Potensi *Augmented Reality* sebagai Sarana Promosi Kolaborasi dan Kerjasama Siswa dalam Pendidikan Agama di SD

The Potential of Augmented Reality as a Means Of Promoting Collaboration and Cooperation of Students in Religious Education In Elementary School

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Abstrak

Pendidikan agama memegang peranan penting dalam membentuk pemahaman dan kerjasama yang harmonis di kalangan peserta didik. Namun, tantangan seringkali muncul dalam menciptakan lingkungan belajar yang mendorong kolaborasi dan kolaborasi antar siswa. Dalam beberapa tahun terakhir, teknologi augmented reality (AR) telah muncul sebagai alat inovatif dalam pendidikan. Artikel ini bertujuan untuk menggali potensi augmented reality dalam mendorong kolaborasi dan kerjasama antar peserta didik dalam pendidikan agama. Penelitian ini berfokus pada pemanfaatan *augmented reality* dalam konteks pembelajaran agama untuk menciptakan lingkungan yang memungkinkan siswa berkolaborasi secara aktif. Dengan menggabungkan elemen virtual dan fisik, *augmented reality* memberikan pengalaman belajar yang mendalam dan interaktif, serta memungkinkan siswa mengeksplorasi konsep-konsep keagamaan secara lebih mendalam. Analisis terhadap studi terkait yang telah dilakukan di bidang ini, berfungsi untuk mengidentifikasi manfaat dan tantangan yang terkait dengan penggunaan AR dalam menciptakan lingkungan pembelajaran kooperatif. Selain itu, pembahasan mengenai strategi dan pedagogi dapat dimanfaatkan untuk mengoptimalkan pemanfaatan augmented reality dalam konteks pendidikan agama. Dengan memanfaatkan potensi teknologi tersebut, diharapkan siswa dapat memperoleh pengalaman belajar yang lebih bermakna dan saling mendukung, yang pada akhirnya akan memperkuat pemahaman mereka tentang agama dan mendorong kerjasama antar budaya yang lebih luas.

Kata kunci: Augmented reality, Kerjasama, Kolaborasi, Pendidikan Agama

Abstract

Religious education plays an important role in forming harmonious understanding and cooperation among students. However, challenges often arise in creating a learning environment that encourages collaboration and collaboration among students. In recent years, augmented reality (AR) technology has emerged as an innovative tool in education. This article aims to explore the potential of augmented reality in encouraging collaboration and cooperation among students in religious education. This research focuses on the use of augmented reality in the context of religious learning to create an environment that allows students to collaborate actively. By combining virtual and physical elements, augmented reality provides an immersive and interactive learning experience, and allows students to explore religious concepts in greater depth. An analysis of related studies that have been conducted in this field, serves to identify the benefits and challenges associated with using AR in creating a cooperative learning environment. In addition, discussions about strategy and pedagogy can be used to optimize the use of augmented reality in the context of religious education. By harnessing the potential of this technology, it is hoped that students will be able to have more meaningful and mutually supportive learning experiences, which in turn will strengthen their understanding of religion and promote wider intercultural cooperation.

Keywords: Augmented reality, Cooperation, Collaboration, Religious education

PENDAHULUAN

Learning is an effort made by individuals to gain knowledge and new knowledge. Learning has a strategic position in human resource development efforts (Ismail, 2010). The learning process can be carried out in various areas of life such as the workplace, neighborhood, school, or college. Learning in schools has the goal of developing students' self-potential including moral and ethical values (Amaliyah and Rahmat 2021). The interactions that occur between teachers and students are expected to be able to encourage high motivation and interest in learning in students. The learning process can be interpreted as a process of transferring information from the teacher (messenger) to the student (recipient of the message). This means that the learning process must contain a pleasant interactive atmosphere to create space for students to develop their creativity according to student abilities.

The education system needs to be responsive to the stages of community development, especially in fulfilling needs. In addition, it is necessary to pay attention to the characteristics of the community to prepare the younger generation for their full integration into society. New technologies that have mingled with the latest educational tools and practices can create innovative digital learning experiences that encourage collaboration and interaction in learning (A. Sari and Destiana 2022).

Religious education plays a central role in shaping understanding, values, and cooperation among students in educational environments. However, in reality, creating a learning environment that encourages collaboration and collaboration among students in religious education is not an easy thing. This is because various challenges arise in it.

Traditionally, religious learning is often based on teaching methods or learning models that are more passive or better known as one-way learning models, where students act more as recipients of information than as active participants in the learning process. This learning model results in a lack of power. absorb students' understanding of the material being studied. The emergence of various criticisms of the learning model applied in Indonesia, certainly indicates that people are starting to be aware of and care about the development of the education sector in their beloved country.

Awareness of the importance of transforming education from a traditional system to a more modern system is nothing new. In the era of rapid technological development as one of the products of globalization, of course, directly or indirectly it will affect all areas of life including education.

Current technological developments influence progress in the learning process in Indonesia. Teachers are required to be able to keep abreast of developments in Science and Technology (IPTEK) to be able to present a class atmosphere that is by the needs of the times and by the character of the students. The development of Science and

Technology (IPTEK) has implications for each generation in various fields of knowledge so that this generation will be educated according to the development of science and technology. The development of science and technology can be used by teachers to create learning media that functions as a tool to attract students' interest in learning. One of the technology-based learning media that is widely used today is learning media using Augmented Reality (AR).

In recent years, augmented reality (AR) technology has emerged as an innovative tool in education. This relatively new technology offers the potential to change the way students learn and collaborate. Augmented reality (AR) is a technology that combines real objects and virtual objects (Jeon et al. 2016). This has a role in creating immersive and interactive learning experiences (Ainie, Roedavan, and Cahyani 2023). In the context of religious education, the use of AR technology can provide new opportunities to encourage collaboration, communication, and deeper understanding between students, especially in terms of understanding the religious material being studied.

Argued reality has various benefits in supporting the learning process of students. This technology has been utilized and produced something effective as a technology-based learning media. Mustaqim concluded that AR-based learning media is considered very useful because it provides a more active and visible learning atmosphere. The emergence of AR technology is said to make it easier for students to better understand the material being studied. This can happen because of the ability of AR which can visualize objects in the real world (Mustaqim 2016).

Next, an example of using AR in learning, namely through collaborative activities. Through collaborative activities, AR can also be used to encourage cooperation and collaboration among students (Yani 2023). They can share the same AR environment and collaborate on completing tasks, solving problems, and building projects together. This indirectly has implications for increasing social interaction and student involvement in the learning process. It is important to review the development of learning multimedia and how its use can encourage cooperation and collaboration between students in the learning process through Augmented Reality (AR) based learning (Bistaman, Idrus, and Rashid 2018).

The aim of exploring the potential of augmented reality (AR) in encouraging collaboration and collaboration between students in religious education is carried out by exploring some of the benefits and advantages that might occur when augmented reality is used in a religious learning environment. In addition, it is important to discuss some of the challenges that may be faced in implementing augmented reality in the context of religious education, such as technical aspects, teacher training, and resource management.

Providing insight into pedagogical strategies and approaches can be used to optimize the use of augmented reality in religious education. By exploiting the potential of this technology, it is hoped that students will be able to participate actively in the learning process, work together in teams, and build a deeper understanding of religious values and cultural diversity.

Research and application of augmented reality in religious education is still relatively new, therefore there is a need for related research analysis. It is intended that this research can provide an overview of the developments and opportunities that exist. Furthermore, it is hoped that gathering information regarding some examples of best practices in the use of AR technology in religious education can provide inspiration and guidance for religious educators and curriculum developers. In addition, this application can also enrich student learning experiences, strengthen religious understanding, and promote broader intercultural cooperation.

Based on the background behind this, to encourage collaboration and collaboration between students, researchers tried to review the potential for augmented reality (AR) technology to be utilized and developed as a medium for religious learning. This article aims to collect scientific articles, journals, books, and other library sources that are trusted and verified about Augmented Reality for learning so that a straight line can be drawn regarding the potential of AR media in encouraging collaboration and collaboration between students. It is hoped that the results of this study can become a reference and motivation for educators and schools to seek AR technology in its implementation of religious learning activities.

METODE PENELITIAN

This study uses a qualitative approach, with the method of documentation by collecting data. The data source used is secondary data. Secondary data are data sources that do not directly provide data to data collectors, for example through documents (Sugiyono 2015). In this study, the secondary data sources were books, journals, and articles related to the research topic regarding the potential of augmented reality technology in encouraging student collaboration and cooperation in religious education. The documentation method by collecting secondary data through indirect data sources, can also be referred to as the library method.

The library research method is a way of finding and then analyzing previous research data or relevant literature references (Jayawardana and Gita 2020). The library research method involves collecting and analyzing relevant literature that has been previously published. Usually, the literature used is the publication year range of the last five to ten years.

In the context of this research, library research methods can be used to identify and analyze research, articles, books, and other sources related to the use of augmented reality in encouraging collaboration and collaboration between students in religious education. Researchers can conduct a comprehensive literature review to understand the latest advances in the use of augmented reality in the context of religious education, as well as gain an understanding of the benefits, challenges, and implementation strategies that have been put forward by previous researchers.

HASIL DAN PEMBAHASAN
A. Definition and Concept of Learning Multimedia

Multimedia is a combination of various media components such as graphics, text, images, video, animation, and audio that are used to help us convey messages. In the learning process, multimedia is used to facilitate students' understanding of the material presented by the teacher so that learning objectives can be achieved

properly (Surjono 2017). Multimedia has an important role in helping the student learning process, namely creating a fun and interactive learning atmosphere. This of course will reduce student boredom during the learning process so that the material delivered by the teacher can be well received by students.

Multimedia can be used to attract students' interest in learning in class. The use of interactive multimedia can increase student learning motivation through the appearance of a combination of text, images, video, audio, and animation that is displayed attractively (Darmawan, 2014). Multimedia can also be used to develop the human senses and attract the attention of students. Computer Technology Research (CTR), defines that humans can remember 20% of what they see, 30% of what they hear, and 50-80% of what they see, hear, and do. This means that the role of multimedia is very important in the learning process because multimedia elements are far more complex than conventional learning media (Munir 2015).

The development of learning multimedia involves the use of various media such as text, images, audio, video, and animation to convey learning material to students. Conceptually, learning multimedia can be developed in various forms, such as slide presentations, learning videos, interactive applications, and so on. The basic concept in learning multimedia is to utilize the power of visuals, audio, and interactive to increase student understanding and involvement.

Based on the explanation above, multimedia is very suitable as a learning medium for children who tend to be more motivated and enthusiastic about learning in visual and sound forms. High memory and intelligence in capturing new things are very relevant if children can be given multimedia facilities for learning media or concepts. Especially in the world of religious education which has a practical learning base and understands the meaning of just knowing a theory(Rasmani et al. 2023).

B. Augmented Reality (AR) Technology

Augmented reality can be interpreted as an expansion of the physical world through aspects of virtual media (Nurhasanah and Putri 2020). According to Ronald T. Azuma in Indah Purnama Sari et al defines augmented reality as a combination of real and virtual objects in a real environment, running interactively in real time and there is integration between the real and virtual worlds made possible with appropriate display technology, equipped with effective explanations. for users (IP Sari et al., 2023).

This AR technology uses multimedia elements that greatly influence the teaching and learning process of students (Mohd Fadzil and Mohd Noor 2023). AR technology facilitates students to be able to see events directly without having to use their imagination to imagine what will happen. This allows augmented reality technology to help the learning process in an effective and fun way (Mahartika, et al 2023).

The application of AR technology is useful for capturing and knowing a student's learning interest through the visualization of teaching materials. Each new interaction elicits a different response. So that increased interactivity to improve

education is a source of information and new knowledge about student interest, motivation, and involvement (Özeren and Top 2023).

C. Religious Education

Religious education has an important role in shaping the character and morals of students (Komariah and Nihayah 2023). Religious education is intended to shape students into human beings who believe and are devoted to God Almighty and have noble character and increase spiritual potential (Arsyad, 2014). In addition, collaboration and cooperation between students are also important social skills to be mastered in everyday life. In today's digital era, technology has a significant role in supporting the learning and development of social skills. Religious education should play an optimal role because the source of absolute value is the basic values that apply universally. Thus giving birth to the formation of civil character, namely behavior that reflects the understanding of rights and obligations and maintains the dignity of humanity with mutual respect (Firmansyah et al. 2023).

The essence of education from an Islamic perspective is that people are responsible for the development of students by seeking all the potential of students, both affective, cognitive, and psychomotor potential. Religious education aims to shape children's personalities in accordance with religious teachings (Wahab, 2017).

Teachers also mean adults who are responsible for assisting students in their physical and spiritual development, so that they reach a level of maturity, can stand alone and fulfill their duties as servants and caliphs of Allah SWT, and are able as social beings, and as independent individual beings (Pasha, 2018).

Like uswah, the teacher teaches as well as exemplifies all forms of virtue taught by Allah and His Messenger through His verses and the sunnah of His prophet (Fitri, Nursikin, and Amin 2023). Understanding this central role, teachers are expected to have creativity and innovation in religious education activities in the school environment for students. Applying digital media as a learning instrument is a must for a teacher in an educational institution (Rafliyanto and Mukhlis 2023). Moreover, religious education is not just theoretical science but practical knowledge with a series of obligatory and sunnah worship in it (Salsabila et al. 2023).

D. Encouraging Collaborationand Inter-Student Cooperation in Religious Education

Efforts to maximize technological developments continue to be carried out by various related parties. The goal is to always exist and be in harmony with the times. However, related the use of augmented reality technology in religious education also needs to be balanced with the right approach. This technology should be used as complementary learning combined with existing teaching methods. Learning methods are the initial foundation for achieving a goal and principles of learning (Firda Zakiyatur Rofi'ah and Zulfatul Azizah 2021). Teachers continue to act as learning facilitators, guiding students in using AR effectively and expanding their understanding of religion.

An example of the practice of using technology *augmented reality* is carried out at SD Immersion Inclusion, Ponorogo Regency. Elementary schools that offer learning for students with special needs such as *slow learner*s and the deaf provide an opportunity for them to carry out learning with regular students. For students with special needs, the school provides a companion teacher, namely one teacher for two students to provide special learning. Not without reason this is intended so that students with special needs have the same enthusiasm for learning as regular students. On the other hand, regular students are born with a spirit of social sensitivity and moral awareness to respect differences and respect each other. Both of these are intended to create collaboration and collaboration between students with special needs and regular students.

Efforts to develop an attitude of collaboration and cooperation are born by schools, one of which is through the media utilization program technology *augmented reality* in religious learning activities. This was carried out during the religious education learning period, students formed teams to understand tasks or questions through visualized images in the application that had been provided. Problem solving is divided into each teams according to the level of understanding and mastery of students. Not only pictures but students also listen to children's songs about religious education which students must understand and memorize. Students with special needs who experience difficulties will be eagerly assisted by regular students. So that the spirit of collaboration and cooperation among students can be born by itself.

Here are some examples of harnessing the potential of augmented reality to encourage collaboration and cooperation among students in religious education:

1. Joint Exploration in Virtual Space: Augmented reality can create virtual space so that students can interact together as learning media for visualization of objects that are difficult to visualize (Andis Indrawan, Saputra, and Linawati 2021, 65). For example, students can visit historical sites or holy places virtually through augmented reality applications. They can collaborate in exploring and studying various aspects of religion by combining their knowledge and observations.

2. Collaborative Projects: Augmented reality can be used to develop collaborative projects in which students work in teams to create religion-related augmented reality content. For example, students can design virtual tours that combine religious elements with augmented reality technology. This kind of project allows students to collaborate, share knowledge, and build shared understanding. Students have the drive to continue to seek and acquire knowledge wherever and whenever they need it (Mashudi 2021, 109).

3. Interactive Simulation: Augmented reality can be used to create interactive simulations that allow students to participate in certain situations and roles related to religion and to build and develop student's knowledge so that students are good at actualizing their thoughts (Pradnyana, Agustini, and Santyasa 2021). For example, students can participate in interactive simulations about interfaith dialogue or interfaith conflict resolution. This kind of simulation allows students

to collaborate in solving problems, thinking critically, and developing cooperative skills.

4. Virtual Discussions and Debates: Augmented reality can be used to facilitate virtual discussions and debates between students. So the need for the role of digital media as a learning innovation in debate learning in discussion forums (Fatimah 2021). Through augmented reality applications, students can represent different religious views and participate in teacher-led discussions. This enables students to understand diverse religious perspectives, respect differences, and practice effective communication skills.

5. Virtual Exhibition: Virtual exhibitions are essentially a means of communication and publication (Rahmasari and Haryadi 2021, 271). Augmented reality can be used to create virtual exhibitions where students can collaborate to present religion-related research or projects. Students can create augmented reality content that displays their knowledge and understanding of a particular religion. Such exhibitions can become collaborative platforms that allow students to share ideas, provide feedback, and learn from one another.

Through the use of augmented reality in religious education, students can experience a more interactive learning experience, participate actively, and work together in a religious context. This can help strengthen their understanding of religion, increase tolerance and mutual understanding, and build important cooperation skills in an increasingly global and multicultural society.

KESIMPULAN DAN SARAN

Augmented reality(AR) has great potential in encouraging collaboration and collaboration among students in religious education. By using AR, students can gain a more interactive and interesting learning experience, as well as develop important social skills, as exemplified at SD Immersion, Ponorogo Regency. AR can also be used as an innovative evaluation tool that requires direct interaction with virtual objects. However, the use of AR in religious education needs to be balanced with the right approach and measurable use. By wisely exploring AR's potential, religious education can become more attractive and effective in preparing students to live in a diverse and collaborating society.

REFERENSI

Ainie, Siti Abdillah, Rickman Roedavan, and Leni Cahyani. 2023. "Interactive Learning Media Based Augmented Subtheme The Miracles Of Changes In Form And Objects For Students Of SDN Campaka 1." *e-Proceeding of Applied Science* 9(3): 1313–19.

Amaliyah, Aam, and Azwar Rahmat. 2021. "Aam Amaliyah, Azwar Rahmat Attadib: Journal of Elementary Education, Vol. 5 (1), Juni 2021." *Journal of Elementary Education* 5(1): 28–45.

Andis Indrawan, I Wayan, Komang Oka Saputra, and Linawati Linawati. 2021. "Augmented Reality Sebagai Media Pendidikan Interaktif Dalam Pandemi Covid-19." *Majalah Ilmiah Teknologi Elektro* 20(1): 61.

Bistaman, Izwan Nurli Mat, Syed Zulkarnain Syed Idrus, and Salleh Abd Rashid. 2018. "The Use of Augmented Reality Technology for Primary School Education in Perlis, Malaysia." *Journal of Physics: Conference Series* 1019(1).

Darmawan, D. 2014. *Inovasi Pendidikan Pendekatan Praktik Teknologi Multimedia Dan Pembelajaran Online*. Bandung: PT Remaja Rosdakarya Offset).

Fatimah, Masni. 2021. "Media Pembelajaran Digital Sebagai Inovasi Pembelajaran Debat Dalam Forum Diskusi Pada Masa Pandemi Covid-19."

Firda Zakiyatur Rofi'ah, and Zulfatul Azizah. 2021. "Implementasi Pembelajaran Matematika Materi Perkalian Kelas V Pada Metode Lattice Di Madrasah Ibtidaiyah (MI) Ar-Rohmah Glagahwangi Sugihwaras Bojonegoro." *Jurnal Riset Madrasah Ibtidaiyah (JURMIA)* 1(1): 73–80.

Firmansyah, Mokh. Iman et al. 2023. "Pendidikan Agama Islam Dan Pembangunan Karakter Siswa Sekolah Dasar: Studi Eksplorasi." *EDUKASI: Jurnal Penelitian Pendidikan Agama dan Keagamaan* 21(1): 46–58.

Fitri, Aulia, Mukh Nursikin, and Khairul Amin. 2023. "Peran Ganda Guru Pendidikan Agama Islam Dalam Membimbing Siswa Bermasalah Di SD Islam Al-Rasyid Pekanbaru." *Journal on Education* 5(3): 9710–17.

Hanafi, Halid, La Adu, and Zainuddin. 2018. *Ilmu Pendidikan Islam*. Yogyakarta: Deepublish.

Jayawardana, H.B.A, and Rina Sugiarti Dwi Gita. 2020. "Inovasi Pembelajaran Biologi Di Era Revolusi Industri 4 . 0." *Prosiding Seminar Nasional Biologi di Era Pandemi Covid-19* 6(1): 58–66.

Jeon, J, Min Hong, M Yi, and J Chuan. 2016. "Interactive Authoring Tool for Mobile Augmented Reality Content." *Journal of Information Processing Systems* 12(4): 612–30.

Komariah, Nurul, and Ishmatun Nihayah. 2023. "Improving The Personality Character of Students Through Learning Islamic Religious Education." *At-Tadzkir: Islamic Education Journal* 2(1): 65–77.

Mahartika, I., Iwan, I., Suttrisno, S., Dwinanto, A., Yulia, N. M., Andryanto, A., ... & Afrianis, N. 2023. *Media Pembelajaran Berbasis Augmented Reality*. ed. Abdul Karim. Medan: Yayasan Kita Menulis. https://isbn.perpusnas.go.id/Account/SearchBuku?searchTxt=Media Pembelajaran berbasis Augmented Reality&searchCat=Judul.

Mashudi, Mashudi. 2021. "Pembelajaran Modern: Membekali Peserta Didik Keterampilan Abad Ke-21." *Al-Mudarris (Jurnal Ilmiah Pendidikan Islam)* 4(1): 93–114.

Mohd Fadzil, Mohamad Zulfadzli, and Noor Anida Zaria Mohd Noor. 2023. "Mengintegrasikan Augmented Reality Dalam Pembelajaran Bentuk 2D Dan 3D." *Journal of Engineering, Technology, and Applied Science (JETAS)* 5(1): 12–22.

Munir. 2015. *Multimedia Konsep & Aplikasi Dalam Pendidikan*. Bandung: CV Alfabeta.

Mustaqim, Ilmawan. 2016. "Pemanfaatan Augmented Reality Sebagai Media Pembelajaran." *Jurnal Pendidikan Teknologi dan Kejuruan* 13(2): 728–32.

Nurhasanah, Yeni, and Daniah Adjani Putri. 2020. "Pengembangan Media Pembelajaran Digital Berbasis Augmented Reality Pada Topik Klasifikasi Hewan Berdasarkan

Habitatnya." *Multinetics* 6(2): 86–98.

Özeren, Seçil, and Ercan Top. 2023. "The Effects of Augmented Reality Applications on the Academic Achievement and Motivation of Secondary School Students." *Malaysian Online Journal of Educational Technology* 11(1): 25–40.

Pradnyana, I Ketut Andika, Ketut Agustini, and I Wayan Santyasa. 2021. "Pengembangan E-Modul Interaktif Kolaboratif Pada Mata Pelajaran Komputer Dan Jaringan Dasar." *Jurnal Jendela Pendidikan* 1(04): 218–25.

Rafliyanto, Muhammad, and Fahrudin Mukhlis. 2023. "Pengembangan Inovasi Pembelajaran Pada Mata Pelajaran Pendidikan Agama Islam Di Lembaga Pendidikan Formal." *TARBIYATUNA: Kajian Pendidikan Islam* 7(1): 121–42.

Rahmasari, Erisa Adyati, and Toto Haryadi. 2021. "Eksistensi Pameran Virtual Tugas Akhir Mahasiswa Dalam Sudut Pandang Difusi-Inovasi." *Jurnal Audience* 4(02): 268–90.

Rasmani, Upik Elok Endang et al. 2023. "Multimedia Pembelajaran Interaktif Untuk Guru PAUD." *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini* 7(1): 10–16.

Salsabila, U H, M S Aghnia, A Sholihin, and … 2023. "Dinamika Teknologi Dalam Pendidikan Agama Islam." *Al Itibar: Jurnal Pendidikan …* 10(1): 1–5.

Sari, Ahmad, and Destiana. 2022. "Studi Literatur Tentang Potensi Augmented Reality Sebagai Media Pembelajaran Sekolah Menengah Pertama." *Angewandte Chemie International Edition, 6(11), 951–952.* 10(2): 114–21.

Sari, Indah Purnama, Ismail Hanif Batubara, Al Hamidy Hazidar, and Mhd Basri. 2023. "Pengenalan Bangun Ruang Menggunakan Augmented Reality Sebagai Media Pembelajaran." *Hello World Jurnal Ilmu Komputer* 1(4): 209–15.

Sugiyono. 2015. *Metode Penelitian Kualitatif, Kuantitatif Dan R&D*. Bandung: Alfabeta.

Surjono, Herman Dwi. 2017. *Multimedia Pembelajaran Interaktif*. Yogyarakta: UNY Press.

Yani, Era. 2023. "Transformasi Teknologi Dalam Pembelajaran Di Era Revolusi Industri 4.0." *Jurnal PenKoMi : Kajian Pendidikan & Ekonomi* 6(2): 68–75.