil Belajar di Sekolah Dasar. *Edukatif : Jurnal Ilmu Pendidikan*, *2*(1), Article 1. https://doi.org/10.31004/edukatif.v2i1.77

Waluyohadi, & Lopatka, A. (2022). 90 Days to Achieve Monetization: Implementing Design Thinking in a YouTube Channel. *Procedia Computer Science*, *207*, 4207–4216. https://doi.org/10.1016/j.procs.2022.09.484

Wardhana, W. S. (2020). Strategi Pengembangan Kompetensi Guru Secara Mandiri Di Era Literasi Digital. *Prosiding Seminar Nasional Bahasa Dan Sastra Indonesia (Senasbasa)*, *4*(1), Article 1. https://doi.org/10.22219/.v4i1.3704

Yudha, J. R. P. A., & Sundari, S. (2021). Manfaat Media Pembelajaran Youtube Terhadap Capaian Kompetensi Mahasiswa. *Journal of Telenursing (JOTING)*. https://journal.ipm2kpe.or.id/index.php/JOTING/article/view/2561

Zeng, Y., & Liu, Y. (2021). Relevance Strategy in Reading and Reading Instruction. *Humanities and Social Sciences*, *9*(2), Article 2. https://doi.org/10.11648/j.hss.20210902.11

Developing augmented reality novel games as English learning media for reading narrative texts

Hajar Khoirunisa [ID]**, Tri Wahyuni Floriasti** *[ID]
Universitas Negeri Yogyakarta, Indonesia.
* Corresponding Author. E-mail: triwahyunifloriasti@uny.ac.id

ABSTRACT

Incorporating augmented reality (AR) into education is increasingly vital for fostering engagement and interactivity, particularly in language learning, where narrative text plays a central role. The objectives of this study were to (1) ascertain the participants' target demands, (2) analyze their English-language learning needs, and (3) create an augmented reality novel game as a teaching tool for narrative text. This research and development project (R&D) was conducted. Junior high schoolers were the subjects; they were 15 males and 17 females. This study was done using a 4-D model. Participants were given questionnaires to complete, and an English teacher was interviewed as part of the need analysis. The instruments used to collect the data were the needs analysis questionnaire, interview guidelines, expert judgment rating scale, and student review questionnaire. The result of this study is an augmented reality novel game as English learning media, which was created after taking into account the findings of the needs analysis, professional opinion, and student evaluation. It consists of narrative texts in general and augmented reality books that serve as instances of narrative texts. The developed media's overall average score was 3.65. The created interactive learning multimedia was therefore categorized as suitable. According to the students' review findings, most augmented reality novel games are excellent and appropriate.

INTRODUCTION

Modern education has seen a rise in mobile learning, particularly in studying English. According to Naciri et al. (2020), "Mobile learning provides a flexible and accessible avenue for remote learning and teaching, allowing students to engage in learning anywhere and at any time. However, due to their widespread use among students, smartphones are frequently used only for amusement, thereby missing meaningful learning opportunities. So, to fully utilize the educational potential of mobile devices, creative strategies that grab students' attention and meet their educational goals are required. Games, which are known for their interactivity and engagement, have the potential to boost motivation and improve learning outcomes (Gee, 2023). The educational experience can be enhanced by adding multimedia components to game-based learning, such as graphics, audio, and video (Prensky, 2001). Augmented reality (AR) technology seamlessly overlaps digital content with

the actual world and helps create immersive and engaging learning environments (Dunleavy & Dede, 2014). The application of AR in English language learning has particular potential since it can facilitate contextual language use and experiential learning (Lai et al., 2019).

Schrader et al. (2018) have advocated incorporating multimedia elements to enrich learning outcomes and engagement in digital environments. Her innovative strategies align seamlessly with the objectives of inclusive education. According to Tai (2022), Augmented reality (AR) within education creates immersive and interactive learning environments and facilitates learning through dynamic mediums. Similarly, Titus and Ng'ambi (2023) delve into the potential of narrative education and digital storytelling to craft captivating learning experiences.

Shifting the focus to game-based learning, Lai et al. (2019) are recognized for their research on the positive impact of gamification on student motivation and outcomes. His expertise harnesses the power of gaming. On a different note, Manna (2023) offers a distinct perspective that bridges pedagogical design and technology integration, her study of pedagogical strategies that fuse technology, pedagogy, and student interaction. In contrast, Kohnke (2020) delves into immersive technologies, such as augmented reality, motivation, and engagement in language learning by drawing from educational psychology and technology integration.

Lai et al. (2019) adeptly navigate the landscape of digital literacy and pedagogy, emphasizing technology's pivotal role in shaping the nature of language learning experiences. His scholarly pursuits align digital tools for dynamic and interactive learning journeys. Meanwhile, Braad et al. (2021) shape environments that foster language acquisition through engaging and challenging encounters in gamification and education. Cubeles and Riu (2018) reveal the integration of multimedia elements and technologically enhanced pedagogies, creating a supporting environment that effectively captivates students.

Furthermore, Baabdullah et al. (2022) expose instructional design and technology and employ her expertise to devise strategies for incorporating augmented reality into language programs. Her work contextualizes experiential learning and uses immersive experiences to accelerate language acquisition. Taeger and Yanchar (2019) probe how digital technologies, including augmented reality, enhance narrative-based learning, bringing the enchantment of digital storytelling and narrative pedagogy to the forefront. Becker and Nguyen (2017) delve deep into interactive media and learning technologies, illustrating how cutting-edge tools like augmented reality (AR) foster interactive and experiential language learning while enhancing engagement with real-world resources.

Titus and Ng'ambi (2023) notably focus on language learning, promoting participation, teamwork, and practical communication skills. By creating and evaluating technology-mediated learning environments tailored to diverse learning styles, Manna (2023) has discovered technology-enhanced language education. Youngs (2021) probes the potential of augmented reality to enhance language acquisition through authentic, real-world contexts. In parallel, Kear et al. (2022) align instructional design with technological integration to fuel innovation and active engagement in language learning.

This study develops an English learning tool called augmented reality novel games to improve the learning of reading narrative texts. Innovative opportunities arise to create a more immersive and practical educational experience. Although the significance of narrative text in language education is well-established, it is vital to consider evolving learning needs and the digital age's transformative potential. While traditional approaches to narrative text teaching may take time to reveal a research gap, integrating augmented reality (AR) technology in this context presents an intriguing avenue for exploration. Research in this area can enhance narrative text comprehension, language proficiency, and critical thinking skills in a digitally mediated learning environment, ultimately bridging traditional practices with contemporary learning tools. The main objective is to create a helpful learning tool that appeals to students' interests while fitting into the rapidly changing digital environment. Based on this research, the constructivist learning paradigm emphasizes active participation, teamwork, and producing meaningful learning experiences (Vygotsky, 1980).

The goals of the study span three areas: (1) a careful examination of participants' individual learning needs; (2) a thorough investigation of students' complex learning needs in English language acquisition; and (3) the development of an augmented reality novel game, designed as a teaching tool

that complements the nuances of learning narrative texts. This study aims to create an interactive, immersive learning environment that stimulates motivation and improves understanding by seamlessly fusing narrative text resources with augmented reality technology. The project's finale is an Augmented Reality Novel Game that presents narrative texts creatively and interestingly. Insights from expert assessments, student comments, and needs analysis are combined during creation.

This study develops a suitable integration between narrative text and augmented reality technology. The contribution of this research will make a difference to the English language teaching landscape, which is expected to change due to the integration of gaming elements and multimedia engagement. We want to maximize the use of mobile devices for educational enrichment by meeting the learning demands of middle school students on a dynamic platform.

METHOD

Type of the Study

This research was classified as R & D using Semmel et al. (1974) Four-D model, which was simplified. The research comprised four stages: definition, design, development, and dissemination.

Research Subjects

The respondents of this study were grade 8 students, consisting of 17 female and 15 male students. There was also an interview with an English teacher.

The Procedure of the Study

This research was conducted using the Four-D model (4D model). The Four-D model was chosen because it is systematic and suitable for developing learning media, and the development results obtained have been revised based on expert judgment before being tested on students. The stages of the Four-D model are as follows:

Define

The initial stage in the 4D model is defining the development requirements. Simply put, this stage is the needs analysis stage. In product development, developers need to refer to development requirements, analyze, and collect information on the extent to which development needs to be carried out. According to Semmel et al. (1974), this stage aims to state and define instructional requirements. The initial phase was primarily analytical. The researcher explained the learning needs and collected various information related to the product that would be developed by conducting an analysis. In this stage, the researcher analyzed the students' condition, the material, and the tasks. In the "define" stage, the researcher would also conduct the following subcategories to comprehend the scene:

1. Front End Analysis
    Problem analysis is a process for breaking down complex substances or problems into smaller parts to gain a better understanding. This analysis determined the underlying issues in developing Augmented Reality Novel Games. At this stage, the researcher found the facts and the alternative solutions to make it easier to determine the initial step in developing the learning media.
2. Learner Analysis
    To carry out an optimal learning process, educators must first analyze their students, including general, academic, and unique characteristics that can influence their abilities, intellect, and learning process. Learner analysis was fundamental at the beginning of the planning. This analysis determined the students' characteristics, abilities, and experiences. The study included the attributes of academic knowledge, background experiences, and students' motivation to learn English.
3. Task Analysis
    Analyzing and describing how humans carry out their duties/work, whatever they do/do, what equipment to use, and what things are needed was aimed at identifying the main tasks that students would do. It analyzed the essential competencies and the indicators related to the material used in developing the media in Table 1.

Table 1. Basic Competencies

No.	Basic Competencies	Basic Sub Competencies
1	Explaining the text structure of narrative texts in the form of fairy tales by their contextual use.Understanding the social function, text structure, and linguistic elements of narrative texts in the form of fairy tales by their contextual use.	a. Explaining the social function of narrative texts in the form of fairy tales by their contextual use. b. Explaining the linguistic elements of narrative texts in the form of fairy tales by their contextual use. c. Explaining the text structure of narrative texts in the form of fairy tales by their contextual use.
2	I am comprehending the meaning of short and straightforward oral and written narrative texts in the form of fairy tales.	Extracting detailed information from short and simple oral and written narrative texts in the form of fairy tales

4. Concept Analysis

Concept analysis aimed to define the content of the Augmented Reality Novel Game. The study was conducted by making mind mapping, and the concept was used to achieve the specific competencies. The analysis was made by systematically identifying and compiling the main parts of the learning materials. The mind mapping can be found in the Figure 1 below.
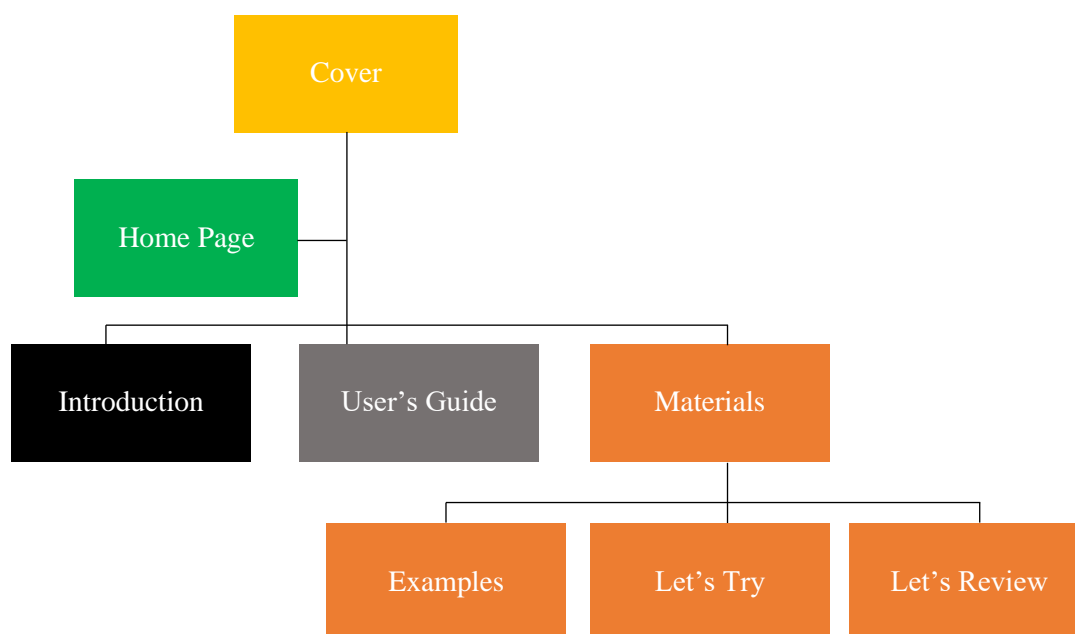
Figure 1. The Mind Map

5. Specifying Instructional Objectives

The purpose of the specifying instructional objective was to determine the achievement indicators of learning based on the material analysis and curriculum analysis. By specifying the learning objectives, the researcher could discover the contents displayed in the Augmented Reality Novel Game, the question grid, and the achievement indicators of learning.

Design

This stage intends to design Augmented Reality Novel Games that can be used as English learning media. The design stages include.

1. Constructing Criterion-Referenced Tests

Constructing criterion-referenced tests based on the learning objectives at the learners' cognitive level. Criterion-referenced tests bridge Stage 1, Define, and the Design Process. Criterion-referenced trials convert behavioral purposes into an outline for the instructional material. The learning objective is identifying narrative texts' social functions, structures, and linguistic

elements. According to that learning objective, can be constructed the question lattices of test such as about what is the purpose of the text, analyzing the structure of the text (orientation, complication, and resolution), exploring the language features of narrative text such as the specific participants, the use of past tense, the use of action verbs, the time conjunctions, the adverb of time, the use of direct speech, and whether what is said in the text is relevant to the student's experience. These tests evaluate a learner's abilities and familiarity with reading, comprehending, and evaluating narrative texts. Each task has a specific objective or criterion the learner must achieve to complete successfully. Each task fits with the idea of criterion-referenced testing in the following ways:

a. Explaining the Social Function

In this activity, students are tested on their ability to comprehend and explain the social function or aim of narrative texts (fairy tales) in the context in which they are used. Most of the time, with an accuracy of 80% or higher, accurate descriptions of the social role may be one of the success criteria.

b. Explaining Linguistic Elements

In this activity, students are assessed on their understanding of the linguistic components—such as using a particular language, vocabulary, or literary devices in narrative texts. A specified percentage may be used as the success threshold, and the success criterion may suitably detect and explain linguistic features in a certain number of the tested texts.

c. Explaining Text Structure

In this activity, students practice identifying and describing the structural components of narrative texts, such as the introduction, the development of the plot, the climax, and the resolution. Success might be characterized as correctly describing the text structure in 90% or more examples.

2. Media Selection

It was carried out to determine which instructional media would best suit the learners' demands and the subject's features. Matching the learner analysis, task analysis, concept analysis, and distribution plans was a step in this approach. The choice of media was crucial in assisting students in meeting their learning goals.

3. Format Selection

Format selection is closely related to media selection. Format selection was conducted so that the selected format was appropriate to the learning material and the media. Format selection in the media development was made by designing content, choosing the proper approaches and learning resources, and organizing and designing visual novel games (layouts, images, and text).

4. Initial Design

The researcher developed the Augmented Reality Novel Game idea during this phase and shared it for comments. Before production, the Augmented Reality Novel Game media was improved with the help of the feedback gathered. This concept eventually advanced to the validation stage, representing the first draft of the Augmented Reality Novel Game media after changes were made based on suggestions for improvement.

Develop

The development phase is intended to modify the Augmented Reality Novel Game. Semmel et al. (1974) explained that feedback was received through formative evaluation in the development stage, and the media were suitably revised. The revision is based on input from experts. The steps in this stage are:

1. Expert Validation (Expert Appraisal)

Expert validation aimed to obtain suggestions for the improvement of the media. The expert validation is intended to validate the content of the Augmented Reality Novel Game. Before the developmental testing, the validation results would be used to revise the initial product of the game. Experts from English lecturers would assess it and were media experts and material experts. Therefore, it could be known whether the media was feasible or not.

2. Developmental Testing

   Developmental testing involves trying out the material with actual learners to identify the sections that need revision. Based on the learners' responses, reactions, and comments, the media is then revised. This testing, revising, and retesting cycle is repeated until the material consistently and effectively works.

Dissemination Phase (Disseminate)

After reaching its final production stage, the Augmented Reality Novel Game was disseminated to only English teachers, with consistent results from developmental testing and positive expert appraisal.

Instrument and Data Collection

The study utilized questionnaires and interview guidelines to collect data and support media development. For data collection instruments to be considered feasible, they must meet specific criteria for reliability and validity in the scores they collect. Experts have validated the interview guidelines, need analysis questionnaire, expert judgment questionnaire, and a student review questionnaire.

The questionnaire of the materials was adapted from BSNP, which evaluates the appropriateness of the content, language, presentation, and layout. A student questionnaire and interview guidelines were used for need analysis. Media and material experts evaluated the first draft, revised it, and improved it based on expert judgment. A student review questionnaire was used for developmental testing.

Analysis Data Technique

The collected data analysis will determine the resulting product's assessment and opinions. The percentage of each answer on the needs analysis questionnaires was calculated using a specific Formula 1.

$$P = \frac{f}{n} \times 100\% \tag{1}$$

The tendency of the students related to the condition is determined by marking the highest percentage of responses for each question. Qualitative data was collected from the interview. Besides that, qualitative data was also obtained from experts' comments or opinions on their assessment of the materials and media. The data from the teacher's interview were presented as transcripts and analyzed qualitatively through descriptions. The teacher's interview was analyzed using thematic analysis.

The Likert scale is used to measure the results of an expert judgment questionnaire. The questionnaire results are calculated using Formula 2 proposed by (Suharto, 2006), where R (range), Xh (the highest score), Xl (the lowest score), and 4 (range of Likert-scale). Besides that, Suharto (2006) suggested converting the data to descriptive analysis and measuring using the Mean (χ) in Formula 3 quantitative data conversion in Table 2 below (Suharto, 2006).

$$\mathcal{R} = \frac{Xh - X1}{4} \tag{2}$$

$$Mn(\chi) = \frac{\Sigma fx}{n} \tag{3}$$

Table 2. Quantitative Data Conversion

No.	The Interval of The Means Score	Descriptive Categories
1	$3.25 \leq X \leq 4.00$	Very Good
2	$2.50 \leq X \leq 3.24$	Good
3	$1.75 \leq X \leq 2.49$	Fair
4	$1.00 \leq X \leq 1.74$	Poor

A media review questionnaire was given to students after they used the Novel Augmented Reality Game. The questionnaire consists of closed questions with answer choices on a Likert scale. The Likert scale is a quantitative data measurement scale obtained or often found in questionnaires when conducting specific surveys regarding what will be researched. The Likert scale is a research scale used to measure a person's or group's attitudes and opinions regarding an event or social phenomenon based on the operational definition established by the researcher. This scale is used to complete a questionnaire that requires respondents to indicate their level of agreement with a series of questions. Likert scale (1-5), including Strongly Agree, Agree, Disagree, Disagree, and Strongly Disagree.

RESULTS AND DISCUSSION

Results

Define

1. Front End Analysis
   Most visual novel games for Android are on itch.io. Visual novels are interactive stories. Graphic novels are adventure games that focus on storytelling, so players often only read narratives on personal computers/smartphones that display images, text, and sound. Visual novels are distinguished from other types of games by their very minimal gameplay. Player interaction is usually mostly limited to clicking to continue on text, graphics, and sound. Recent visual novels offer the option to "play" or "fast-forward" so that this can not happen but still provide narrative choices. They focus mainly on character development and plot rather than action and gameplay. Title of the Visual Novel Game: Country Mouse and City Mouse and Bait Line. Some visual novel game creations also have to rely on coding skills. To overcome this, the researcher used a more straightforward platform, Powerpoint, which can be accessed quickly and widely. The researcher used the UniteAR application to process the AR media because it was user-friendly. The application was easy to use and applicable to various types of smartphones. UniteAR is an augmented reality (AR) platform that allows everyone to create white-labeled AR Apps, WebAR plugins, and AR experiences without coding.

2. Learner Analysis
   After that, the researcher distributed a questionnaire to know the analysis of the students. The researcher chose the students to be the respondents. The students primarily wanted to improve their reading fluency and comprehension, enrich their vocabulary, and accurately answer questions based on the texts. They believed reading activities would help them overcome difficulties with vocabulary, grammar, and text structure. Additionally, they expressed an interest in learning about the English language and culture to improve their communication skills. Students are motivated to learn with pictures and audio-visual and printed media, often using smartphones. They can learn independently or in groups. Media and technology are effective, and teachers and friends are available to help.

3. Task Analysis
   Each task that has been designed certainly has defined core competencies and essential competencies. Therefore, based on the Core Competence-Basic Competences, students were expected to compare social functions, text structures, and linguistic elements of some texts in narrative text. Based on the teacher interview, the learning method usually used is home learning and assignment. Therefore, in this research, the students will be given two narrative texts to be analyzed as the assignment during distance learning.

4. Concept Analysis
   The first step for researchers is to create the opening of a Visual Novel Game. The door contains a menu that will guide students to the learning material. This aims to attract students' attention and motivation before entering the core of teaching and learning activities. It displays the narrative text's social function, structure, and linguistic elements. There are examples of narrative texts below in Figure 2.
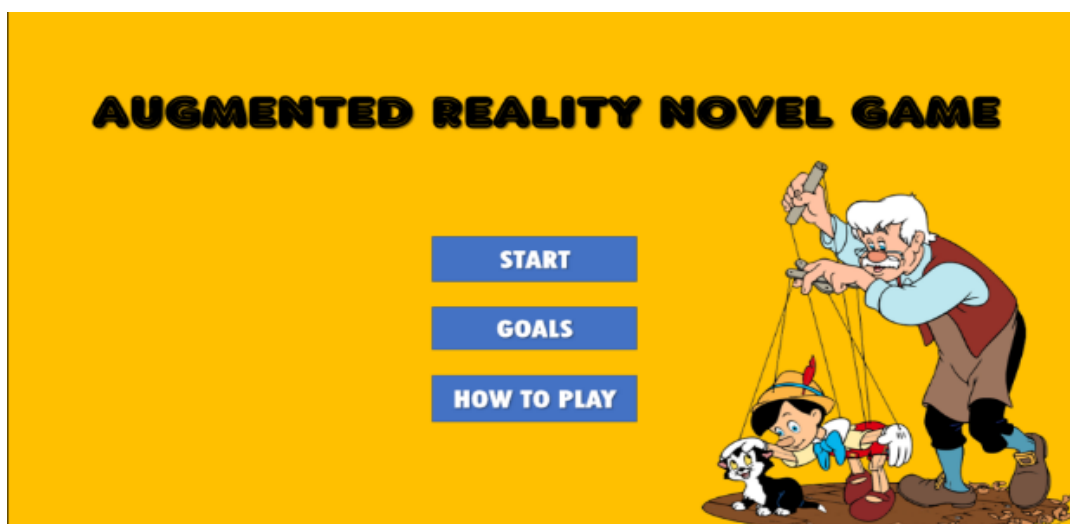
Figure 2. The Menu

The next stage focuses on developing students' narrative text analysis skills, covering aspects such as text purpose, structure (orientation, complication, and resolution), language features (participants, past tense, action verbs, time conjunctions, adverbs of time, and direct speech), and relevance to the student's experience. There are two narrative texts in the augmented reality book that students analyze. The book contains the narrative text, related vocabulary, and tasks/discussions on the narrative's social function, structure, and language features.

5. Specifying Instructional Objectives
    The learning objective of this material is to identify the social function, text structures, and linguistic elements of narrative texts, particularly fairy tales.

Design

1. Constructing Criterion-Referenced Tests
    The construction of criterion-referenced tests is based on the learning objectives at the learners' cognitive level. The learning objective is identifying narrative texts' social functions, structures, and linguistic elements. Test question lattices can be constructed based on learning objectives, including analyzing text purpose, structure (orientation, complication, resolution), and language features such as participants, past tense, action verbs, time conjunctions, adverbs, direct speech, and relevance to the student experience. The pictures beside the text are examples of AR below Figure 3.

Figure 3. The Type of Narrative Text

2. Media Selection

The researcher analyzes material characteristics and learners' needs in selecting appropriate media. Media is determined based on needs, learner, concept, task, and instructional analysis. Audio-visual media in the form of an augmented reality game was chosen for this study on narrative texts. The selection of this media was also based on the learners' need for engaging learning media to learn about narrative texts. Implementing augmented reality in education provided the potential for portable and accessible media. The students could access the media and the materials anytime and anywhere. Therefore, with augmented reality, education has become more accessible and mobile.

3. Media Selection

After selecting the media, the researcher chose the format for making the augmented reality novel game. The format selection aimed to make the learning media accessible and can be used in education, especially in audio-visual-based learning. The format chosen for the visual novel was a slides-based visual novel game using the PowerPoint platform. Currently, the development of the technology and its wide availability are advantageous, so that access and use of applications via the slides are much easier and more practical. With the existence of a PowerPoint-based authoring tool, the researcher can easily create visual novels with ease and the availability of unlimited access using their computer. This graphic novel game is based on a Graphical User Interface, which does not require an editor with coding skills. Editors do not need to learn a scripting language, thus providing an opportunity for novel writers to create their visual novel works online. In addition, the players or the students can play graphic novels that can be accessed anywhere online without installing the graphic novel. Besides that, the researcher made two augmented reality books that provide QR codes that the students could scan to get the optical audio of the narrative text. The scanning process was simple. It just needed the UniteAR application to scan the barcodes.

4. Initial Design

The researcher initiated building the augmented reality novel game during this procedure and solicited input. Before manufacturing, the Augmented Reality Novel Game material was improved using the feedback collected. The concept then advanced to the validation step, representing the first draft of the Augmented Reality Novel Game media, after adjustments based on suggestions for improvement. In this AR book, the researcher encourages students to discuss the narrative text's social function, generic structure, and language features in Figure 4.
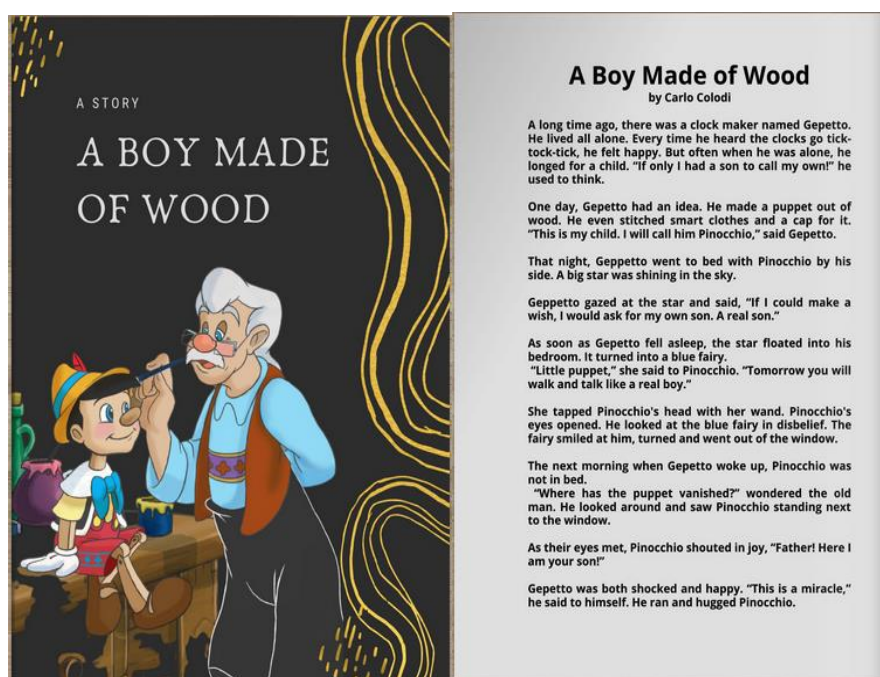

Figure 4. The Cover of "A Boy Made of Wood" AR Book

Develop

This stage aims to produce the Augmented Reality Novel Game, which the researcher has revised based on expert appraisal and development testing for the students. There are two stages:

1. Expert Judgment

   After creating the initial draft of the augmented reality novel game, the next step was to gather expert feedback on the appropriateness of the product's materials and media. The questionnaire used to assess the materials was adapted from BSNP and covered content, language, presentation, and layout. The second questionnaire uses the Likert scale to evaluate media design, audio availability, autonomous language learning, and media illustrations. An expert evaluates the interactive multimedia and offers feedback and suggestions in open-ended questions.

   a. Materials

      The questionnaire showed a mean score of 3.70, which falls under the "Very Good" category according to Suharto (2006) quantitative data conversion. This suggests that the augmented reality novel game materials are appropriate for eighth-grade students. Table 3 below presents the results of expert judgment regarding the media aspect.

Table 3. The Appropriateness of the Materials

No.	Statements	Score	Criteria
Content Appropriateness			
1	The Materials are Appropriate for Core Competence Basic Competences of Narrative Text for Grade VIII of Junior High School	4	Very Good
2	The Materials are Relevant to The Discussed Topics	4	Very Good
3	The Materials can Develop Students' Understanding About Narrative Text	4	Very Good
4	The Materials are Appropriate for The Students' Competence in Narrative Text	4	Very Good
5	The Tasks Already Follow The Steps of The Scientific Approach	3	Good
6	The tasks already follow the steps of the scientific Approach	3	Good
Presentation			
7	The Tasks Are Arranged Systematically, From The Very Easy Task To The Complicated Ones	3	Good
8	The Pictures/Figures/Sound/Tables are Interesting Enough to Motivate The Students to Learn	4	Very Good
9	The Materials Contain Opening, Main, and Closing Activities	3	Good
10	The Materials Involve Students to Participate to Complete The Tasks Actively	4	Very Good
11	The Activities of The Materials are Varied	3	Good
Language			
12	The Use of Language is Clear and Relevant to The Proficiency Level of Junior High School Students	4	Very Good
13	The Instructions of The Tasks are Clear and Easy to Understand	4	Very Good
14	The Materials are Grammatically Correct	3	Good
15	The Materials Reflect The Unity of Ideas	4	Very Good
16	The Teaching of Grammar, Vocabulary, and Pronunciation Of The Materials is Based on Curriculum 2013	4	Very Good
Layout			
17	The Use of The Font is Already Appropriate	4	Very Good
18	The Colors of Materials Support The Materials Delivery	4	Very Good
19	Sources are Available	4	Very Good
20	The Developed Materials can be Used by Teachers and Students Easily	4	Very Good
Total Score		**74**	
Mean		**3.70**	
Criteria		**Very Good**	

b. Media

Things assessed in the media include presentation design, audio and physical appearance, autonomous language learning, and media illustration. The media-related questionnaire received a mean score of 3.60, falling into the "Very Good" category according to the quantitative data conversion method proposed by (Suharto, 2006), indicating that the augmented reality novel game is a suitable learning tool for grade 8 students. The appropriateness of media is shown in Table 4.

Table 4. The Appropriateness of Media

No.	Statements	Score	Criteria
Presentation Design of the Media			
1	The Actions of Completing The Activity are Already Based on The Instructions	4	Very Good
2	The Movement of The Media is Interactive and Smooth	4	Very Good
3	The Media is Simple and Understandable	4	Very Good
Audio and Physical Appearance			
7	The Sound of Pronunciation can be Heard Clearly	3	Good
8	The Composition of The Colors is well Arranged on The Contrast and Brightness	4	Very Good
9	The Texts are Visually Clear and Easy to Read	4	Very Good
10	The Texts, Illustrations/Pictures, and The Instruction Are Good Enough to Motivate The Students to Learn	3	Good
11	The Layout is Consistent	4	Very Good
	The Layout of The Whole Materials is Interesting.		Very Good
Autonomous Language Learning			
12	It is Easy for The Students to Review Certain Parts for Which They Need More Practice	3	Good
13	The Media Allow Students to Redo any Parts of The Present Segment	3	Good
14	The Score of The Evaluation Done by The Students can be Directly Shown	3	Good
Illustration of the Media			
17	The Illustration Makes The Information is being Easier To Recall.	4	Very Good
18	The Use of Illustration Is Appropriate for The Topic of The Materials	3	Good
19	The Use of Illustration is Aesthetic and Functional	4	Very Good
Total Score		**54**	
Mean		**3.60**	
Criteria		**Very Good**	

c. The Revisions

Revision is a process of reviewing work results to make improvements or updates. With revisions, a work can show its aims and objectives more optimally. The revision process cannot be ignored; this is because revisions help make the work we create better than before. Therefore, the developed materials for teaching narrative text need more activities to explore the given texts. They should be clear when the researcher divides tasks into easy-moderate-difficult and opening-main-closing activities. The research introduced additional functions that use the provided texts, including advanced vocabulary lessons and activities to practice guessing word meanings based on context. The researcher also corrected any identified grammar mistakes. According to the expert judgment questionnaire, the overall media unit is good, but certain media activities need improvement to optimize students' reading learning through media. The expert found that the developed media is less practical; it would create an unnecessary problem when used in schools with minimum facilities/students with gadget problems. The revision can be seen in Table 5 below.

Table 5. The Revisions

No.	Point to Revise	Revisions
1	The developed materials for teaching narrative text need more activities to explore the given texts. They should be clear when the researcher divides tasks into easy, moderate, challenging, and opening-main closing activities. The following parts of the display that need to be revised are presented below: Figure 6, Figure 8, and Figure 10.	The researcher gave more tasks for maximizing students' learning. The research added more functions that can be created using the texts. There are some advanced vocabulary lessons, such as making one's sentences using the newly learned vocabulary and activities to introduce the skill of guessing the meaning of a word based on the available information/context in the text. The following part of the revised display is presented below in Figure 7, Figure 9, and Figure 11.

Parts of The Unit
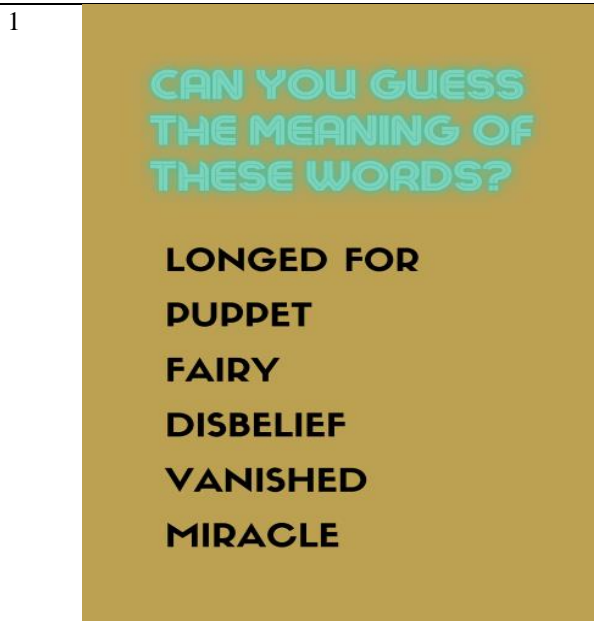
No.	Before	After
1
Figure 6. Vocabulary Task
Figure 7. Let's Review
2
Figure 8. Trivia Game |
Figure 9. Matching Words |
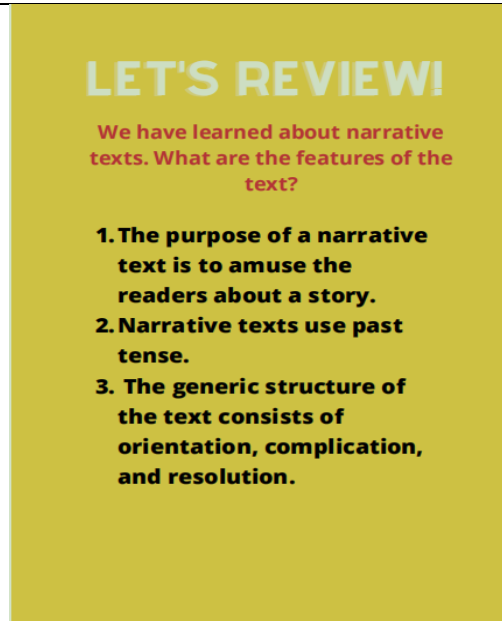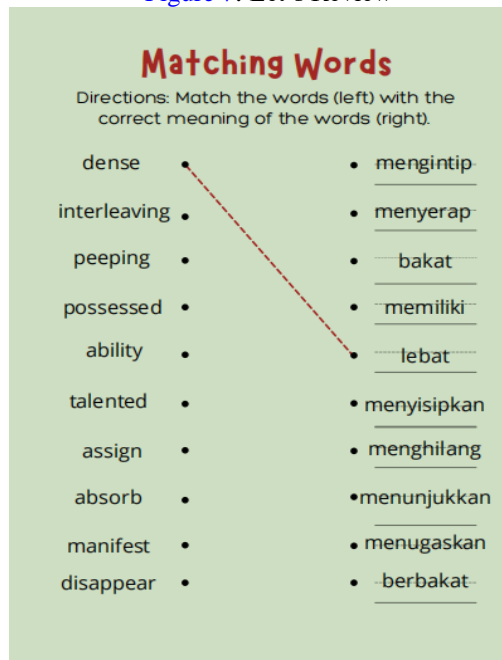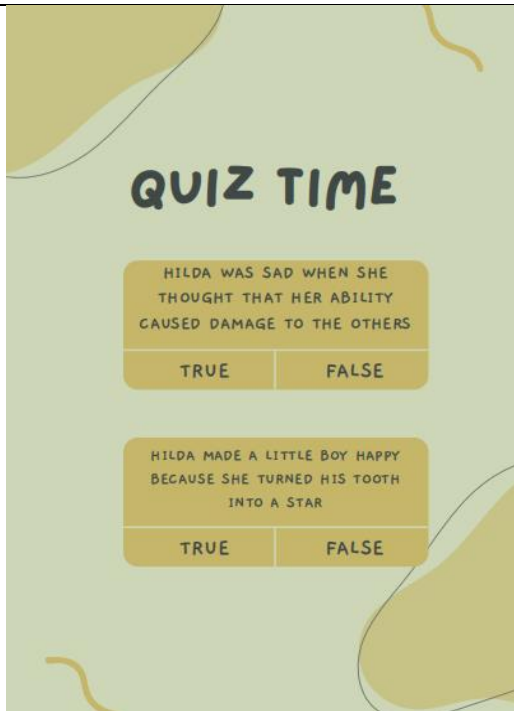
No.	Point to Revise	Revisions
Parts of The Unit		
No.	**Before**	**After**
3.	Figure 10. Quiz Time	Figure 11. Quiz Time

No.	Point to Revise	Revisions
1	There are grammar mistakes in some parts below Figure 12 and Figure 14.	The researcher corrected the mistaken grammar in Figure 13 and Figure 15.
No	**Before**	**After**
1	Figure 12. Social Function	Figure 13. Social Function
2	Figure 14. Language Features	Figure 15. Language Features

Development Testing

After being validated by the expert, the researcher does a small-scale field test to know the result of the learning media application and the review from the students. The result from this stage is the final revised augmented reality novel game. The researcher achieved feedback from the students by giving a questionnaire to them. The results of the questionnaires are described in Table 6 below.

Table 6. The Results of Students' View

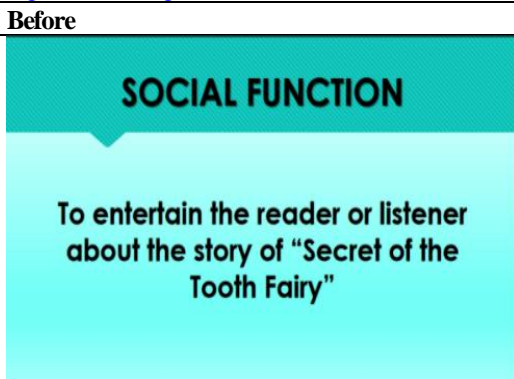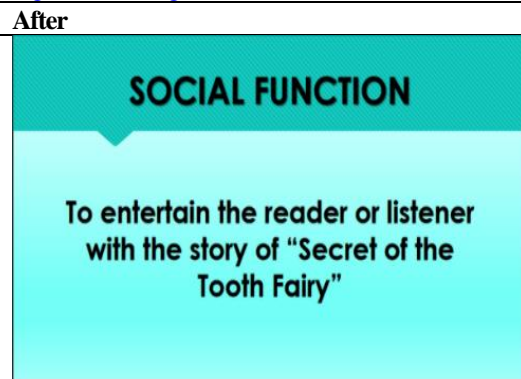| No.	Items of Questionnaire	Frequency and Percentage				
		1	2	3	4	5
1	The Materials are Presented Clearly	15	12	3	2	0
		46.9 %	37.5 %	9.4 %	6.3 %	0 %
2	The Materials in The Media are Presented Systematically	14	8	10	0	0
		43.8%	25%	31.3 %	0%	0%
3	The Discussion of The Materials is Easy to Understand	14	10	5	1	2
		43.8 %	31.3 %	15.6 %	3.1 %	6.3 %
4	The Tasks are Presented Clearly	7	18	5	2	0
		21.9 %	56 %	15.6 %	6.3 %	0 %
5	The Language is Easy to Understand	13	11	7	0	1
		40.6%	34.4 %	21.9 %	0 %	3.1 %
6	The Materials and Media are Quite Interactive	14	7	10	1	0
		43.8 %	21.9 %	31.3 %	3.1 %	0 %
7	The Media Motivate Students' To Learn.	15	11	4	1	1
		46.9 %	34.4 %	12.5 %	3.1%	3.1%
8	The Materials Help Students to Understand The Lesson	13	9	8	2	0
		40.6%	28.1%	25%	6.3%	0%
9	The Learning Media can Encourage Students to Learn Independently	11	12	5	2	2
		34.4 %	37.5 %	15.6 %	6.3 %	6.3 %
10	The Learning Media does Not Hang (Stop) During The Operation	13	10	9	0	0
		40.6 %	31.3 %	28.1 %	0 %	0 %
11	The Media Installation Process is Easy	14	11	6	1	0
		43.8 %	34.4 %	18.8 %	3.1%	0 %
12	The Augmented Reality Learning Media has Clear Instructions	14	10	6	2	1
		43.8 %	31.3 %	18.8 %	3.1%	3.1%
13	The Audio Is Clear and does not Disturb The Process	13	15	3	1	0
		40.6 %	46.9 %	9.4 %	3.1%	0 %
14	The Appearance is Interesting	17	9	5	0	1
		53.1%	28.1%	15.6 %	0 %	3.1%
15	The Color Selection and Composition is Appropriate	10	13	8	0	1
		31.3 %	40.6 %	25 %	0 %	3.1%
16	The Layout Setting is Appropriate	12	12	5	2	1
		37.5%	37.5 %	15.6 %	6.3%	3.1%
17	The Navigation (Menu Icons) in The Media is Easy to Use	13	12	4	1	2
		40.6 %	37.5 %	12.5 %	3.1 %	6.3 %

Based on the data above, more than half of the respondents (more than 50% votes) agree and strongly agree that the augmented reality novel game is good and acceptable. The survey results show that the materials and the media are appropriate for the learning process of grade 8 students.

Disseminate

After the product's development, testing, and revising, the next stage is disseminating the product. The purpose of this stage is to spread the augmented reality novel game. In this study, the researcher conducted small-scale dissemination. The developed media is only being shared and limited to the English teachers through telegram.

Discussion

In this study, the researcher investigated the learning needs of Grade 8 students of Junior High School to create suitable learning media. The needs analysis involved distributing questionnaires and interviewing English teachers using the Four-D model approach: Define, Design, Development, and Disseminate. In the define stage, the researcher conducted a need analysis by distributing questionnaires to the grade 8 students and interviewing with an English teacher. The participants were 32 students of grade 8 and an English teacher of grade 8. Regarding target needs, the students mostly wanted to read fluently, enrich their vocabulary, comprehend texts, and answer questions correctly. Reading activities help with vocabulary, grammar, and text structure. They also wanted to learn about the English language and culture to communicate well. Students prefer media and technology to aid reading. They use pictures, illustrations, audio-visuals, and printed materials in large or individual groups. Their smartphones support the learning process, and they comfortably ask their teacher for help. The augmented reality game was developed using data from a needs analysis. The course grid outlined competencies, topics, materials, activities, and language focus.

The next step was developing the media and materials. The developed media was an augmented reality novel game that could be scanned using the UniteAR application. The product is a visual-audio learning media. According to the course grid, two parts of English learning materials were being developed. The first part is the explanations of narrative text in general. The second part is the analysis of the narrative text aspects, such as the social function, the generic structure, and the language features. Each part consists of a random number of tasks. Various tasks are arranged to achieve the objectives of the narrative text's core and essential competencies. The title and learning objective were presented on each part's first page. The expert evaluated the media and materials via a questionnaire based on BSNP 2011 criteria. Results validated their appropriateness, including content, language, methodology, layout, design, audio quality, physical appearance, and effectiveness in promoting autonomous language learning.

From the expert judgment, the value of the developed product is in the range of $3.25 \leq X \leq 4$. It means the media and the materials can be categorized as very good and considered appropriate for students in grade 8. Based on expert judgment, the materials are feasible with revisions. After the modification, the product was tested on the students and got their reviews. The students' reviews showed that the augmented reality novel game was excellent and suitable for Grade 8 students of Junior High School. There were a few revisions before the final product. The last step was to disseminate the products to English teachers.

CONCLUSION

The students' need analysis showed that their main goals were to read fluently, comprehend texts, answer questions based on provided texts, and enrich their vocabulary. Additionally, they wanted to overcome vocabulary, grammar, and text structure comprehension difficulties. The students must have exciting and interactive materials involving pictures and illustrations to motivate them to learn reading. They also chose audio-visual and printed media to support learning reading.

The UniteAR application offers an augmented reality game as a visual-audio learning tool for English students. The game's English learning materials are divided into two parts. The first part provides a general explanation of narrative text, while the second part analyzes narrative text aspects, including social function, generic structure, and language features. Each piece includes various tasks to achieve core and essential competencies' objectives. The title and learning objectives are presented on each part's first page. Based on expert judgment and development testing results, the media and materials are appropriate for grade 8 students. The learning media includes sounds, illustrations, pictures, and exciting activities to attract and motivate students to learn narrative texts. The aesthetic function and suitability to the learning process goals are considered in the presented elements. So, it can be concluded that the augmented reality game is a suitable English learning media for grade 8 students in narrative text learning. Various learning resources are available to support students while doing independent learning.

REFERENCES

Baabdullah, A. M., Alsulaimani, A. A., Allamnakhrah, A., Alalwan, A. A., Dwivedi, Y. K., & Rana, N. P. (2022). Usage of augmented reality (AR) and development of e-learning outcomes: An empirical evaluation of students' e-learning experience. *Computers and Education*, *177*(1), 1–19. https://doi.org/10.1016/j.compedu.2021.104383

Becker, K., & Nguyen, P. (2017). Technology-enhanced language learning for specialized domains: Practical applications and mobility. *Language Learning & Technology*, *21*(3), 67–71. http://hdl.handle.net/10125/44633

Braad, E., Degens, N., Barendregt, W., & Ijsselstejin, W. (2021). Development of a design framework for metacognition in game-based learning. *Journal of Interactive Learning Research*, *32*(4), 295–323. https://www.learntechlib.org/primary/p/220332/

Cubeles, A., & Riu, D. (2018). The effective integration of ICTs in universities: the role of knowledge and academic experience of professors. *Technology, Pedagogy and Education*, *27*(3), 339–349. https://doi.org/10.1080/1475939X.2018.1457978

Dunleavy, M., & Dede, C. (2014). Augmented reality teaching and learning. In *Handbook of Research on Educational Communications and Technology* (pp. 735–745). Springer. https://doi.org/10.1007/978-1-4614-3185-5_59

Gee, J. P. (2023). *What video games have to teach us about learning and literacy*. PALGRAVE MACMILLAN.

Kear, K., Cathryn Peoples, Helen Donelan, & Jon Rosewell. (2022). Active participation in synchronous online learning. *Envisioning Report for Empowering Universities*, *6*(May), 24–26. https://doi.org/10.5281/zenodo.6511424

Kohnke, L. (2020). Exploring learner perception, experience and motivation of using a Mobile App in l2 vocabulary acquisition. *International Journal of Computer-Assisted Language Learning and Teaching*, *10*(1), 15–26. https://doi.org/10.4018/IJCALLT.2020010102

Lai, A.F., Chen, C.H., & Lee, G.Y. (2019). An augmented reality-based learning approach to enhancing students' science reading performances from the perspective of the cognitive load theory. *BJET: British Journal of Educational Technology*, *50*(1), 232–247. https://doi.org/10.1111/bjet.12716

Manna, M. (2023). Teachers as augmented reality designers: a study on Italian as a foreign language – teacher perceptions. *International Journal of Mobile and Blended Learning*, *15*(2), 1–16. https://doi.org/10.4018/IJMBL.318667

Naciri, A., Baba, M. A., Achbani, A., & Kharbach, A. (2020). Mobile learning in higher education: Unavoidable alternative during covid-19. *Aqudemia*, *4*(1), 1–2. https://doi.org/10.29333/aquademia/8227

Prensky, M. (2001). Digital natives, digital immigrants part 1. *On the Horizon, 9*(5), 1–6. https://doi.org/10.1108/10748120110424816

Schrader, C., Reichelt, M., & Zander, S. (2018). The effect of the personalization principle on multimedia learning: The role of student individual interests as a predictor. *Educational Technology Research and Development*, *66*(6), 1387–1397. https://doi.org/10.1007/s11423-018-9588-8

Semmel, M. I., Semmel, D. S., & Thiagarajan, S. (1974). *Instructional development for training teachers of exceptional children: A sourcebook*. Indiana University.

Suharto, G. (2006). *Penilaian pembelajaran bahasa inggris*. P2B UNY.

Taeger, S. D., & Yanchar, S. C. (2019). Principles and practices of designing narrative distance for transformative learning experiences. *Educational Media International*, *56*(2), 164–181. https://doi.org/10.1080/09523987.2019.1614322

Tai, T.Y. (2022). Impact of mobile virtual reality on EFL learners' listening comprehension. *Language Learning & Technology*, *26*(1), 1–23. https://hdl.handle.net/10125/73491

Titus, S., & Ng'ambi, D. (2023). Digital gaming for cross-cultural learning: Development of a social constructivist game based learning model at a South African University. *International Journal of Game-Based Learning*, *13*(1), 1–20. https://doi.org/10.4018/IJGBL.331995

Vygotsky, L. S. (1980). *Mind in society: Development of higher psychological processes*. Harvard University Press.

Youngs, B. L. (2021). Item-level learning analytics: Ensuring quality in an online French course. *Language Learning & Technology*, *25*(1), 73–91. https://hdl.handle.net/10125/73426

Influence of play-based learning on socio-emotional development among early childhood children in Afijio Local Government Area of Oyo State, Nigeria

Elizabeth Olaoluwa Adubuola [1], Taofeek Akolade Gbadeyanka [1*] [iD], Baniyaminu Opeyemi Hamzat [2], Nasimot Opeyemi Oyewumi [2]

[1] Federal College of Education (Special) Oyo, Oyo State, Nigeria
[2] Federal College of Education, Iwo, Osun State, Nigeria
[*] Corresponding Author E-mail: gbadeyanka.taofeek2187@fcesoyo.edu.ng

ARTICLE INFO

ABSTRACT

With two key objectives, this study delves into the impact of play-based learning programs on the socio-emotional development of early childhood children in Afijio Local Government Area, Oyo State, Nigeria. Firstly, it examines whether these programs affect socio-emotional development differently based on gender. Secondly, it investigates how school type, whether private or public, influences the effectiveness of play-based learning on socio-emotional development within this region. This study employs a non-randomized quasi-experimental design. The study engaged 132 early childhood children aged 3-5 years from two schools in the area. An Emotional Regulatory Skill Test (ERST) was designed and demonstrated strong reliability ($\alpha = 0.84$) and content validity. Results revealed that play-based learning programs are intentionally designed for gender-neutral effectiveness, promoting inclusivity and equality. A significant effect of play-based learning programs on socio-emotional development based on school type was found, with private schools providing enriched environments and public schools leveraging diversity for growth. These findings underscore the transformative potential of play-based learning in fostering inclusive socio-emotional development among early childhood children, advocating for gender-equitable programs, and suggesting allocating additional resources to public schools for enriched play-based experiences. Ultimately, the study offers a vision of a harmonious future where socio-emotional development knows no gender boundaries, and every child thrives, regardless of school type.

INTRODUCTION

Over time, annalsplay assumes its irreplaceable role in human development (Sahlberg & Doyle, 2019). It transcends mere amusement, becoming a potent catalyst for learning and advancement (Cutter-Mackenzie et al., 2014). Within this realm, children set sail on a voyage of

self-discovery, interweaving the tapestry of their understanding and engaging with their peers. The educational realm now recognizes play's profound influence in nurturing holistic development, especially socio-emotional growth (Chopra & Khanna, 2019). Through play-based learning, an educational strategy that harnesses the boundless power of play for scholastic objectives, the seeds of young learners' social and emotional competence are sown (Wood, 2013).

Drawing inspiration from the conviction that play serves as the primary conduit for the tender minds of our youth eloquently conveys this notion (Bodrova & Leong, 2007). Emotional understanding is etched onto the pages of imaginative and cooperative play, artistry in which children master the expression and navigation of their sentiments while sculpting empathy, as seen in the work of Saracho and Spodek (2010). These skills forge the bedrock of robust relationships and enable the flourishing of children academically, socially, and emotionally.

In the theatre of play-based learning, children's innate curiosity and instinctual drive to explore their surroundings harmonize with their desire to express their creative essence. Here, they partake in scenarios mirroring real life, where emotional responses and social dynamics are artfully experimented upon. The spontaneity and autonomy inherent in this performance provide a stage where children traverse the entire spectrum of emotions, forging an intimate connection with their inner feelings and crafting a repertoire of strategies for emotional equilibrium, a masterstroke aptly described by Dockett and Perry (2014).

This illustrious play-based learning, a multifaceted gem, presents itself in various forms, from the boundless freedom of free play to the structured artistry of guided play. It beckons children into a realm of cooperative play, where negotiation, conflict resolution, and the virtue of taking turns are etched into their futures—an insight affirmed by Lillard et al. (2013). Beyond this, it extends its embrace to children from less privileged backgrounds, bridging disparities and offering rich, engaging learning escapades, as Rogers (2005) emphasizes. Furthermore, it is a sanctuary for children with special needs, nurturing meaningful engagement and skill development within an inclusive environment, a testament to its boundless generosity (Pellegrini, 2009).

To unleash the power of play-based learning in children's socio-emotional development during early childhood, we turn to Vygotsky's Zone of Proximal Development (ZPD), which emphasizes that children can achieve more when guided by a teacher. Frequent interactions within play-based learning create opportunities for scaffolding, wherein knowledgeable peers or adults assist children in understanding and managing their emotions during play, contributing to socio-emotional development (Vygotsky & Cole, 1978).

Children's inseparable bond with play stands as an undeniable truth and their inherent right, as emphasized by Jantan (2013). It plays a pivotal role in a child's journey towards realizing their utmost potential. It extends across cognitive, physical, social, and emotional dimensions, as corroborated by Rosli and Lin (2018) and Ali and Mahamod (2015). Pellegrini's (2009) study unveiled that play-based learning environments provide children with opportunities to regulate emotionally, manage emotions in a safe setting, and develop empathy and perspective-taking.

The pinnacle of social development emerges when children navigate their surroundings alongside peers or adults through social interactions, illuminated by Dzainudin et al. (2018). Play becomes a fertile ground where adults actively participate in children's endeavors (Jantan, 2013). This pedagogical process, rooted in play-based activities, unfolds as a well-structured framework, cultivating cooperative skills, socially appropriate behavior, and heightened social competence, a journey articulated by Loy (2017) and Vygotsky's scaffolding concept (Vygotsky & Cole, 1978).

Bodrova and Leong (2007) further emphasize that play-based learning encourages self-awareness and self-regulation. As children immerse themselves in imaginative play, they become attuned to their emotional responses and adapt their behavior accordingly. Longitudinal research by Saracho & Spodek (2010) underscores the lasting effects of play-based learning on socio-emotional development, demonstrating that children who experienced play-based education in their early years displayed higher levels of emotional intelligence, improved interpersonal relationships and greater resilience compared to their peers who did not have the same opportunity. Consequently, prompted by the insights gained from the preceding discussion, the researchers were inspired to investigate the influence of play-based learning on the socio-emotional development of early childhood children within the Afijio Local Government Area of Oyo State, Nigeria.

This exploration aims to reveal the undeniable transformative potential that can illuminate a path toward a brighter and more harmonious future for these children. As a result, this study aims to fill a critical gap in our understanding of this crucial topic. The purpose of this study was specifically to investigate the potential impact of play-based learning programs on the socio-emotional development of early childhood children, examining whether there are significant gender-related differences in Afijio Local Government Area of Oyo State, Nigeria, and determine whether play-based learning programs have a significant influence on the socio-emotional development of early childhood children, taking into account variations based on school types, within Afijio Local Government Area of Oyo State, Nigeria.

METHOD

The researchers employed a non-randomized quasi-experimental design. The population for the study comprised all early childhood children in the Afijio Local Government Area of Oyo State, Nigeria. At the same time, the target sample consisted of 132 early childhood children aged 3-5 years in two schools in the sampled Local Government. The researchers created the Emotional Regulatory Skill Test (ERST) and employed both as a pretest and post-test for the children. The instrument's content validity was confirmed through evaluation by two early childhood experts. To assess the instrument's reliability, it was administered twice to a different group of early childhood children from the trial testing, and the reliability coefficient obtained using the Pearson Product Moment Coefficient (PPMC) was 0.84. The research hypotheses were evaluated using Analysis of Covariance (ANCOVA) at a significance level of 0.05 alpha.

RESULTS AND DISCUSSION

Result

The H_{01} showed no significant difference in the effect of play-based learning programs on the socio-emotional development of male and female early childhood children in Afijio Local Government Area of Oyo State, Nigeria. R Square was 0.632, then adjusted R Squared was 0.615. The result of the first hypothesis can be drawn in Table 1.

Table 1. ANCOVA table on significant effect of play-based learning programs on the socio-emotional development of male and female early childhood children.

Source	Type III Sum of Square	df	Mean Square	F	Sig	Remark
Corrected Model	662.225a	4	165.556	37.277	0.000	
Intercept	242.340	1	242.340	54.566	0.000	
Pretest	23.670	1	23.670	54.566	0.023	
Group	350.827	1	350.827	78.994	0.000	
Gender	0.066	1	0.066	0.015	0.903	Not
Group * Gender	6.190	1	6.190	1.394	0.241	Significant
Error	**386.383**	**87**	**4.441**			
Total	**9466.000**	**92**				
Corrected Total	**1048.609**	**91**				

The results in Table 1 showed the effect of play-based learning programs on the socio-emotional development of male and female early childhood children in Afijio Local Government Area of Oyo State, Nigeria. The results show no significant interaction effect of play-based learning programs and gender on the socio-emotional development of early childhood children. The calculated F-value of 1.394 is not significant at 0.05 alpha levels. Therefore, the stated null hypothesis is accepted.

On the other hand, H_{02} was no significant difference in the effect of play-based learning programs on the socio-emotional development of early childhood children based on school type in

Afijio Local Government Area of Oyo State, Nigeria. R Square was 0.717, then adjusted R Squared was 0.704. The calculation of the second hypothesis can be shown in Table 2.

Table 2. ANCOVA table on the significant effect of play-based learning programs on the socio-emotional development of early childhood children based on school type.

Source	Type III Sum of Square	df	Mean Square	F	Sig	Remark
Corrected Model	752.148a	4	188.037	55.182	0.000	
Intercept	285.977	1	285.977	83.924	0.000	
Pre-test	16.883	1	16.883	4.955	0.029	
Group	392.432	1	392.432	115.164	0.000	
School Type	53.600	1	53.600	15.730	0.000	
Group * School Type	47.580	1	47.580	13.963	0.000	Significant
Error	**386.383**	**87**	**3.408**			
Total	**9466.000**	**92**				
Corrected Total	**1048.609**	**91**				

Results in Table 2 showed the significant effect of play-based learning programs on the socio-emotional development of early childhood children based on school type in Afijio Local Government Area of Oyo State, Nigeria. The results show a significant effect of play-based learning programs on the socio-emotional development of early childhood children based on school type. The calculated F-value of 13.963 is significant at 0.05 alpha level. Therefore, the stated null hypothesis is rejected.

Discussion

Hypothesis one shows no significant interaction effect of play-based learning programs and gender on the socio-emotional development of early childhood children. The researchers found that the program's effect on socio-emotional development may not significantly differ between genders because the program is intentionally designed to be equally effective for all children, regardless of gender. Also, a lack of a significant interaction effect in this context could indicate that the play-based learning programs successfully foster socio-emotional development without favoring one gender, reflecting the program's commitment to promoting inclusivity and equality among early childhood children. It supported the findings of Schousboe and Winther-Lindqvist (2013), who pointed out that play-based learning enhances socio-emotional skills such as empathy, emotional regulation, and social competence. Lietaert et al. (2015), whose work disagreed with the findings, revealed that boys benefit more from play-based learning activities that align with their active play preferences. Conversely, girls may excel in the cooperative aspects of play-based learning, reinforcing their social and emotional skills (Pellegrini, 2009).

Finally, research hypothesis two shows a significant effect of play-based learning programs on the socio-emotional development of early childhood children based on school type. The researchers believed this significant effect can be attributed to resource variations, teacher training, class sizes, curriculum integration, parental involvement, peer dynamics, and assessment methods. This finding is in line with Dockett and Perry (2014), who found out that public schools that typically operate with fewer resources have the potential to serve a more diverse children population which diversity can provide valuable opportunities for children to develop socio-emotional skills by interacting with peers from various backgrounds. Also, Bergen (2009) asserted that private schools often boast more substantial resources, including smaller class sizes, well-trained teachers, and access to a broader range of educational materials. These advantages can enhance the quality and depth of play-based learning experiences, facilitating greater socio-emotional development.

CONCLUSION

The findings of this study pave the way for a brighter future where every child's socio-emotional development is nurtured and celebrated, irrespective of gender or school type. Our research has demonstrated no significant interaction effect of play-based learning programs and gender on the socio-emotional development of early childhood children. This finding carries a powerful message: play-based learning, when thoughtfully designed, fosters inclusivity and equality among learners, transcending gender stereotypes. It was established that the type of school plays a significant role in the effectiveness of play-based learning programs. With their abundant resources, private schools create environments that facilitate a more profound socio-emotional development experience.

In contrast, public schools leverage diversity to promote socio-emotional growth. It is crucial to continue promoting and implementing play-based learning programs that prioritize gender equity. Educators and curriculum designers should ensure that play-based activities are diversified, addressing various interests and needs. Also, policymakers and educators should consider these findings when designing and funding early childhood education programs. Efforts should be made to provide public schools with additional resources, training, and support to enhance the quality of play-based learning. Furthermore, private schools should continue to prioritize socio-emotional development in their curricula.

REFERENCES

Ali, A., & Mahamod, Z. (2015). Development of play-based instruction module for teaching preschoolers' language skills. *Australian Journal of Basic and Applied Sciences*, *9*(34), 110–118.

Bergen, D. (2009). *Play as a medium for learning and development: A handbook of theory and practice*. Routledge.

Bodrova, E., & Leong, D. J. (2007). *Tools of the mind: The Vygotskian approach to early childhood education*. Merrill/Prentice Hall.

Chopra, N., & Khanna, I. (2019). Play as a mechanism of promoting emergent literacy among young children: The Indian context. In *Early Childhood Education*. IntechOpen. https://doi.org/10.5772/intechopen.82363

Cutter-Mackenzie, A., Edwards, S., Moore, D., & Boyd, W. (2014). *Young children's play and environmental education in early childhood education*. Springer. https://doi.org/10.1007/978-3-319-03740-0

Dockett, S., & Perry, B. (2014). Mapping transition. *Early Childhood Folio*, *18*(2), 33–38. https://doi.org/10.18296/ecf.0104

Dzainudin, M., Yamat, H., & Yunus, F. (2018). Emerging young children's thinking through social and cognitive development in the project approach. *Creative Education*, *09*(14), 2137–2147. https://doi.org/10.4236/ce.2018.914155

Jantan, R. (2013). Jantan, R. (2013). Faedah bermain dalam perkembangan kanak-kanak prasekolah (4-6 tahun). In *Trend dan isu: Pengajaran dan Pembelajaran*. Universiti Pendidikan Sultan Idris.

Lietaert, S., Roorda, D., Laevers, F., Verschueren, K., & De Fraine, B. (2015). The gender gap in student engagement: The role of teachers' autonomy support, structure, and involvement. *British Journal of Educational Psychology*, *85*(4), 498–518. https://doi.org/10.1111/bjep.12095

Lillard, A. S., Lerner, M. D., Hopkins, E. J., Dore, R. A., Smith, E. D., & Palmquist, C. M. (2013). The impact of pretend play on children's development: A review of the evidence. *Psychological Bulletin*, *139*(1), 1–34. https://doi.org/10.1037/a0029321

Loy, C. L. (2017). Boneka sebagai alat pedagogi dalam perkembangan sosial dan emosi kanak-kanak prasekolah. *Jurnal Pendidikan Awal Kanak-Kanak Kebangsaan*, *6*(1), 45–56. https://doi.org/10.37134/jpak.vol6.1.4.2017

Pellegrini, A. D. (2009). *The role of play in human development*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780195367324.001.0001

Rogers, S. J. (2005). Play interventions for young children with autism spectrum disorders. In *Empirically Based Play Interventions for Children* (pp. 215–239). American Psychological Association. https://doi.org/10.1037/11086-014

Rosli, R., & Lin, T. W. (2018). Children early mathematics development based on a free play activity. *Creative Education*, *09*(07), 1174–1185. https://doi.org/10.4236/ce.2018.97087

Sahlberg, P., & Doyle, W. (2019). *Let the children play: How more play will save our schools and help children thrive*. Oxford University Press.

Saracho, O. N., & Spodek, B. (2010). *Contemporary perspectives on language and cultural diversity in early childhood education*. Information Age Publishing.

Schousboe, I., & Winther-Lindqvist, D. (2013). *Children's play and development: Cultural-historical perspective*. Springer. https://doi.org/10.1007/978-94-007-6579-5

Vygotsky, L. S., & Cole, M. (1978). *Mind in society: Development of higher psychological processes*. Harvard University Press.

Wood, E. A. (2013). *Play, learning and the early childhood curriculum*. SAGE Publications.

Systematic review of multiliteracies skills, multimodal tools to facilitate learning in early childhood classroom

Francis Moodu Yakubu[1]* iD **, Kayode Ezechael Obafemi[2]**
[1]University of Alabama, Tuscaloosa, USA.
[2]Kwara State University, Malete, Nigeria.
* Corresponding Author. E-mail: francismoodu@gmail.com

ARTICLE INFO

ABSTRACT

This systematic review of literature investigates the use of multimodal tools and acquisition of multiliteracies skills to facilitate effective learning in early childhood educational settings. The review covered a total of 15 relevant articles obtained from databases such as ERIC, Education Full Text, PsycINFO, and Web of Science. Having analyzed and synthesized the current evidence, the review provides a significant and valuable insight into the use and acquisition of multiliteracies skills and tools to facilitate learning in early childhood settings. The sole purpose of this review is to add to the body of existing literature in multiliteracies. The study also provides answer to the only research question of the review which was what are the most effective ways to implement multiliteracies and multimodal techniques in the classroom and how early childhood education can benefit from the systematic application of multiliteracies and multimodal learning. The result of the review revealed that, teachers are facing greater challenges than ever in choosing and designing a pedagogy that can engage students in meaningful literacy practices due to the changing literacy needs in the multimedia environment, the changing lifeworld's of the learners, and the changing dimensions of school literacies. Therefore, the review recommended that policymakers must work to incorporate all multimodal tools and technology into the curriculum, especially for early childhood education. Also, schools and learning centers should provide limitless opportunities in early childhood classrooms and environment to assist, direct, and motivate students to learn.

INTRODUCTION

Giving students the reading skills, they need to participate fully in social and cultural events in the contemporary world is a key purpose of learning and teaching literacy. The New London Group (1996) notes that the traditional definition of literacy is limited to the capacity for "page-bound, standard and official forms of the national language." To put it another way, literacy is understood to mean forms of language that are written down, formalized, standardized, and which only reflect the primary dialect of the society. However, the language abilities required to comprehend the world are likewise evolving at the same time that social life and technology are.

Since the drastic changes in pupils' lives, the tremendous changes in students' lives have profoundly altered the educational landscape. The student experience has changed as a result of technological development, the worldwide pandemic's effects, shifting societal dynamics, and changing educational perspectives. Despite the difficulties these changes have brought, they have also given rise to fresh chances for growth and learning. In order to develop a resilient and forward-thinking educational system that equips students for the opportunities and challenges of the future, it is critical for students, instructors, and educational institutions to adapt to and embrace these transformations.

There are now new specifications for learning to read and write that are far more complex and varied than before. Scholars work to enlarge the conventional definition of literacy because it is inadequate to meet demands for full participation in social and cultural activities. This broadened definition of literacy will better support research, teaching, and learning.

As a result of the world's rapid transition to the new global capitalism from outdated (Fordism) capitalism, Fordism was an obsolete kind of capitalism that has evolved into modern global capitalism as a result of elements including globalization, technical developments, adaptability, and innovation. Businesses now work differently thanks to global capitalism, which emphasizes flexibility, customization, and cross-border supply chains. The New Literacies theory evolved pertaining to education. (Gee, 2004; Hall, 1996). Due to technological advancement and innovation, the modern industry is very distinct from the previous one, which is distinguished by "centralized mass production, top-down organization, and steady employment structure" and focuses more on "rapidly information that is always changing, distributed management, unpredictability, and project-oriented employment." (Tang, 2015).

Since the economy's drastic transformation, educators contend that traditional literacy instruction may possibly be insufficient to prepare children for the difficulties of today's work and social life environments. (Gee, 2004; Lave & Wenger, 1991; Luke, 1998). The idea of literacy ought to be expanded in light of how the globe has changed. Such an endeavor to enlarge the notion of what constitutes literacy is the New Literacies theory. The emphasis on "the revolution in everyday technology and its corresponding cultural practices" is the key characteristic that sets New Literacies apart from other literacy paradigms (Coiro et al., 2008). It goes beyond the traditional definition of literacy as reading and writing texts to encompass meaning-making activities involving digital technologies (such as mobile messages, video games, weblogs, etc.), and it investigates how attitudes toward literacy change as practices change. There are disagreements over what qualifies as "new" in terms of the definition of new literacies. The new "technical stuff" and the new "ethos stuff," which were defined by Lankshear and Knobel in 2007, are two concepts that scholars generally agree define the "new" in New Literacies.

The "new ethos" material, which refers to new values of participation, cooperation, interaction, the diffusion of expertise, and relatedness, may help people learn new technology quickly. The "new technical stuff" (name any of the kinds of programs or websites that we use to produce meaning) can only have a little impact on education if the "new ethos stuff" is there. Greater explanations of "new ethos stuff" and "new technical stuff" are as follows: Knowledge of the technological tools that enable creating, exchanging, and negotiating encoded meanings is what is meant by "new technical stuff." Comparatively, to what is called conventional literacies, the technical aspects of digital meanings considerably expand the methods of generating encoded meanings that are available to humans. Someone who would readily admit they are incapable of producing any artistically or otherwise noteworthy drawings, paintings, or photographs can, in a relatively short period of time, put together a collage of images and words to contribute to a well-known online meme...This type of encoded text creation necessitates the use of image-editing software. Considerable familiarity with the fundamental 'moves' in image editing, knowing how to paste the cropped image onto a new background, using an image search engine to choose an appropriate replacement background image...a sequence of mouse clicks is used to upload the finished image to a shared web location. All in the course of around ten minutes. (Lankshear & Knobel, 2011).

The modern society's technological advancements and innovations are included in the new "technical stuff." Since the beginning of the 20th century, technology has been used in classroom

instruction, including movies, television, radio, and computers. The "technical stuff" is in New Literacies "new" in contrast to "old technologies" owing to two notably different characters. First, the new "technical stuff" is a "hybridization of multimodal media," which combines words, pictures, music, and videos to develop flexible, linked, and interactive modes of production that are easily retrieved. The "old technologies" mainly consist of basic varieties of production (Lankshear & Knobel, 2007). People can now access the internet on their smartphones and obtain information using a variety of presentation methods. Second, distributed media production is now possible because of new "technical stuff." (Lankshear & Knobel, 2007).

In today's society, the vast majority of internet material, such as YouTube videos, is created by regular people who just have digital cameras or mobile devices with internet access. The New Literacies' practices and beliefs, on the other hand, make up the new "ethos stuff." Instead of using new instruments to perform the same tasks in more "technologized ways," It alludes to a fresh perspective that the globe has fundamentally altered as a result of the use of novel technology (Lankshear & Knobel, 2007). In contrast to the "published, distinct, author-centered, and expert-dominated" types of traditional literacies because they emphasize greater "participatory, collaborative, and distributed" in character. (Lankshear & Knobel, 2007). In conclusion, the viewpoint of the New Literacies sees literacy as engaging in group activities to develop scattered expertise and knowledge.

The use of many semiotic systems by humans to represent or create meanings, such as language, depiction, gesture, and music, is known as multimodality (Jewitt, 2008; Martinec, 2005). The change in the new media age from the dominance of writing in printed materials to the relatively new dominance of visuals on the digital screen was the catalyst for the increased attention to multimodality in educational research (Kress, 2003). Halliday's (1978) social semiotic approach to language served as the early theoretical underpinning for studies in multimodality. Halliday initially focused on creating a linguistic framework (i.e., SFL), but in the 1990s, a number of theorists started to expand his theory to include other semiotic systems of meaning, such as images (Kress & van Leeuwen, 1996), music (van Leeuwen, 1998), movement and gesture (Martinec, 2000), and mathematical symbolism (O'Halloran, 2000).

A unified language for analyzing how disciplinary knowledge is affected by the semiotic structure inside a given discourse or disciplinary domain is an important development in multimodality. The New London Group (1996) referred to this as a metalanguage, which consists of three aspects of meaning that are realized in any semiotic text (Halliday, 1978): (a) ideational meaning, which is used to create thematic content about the world, (b) interpersonal meaning, which is used to enact one's stance and relationship towards others, and (c) textual meaning, which is used to link unrelated elements into a larger coherent text or entity. These three categories of meaning can be applied to any semiotic system of representation, including language, an imaging system, or gestures. Additionally, this metalanguage can be used to analyze meanings in any subject matter, including science (Kress, Jewitt, Ogborn, & Tsatsarelis, 2001), visual arts (Duncum, 2004), music (Pramling & Wallerstedt, 2009), and English (Benson, 2008).

The term "multiliteracies" was first used by New London Group (1996) to broaden the definition of literacy in order to account for new practices in people's work, public, and private lives. The old "command-and-control" structure of work is being replaced by "horizontal relationships of teamwork," and employees are expected to be more "multiskilled" rather than "deskilled"; historically, the terms "monocultural" and "monolingual" are the identification that has been put in place (New London Group, 1996). New languages are created as a result of the application of new technology and the rise of new types of social relationships. People must acquire literacy in a variety of languages in order to communicate effectively in a variety of settings.

A key distinction between the multiliteracies perspective and the traditional one on literacy is that the multiliteracies perspective sees literacy as involving a variety of representational techniques, including gestures, music, and visuals (New London Group, 1996; Perry, 2012). Alternatively put, even while writing and reading are vital, only one type of literacy can convey meaning in a specific context. It is critical to understand that in order to effectively communicate

meaning, various situations call for various levels of literacy. The idea that "only one type of literacy can convey meaning in a specific context" emphasizes how crucial it is to comprehend the wide variety of literacies and how they each apply in different contexts. The assumption that "only one type of literacy can convey meaning in a specific context" admits that several forms of literacy are appropriate in various contexts for communication. The literacy abilities required to comprehend, express, and interact effectively can change depending on the setting. The ability to recognize and cultivate numerous forms of literacy enables people to interact meaningfully in a variety of contexts, improving communication, critical thinking, and engagement with various informational and media sources.

Among the qualities outlined by multiliteracies experts is the perception of literacy as multimodal. According to the theory of multiliteracies, literacy is located and serves a social function (Olthouse, 2013). Since literacy practices vary according to the setting, literacy is contextual. For instance, writing and sending an email to a buddy is different than writing and sending an email to the boss, not to mention many cultural groups use English differently in different nations. Additionally, the theory of multiliteracies asserts that one goal of literacy is to prepare pupils to "design social futures" (Olthouse, 2013). The phrase "social futures" speaks of the accomplishment of fulfilling the demands in both moral and useful issues of the new period, which encompasses engaging in significant employment and civic engagement, together with individuals from different backgrounds (New London Group, 1996).

Given that being literate is multimodal, and it serves a societal purpose, it is necessary to comprehend the idea of design so as to acquire multiliteracies abilities, according to the multiliteracies framework. According to Kalantzis and Cope (2008), design is "a dynamic interaction between personal interests and transformation," and it consists of three parts: Designed, Designing, and Redesigning. The resources that have applications to create meaning in particular cultural and social contexts are known as the Designed (Kalantzis & Cope, 2008). These are resources that individuals are accustomed to, such as written language discourses, academic argumentation writing's lexical choices, grammatical patterns, and organizational structure. However, designed resources include components from other modalities, like auditory, gestural, visual, etc. Second, according to Kalantzis and Cope (2008), designing is "the process of shaping emergent meaning which involves representation and recontextualization."

The New London Group (1996) offered practical pedagogical solutions to aid teachers in helping students develop abilities within the multiliteracies framework, in addition to acknowledging the rapidly changing nature of society and broadening the definition of literacy. The New London Group (1996) suggested that there should be four elements to teaching and learning literacy: critical framing, situated practice, overt instruction, and transformed practice.

Students engage in learning exercises that are based on personal encounters, connected to relationships located in social lives. (Kalantzis & Cope, 2008; Westby, 2010). To resolve important issues, students utilize the resources for meaning-making that are accessible and ingrained in life experience. Successful situated practice speeds up the transfer of information from one social situation to another.

Overt Instruction incorporates both teacher involvement and systemic student awareness and understanding among the intended resources. Students build metalanguage to explain the resources accessible, as well as understand, and comprehend various multiliteracies with the assistance of experts and scaffolded support. Overt Instruction seeks to empower students with metacognition so they may take charge of their own learning (Westby, 2010).

Students must "take a step back from the material they are learning and evaluate it critically in light of its context" to be able to practice critical framing (Kalantzis & Cope, 2008; Westby, 2010). Students should learn that no one, obvious fact is both universal and applicable in all circumstances. Instead, students must be aware of how social settings affect the choice and exploration of the resources on hand and make key resource selections for various jobs. Students can comprehend the purpose, function, and justification of the layout thanks to the critical framing (Kalantzis & Cope, 2008; Westby, 2010).

Undertakings that are part of transformed practice allow students to use what they have learned in new situations. Students may be required to apply a proven design in a different setting,

modify a specific plan so that it functions in a fresh setting, or develop new designs that are appropriate for novel conditions, depending on the activities' requirements. (Kalantzis & Cope, 2008).

Additionally, video games and computer games, which are popular among young learners, are seen to be the best way to communicate with them and understand what and how they view the world. Playing video games is evolving into a new literary activity among young teenagers. Outside of school, young people frequently spend time playing challenging games. It is important to note that, from an educational standpoint, interest in digital learning games is mostly driven by the need to employ motivating power to urge young learners to learn (Butler, 2019; Williams, 2017). Games are frequently seen as being quite helpful for learning functional skills, improving perceptions, encouraging and developing abilities in problem-solving, strategic evaluation, media, and resources, in addition to motivating people (Boyle et al., 2016; Butler, 2019; Tan & Tan, 2020). Simulators are regarded as the game mode with the most instructional potential out of all those that are now accessible.

It is indisputable that adolescents and children bring mostly digital and online literacies into the classrooms, along with certain foundational print literacies. The way we communicate has significantly been altered: the keyboard and touch screen are quickly displacing the days of the pencil and paper. New technologies have made it possible to develop novel forms of communication as well as fresh perspectives on the world. In addition, according to Mills (2015), young people have transformed the sequential reading of the written word into non-linear and discontinuous digital text browsing. Their literacy habits are naturally carried into the classroom environment as a result of their comfort with immediate access to and dissemination of digital texts in cyberspace and the digital world. All of these have a big impact on the teachers' pedagogical innovations and the literacy expectations of the students. The above-mentioned multiliteracies of the teens and children could be gained or discovered through routine online activities and interactions. These interactions have a substantial impact on how young people think and, to a greater extent, how they interact with and produce various types of texts, including tempo and mode, as well as how they construct and portray their identities. (Coman et al., 2020).

In this review, the investigation is built on analyzing research on the use of multiliteracies and multimodal learning in early childhood classrooms. Early childhood education has historically been a pillar of multimodality in that it promotes and provides spaces for play-based learning that is multisensory and multi semiotic. It is transformative to include multimodal literacy projects in elementary school settings: multiliteracy initiatives promote group inquiry and give learners more agency of learning using a variety of modes. While multimodality is not a new concept in elementary education, it has historically been contained in early childhood education, with kindergarten serving as the pinnacle of play. More and more people are praising kindergarten's emphasis on play as a model for learning in general (De Castell & Jenson, 2003).

In this present review, the researcher wants to establish the significance of multiliteracies and multimodal tools usage in early childhood classes and other educational environments for young children. The literature already published has explored the various modes and elements of multiliteracies in teaching and learning across all levels of education. However, there is still a paucity of research findings documenting the use of multiliteracies and multimodality in early childhood education settings. It is on that existing note that this review offers answers to the study's goal of what are the most effective ways to implement multiliteracies and multimodal techniques in the classroom and how early childhood education can benefit from the systematic application of multiliteracies and multimodal learning.

METHOD

This review was conducted to gain an overview of the application of multiliteracies and multimodality in early childhood classrooms. A systematic review adds to the corpus of information and offers a strong foundation for developing knowledge in the specific area of study. It answers queries that are challenging to answer using isolated qualitative research findings or

quantitative methodologies (Finfgeld-Connett, 2014; Hainey et al., 2016). This investigation also used the qualitative content analysis concept, which is more adaptable than purely qualitative analysis methods, in addition to the systematic review. This review reported and discussed the most recent multiliteracies practices and multimodal components in early childhood settings.

The information used in the present review came from earlier studies that focused on the application of multiliteracies and multimodal learning in early childhood schools. The peer-reviewed research articles that were published between 2010 and 2022 were systematically reviewed for the current investigation, which is shown in Figure 1. Keywords such as "multiliteracies", "multimodal learning", "early childhood", "preschool", "kindergarten", and "primary education", were used in a thorough search of pertinent databases, including ERIC, Education Full Text, PsycINFO, and Web of Science. The researcher reviewed 15 publications that matched the inclusion criteria. The search was restricted to English-language articles that discussed how multiliteracies and multimodal learning are used in early childhood settings and how they affect the learning outcomes of young learners.
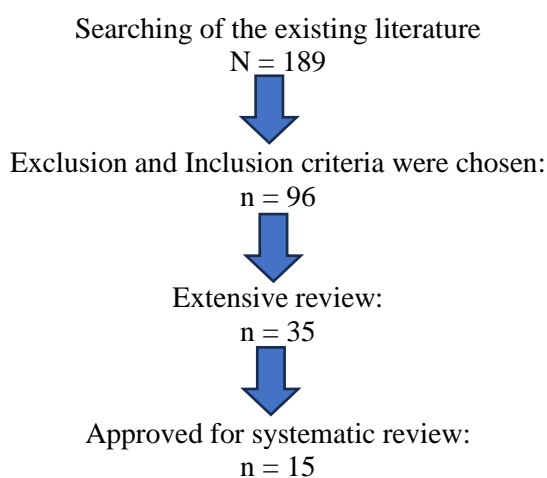
Searching of the existing literature
N = 189

Exclusion and Inclusion criteria were chosen:
n = 96

Extensive review:
n = 35

Approved for systematic review:
n = 15

Figure 1. Showing diagram of the systematic review of the literature

RESULTS AND DISCUSSION

To answer the sole goal of this review, the researcher showed the following results: that teachers are facing greater challenges than ever in choosing and designing a pedagogy that can engage students in meaningful literacy practices due to the changing literacy needs in the multimedia environment, the changing lifeworld's of the learners, and the changing dimensions of school literacies (Scherer, Siddiq, & Tondeur, 2019). Researchers have recommended educators implement gamified learning that can engage both educators and students. For instance, Mohd et al. (2020) recommend that language teachers use gamified learning to improve the learning experiences of their students. The idea of gamification was first introduced by Pelling (2011), and many interactive programs like Kahoot!, Quizzes, Plickers, Quizlet, and Socrative followed. These programs have been helpful for students because learning in a fun environment improves the memory of the lessons taught in the classroom.

While some teachers are eager to digitize teaching and learning, others are still sentimental about the old-fashioned literacy based on paper. Researchers have noted that this is the most difficult period for literacy pedagogy, where teachers battle the transitional contradictions between the advancement of modern digital literacy and the retrograde influence of traditional literacy (e.g. Chandler, 2017; Liang & Lim, 2020; Pishol & Kaur, 2015; Santori & Smith, 2018; Zhang et al., 2019). The monomodal and solitary conception of literacy that instructors and teachers of literacy continue to promote will always be in conflict with the multimodal literacy that today's adolescents and children value. They can no longer be motivated only by reading and writing on the page since they are accustomed to the variety of forms and modes of communication literacy activities on the

screen. It will significantly affect how students are taught to read in the classroom. For that reason, all the multimodal and multiliteracies elements of meaning-making must be explored and exploited by the early childhood educator and teacher to bring about the systemic use of different modes of learning by the child.

Furthermore, the findings imply that the caliber of teacher preparation and instructional design determines how well multiliteracies and multimodal learning are implemented in early childhood education. According to studies, teachers who have received training in the application of these methods and who scaffold children's learning can produce higher learning outcomes than those who do not.

The systematic review of the use of multiliteracies and multimodal tools in learning in early childhood classrooms was investigated in this review. The findings of the review showed that teacher preparation and instructional designs determine how well multiliteracies and multimodal learning are implemented in early childhood education. Early childhood teachers and educators need to receive training in the application of methods and techniques of using various modes of multiliteracies and multimodal in early childhood classrooms. (Mirra et al., 2018) suggest that educators and students accept the critical multiliteracies theory, which integrates four modes of digital interaction, in order to deal with the rapidly changing trends in multiliteracies pedagogy implementation in the classroom. This covers important digital usage, critical digital creation, critical digital sharing, and critical digital invention.

According to Mirra et al. (2018), classroom pedagogy demands a fundamental overhaul and calls for both teachers and students to have a grasp of the concept of criticality. In particular, the New London Group's (2000) long-standing multiliteracies pedagogy is extended by the criticality of media literacy. In order to be internationally competitive, students need to learn how to create digital multimedia material in addition to utilizing the multimodal learning resources that are already available, according to the important digital consuming factor. Learners must comprehend, utilize, and deconstruct the tropes of the existing multimodal resources before they can accomplish this. This is possible if teachers and students are exposed to the critical traditions and theories that are currently prevalent in the pertinent field of education. To enable students to critically analyze multimodal information, exposure is crucial.

CONCLUSION

The systematic review shows that previous research frequently takes into account the multimodality of meaning-making and meaning-recreation as well as the numerous multiliteracies abilities students bring to the classroom, particularly in early childhood classrooms and environments. This concurs with the New London Group's (2000) suggestion that educators and teachers should address the multiliteracies skills that learners possess. The study of classroom multiliteracies has drawn a lot of interest and has continued to grow as new technological advancements have made teaching and learning more convenient in the twenty-first century. Students should advance in this direction to communicate and compete with one another locally and worldwide, according to the critical theory of multiliteracies offered by Mirra et al. (2018).

Additionally, the systematic review of the literature suggests that teachers should negotiate multiliteracies in the classroom across a wide range of multimodal pedagogical experiences, especially in the early childhood classroom and environment, as these components support effective learning outcomes. There is growing interest in how multimodal digital texts and other technical tools can be used effectively in educational contexts as a result of the impact of multimedia technology on children's daily lives. As educators and teachers, we must recognize the widespread use of multimodal teaching and learning strategies in pedagogical situations in this cutting-edge technological era. As a result, policymakers must work to incorporate all multimodal tools and technology into the curriculum, especially for early childhood education.

Additionally, early childhood educators must use creativity to meet the learning requirements of their students by addressing the multimodal literacies they are using and, as a result, adapting their pedagogies to the virtual world and other contexts. This will allow the

students to hone their ability to interpret the various types of literature they encounter, helping them to establish their values, identities, and worldviews.

Conclusively, in order to improve learning utilizing all the senses, students must use, create, and share appropriate multimodal technologies in the classroom. Children explore to build their brains and create connections between real, tangible, and perceived actions by teachers and instructors in all contexts that support teaching and learning. Therefore, limitless opportunities must be provided in early childhood classrooms and environments to assist, direct, and motivate students to learn.

REFERENCES

Benson, S. (2008). A restart of what language arts is: Bringing multimodal assignments into secondary language arts. *Journal of Advanced Academics*, *19*, 634-674. https://doi.org/10.4219/jaa-2008-828

Boyle, E., Hainey, T., Connolly, T. M., Gray, G., Earp, J., Ott, M., Lim, T., Ninaus, M., Ribeiro, C., & Pereira, J. (2016). An update to the systematic literature review of empirical evidence of the impacts and outcome of computer games and serious games. *Computers & Education, 94,* 178-192. https://doi.org/10.1016/j.compedu.2015.11.003

Butler, Y. G. (2019). Gaming and young learners. In S. Garton & F. Copland (Eds.) *Hand-book of teaching English to young learners* (pp. 305-319). https://doi.org/10.4324/9781315623672-20

Chandler, P.D., (2017). To what extent are teachers well prepared to teach multimodal authoring? *Cogent Education*, *4*(1), 1-19. https://doi.org?10.1080/2331186x.2016.1266820.

Coiro, J., Knobel, M., Lankshear, C., & Leu, D. J. (2008). *Handbook of research on new literacies*. Lawrence Erlbaum Associates. https://researchonline.jcu.edu.au/27781/1/27781_Coiro_etal_2008.pdf

Coman, C., Țîru, L., G., Meseșan-Schmitz. L., Stanciu, C., Bularca, M., C. (2020). Online Teaching and Learning in Higher Education during the Coronavirus Pandemic: Students' Perspective. *Sustainability*. 12(24):10367. https://doi.org/10.3390/su122410367

Duncum, P. (2004). Visual culture isn't just visual: Multiliteracy, multimodality and meaning. *Studies in art education*, *45*, 252-264. https://doi.org/10.1080/00393541.2004.11651771

Finfgeld-Connett, D. (2014). Use of content analysis to conduct knowledge-building and theory-generating qualitative systematic reviews. Qualitative research, 14(3), 341-352. https://doi.org/10.1177/1468794113481790

Gee, J. P. (2004). New times and new literacies: Themes for a changing world. In A. F. Ball & S. W. Freeman (Eds.), *Bakhtinian perspectives on language, literacy, and learning* (pp. 279-306). Cambridge, UK: Cambridge University Press. https://doi.org/10.1017/CBO9780511755002.014

Hainey, T., Connolly, T. M., Boyle, E. A., Wilson, A., & Razak, A. (2016). A systematic literature review of games-based learning empirical evidence in primary education. *Computers & Education*, *102*, 202-223. https://doi.org/10.1016/j.compedu.2016.09.001

Hall, S. (1996). The meaning of new times. In A. Morley & K. H. Chen (Eds.), *Critical dialogues in cultural studies* (pp. 223-237). NY: Routledge. https://www.academia.edu/download/36977630/Critical_Dialogues_in_Cultural_Studies_Struart_Hall.pdf#page=234

Halliday, M. A. K. (1978). *Language as social semiotic: the social interpretation of language and meaning*. London: Edward Arnold. https://doi.org/10.1017/S004740450000782X

Jewitt, C. (2008). Multimodality and Literacy in School Classrooms. *Review of Research in Education, 32*, 241-267. https://doi.org/10.3102/0091732X07310586

Kalantzis, M., & Cope, B. (2008). Language education and multiliteracies. *Encyclopedia of language and education*, *1*, 195-211. https://doi.org/10.1007/978-0-387-30424-3_15

Kress, G. (2003). *Literacy in the new media age*. London: Routledge. https://doi.org/10.4324/9781003099857

Kress, G., Jewitt, C., Ogborn, J., & Tsatsarelis, C. (2001). *Multimodal teaching and learning: the rhetorics of the science classroom*: London: Continuum. https://www.bloomsbury.com/uk/multimodal-teaching-and-learning-9781441109965/

Kress, G., & Van Leeuwen, T. (1996). *Reading images: the grammar of visual design*. London: Routledge. https://doi.org/10.4324/9781003099857

Lankshear, C., & Knobel, M. (2007). Sampling "the New" in new literacies. In M. Knobel & C. Lankshear (Eds.), *A New Literacies Sampler* (pp.1-24). NY: Peter Lang. https://www.researchgate.net/publication/283968439_Sampling_the_new_in_new_literacies

Lankshear, C. & Knobel, M. 2011. *The New Literacies.* 3rd Edition. Mcgraw Hill. http://eprints.jcu.edu.au/18503/7/18503_Lankshear_&_Knobel_2011_Back_pages.pdf

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9780511815355

Liang, W. L. J., & Lim, F. V., (2020). A pedagogical framework for digital multimodal composing in the English Language classroom. *Innovation in Language Learning and Teaching,* 1-5. https://doi.org/10.1080/17501229.2020.1800709

Luke, A. (1998). Getting over method: Literacy teaching as work in "new times". *Language Arts*, *75*, 305-313. https://www.jstor.org/stable/41962065

Martinec, R. (2000). Types of process in action. *Semiotica, 130*, 243-268. https://www.degruyter.com/document/doi/10.1515/semi.2000.130.3-4.243/html

Martinec, R. (2005). Topics in Multimodality. In R. Hasan, C. Matthiessen & J. Webster (Eds.), *Continuing Discourse on Language* (Vol. 1). London: Equinox. https://scholars.cityu.edu.hk/en/publications/publication(3d83e73b-6fa5-4a94-8afb-aeff6d9e4eba).html

Mills, K. A. (2015). Doing digital composition on the social web: Knowledge processes in literacy learning. In B. Cope & M. Kalantzis (Eds.), *A Pedagogy of multiliteracies: Learning by design* (pp. 172-185). New York: Palgrave Macmillan. https://link.springer.com/chapter/10.1057/9781137539724_10

Mirra, N., Morrell, E., & Fillipiak, D. (2018). From digital consumption to digital invention: Toward a new critical theory and practice of multiliteracies, *Theory into Practice,* 57(1), 12-19. https://doi.org/10.1080/00405841.2017.1390336

Mohd, I.I., Nur, E.M.S., & Tan, K.H., (2020). Game-based learning platform and its effects on present tense mastery: Evidence from an ESL classroom. *International Journal of Learning, Teaching and Educational Research.* 19(5),13-26. https://doi.org/10.26803/ijlter.19.5.2

New London Group. (1996). A pedagogy of multiliteracies: Designing social futures. *Harvard Educational Review,* 66, 60-92. https://doi.org/10.17763/haer.66.1.17370n67v22j160u

O'Halloran, K. L. (2000). Classroom discourse in mathematics: A multisemiotic analysis. *Linguistics and Education, 10*, 359-388. https://doi.org/10.1016/S0898-5898(99)00013-3

Olthouse, J. M. (2013). Multiliteracies theory and gifted education: Creating "Smart Spaces" in the language arts classroom. *Gifted Child Today*, 36(4), 247-253. https://doi.org/10.1177/1076217513497575

Pelling, N., (2011). The (short) prehistory of "gamification" …. Funding Startups & otherimpossibilities. Retrieved from https://nanodome.wordpress.com/2011/08/09the-short-prehistory-of-gamification.

Perry, K. H. (2012). What is literacy? – A critical overview of sociocultural perspectives. *Journal of Language & Literacy Education*, 8(1), 50-71. https://files.eric.ed.gov/fulltext/EJ1008156.pdf

Pishol, S., & Kaur, S. (2015). Teacher and students perceptions of reading a graphic novel using the multiliteracies approach in an ESL classroom. *Malaysian Journal of Learning and Instruction*, *12*, 21-47. https://doi.org/10.32890/mjli2015.12.2

Pramling, N., & Wallerstedt, C. (2009). Making musical sense: The multimodal nature of clarifying musical listening. *Music Education Research*, *11*, 135-151. https://doi.org/10.1080/14613800902924433

Santori, D., & Smooth, C.A., (2018). Teaching and learning with iPads to support dialogic construction of multiliteracies, *Middle School Journal,* 49(1), 24-31. https://doi.org/10.1080/00940771.2018.1398944

Scherer, R., Siddiq, F., & Tondeur, J. (2019). The technology acceptance model (TAM): A meta-analytic structural equation modeling approach to explaining teachers' adoption of digital technology in education. *Computers & Education,* 128, 13-35. https://doi.org/10.1016/j.compedu.2018.09.009

Tan, P.Q., & Tan, K.H. (2020). In-game instructions: The extent of their usefulness in enhancing the vocabulary acquisition of ESL learners. *International Journal of Emerging Technologies in Learning (iJET), 15*(4), 73-89. https://doi.org/10.3991/ijet.v15i04.11647

Tang, K. S. (2015). Reconceptualizing science education practices from new literacies research. *Science Education International, 26*(3), 307-324. https://eric.ed.gov/?id=EJ1074880

Van Leeuwen, T. (1998). Music and Ideology: Notes toward a Sociosemiotics of mass media music. *Popular Music and Society, 22*(4), 25-54. https://doi.org/10.1080/03007769808591717

Westby, C. (2010). Multiliteracies: The changing world of communication. *Topics in Language Disorders*, *30*(1), 64-71. *DOI:* 10.1097/TLD.0b013e3181d0a0ab

Williams, A. (2017). *History of digital games: Development in art, design and interaction.* Boca Raton, FL: Focal Press. https://doi.org/10.1201/9781315715377

Zhang, Z., Nagle, J., McKishnie, B., Lin, Z., & Li, W. (2019). Scientific strengths and reported effectiveness: a systematic review of multiliteracies studies. *Pedagogies: An International Journal*, *14*(1), 33-61. https://doi.org/10.1080/1554480X.2018.1537188