

ICT-Based Arabic Learning: A 21st Century Learning Innovation

(Pembelajaran Bahasa Arab Berbasis ICT: Sebuah Inovasi Pembelajaran Abad 21)

Abdul Muid¹

¹ Universitas Jambi
abdulmuid02@unja.ac.id¹

Abstract:

This research reveals innovations in Arabic language learning based on information and communication technology (ICT) in the 21st Century. The main focus of this study is to know and analyze innovations in Arabic language learning based on ICT. This study used a descriptive-analytical approach. The literature study method, also known as content analysis, uses the review and analysis of primary sources such as books, scientific journals, articles, and documents related to the topic. The results showed that Arabic learning innovations based on information and communication technology (ICT) were considered by teachers as new ideas and approaches. Teachers see ICT as a tool to solve problems and achieve learning objectives. Therefore, the role of teachers in using ICT to develop innovation and learning media is very important.

Keywords: Arabic Language; Learning Innovation; Information and Communication Technology of the 21st Century

Abstrak:

Penelitian ini mengungkapkan inovasi dalam pembelajaran Bahasa Arab yang didasarkan pada teknologi informasi dan komunikasi (TIK) di Abad 21. Fokus utama penelitian ini adalah untuk mengetahui dan menganalisis inovasi dalam pembelajaran Bahasa Arab yang didasarkan pada TIK. Penelitian ini menggunakan pendekatan deskriptif-analitis. Metode studi kepustakaan, yang juga dikenal sebagai analisis konten, menggunakan kajian dan analisis sumber utama seperti buku, jurnal ilmiah, artikel, dan dokumen yang terkait dengan topik. Hasil penelitian menunjukkan bahwa inovasi pembelajaran bahasa Arab yang berbasis teknologi informasi dan komunikasi (TIK) dianggap oleh para guru sebagai ide dan pendekatan baru. Guru melihat TIK sebagai alat untuk memecahkan masalah dan mencapai tujuan pembelajaran. Oleh karena itu, peran guru dalam menggunakan TIK untuk mengembangkan inovasi dan media pembelajaran menjadi sangat penting.

Kata Kunci: Bahasa Arab; Inovasi pembelajaran; Teknologi Informasi dan Komunikasi Abad 21

INTRODUCTION

Learning innovation as an important part of educational innovation in the era of the industrial revolution 5.0 is a must that must be done by education actors, especially teachers through learning interactions. The industrial revolution 5.0 is fundamental that provides changes in how to socialize, work and also carry out daily activities. The virtual world with connections between three variables, namely data, machines and humans is called the *Internet of Things* (IoT). The existence of IoT shows the role of Artificial Intelligence (AI) as a typical identifier rather than industry 5.0. AI is designed to process models of human thinking and cognitive performance related to how a machine can record information, imitate and modify it

automatically. As one of the computer sciences, AI is studied in order to replace the role of humans¹.

Creativity due to Education with technological updates that realize the Education Era 4.0. It is this creative character that helps in terms of growth and development as there is an uninterrupted emergence of the latest innovations globally. Human resource development in international competition has two priorities. First, the learning process and the formation of student personality. Second, Indonesian education needs to start learning on its own and be driven by teachers. From the two statements above, we can conclude that the implementation of the educational process is not only about artificial intelligence through the connectivity of everything, but also about the human element as a driver of education. Our education has entered the era of Society 5.0, which provides a balanced society without our knowledge. Where the Internet is not only for information but also for life, all technology is part of human beings, and technological development can minimize inequality and economic problems of society in the future².

Bringing innovation in the era of the Industrial Revolution 4.0, which includes the Internet of Things (IoT), big data analysis, artificial intelligence (AI), robotics, sharing economy, and so on, to various industrial sectors is a must. The integration of artificial intelligence technology into the field of education is also important as a supporting tool for the development of knowledge in the learning process. As a result, the application of Artificial Intelligence in the context of education has the potential to bring new breakthroughs in the implementation of learning, which is based on the foundation of Science and Technology (IPTEK) in the 21st century³.

The role of parents and teachers in mastering the development of Science and Technology (IPTEK) will be further enhanced thanks to the adoption of artificial intelligence technology. Therefore, it is hoped that this research will generate a deeper understanding of the role of AI in the educational context.

¹ Abdul Muid, Rosita Ilhami, and Suci Ramadhanti Febriani, "MBKM (Merdeka Belajar Kampus Merdeka) Under Jambi University's Arabic Education Program during the Industrial Revolution: Implementation, Supporting and Inhibiting Factors (Version 4.0)," *Arabiyatuna: Jurnal Bahasa Arab* 6, no. 1 (April 11, 2022): 85.

² Adekunle Oke and Fatima Araujo Pereira Fernandes, "Innovations in Teaching and Learning: Exploring the Perceptions of the Education Sector on the 4th Industrial Revolution (4IR)," *Journal of Open Innovation: Technology, Market, and Complexity* 6, no. 2 (June 1, 2020).

³ Abdul Muid et al., "Project-Based Learning Models Approach in Improving Arabic Speaking Ability," *An Nabighoh* 24, no. 1 (June 30, 2022): 17.

Education is considered as a Primadone in Indonesia today and has become a hot conversation in every element of society, from housewives, small traders and MSMEs, academics to policy makers and the highest stakeholders. In the topics discussed, do not run away from the low quality of education which is still a crawling path towards improving quality⁴.

From the statement above, education in the life of the state and nation is considered as a system that binds each other. If only every level of society and education practitioners work together in improving the quality of education and work hand in hand with each educational institution, then indirectly quality education in this country will increase simultaneously. This is in line with Kristiawan's opinion that in theory learning is based on completeness in preparing professional human resources who are able to absorb all other dimensions⁵. Discussing this topic of education will not reach the finish line, because the big problem of every human being is education that will always be warm to be discussed at each moment, opportunity and different space. In this case, education is required to always be relevant to sustainable change. This is said to be the foundation of epistemology and the general principle of education itself or is considered as the basis of desired renewal⁶.

Quality human resources greatly determine the pace of development of a nation. It is inevitable that an important role is held by education as an effort to realize the quality of human resources⁷. In line with that, education is considered as an important thing in human life to humanize humans as a form of effort that must be done⁸. If the Indonesian nation has the desire to take part in the international and even global arena, then managing human resources is the first step that must be done, especially in emotional, religious, creative, and moral aspects, in addition to intellectual aspects. Organized human resources must be operated informally, formally, or informally, from early education to tertiary education through a quality education

⁴ Tatang Hidayat and Syahidin Syahidin, "Inovasi Pembelajaran Pendidikan Agama Islam Melalui Model Contextual Teaching and Learning Dalam Meningkatkan Taraf Berfikir Peserta Didik," *Jurnal Pendidikan Agama Islam* 16, no. 2 (December 20, 2019): 115–136.

⁵ Muhammad Kristiawan and Nur Rahmat, "Peningkatan Profesionalisme Guru Melalui Inovasi Pembelajaran" (2018), <https://doi.org/10.25217/ji.v3i2.348>.

⁶ Taofeek D. Akinosho et al., "Deep Learning in the Construction Industry: A Review of Present Status and Future Innovations," *Journal of Building Engineering* 32 (November 1, 2020).

⁷ Restu Rahayu, Sofyan Iskandar, and Yunus Abidin, "Inovasi Pembelajaran Abad 21 Dan Penerapannya Di Indonesia," *Jurnal Basicedu* 6, no. 2 (February 11, 2022): 2099–2104.

⁸ Norhikmah Norhikmah et al., "Inovasi Pembelajaran Dimasa Pandemi: Implementasi Pembelajaran Berbasis Proyek Pendekatan Destinasi Imajinasi," *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini* 6, no. 5 (March 24, 2022): 3901–3910.

system⁹. This is inseparable from the learning process in educational units that are held interactively, inspirationally, fun, challenging, and can motivate students to actively participate and provide sufficient space for initiative, effectiveness, and in accordance with the talents of independence, desire, and physical and psychological development of students¹⁰.

From this statement, teachers must organize active, innovative, creative, effective, and fun learning (PAIKEM)¹¹. PAIKEM is learning that empowers students to carry out various activities to develop skills, attitudes and understanding by prioritizing learning while working, teachers use various learning resources and tools including utilizing the environment as a learning resource, so that learning becomes more interesting, fun and effective¹². Today's science and technology have developed rapidly and the speed cannot even be caught up. As a result, the impact caused is increasingly open and information can be accessed at any time even science no longer has distance because it has been able to penetrate the boundaries of distance, time and space. The influence of IT was also found to have extended to the corners of life. According to Rosdiana, ICT is a learning medium that also has a tendency that can increase student interest and provide many benefits to the learning cycle¹³.

From the initial research that has been carried out, it was found that at MA Al-Muhsinin Jambi, the learning system that uses the PAIKEM model is based on the *Blended Learning* method which combines face-to-face learning with online or distance learning methods based on ICT (*Information and Communication Technology*). Facts in the field show that teachers are less creative and unable to design ICT in Arabic language learning so that the average student still has difficulty in understanding the lessons given, which is seen from the exam results below the KKM score.

⁹ Syamsidah Lubis, "Inovasi Pembelajaran Berbasis Digital Untuk Meningkatkan Hasil Belajar Siswa Sekolah Dasar," *Jurnal Pembelajaran, Bimbingan, dan Pengelolaan Pendidikan* 2, no. 12 (December 30, 2022): 1121–1126.

¹⁰ Anggi Nurul Baity and Putri Kholida Faiqoh, "Optimizing Arabic Learning for University Students through 4c Skills of 21st Century," *Journal of Arabic Education* 02 (2022): 2.

¹¹ Jalal Nouri et al., "Development of Computational Thinking, Digital Competence and 21st Century Skills When Learning Programming in K-9," *Education Inquiry* 11, no. 1 (January 2, 2020): 1–17.

¹² Waleed Mugahed Al-Rahmi et al., "Integrating Technology Acceptance Model with Innovation Diffusion Theory: An Empirical Investigation on Students' Intention to Use E-Learning Systems," *IEEE Access* 7 (2019): 26797–26809.

¹³ Ahmad Muradi et al., "Higher Order Thinking Skills Dalam Kompetensi Dasar Bahasa Arab," *Arabi: Journal of Arabic Studies* 5, no. 2 (December 31, 2020): 177.

The results of relevant research reveal where learning using ICT shows an increase in student learning outcomes¹⁴, Technology-based learning models affect the learning outcomes and learning motivation of a student¹⁵. Not only that, similar research also revealed that in using ICT-based media, the completeness of student learning rose to 91%¹⁶. In terms of learning innovation or the use of Islamic religious education, the problem of learning methods in particular must be implemented immediately¹⁷. The internet as a means of learning can be an alternative to learning Arabic¹⁸. In line with this, the use of ICT in every Arabic learning process is more focused on the target object. Now, the role of ICT needs to be developed and explored its usefulness¹⁹.

With regard to existing problems, it is expected that Arabic teachers will be able to make several implementations and efforts in implementing ICT-based learning systems, so that the theme of *Information and Communication Technology (ICT)-based Arabic learning innovation* in the industrial era 4.0 is an interesting theme to be researched.

METHOD

This research was conducted using descriptive-analytical methods. Meanwhile, based on the object of study and orientation to be achieved, this research uses literature studies (*Library research* or also called *content analysis*. *How to collect data and information in the form of materials in the library in the form of archives, documents, magazines, books, and other library materials, assuming the material needed in this discussion is contained therein*. After the data is collected, then analysis is carried out through and other sources that are related to the research theme, namely data reduction, data presentation and conclusions or verification or drawing conclusions.

¹⁴ Dewa Gede Hendra Divayana, P. Wayan Arta Suyasa, and Ni Ketut Widiartini, "An Innovative Model as Evaluation Model for Information Technology-Based Learning at ICT Vocational Schools," *Heliyon* 7, no. 2 (February 1, 2021).

¹⁵ Sergio Humberto Barbosa Granados and Marly Leana Amariles Jaramillo, "Learning Styles and the Use of ICT in University Students within a Competency-Based Training Model," *Journal of New Approaches in Educational Research* 8, no. 1 (January 1, 2019): 1–6.

¹⁶ Hengqin Wu et al., "A Transformer-Based Deep Learning Model for Recognizing Communication-Oriented Entities from Patents of ICT in Construction," *Automation in Construction* 125 (May 1, 2021).

¹⁷ Hidayat and Syahidin, "Inovasi Pembelajaran Pendidikan Agama Islam Melalui Model Contextual Teaching and Learning Dalam Meningkatkan Taraf Berfikir Peserta Didik."

¹⁸ Andri Ilham and Ahmad Muzayyin Haqi, "The Need for Arabic Language Teaching Materials Based On Multicultural Education For Indonesian Diaspora Students," *Journal of Arabic Linguistics and Education* 7, no. 1 (2021): 45–63.

¹⁹ Sulihin B Sjukur, "Pengaruh Blended Learning Terhadap Motivasi Belajar Dan Hasil Belajar Siswa Di Tingkat SMK," *Jurnal Pendidikan Vokasi* 2, no. 3 (January 9, 2013).

DISCUSSION AND ANALYSIS

ICT-Based Learning Innovation

The role of teachers in innovation and development of learning media is very necessary considering that teachers are the main actors who play an important role in learning, teachers are strived to be able to manage their ability to create effective and efficient learning media. It is, according to Irina Engeness, Due to the development of technology and information that continues to develop dynamically, conventional learning patterns that emphasize rote memorization methods are considered less relevant to the development of ICT technology must be changed along with the development of information and communication technology²⁰. Therefore, it is very natural that this condition must be considered by teachers in order to continue to innovate²¹.

Innovation Learning planning

Innovative lesson planning that is able to provide useful experiences for students, we need to pay attention to important components in learning. From the learning component, teachers are guided to be able to plan activities and learning strategies that are relevant to learning objectives. This learning development strategy is important because there are several problems in the learning process that may exist in a learning system. Learning development strategies include: a). Preparation, including curriculum analysis, needs analysis and learning design. b). The methods used in general are classical, group, and individual. c). Evaluation is needed to find out whether the strategy used is suitable or not.

The problem now is, how the function of the 3 components (Teacher, Student, and Curriculum / material) can provide synergistic support to each other for the learning process so as to be able to produce valuable experiences for student life in the future when the student faces real life in society. In terms of teachers, for example, it is necessary to have a clear vision and mission towards the future of students. This means that teachers need to have an organizational insight into the future. Thus, teachers must always provide up-to-date

²⁰ Irina Engeness, "Developing Teachers' Digital Identity: Towards the Pedagogic Design Principles of Digital Environments to Enhance Students' Learning in the 21st Century," *European Journal of Teacher Education* 44, no. 1 (2021): 96–114.

²¹ Abdul-Ganiy Kayode Ahmad, "E-Learning: An Implication of Covid-19 Pandemic for the Teaching and Learning of Arabic and Islamic Studies in Ogun State's Tertiary Institutions," *International Journal of Social Learning (IJSL)* 2, no. 2 (April 6, 2022): 217–234.

information in the field they teach. It is also necessary to have the ability to predict what will emerge and what will sink from the application of the field of study to be taught²².

The Role of Teachers in Arabic Language Learning with the Use of ICT Media

As a basis for utilizing the internet as a learning medium in school settings, there are several things that need serious attention and handling so that the implementation of the use of the internet for learning can be successful, namely: 1). Environmental Factors, which include educational institutions and communities. 2). Learners, which include age, background, culture, language acquisition and various learning styles. 3). Teachers, which include their background, age, teaching style, experience and personality. 4). Technological factors, which include computers, software, networks, connections to the internet and various capabilities needed related to the application of the internet in the school environment²³.

The role of teachers is no less decisive for the success of internet use in schools. Temporary monitoring in several primary and secondary schools in Indonesia generally shows that many initiatives to use the internet in schools come from teachers who have an early awareness of the potential of the internet to support the teaching and learning process. The success of internet-based learning is significantly determined by the characteristics of teachers who will be involved in the use of the internet. For this reason, it is necessary to note the following:

1. Teachers need to be given an understanding of the various advantages, including the advantages and disadvantages of using the internet for learning, so that they have high enough motivation and commitment.
2. Teachers, whether they will act as developers and users or who are projected as managers of internet-based learning systems, must be equipped with awareness, insight, knowledge and skills about the internet.
3. Teachers who will be involved in the development and use of the internet for learning should have sufficient experience and teaching ability.

²² Pengetahuan Teknologi Guru Bahasa Arab Dan Hubungannya Dengan Kreativiti Pengajaran Di Malaysia Muhammad Rusdi Ab Majid Zawawi Ismail et al., *Jurnal Islam Dan Masyarakat Kontemporari* ISSN 2289 6325 Bil, vol. 18, 2018.

²³ Şengül S. Anagün, "Teachers' Perceptions about the Relationship between 21st Century Skills and Managing Constructivist Learning Environments," *International Journal of Instruction* 11, no. 4 (October 1, 2018): 825–840.

4. The number of teachers who will be involved in the development and use of the internet for learning should be adjusted to the needs and carried out gradually.
5. Teachers must have commitment and seriousness in handling the development and use of the internet for learning.
6. Keep each teacher's teaching style. Because it will be reflected in the way their learning will be in the learning system with the internet²⁴.

ICT-Based Arabic Learning Innovation

The internet, which is currently universal, was introduced as a medium for transferring information and insight and knowledge in various aspects. Virtual Mentor (VM) is one of the applications juxtaposed with *The Lab System* which functions more as an integrated multimedia environment that has implemented *e-Learning*. In one article in the Journal of Computer Information Systems, it is mentioned that VM environments are more effective than traditional conventional learning²⁵. Learning interaction will not be realized if it is not implemented by asking questions known as *Learning by Asking* (LBA). By using this LBA there will be two main components (Video Streaming Server and Web Server). Both components will process the original Video and produce one question which later becomes one of the question data which can later be recalled and developed according to the intensity of the question occurrence and the variety of the video processed.

The existence of virtual mentors such as LBA facilitates interaction with effectiveness in the perspective aspects of management and financing. However, LBA will not be directed if there is no Learning Assistant Module. LBA's potential as a Virtual Mentor fuels multimedia-based learning forever.

The use of information technology in innovation in the eyes of Arabic learning in the era of the industrial revolution 4.0 according to the Minister of Research, Technology and Higher Education is sought to be prepared:

²⁴ Naeklan Simbolon et al., "The Effectiveness of ICT-Based Learning in Improving English Skills of Elementary School Teacher College Students," *Academic Journal of Interdisciplinary Studies* 9, no. 5 (September 1, 2020): 217–226.

²⁵ Guadalupe Martínez-Borreguero et al., "Development of ICT-Based Didactic Interventions for Learning Sustainability Content: Cognitive and Affective Analysis," *Sustainability (Switzerland)* 12, no. 9 (May 1, 2020).

- 1) Preparation of a more innovative learning system to produce competitive and skilled graduates, especially in aspects of data *literacy*, *technological literacy* and *human literacy*.
- 2) Reconstruction of adaptive higher education institutional policies and responsive to the Industrial Revolution 4.0 in developing the required transdisciplines and study programs.
- 3) Preparation of responsive, adaptive and reliable human resources to face the industrial revolution 4.0.
- 4) Rejuvenation of infrastructure facilities and infrastructure development of education, research, and innovation also need to be carried out to support the quality of education, research, and innovation²⁶.

The challenges of education in the era of the industrial revolution 4.0, can be detailed as follows. 1) Provide understanding or knowledge to all educators to be able to utilize ICT in learning, guide students in using ICT and facilitate the implementation of education throughout Indonesia. 2) Provide training, mentoring, and continuous evaluation to educators to realize responsive, reliable, and adaptive educators 3) Preparing educators to be able to create innovative learning, so as to provide opportunities for children to be creative, solve problems, optimize literacy and numeracy skills, collaboration, and critical thinking. 4) Provide meaningful civic education for students, as part of value education to realize human beings with character²⁷.

In the current industrial revolution 4.0, the use of Information Technology (IT)-based learning media has become a necessity and demand by paying attention to several techniques so that the media used can be utilized optimally and does not deviate from the purpose of the media²⁸. Computer network technology / internet provides benefits for users to communicate directly with other users. This is possible with the creation of a device called a modem. Computer networks / internet provide opportunities for participants to communicate in writing and exchange ideas about the learning activities they do. Computer networks can be designed

²⁶ Moch Wahib Dariyadi, *217 Konferensi Nasional Bahasa Arab (KONASBARA) VII 2021 Approaching Arabic Learning Through The Use Of The Google Website*, n.d.

²⁷ Nurul Hidayah et al., *Dampak Penggunaan Teknologi Dalam Pembelajaran Bahasa Arab Terhadap Motivasi Belajar Siswa*, vol. 2, 2023, <https://journal.mudaberkarya.id/index.php/JoME>.

²⁸ Abdul Muid et al., "Learning Model of Speaking Arabic: Field Research Based on Constructivism Theory at Al Muhsinin Islamic Boarding School Kerinci," *Alsuna: Journal of Arabic and English Language* 3, no. 2 (November 25, 2020): 140–151.

in such a way that teachers can communicate with students and students can have learning interactions with other students. Learning interaction using computer networks can be done individually and in groups to support learning activities. The use of computer networks in the distance education system is also known as *the Computer Conferencing System (CCF)*. Usually this system is done via electronic mail or E-mail. Some of the advantages of utilizing computer networks in the distance education system are: can enrich tutorial models, can solve learning problems faced by students in a shorter time and can overcome space and time barriers in obtaining information. CCF provides the possibility for students and lecturers to interact directly between individuals, individuals with groups, and group by group²⁹.

Rehan Almegren presents various media that can be used in IT-based learning. These include e-learning-based learning models, distance learning, web-based learning, and various other terms related to IT-based education³⁰. These media aim to facilitate and accelerate access and distribution of information and learning materials. Thus, the teaching and learning process can continue to be updated as needed. However, it should be emphasized that in IT-based learning, the availability of internet access is the main requirement. Therefore, efforts continue to be made to ensure network availability, ranging from telephone networks in homes or offices, Speedy services from Telkom, leased lines from ISPs, to communication through GPRS, 3G, and HSDPA technology.

CONCLUSION

The use of technology and information is a strategic breakthrough in increasing learning effectiveness in building creativity, independence and student learning innovation by changing traditional learning patterns into automatic learning patterns. Arabic learning innovation is a renewal in the field of education or innovation carried out to solve educational problems, learning innovation is an idea, item, method that is perceived or observed as new to a person or group of people (society) either in the form of invention or discovery results used to achieve learning goals. The role of teachers in the innovation of Arabic language learning and the development of learning media is very necessary, because teachers can be said to be the main actors who play a very important role in learning activities should be, teachers are strived to be able to manage their skills to make effective and efficient learning media. In this era of

²⁹ Abdul Muid, Aulia Mustika Ilmiani, and Ahmad Fikri, "Typology of Student Learning in Qira'ah Subject with Multiple Intelligence Perspective," *Ta'lim al-'Arabiyyah: Jurnal Pendidikan Bahasa Arab & Kebahasaaraban* 5, no. 1 (June 1, 2021): 84–96.

³⁰ Rehan Almegren, "The Speech Act of Apology for Saudi EFL Students," *International Journal of Applied Linguistics and English Literature* 7, no. 4 (July 1, 2018): 144.

globalization and information, the use of Information Technology (IT)-based learning media has become an urgent need and demand through the use of computer networks that can be done individually and in groups. This is because the advantages of utilizing computer networks in the distance education system are: can enrich tutorial models, can solve learning problems faced by students in a shorter time and can overcome space and time barriers in obtaining information.

BIBLIOGRAPHY

- Abdul-Ganiy Kayode Ahmad. "E-Learning: An Implication of Covid-19 Pandemic for the Teaching and Learning of Arabic and Islamic Studies in Ogun State's Tertiary Institutions." *International Journal of Social Learning (IJSLS)* 2, no. 2 (April 6, 2022): 217–234.
- Akinosho, Taofeek D., Lukumon O. Oyedele, Muhammad Bilal, Anuoluwapo O. Ajayi, Manuel Davila Delgado, Olugbenga O. Akinade, and Ashraf A. Ahmed. "Deep Learning in the Construction Industry: A Review of Present Status and Future Innovations." *Journal of Building Engineering* 32 (November 1, 2020).
- Almegren, Rehan. "The Speech Act of Apology for Saudi EFL Students." *International Journal of Applied Linguistics and English Literature* 7, no. 4 (July 1, 2018): 144.
- Al-Rahmi, Waleed Mugahed, Noraffandy Yahaya, Ahmed A. Aldraiweesh, Mahdi M. Alamri, Nada Ali Aljarboa, Uthman Alturki, and Abdulmajeed A. Aljeraiwi. "Integrating Technology Acceptance Model with Innovation Diffusion Theory: An Empirical Investigation on Students' Intention to Use E-Learning Systems." *IEEE Access* 7 (2019): 26797–26809.
- Anagün, Şengül S. "Teachers' Perceptions about the Relationship between 21st Century Skills and Managing Constructivist Learning Environments." *International Journal of Instruction* 11, no. 4 (October 1, 2018): 825–840.
- Dariyadi, Moch Wahib. *217 Konferensi Nasional Bahasa Arab (KONASBARA) VII 2021 Approaching Arabic Learning Through The Use Of The Google Website*, n.d.
- Divayana, Dewa Gede Hendra, P. Wayan Arta Suyasa, and Ni Ketut Widiartini. "An Innovative Model as Evaluation Model for Information Technology-Based Learning at ICT Vocational Schools." *Heliyon* 7, no. 2 (February 1, 2021).
- Engeness, Irina. "Developing Teachers' Digital Identity: Towards the Pedagogic Design Principles of Digital Environments to Enhance Students' Learning in the 21st Century." *European Journal of Teacher Education* 44, no. 1 (2021): 96–114.
- Granados, Sergio Humberto Barbosa, and Marilly Leana Amariles Jaramillo. "Learning Styles and the Use of ICT in University Students within a Competency-Based Training Model." *Journal of New Approaches in Educational Research* 8, no. 1 (January 1, 2019): 1–6.
- Hidayah, Nurul, Haeruman Rusandi, Sekolah Tinggi Ilmu Kesehatan Siti Khadijah Palembang, and Pendidikan Bahasa Arab. *Dampak Penggunaan Teknologi Dalam Pembelajaran Bahasa Arab Terhadap Motivasi Belajar Siswa*. Vol. 2, 2023. <https://journal.mudaberkarya.id/index.php/JoME>.

- Hidayat, Tatang, and Syahidin Syahidin. "Inovasi Pembelajaran Pendidikan Agama Islam Melalui Model Contextual Teaching and Learning Dalam Meningkatkan Taraf Berfikir Peserta Didik." *Jurnal Pendidikan Agama Islam* 16, no. 2 (December 20, 2019): 115–136.
- Ilham, Andri, and Ahmad Muzayyin Haqi. "The Need for Arabic Language Teaching Materials Based on Multicultural Education For Indonesian Diaspora Students." *Journal of Arabic Linguistics and Education* 7, no. 1 (2021): 45–63.
- Kristiawan, Muhammad, and Nur Rahmat. "Peningkatan Profesionalisme Guru Melalui Inovasi Pembelajaran" (2018). <https://doi.org/10.25217/ji.v3i2.348>.
- Lubis, Syamsidah. "Inovasi Pembelajaran Berbasis Digital Untuk Meningkatkan Hasil Belajar Siswa Sekolah Dasar." *Jurnal Pembelajaran, Bimbingan, dan Pengelolaan Pendidikan* 2, no. 12 (December 30, 2022): 1121–1126.
- Martínez-Borreguero, Guadalupe, Juan José Perera-Villalba, Milagros Mateos-Núñez, and Francisco Luis Naranjo-Correa. "Development of ICT-Based Didactic Interventions for Learning Sustainability Content: Cognitive and Affective Analysis." *Sustainability (Switzerland)* 12, no. 9 (May 1, 2020).
- Muid, Abdul, Sulhi Muhamad Daud Abdul Kadir, Noza Aflisia, and Neldi Harianto. "Learning Model of Speaking Arabic: Field Research Based on Constructivism Theory at Al Muhsinin Islamic Boarding School Kerinci." *Alsuna: Journal of Arabic and English Language* 3, no. 2 (November 25, 2020): 140–151.
- Muid, Abdul, Muhammad Fadhlan, Rasidin Rasidin, and Muhammad Dasrul Jabir. "Project-Based Learning Models Approach in Improving Arabic Speaking Ability." *An Nabighoh* 24, no. 1 (June 30, 2022): 17.
- Muid, Abdul, Rosita Ilhami, and Suci Ramadhanti Febriani. "MBKM (Merdeka Belajar Kampus Merdeka) Under Jambi University's Arabic Education Program during the Industrial Revolution: Implementation, Supporting and Inhibiting Factors (Version 4.0)." *Arabiyatuna: Jurnal Bahasa Arab* 6, no. 1 (April 11, 2022): 85.
- Muid, Abdul, Aulia Mustika Ilmiani, and Ahmad Fikri. "Typology of Student Learning in Qira'ah Subject with Multiple Intelligence Perspective." *Ta'lim al-'Arabiyyah: Jurnal Pendidikan Bahasa Arab & Kebahasaaraban* 5, no. 1 (June 1, 2021): 84–96.
- Muradi, Ahmad, Faisal Mubarak, Ridha Darmawaty, and Arif Rahman Hakim. "Higher Order Thinking Skills Dalam Kompetensi Dasar Bahasa Arab." *Arabi: Journal of Arabic Studies* 5, no. 2 (December 31, 2020): 177.
- Norhikmah, Norhikmah, Nahdiyatul Fitria Rizky, Dwi Puspita, and Saudah Saudah. "Inovasi Pembelajaran Dimasa Pandemi: Implementasi Pembelajaran Berbasis Proyek Pendekatan Destinasi Imajinasi." *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini* 6, no. 5 (March 24, 2022): 3901–3910.
- Nouri, Jalal, Lechen Zhang, Linda Mannila, and Eva Norén. "Development of Computational Thinking, Digital Competence and 21st Century Skills When Learning Programming in K-9." *Education Inquiry* 11, no. 1 (January 2, 2020): 1–17.

- Nurul Baity, Anggi, and Putri Kholida Faiqoh. "Optimizing Arabic Learning for University Students through 4c Skills of 21st Century." *Journal of Arabic Education* 02 (2022): 2.
- Oke, Adekunle, and Fatima Araujo Pereira Fernandes. "Innovations in Teaching and Learning: Exploring the Perceptions of the Education Sector on the 4th Industrial Revolution (4IR)." *Journal of Open Innovation: Technology, Market, and Complexity* 6, no. 2 (June 1, 2020).
- Rahayu, Restu, Sofyan Iskandar, and Yunus Abidin. "Inovasi Pembelajaran Abad 21 Dan Penerapannya Di Indonesia." *Jurnal Basicedu* 6, no. 2 (February 11, 2022): 2099–2104.
- Simbolon, Naeklan, Eva Betty Simanjuntak, Mariati Purnama Simanjuntak, and John Tampil Purba. "The Effectiveness of ICT-Based Learning in Improving English Skills of Elementary School Teacher College Students." *Academic Journal of Interdisciplinary Studies* 9, no. 5 (September 1, 2020): 217–226.
- Sjukur, Sulihin B. "Pengaruh Blended Learning Terhadap Motivasi Belajar Dan Hasil Belajar Siswa Di Tingkat SMK." *Jurnal Pendidikan Vokasi* 2, no. 3 (January 9, 2013).
- Teknologi Guru Bahasa Arab Dan Hubungannya Dengan Kreativiti Pengajaran Di Malaysia Muhammad Rusdi Ab Majid Zawawi Ismail, Pengetahuan, Kata kunci, Pengetahuan Teknologi, Pengetahuan Teknologi Pedagogi Kandungan, Guru Bahasa Arab, and Kreativiti Pengajaran Guru. *Jurnal Islam Dan Masyarakat Kontemporari ISSN 2289 6325 Bil. Vol. 18, 2018.*
- Wu, Hengqin, Geoffrey Qiping Shen, Xue Lin, Minglei Li, and Clyde Zhengdao Li. "A Transformer-Based Deep Learning Model for Recognizing Communication-Oriented Entities from Patents of ICT in Construction." *Automation in Construction* 125 (May 1, 2021).