

# Modern Education and an Artificially Intelligent World

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**Keywords:** Modern Education, Artificial Intelligence, Teaching, Learning.

**Abstract:** Recent trends in Artificial Intelligence have a significant influence on people and their daily life. AI has a substantial impact on almost all domains and thus has shown its miracles education sector too. At the same time, modern education has become a requirement of the modern era. Artificial intelligence is nowadays an essential pillar in technological development and current knowledge. This paper aims to collect and review the publications related to AI and education and expose its importance. This paper primarily aims to identify the role of AI and how it supports teaching, learning and other functions of teachers like academic advising. Around ten recent research works were selected and reviewed to understand how they use AI to enhance education. The selection of the papers was performed by collecting articles related to AI and education, and based on the year of publication. The review results indicate the positive influence of AI on both teachers and students. Even though the high affinity of technology may have some drawbacks like the weak teacher-student bond, the technology has proved its excellence in this COVID-19 pandemic. The whole world is making use of the technology for their living in this pandemic. Besides the role of AI in supporting teaching and learning, this study also reveals its role in student advising, notifying important events, selecting study materials, etc. The ultimate suggestion of this paper is to use AI for supporting and enhancing education rather than replacing the current education system.

## 1 INTRODUCTION

The idea of information and communication technology and artificial intelligence was unbelievable in the last century. Still, all the old hadiths talk about this development that we have come across now. The old tales of contemporary technology have become a reality. You would be swiping on your smartphone, and you can know everything under the world at your fingertip. Internet was one of the significant developments, which can consider as a gemstone in the digital technology of communication and media (Henten, A., and Tadayoni, R. 2008). Thanks to the internet, you would know what time your aunt in France was drinking her coffee or that teenagers could become drone pilots even during their vocational studies.

Perhaps nobody can predict the future. Although technological developments are reasonably foreseeable, the social and cultural consequences they will have in the future are complicated to predict. For instance, a film from the sixties about

the 'office future' was accurate from a technological point of view. The arrival of washing machines, vacuum cleaners and gas cookers had given them more time for office work. How do we prepare young people to live an independent life in a world in which we are continually developing and deploying better, smarter and more efficient technologies? A world where artificial intelligence (AI) helps prevents diseases and domestic burglary, where robots perform surgery. The influence of AI and robotics on people and society is profound and far-reaching. In 25 years, a significant portion of the tasks people currently perform will have taken over by robots or AI systems. AI systems create challenges, but also offers new opportunities (Alfarsi et al. 2020) Grosz, B. J., and Stone, P. 2018).

We quickly meet different cultures via the internet, job security is outdated, and information (or misinformation) is abundantly and publicly available. Life in this kind of society requires skills. Knowledge and cognitive skills remain essential, but, more than ever, social-emotional skills are

necessary for personal and professional development. The student of today must, in the future be able to cooperate in teams of people from different backgrounds and come up with solutions for new issues that we cannot even imagine yet.

The artificial intelligence did not replace human teachers completely, especially in the emotional side and the local culture that is important to the Arab person and for this reason, the human and technology work with each other in the scientific side. Influence of AI has influenced almost all domains and hence the education sector to Samigulina, G., & Samigulina, Z. 2016). Some of the applications of AI in education are smart content, intelligent tutoring systems, virtual facilitators, learning environments, and many more. One of the most significant challenges regarding education is that people learn differently and at different rates—the progress in machine learning utilized in education to develop a custom learning profile of each student. Based on the student's ability, the training materials for each student for knowledge and their experience can customize Van Eck, R. 2007). In this research paper, the role and impact of Artificial Intelligence in Education sector covered.

Artificial intelligence used everywhere. It helps the police to predict domestic burglaries, and it assists doctors in choosing the most effective treatment method for cancer patients. The influence of AI and robots will increase in the future. For example, robots will perform surgery, and algorithms will predict the consequences of new government policies. The work carried out by people will predominantly be those tasks and functions where machines are not yet profitable or useful.

In this paper, the role of AI in education sector focused. Numerous methods can enhance education and attract people. Virtual reality and e-learning are some of them. They have also shown a positive impact on both students and teachers. The traditional model of teaching can also enhance by the inventions and the introduction of AI in education. The man and human intelligence on one side and artificial intelligence must be incorporated together, which leads to an unexpected outcome.

The success of humans linked to the consumption of artificial intelligence, whereas artificial intelligence cannot occur in the absence of humans. It cannot evolve, where it remains in one stage, and this stage becomes expired after a while.

This paper aims to communicate important information to people about AI and its application. It aims to educate people about the application of artificial intelligence in the educational framework

and prepare young people for a meaningful and successful career.

Our analysis shows that Artificial Intelligence (AI) is the most promising technology to achieve. These educational aspirations, personal guidance and individual attention are impossible without technology but are very expensive and time-consuming. By applying artificial intelligence, academic professionals can use time more effectively. Dedicate it to each student.

The objectives of this paper can summarize as:

- To identify the role of AI in education.
- The influence of AI in various majors of teaching and learning.
- To describe the use of AI in supporting teachers and students.

## 2 ROLE OF AI IN EDUCATION

Artificial intelligence (AI), deep learning, machine learning and neural networks represent incredibly exciting and powerful machine learning-based techniques used to solve many real-world problems.

According to the father of Artificial Intelligence John McCarthy, it is “The science and engineering of making intelligent machines, especially intelligent computer programs”. Artificial Intelligence is a way of making a computer, a computer-controlled robot, or software, which thinks intelligently to humans. AI accomplished by studying how human brain thinks and how humans learn, decide, and work while trying to solve a problem, and then using the outcomes of this study as a basis of developing intelligent software and systems.

Various researches on Expert system or artificial intelligence applications in the learning area focus on the importance of AI in education. Besides, it begins with the application of school students to facilitate the task of education and technological developments. This research talks about the challenges education faces in studying the application of artificial intelligence and the application of artificial intelligence in the scientific field in all stages.

Luckin et al. in their publication of open ideas describe AI in education (AIED). AI comprises programs to intermingle with the world, which requires human intelligence. Thus, AI depends on knowledge about the system or world, and algorithms to intelligently process that knowledge. Figure 1 shows the model-based adaptive tutor of AIED system. The experience can represent three models:

- pedagogical model - various approaches to teaching
- domain model - subject to be learned
- learner model - the students

AIED algorithms process the knowledge to select and deliver the appropriate content to the learner. The learner can interact through the learner interface, which is analysed to update the model specifically learner model. A new module named Open Learner models are added in some systems which provide feedback of the data analysis to teachers and learners. In addition to the learner, pedagogical, and domain models, AIED researchers have to develop models for social, emotional, and meta-cognitive aspects of learning. The entire models constitute the AIED systems (Luckin, R et al., 2016).

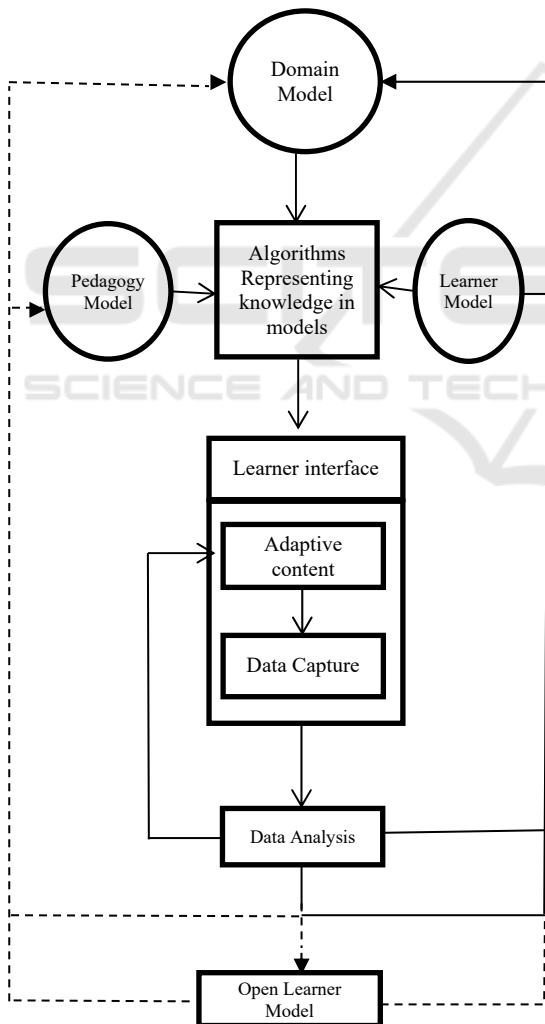


Figure 1: Model-based adaptive tutor of AIED system (Luckin, R et al., 2016).

Brezto and Ghuftron in their research work on AI in education analyzed various learning styles like visual, auditory and kinesthetic. They developed an AI-based website by applying the forward chaining algorithm as an inference engine. As a result, they merged learning styles and system knowledge in forwarding chaining. The system showed a positive impact on students (Dewantara, B. A., & Ghuftron, A. 2019).

AI also collaborated with e-learning. Because the learning process and learners vary in each year, Khalid et al. designed an adaptive learning system. In these adaptive educational systems, various AI techniques such as Fuzzy Logic (FL), Decision tree, Bayesian networks, Neural Networks, Genetic algorithms and Hidden Markov Models used. They used various methods to consume AI approaches in adaptive educational systems (Colchester, K et al., 2017).

E-learning plays vital role nowadays in the educational sector: to support and enhance the teaching practices. It has increased the motivation and performance of students (Tawafak et al., 2019) (Tawafak et al., 2019 b). Researchers conducted and mobile applications and websites designed to support students in programming and various other courses. In some websites, AI is also collaborated to support and expedite the needs of both students and teachers (ALFarsi et al., 2020) (Tawafak et al., 2019).

Besides AI influences in teaching and learning, the student is advisory, notification of important events in college, assessments, etc. are also factors in the education sectors. There are various expert systems in this regard, too (ALFarsi, G and ALSinani M.2017) (Colchester, K et al., 2017). Academic advising of the students is also part of education and an essential responsibility for the teachers. Expert systems are one of the main application of AI, which widely used in universities. A rule-based expert system designed for students to propose courses they can take without conflict just as an advisor does. The analysis of results showed that the implementation of the model for the undergraduate advisory expert system was successful (Y. Yorozu et al., 1980).

Utku and Durmus in their book "Artificial Intelligence Applications in Distance Education" investigate, reveal and broadly depict the current and progressive technology in the field of education and high-performance facilities for a novel, pioneering and innovative real-world applications in the area of education. The various chapters in the book deal with the collaboration of AI with distance learning, different intelligent education supporting systems,

expert systems and websites are supporting distance education, the evaluation and effectiveness of these systems (ALFarsi, Jabbar, & ALSinani, M. 2018).

The artificial intelligence perception and physical education perception with modern technology are discussed in an article by Xin Zhang. The relationship between the development and application projections and the paper analyzes the problems of modern physical education techniques, the deficiency of rational thinking and strategic focus, etc. There are not enough breakthroughs of AI in the physical education area, the hindrances and the countermeasures discussed in this paper (Kose, U. 2014).

The influence of AI had a significant impact on the medical field during this COVID-19 pandemic. An article of Poh-Sun Goh and John Sandars depicts the role of artificial intelligence for adaptive learning and virtual reality in medical education. The pros and cons of the use of technology in medical education deliberated to disseminate the changes occurred in medical education after the pandemic, its positive impact on both educators and students across the world (Zhang, X. 2014).

### 3 METHODOLOGY

This paper focuses on artificial intelligence and the role of it in education. A review of existing and published articles available on open-access database system was conducted. Several keywords related to AI, the impact of AI in education, etc. was searched and ten papers published in the last six years were selected.

The selected articles and the year of publications are stated below:

- Intelligence unleashed: An argument for AI in education (2016)
- Artificial Intelligent in Education: The Development of 'Disabel' System to Analyze Student Learning Styles (2019)
- A survey of artificial intelligence techniques employed for adaptive educational systems within e-learning platforms (2017)
- Teaching Problem Solving Skills using an Educational Game in a Computer Programming Course (2019)
- Developing a Mobile Notification System for AlBuraimi University College Students (2017)
- Artificial Intelligence applications in distance education (2014)

- Research of Modern Physical Education Technology Based on Artificial Intelligence (2014)
- A Rule-Based System for Advising Undergraduate Students (2017)
- Mobile Application System Supported BUC Students Services and Learning (2020)
- Implementing a Mobile Application News Tool for Disseminating Messages and Events of AlBuraimi University College (2018)

This paper shows how each of these research works makes use of AI to assist and enhance the education domain. Some have developed websites, expert systems, and mobile applications to support learning, teaching and other education supporting features like advising.

### 4 DISCUSSION

Artificial intelligence is on the rise, with far-reaching consequences in our society and our education. Although there is still a long way to go, the impacts of AI in specific tasks and professions are already visible. In the above section, we have gone through various articles, which prove the influence of AI in education.

There are numerous impacts of AI on the education sector. One of them is to monitor a student's learning process and, based on analyses and predictions, provide targeted feedback and propose changes in their learning path. As a result, teachers can focus more of their time on guidance and coaching, for example, in the acquisition of social-emotional skills which is a primary requirement of students. In this way, we are educating students not only to have a profession but also to live a meaningful existence in a complex world.

Some of the developments in the educational area using AI that reviewed can sum up as below:

- Website designed to analyze student learning styles.
- An adaptive learning system designed by merging e-learning and AI.
- Websites with chatbots and games designed to support and make teaching and learning easier.
- A rule-based expert system designed to support academic advising.
- Various methods for designing AI-based distance-learning systems.



- AI-based physical education designing were analyzed to identify the hindrances and to propose countermeasures on it.
- AI is supporting medical education during this COVID-19 pandemic.

The review on various developments in the area education reveals the influence of AI in education. AI can take education to a different level. However, the consequence of this techno-philia in education harms classroom teaching as well as the relationship between teachers and students (Goh, P. S., & Sandars, J. 2020) (Alfarsi, G. et al. 2017). AI-based education is suitable as a supplement to the education system. It enables motivation and curiosity in students and eases the works of teachers as well. It can use to reshape the education system but better not to replace the current education system with AI learning systems.

## 5 CONCLUSION

Every new tool that improves our lives brings several risks along with it. Alongside offering convenience in the household, electrical appliances constitute a fire risk. Cars provide mobility, but they also claim traffic casualties. By making agreements with fire and safety standards and traffic rules, we can safely use these tools with an acceptable level of risk. These kinds of deals also required for AI. Because AI is still very much in development, the frameworks within which this technology can and may act even defined. In education, too, we can exert influence by holding discussions on an appropriate division of roles between people and technology. Besides, enable us to use the power of AI fully, and in an ethically responsible way.

Technology, AI has wide acceptance. Students need to acquire the knowledge and skills that will prepare them for society. The purpose of this study was to identify the role of AI and how it supports teaching, learning and other functions of teachers like academic advising. The review results indicate the positive influence of AI on both teachers and students. Even though the high affinity of technology may have some drawbacks like the weak teacher-student bond, the technology has proved its excellence in this COVID-19 pandemic. The whole world is making use of the technology for their living in this pandemic. Besides the role of AI in supporting teaching and learning, this study also reveals its role in student advising, notifying important events, selecting study materials, etc.

AI can be thus collaborated with education to enhance the learning and teaching styles. It eases the load of teachers and supports both teacher and students. Students are more excited and influenced by technology as everything is at their fingertip. As this is the digital world, and all have an affinity to technology, AI can use efficiently to produce effectiveness.

## REFERENCES

- AlFarsi, Ghaliya & ALSinani, M. (2017). Developing a Mobile Notification System for AlBuraimi University College Students. *International Journal of Information Technology and Language Studies (IJITLS)*, 1(1).
- Tawafak, Ragad M., Sohail Iqbal Malik, and Ghaliya Alfarsi. (2020). "Development of Framework from Adapted TAM with MOOC Platform for Continuity Intention." *Development* 29, no. 1 1681-1691.
- Tawafak, Ragad M., Abir AlSideir, Ghaliya Alfarsi, Maryam Nasser Al-Nuaimi, Sohail Iqbal Malik, and Jasiya Jabbar. (2019). "E-learning Vs. Traditional Learning for Learners Satisfaction." *E-learning* 29, no. 3, 388-397.
- Tawafak, Ragad M., Awanis BT Romli, and Ruzaini Bin Abdullah Arshah. (2019). "E-learning Model for Students' Satisfaction in Higher Education Universities." In 2019 International Conference on Fourth Industrial Revolution (ICFIR), pp. 1-6. IEEE,
- Y. Yorozu, M. Hirano, K. Oka, and Y. Tagawa, "Electron spectroscopy studies on magneto-optical media and plastic substrate interface," *IEEE Transl. J. Magn. Japan*, vol. 2, pp. 740-741, August 1987 [Digests 9th Annual Conf. Magnetism Japan, p. 301, 1982].
- Alfarsi, Ghaliya, M, K. A., & ALSINANI, M. A Rule-Based System for Advising Undergraduate Students. *Journal of Theoretical and Applied Information Technology*, 95(11). (2017).
- Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence unleashed: An argument for AI in education*.
- Tawafak, R. M., Malik, S. I., & Alfarsi, Ghaliya. Development of Framework from Adapted TAM with MOOC Platform for Continuity Intention. *Development*, 29(1), (2020).1681-1691.
- Tawafak, R. M., & Romli, A. B. Ruzaini bin Abdullah Arshah, and Sohail Iqbal Malik." Framework design of university communication model (UCOM) to enhance continuous intentions in teaching and e-learning process". *Education and Information Technologies*, (2019).1-27.
- Mathew, R., Malik, S. I., & Tawafak, R. M. Teaching Problem Solving Skills using an Educational Game in a Computer Programming Course. *Informatics in education*, 18(2), (2019).359.

- Alfarsi, Ghaliya, Jasiya Jabbar, Ragad M. Tawafak, Abir Alsidiri, and Maryam Alsinani. "Techniques for Face Verification: Literature Review." In 2019 International Arab Conference on Information Technology (ACIT), pp. 107-112. IEEE, 2019.
- Tawafak, F. R. M. (2019). The Comprehension Theories of Continuous Intention to Use Tel with E-Learning Models in Educations. P., 41.Clustering, A. S. International Arab Conference on Information Technology (ACIT). Higher Education, 165, 170.
- Tatnall, A. Editorial for EAIT issue 2, 2020. Education and Information Technologies, 25(2),. 647-657.
- Tatnall, A. Editorial for EAIT issue 2, 2019. Education and Information Technologies, 24(2),. 953-962.
- Tawafak, R. M., Romli, A. B., Abdullah, R., Alfarsi, Ghaliya., Jabbar, J., Esbai, R., ... & Abdelhameed, W. Competitiveness & Quality.
- Alfarsi, Ghaliya., Sulaiman, H., Tawafak, R. M., Malik, S., Jabbar, J., & Alsidiri, A. (2019). A Study of Learning Management System with E-Learning.
- Tawafak, Ragad M., Awanis Romli, and Ruzaini Abdullah Arshah. (2019) "E-learning prospect on improving academic performance in Omani Universities." In IOP Conference Series: Materials Science and Engineering, vol. 551, no. 1, p. 012033. IOP Publishing.
- Tawafak, Ragad M., Awanis BT Romli, and Ruzaini Bin Abdullah Arshah. "E-learning Model for Students' Satisfaction in Higher Education Universities." In 2019 International Conference on Fourth Industrial Revolution (ICFIR), pp. 1-6. IEEE, 2019.
- Tawafak, Ragad M., Awanis Romli, Sohail Iqbal Malik, Mohanaad Shakir, and Ghaliya M. Alfarsi. "A systematic review of personalized learning: Comparison between E-learning and learning by coursework program in Oman." International Journal of Emerging Technologies in Learning (iJET) 14, no. 09 (2019): 93-104.
- Tawafak, Ragad M., Awanis M. Romli, and Maryam Juma Alsinani. "Student Assessment Feedback Effectiveness Model for Enhancing Teaching Method and Developing Academic Performance." International Journal of Information and Communication Technology Education (IJICTE) 15, no. 3 (2019): 75-88.
- Tawafak, Ragad M., Awanis BT Romli, and Maryam Alsinani. "E-learning system of UCOM for improving student assessment feedback in Oman higher education." Education and Information Technologies 24, no. 2 (2019): 1311-1335.
- Tawafak, Ragad M., Awanis BT Romli, and Ruzaini Bin Abdullah Arshah. "Continued Intention to use UCOM: Four factors for integrating with a technology acceptance model to moderate the Satisfaction of Learning." IEEE Access 6 (2018): 66481-66498.
- Alfarsi, Ghaliya, Jasiya Jabbar, Ragad M. Tawafak, Sohail Iqbal Malik, Abir Alsidiri, and Maryam Alsinani. "Using Cisco Packet Tracer to simulate Smart Home." Tawafak, Ragad M., Muamer N. Mohammed, Ruzaini Bin Abdullah Arshah, Mohanaad Shakir, and Vitaliy Mezhuhev. "Technology enhancement learning reflection on improving students' satisfaction in Omani universities." Advanced Science Letters 24, no. 10 (2018): 7751-7757.
- Tawafak, Ragad M., A. B. Romli, Ruzaini bin Abdullah Arshah, and Rana A. Saeed Almaroof. "Assessing the impact of technology learning and assessment method on academic performance." EURASIA Journal of Mathematics, Science and Technology Education 14, no. 6 (2018): 2241-2254.
- Tawafak, Ragad M., Muamer N. Mohammed, Ruzaini bin Abdullah Arshah, and Awanis Romli. "Review on the effect of student learning outcome and teaching Technology in Omani's higher education Institution's academic accreditation process." In Proceedings of the 2018 7th International Conference on Software and Computer Applications, pp. 243-247. 2018.
- AlFarsi, Ghaliya, Jasiya Jabbar, Ragad M. Tawafak, Sohail Iqbal, Abir Alsidiri, Maryam Alsinani, and Hidayah bte Sulaiman. "Mobile Application System Supported BUC Students Services and Learning." International Journal of Interactive Mobile Technologies (IJIM) 14, no. 09 (2020): 79-94.
- Azmi, N. (2013). Multi-sensory delivery in EFL 'Smart' classrooms: Students' perceptions of benefits, limitations and challenges. Journal of Educational and Social Research, 3(1), 33-33.
- Ikedinachi, A. P., Misra, S., Assibong, P. A., Olu-Owolabi, E. F., Maskeliūnas, R., & Damasevicius, R. (2019). Artificial intelligence, smart classrooms and online education in the 21st century: Implications for human development. Journal of Cases on Information Technology (JCIT), 21(3), 66-79.
- Courtad, C. A. (2019). Making your classroom smart: Universal design for learning and technology. In Smart Education and e-Learning 2019 (pp. 501-510). Springer, Singapore.
- Henten, A., & Tadayoni, R. (2008). The impact of the internet on media technology, platforms and innovation. The internet and the mass media, 45-64.
- Grosz, B. J., & Stone, P. (2018). A century-long commitment to assessing artificial intelligence and its impact on society. Communications of the ACM, 61(12), 68-73.
- Van Eck, R. (2007). Building artificially intelligent learning games. In Games and simulations in online learning: Research and development frameworks (pp. 271-307). IGI Global.
- Samigulina, G., & Samigulina, Z. (2016). Intelligent system of distance education of engineers, based on modern innovative technologies. Procedia-Social and Behavioral Sciences, 228, 229-236.
- Dewantara, B. A., & Ghufroon, A. (2019, June). Artificial Intelligent in Education: The Development of 'Disabel' System to Analyze Student Learning Styles. In Journal of Physics: Conference Series (Vol. 1233, No. 1, p. 012083). IOP Publishing.
- Colchester, K., Hagraas, H., Alghazzawi, D., & Aldabbagh, G. (2017). A survey of artificial intelligence techniques employed for adaptive educational systems

- within e-learning platforms. *Journal of Artificial Intelligence and Soft Computing Research*, 7(1), 47-64.
- AlFarsi, G. M., Jabbar, J., & ALSinani, M. (2018). Implementing a Mobile Application News Tool for Disseminating Messages and Events of AlBuraimi University College. *International Journal of Interactive Mobile Technologies (IJIM)*, 12(7), 129-138.
- Kose, U. (Ed.). (2014). *Artificial Intelligence applications in distance education*. IGI Global.
- Zhang, X. (2014). Research of Modern Physical Education Technology Based on Artificial Intelligence. In *Proceedings of the 2012 International Conference on Cybernetics and Informatics* (pp. 435-442). Springer, New York, NY.
- Goh, P. S., & Sandars, J. (2020). A vision of the use of technology in medical education after the COVID-19 pandemic. *MedEdPublish*, 9.
- Guilherme, A. (2019). AI and education: the importance of teacher and student relations. *AI & SOCIETY*, 34(1), 47-54.
- Tawafak, R., Romli, A., Malik, S. and Shakir, M., 2020. IT Governance Impact on Academic Performance Development. *International Journal of Emerging Technologies in Learning (IJET)*, 15(18), pp.73-85.
- Tawafak, R.M., Buraimi, O., Jabbar, J., Alfarsi, G., Malik, S.I., Romli, A. and Alsideiri, A., A Review Paper on Student-Graduate Advisory Expert system.
- Malik, S., Al-Emran, M., Mathew, R., Tawafak, R. and AlFarsi, G., 2020. Comparison of E-Learning, M-Learning and Game-based Learning in Programming Education—A Gendered Analysis. *International Journal of Emerging Technologies in Learning (IJET)*, 15(15), pp.133-146.
- Jabbar, J., Malik, S.I., AlFarsi, G. and Tawafak, R.M., The Impact of WhatsApp on Employees in Higher Education. In *Recent Advances in Intelligent Systems and Smart Applications* (pp. 639-651). Springer, Cham.