The Transformative Role of Artificial Intelligence in Modern Education

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Abstract

The Fourth Industrial Revolution has led to significant advances in digital devices and social media, contributing to the emergence of artificial intelligence (AI) as a key tool for improving the educational process. Computing and information technologies have enabled the use of computers in education, particularly in computer-assisted instruction and improving classroom interaction. Artificial intelligence in education (AIEd) aims to support teaching strategies, enhance student learning, and improve educational outcomes through performance monitoring, adaptive learning, providing educational resource recommendations, and identifying educational gaps. The study focuses on exploring the role of AI applications in improving the quality of learning, assuming that these applications contribute to developing the educational process, addressing traditional challenges, and improving the performance of teachers and students. The study adopted a descriptive-analytical approach and collected data through a survey of academics and teachers in Iraq during the 2024-2025 academic year. The study recommends holding training workshops, providing necessary resources, promoting the effective use of AI applications, and developing future development plans, while proposing additional research on innovation and interactive lesson design.

Keywords: Artificial Intelligence (AI), Educational Institutions, Technology Integration, Education Technology, AI in Education.

I. INTRODUCTION

The fourth technological revolution has brought about incredible advancements in technology, including digital tablets, display tools, and social media platforms like Facebook, Twitter, and others. These innovations have had a profound impact on people of all ages and have become indispensable in every aspect of life [1]. The nations with the best information technology have emerged as the most powerful both materially and economically. The phrase "artificial intelligence" has emerged as a result of this advancement [2].

Artificial intelligence is a significant turning point in the history of service organizations worldwide, one that will ultimately result in profound changes to the institutions' philosophies in order to enhance their operations and outputs [3].

Since the middle of the 20th century, advances in computing and related information technologies have made it possible to use computers in many sectors of the education sector, and especially in various departments of educational institutions, such as the development of computer assisted teaching and learning. in classroom interaction. Subsequent advances in computing and information technologies including networking, Internet, World Wide Web, processing, computing and other capabilities, as well as various software packages and software oriented to work, have made possible the ever-greater use of computers in various ways in the education sector. More precisely, in various departments of educational institutions [4]. Computer science and computational technology have advanced, automated, adaptable, and effective artificial intelligence (AI) technologies have been widely used in a variety of academic domains. The interdisciplinary field of artificial intelligence in education (AIEd) is concerned with using AI to support teachers' instructional strategies, enhance students' learning, and advance the transformation of educational systems [5],[6].

First, by automatically accessing student performance tracking and monitoring student learning and identifying at-risk students. AIEd can improve instructional design and pedagogical development in teaching processes [7],[8],[9],[10],[11],[12]. Second, Adaptive tutoring, personalized learning resource recommendations and learning gap diagnosis are just a few of the ways that AIEd can enhance student-centered learning [13],[14],[15],[16],[17]. Third, by emphasizing the essential role of technology improving

methods of knowledge transmission and altering the teacher-student dynamic [18],[19],[20],[21].

AIEd also offers chances to change the educational system. To improve the teaching and learning process, a variety of AI technologies, including machine learning and deep learning, have generally been implemented in the educational sector. It constitutes a paradigm shift in the construction of knowledge and has a positive impact on student success [22]. The importance of artificial intelligence in education is evident through the global trend of adoption and diffusion of artificial intelligence technologies in education, which include smart screens and telephone devices, software, educational platforms provided on the Internet, mobile and educational smart screen displays. Apps available in the Apple, Samsung or Google stores. It has become a necessity of the time and a criterion of scientific and practical progress among countries. Based on the above, the advantages and benefits of artificial intelligence and its applications in education will not only be achieved through its availability, but through the recognition, awareness and acceptance of teachers and students and through training on how to use it to achieve the desired goals [23].

The impact of modern technologies on education has also become evident, as they offer ways to innovate and develop education while gradually abandoning traditional methods that are no longer in line with the aspirations of the younger generation. Artificial intelligence programs, along with other unconventional methods and social networking sites, have become the most important means of communication and interaction for Internet users, regardless of their age or goals. The issue is not limited to the general public, though, as academic circles have recently expressed interest in how to activate artificial intelligence programs in the educational process to get the most out of them [24],[25].

A. Study Problem

The research problem was identified in the following main question: What is the role of artificial intelligence applications in improving the quality of learning outcomes?

B. Study Hypothesis

We put out the following hypothesis to address the queries regarding the significance of artificial intelligence in education:

- A contributing factor to the evolution of the educational process is artificial intelligence.
- Artificial intelligence has several applications in the realm of education, and its uses are varied.
- Applications of artificial intelligence help to overcome the challenges of conventional instruction.
- Applications of artificial intelligence are essential to the advancement of the educational process.
- Applications of artificial intelligence help their users, including instructors and students perform better.
- The quality of educational outcomes is positively supported by using artificial intelligence technologies.

C. Study Questions

A set of sub-questions branch out from the main research problem, which were defined as follows:

- What is the role of artificial intelligence applications in developing the educational process?
- How can artificial intelligence applications address teaching obstacles?
- Do artificial intelligence applications contribute to improving the performance of their users, teachers and students?
- What is the quality of educational outcomes resulting from the application of artificial intelligence applications?

D. Study Objectives

The current study aims to evaluate the use of artificial intelligence in education from the following areas:

- The benefit of using artificial intelligence technology in the educational process.
- Identify the most important axes of artificial intelligence applications and how they can be harnessed to benefit from this technology in developing education.
- Teachers' opinions and awareness of artificial intelligence applications.
- What are the challenges facing the use of artificial intelligence applications in education.
- Provide a generalizable reference model on the advantages of applying educational artificial intelligence applications.

E. Study Limits

It is worth noting that this study faces several limitations that should be considered when interpreting the results:

1. Subject Limit
   The study was limited to examining the impact of implementing digital educational platforms on the quality of learning outcomes. It did not address other factors that may influence these outcomes, such as student motivation, institutional support, or the level of technical infrastructure. Therefore, the results are interpreted within the framework of this specific variable only.
2. Time Limit
   The study was conducted exclusively during the 2024–2025 academic year. Since educational environments and educational policies may change over time, the results may not necessarily reflect long-term trends or changes.
3. Spatial Limit
   The study's spatial scope was limited to the opinions of teachers and academics within Iraq. Therefore, the generalizability of the results to other educational or cultural contexts should be approached with caution.

These limitations underscore the need for more comprehensive future studies spanning multiple academic years, including broader, more geographically and culturally diverse samples, and incorporating additional variables that may contribute to a more in-depth interpretation of the impact of digital education. Such studies will enhance the generalizability of the results and strengthen the strength of future conclusions.

II. RESEARCH METHODOLOGY

To describe the role of artificial intelligence, the study used a descriptive analytical approach. This is accomplished through an analysis of the subject of artificial intelligence in education and how it contributes to the advancement of the educational process. This is demonstrated by the case study "The opinion of a group of academics and educators," which depended on gathering precise and thorough data through a guided questionnaire, interpreting the results, and formulating suggestions that aid in the advancement of the educational process through the use of artificial intelligence and elucidating effective techniques for instructors and students to employ.

A. Study Instruments

Because the questionnaire is regarded as "a suitable tool for obtaining information and facts related to a specific reality", it was utilized as a means of gathering the necessary data in order to gain the necessary information from the study sample members. One of the most significant and effective data collection tools that has gained popularity in the field of research is the questionnaire, which continues to be a crucial component of all data collection techniques due to its ease of use and adaptability to the type and nature of the study, making it flexible and able to cover all variables of the research model or study determinants [12].

All of the study's variables, questions, and hypothesis were covered in the questionnaire form. The questionnaire method has a number of benefits that set it apart from other approaches. These benefits can be summed up as follows: it anonymizes the researcher, allowing the respondent to feel comfortable answering private and delicate questions [13]. The final version of the questionnaire had two primary sections: the first asked for demographic information, and the second included statements about the use of artificial intelligence and how it affects education.

B. Statistical Techniques Employed in the Study

The Statistical Package for the Social Sciences programmed was utilized to analyze the questionnaire data in accordance with statistical techniques appropriate for the study's nature. Statistical processing based on measures of central tendency and dispersion measures was used to extract arithmetic means and standard deviations in addition to analytical statistical methods based on frequency analysis and comparisons between means. This was done in order to answer the research questions and validate its hypotheses. Then, the required statistical coefficients were found in order to analyses the data and produce results that are amenable to discussion and adoption.

C. Study Community and Sample

The study sample was selected using a simple random method. The study community consists of a group of educators and academics (males and females) with various academic degrees (diploma, bachelor's, master's, doctorate). The size of the study sample was (306) individuals, distributed between educators affiliated with the educational institution (teacher or trainer) and academics working in other jobs, and they received the questionnaire indirectly (electronically), as shown in Table 1.

Table 1. Distribution of Sample Individuals According to Demographic Variables

Variables	Categories	Number	Percentage
Type	Male	166	54%
	Female	140	46%
Certificate	Diploma	8	3%
	Bachelor's	118	39%
	Master's	134	44%
	PhD	46	15%

D. Study Aid

The study aid comprised a questionnaire consisting of thirteen statements dispersed along three axes as follows: The initial axis: The first axis, which has five statements, highlights the significance of artificial intelligence technology in the educational process. The second axis, which comprises three statements, examines the effects of implementing artificial intelligence technologies in the educational process. The third axis, which focuses on the difficulties of implementing AI applications in the classroom, comprises five statements. Each statement has three possible answers based on the following three-point Likert scale: I disagree (1 point), I agree (3 points), and I am indifferent (2 points).

E. Dependability of the Questionnaire

The Cronbach's alpha reliability coefficient for the questionnaire was determined using the SPSS statistical tool after it was applied to the research sample. The reliability coefficient's computation results are displayed in the following Table 2.

Table 2. The Reliability Coefficient's Computation Results

Axis	Number of Phrases	Stability Coefficient
First Axis	5	0.990
Second Axis	3	0.990
Third Axis	5	0.915
The Questionnaire As A Whole	13	0.979

III. RESULTS AND DISCUSSION

The arithmetic means and standard deviations of the sample members' responses to the statements of the several axes of the questionnaire were computed in order to perform descriptive analysis and address the research issues. The outcomes are shown in the Table 3 below:

Table 3. The Sample Members' Arithmetic Means and Standard Deviations for Their Responses to the First Axis "The Importance of Artificial Intelligence Technology in The Educational Process"

Expressions	Arithmetic Mean	Standard Deviation	Level	Rank
Do you think there is a positive impact of artificial intelligence applications on student learning?	2.17	0.516	Neutral	5
Artificial intelligence applications can be used to support the educational process?	2.80	0.437	Agree	2
Do you support training teachers and teachers to deal with artificial intelligence applications and e-governance?	2.86	0.395	Agree	1
Can artificial intelligence applications be used to update academic courses to serve scientific goals?	2.55	0.667	Agree	3
Are you aware of the latest developments in artificial intelligence applications?	2.49	0.628	Agree	4
Overall average	2.574	0.528	Agree	

Table 3 shows the descriptive analysis, which consists of calculating the arithmetic means and standard deviations of the study sample members' responses to the statements in the first axis. The overall mean for the dimension was (2.574), falling within the third category (2.34–3) on a three-point Likert scale, indicating a general trend toward agreement. The overall standard deviation was (0.528), reflecting a degree of homogeneity in the sample members' responses.

After arranging the statements in descending order according to the arithmetic means, the results were as follows:

- The statement "Do you support training teachers to deal with artificial intelligence applications and e-governance?" ranked first (M = 2.86) with a "agree" level.
- The statement "Artificial intelligence applications can be used to support the educational process" ranked second (M = 2.80) with a "agree" level.
- The statement "Can artificial intelligence applications be used to update curricula to serve academic objectives?" ranked third (M = 2.55) with a "agree" level.
- The phrase "Are you aware of the latest developments in artificial intelligence applications?" came in fourth place (M = 2.49) with a "agree" level.
- Finally, the phrase "Do you think that artificial intelligence applications have a positive impact on student learning?" came in fifth place (M = 2.17) with a "neutral" level.

These results indicate that sample members generally tend to agree on the importance of using artificial intelligence applications in education and their positive impact on the educational process, with some reservations expressed in some statements.

From the table, we conclude that the statement related to training teachers to deal with artificial intelligence applications and e-governance received the highest mean (2.86), reflecting broad agreement among sample members regarding its importance. Meanwhile, the statement related to the impact of artificial intelligence applications on student learning came in last place with a mean (2.17), indicating that participants expressed a more neutral attitude toward it compared to the other statements.

Table 4. Arithmetic Means and Standard Deviations of the Sample Members' Answers on the Second Axis: The Impact of Using Artificial Intelligence Applications in the Educational Process.

Expressions	Arithmetic Mean	Standard Deviation	Level	Rank
Artificial intelligence applications help in delivering the academic material easily to the student?	2.68	0.538	Agree	2
Artificial intelligence applications make it easier for the teacher to present the educational material effectively and simply?	2.81	0.427	Agree	1
Do artificial intelligence applications motivate the student learner to self-educate?	2.52	0.679	Agree	3
Overall average	2.67	0.548	Agree	

Table 4 shows the descriptive analysis, which consists of calculating the arithmetic means and standard deviations of the study sample members' responses to the statements in the second axis. The overall mean for the dimension was (2.67), which falls within the third category (2.34–3) on a three-point Likert scale, indicating a general tendency toward agreement. The standard deviation was (0.548), reflecting a degree of homogeneity in the sample's responses.

After arranging the statements in descending order according to the arithmetic means, the results were as follows:

- The statement " Artificial intelligence applications make it easier for the teacher to present the educational material effectively and simply**?**" (M = 2.81) came in first place.
- The statement " Artificial intelligence applications help in delivering the academic material easily to the student?" (M = 2.68) came in second place.
- The statement " Do artificial intelligence applications motivate the student learner to self-educate?" (M = 2.52) came in third place.

These results indicate that sample members generally agree with the role of AI applications in enhancing the cognitive, practical, and communicative aspects of the educational process. From the table, we note that the statement related to the role of AI applications in facilitating the effective and simple delivery of educational material to teachers received the highest mean score (2.81), reflecting participants' direct awareness of the usefulness of these applications in improving teaching performance. In contrast, the statement related to the role of these applications in motivating students to self-educate received a lower mean score (2.52), indicating that the impact of AI in enhancing students' intrinsic motivation remains limited or less pronounced compared to its role in supporting teachers in the classroom.

Table 5. Arithmetic Means and Standard Deviations of the Sample Members' Answers on the Third Axis: Challenges of Using Artificial Intelligence Applications in the Educational Process

Expressions	Arithmetic Mean	Standard Deviation	Level	Rank
Can artificial intelligence applications replace the teacher in the classroom?	1.34	0.587	Disagree	5
Can artificial intelligence take into account individual differences among educated students?	1.69	0.407	Neutral	4
Artificial intelligence applications are financially expensive?	2.37	0.685	Agree	2
Can artificial intelligence applications reduce student stress resulting from trial and error during the lesson?	2.35	0.696	Agree	3
Do artificial intelligence applications help cooperative learning among students in the classroom?	2.47	0.683	Agree	1
Overall average	2.044	0.611	Neutral	

Table 5 shows the descriptive analysis of the study sample's responses to the statements in the third axis, using arithmetic means and standard deviations. The overall mean for the dimension was (2.044), falling within the second category (1.67–2.33) on a three-point Likert scale, indicating a neutral stance among the sample regarding the challenges associated with using artificial intelligence applications. The standard deviation was (0.611), reflecting a moderate degree of variation in participants' opinions. Arranging the statements in descending order of arithmetic means, the results were as follows:

- Do artificial intelligence applications help cooperative learning among students in the classroom? (M = 2.47).
- Are artificial intelligence applications financially expensive? (M = 2.37).
- Can artificial intelligence applications reduce student stress resulting from trial and error during the lesson? (M = 2.35).
- Accounting for individual differences among students (M = 1.69).
- Can artificial intelligence take into account individual differences among educated students? (M = 1.34).

The Response for each levels comes as the first three were "agree", the fourth was "neutral", and the fifth was "disagree". The results indicate that participants peoples are aware of some of the practical and financial challenges associated with using AI, like enhancing collaborative learning and application costs, while showing greater reservations regarding sensitive or intangible issues, such as the possibility of teacher replacement, which explains the highest and lowest means in the data.

The study results show that participants generally tended to agree on the importance of AI applications in education, particularly with regard to directly supporting the educational process and enhancing and developing the teacher's role, such as facilitating the clarification and delivery of course material and supporting collaborative learning among students. In contrast, the results showed more neutral or conservative attitudes toward indirect or sensitive aspects of these applications, such as motivating students to self-study or the possibility of replacing teachers. This indicates that the acceptance of AI in supporting the educational process depends largely on the clarity of its benefits and its practical and applied importance. The standard deviation results also showed that participants' opinions were fairly similar, with some differences in the evaluation of less obvious or more sensitive points. Therefore, we can conclude that AI

applications are generally accepted in education, with a focus on clarifying and emphasizing their practical benefits and reducing and limiting concerns related to the indirect effects of AI uses in education.

IV. CONCLUSSION AND SUGGESTIONS

Following an analysis and discussion of the study's findings, it is advised that:

1. Hold training workshops for teachers and students on the value of artificial intelligence in the classroom and how it may help accomplish a variety of learning objectives quickly and successfully.
2. Establish the financial resources required to supply instructors and students with the artificial intelligence applications they require.
3. Motivate educators and learners to take use of all authorized and accessible uses of AI in the classroom. 4. Create a strategy for future development so that artificial intelligence applications may be used efficiently.
4. Share knowledge and insights with organizations and academic and professional divisions that have effectively used artificial intelligence applications and gain from their expertise in this area.
5. Conduct studies and research on the impact of using artificial intelligence applications on the classroom and explain its advantages.
6. Conduct studies and research on the role of artificial intelligence applications in developing innovation among students.
7. Conduct studies and research on the impact of artificial intelligence applications in designing and producing interactive electronic lessons for students.

REFERENCES

[1] Chou, S. Y. (2018). The fourth industrial revolution. *Journal of International Affairs*, 72(1), 107-120.

[2] I. A. Kashmeeri, I. M. Alzughaibi, R. M. Alem, A. M. Barayan, and H. S. Alharbi, "The use of artificial intelligence in education in Arab world: A systematic review," *Journal of Arts, Literature, Humanities and Social Science*, vol. 109, no. 5, pp. 223–245, Jul. 2024. https://doi.org/10.33193/JALHSS.109.2024.1174.

[3] M. F. M. El-Sayed, "Artificial intelligence and the future of education," *Journal of Artificial Intelligence and Information Security* , vol. 2, no. 3, pp. 17–32, Feb. 2024. ISSN (Print): 2812-6114, ISSN (Online): 2812-6122. DOI: https://doi.org/10.21608/aiis.2024.345840.

[4] L. Chen, P. Chen and Z. Lin, "Artificial Intelligence in Education: A Review," *in IEEE Access*, vol. 8, pp. 75264-75278, 2020, DOI: 10.1109/ACCESS.2020.2988510.

[5] W. Holmes, M. Bialik, and C. Fadel, "Artificial Intelligence in Education: Promises and Implications for Teaching and Learning". *Boston, MA: Center for Curriculum Redesign*, 2019. ISBN: 978-1794293700

[6] F. Ouyang, L. Zheng, and P. Jiao, "Artificial intelligence in online higher education: A systematic review of empirical research from 2011 to 2020", *Education and Information Technologies*, vol. 27, pp. 7893–7925, 2022. DOI: 10.1007/s10639-022-10925

[7] T. Wang, X. Su, P. Ma, Y. Wang, and K. Wang, "Ability-training-oriented automated assessment in introductory programming course," *Computers & Education*, vol. 56, no. 1, pp. 220–226, Jan. 2011, doi: 10.1016/j.compedu.2010.08.003.

[8] F. A. Zampirolli, J. M. Borovina Josko, M. L. F. Venero, G. Kobayashi, F. J. Fraga, D. Goya, and H. R. Savegnago, "An experience of automated assessment in a large-scale introduction programming course," *Computer Applications in Engineering Education*, vol. 29, no. 5, pp. 1284–1299, Sep. 2021, DOI: 10.1002/cae.22385.

[9] M. Berland, D. Davis, and C. P. Smith, "AMOEBA: Designing for collaboration in computer science classrooms through live learning analytics," *International Journal of Computer-Supported Collaborative Learning*, vol. 10, no. 4, pp. 425–447, Dec. 2015, DOI: 10.1007/s11412-015-9217-z

[10] Y. Ji and Y. Han, "Monitoring indicators of the flipped classroom learning process based on data mining—Taking the course of 'Virtual Reality Technology' as an example," *International Journal of Emerging Technologies in Learning (iJET)*, vol. 14, no. 3, pp. 4–15, 2019, DOI: 10.3991/ijet.v14i03.10105

[11] J. Hellings and C. Haelermans, "The effect of providing learning analytics on student behaviour and performance in programming: A randomized controlled experiment," Higher Education, vol. 83, no. 1, pp. 1–18, Jan. 2020, DOI: 10.1007/s10734-020-00560-z.

[12] R. Lamb, B. Hand, and A. Kavner, "Computational modeling of the effects of the science writing heuristic on student critical thinking in science using machine learning," Journal of Science Education and Technology, vol. 30, no. 2, pp. 283–297, Apr. 2021, , DOI: 10.1007/s10956-020-09871-3.

[13] U. Kose and A. Arslan, "Optimization of self-learning in computer engineering courses: An intelligent software system supported by artificial neural network and vortex optimization algorithm," Computer Applications in Engineering Education, vol. 25, no. 1, pp. 142–156, 2017, DOI: 10.1002/cae.21787.

[14] L. S. Myneni, N. H. Narayanan, S. Rebello, A. Rouinfar and S. Pumtambekar, "An Interactive and Intelligent Learning System for Physics Education," in *IEEE Transactions on Learning Technologies*, vol. 6, no. 3, pp. 228-239, July-Sept. 2013, DOI: 10.1109/TLT.2013.26.

[15] E. F. Ruiz Ledesma and J. J. Gutiérrez García, "Selection of mathematical problems in accordance with student's learning style," *International Journal of Advanced Computer Science and Applications (IJACSA)*, vol. 8, no. 3, pp. 101–105, Mar. 2017, DOI: 10.14569/IJACSA.2017.080316.

[16] Z. Zhang, H. Liu, J. Shu, H. Nie, and N. Xiong, "On automatic recommender algorithm with regularized

convolutional neural network and IR technology in the self-regulated learning process," *Infrared Physics & Technology*, vol. 105, p. 103211, 2020, DOI: 10.1016/j.infrared.2020.103211.

[17] M. Liu, Y. Li, W. Xu, and L. Liu, "Automated essay feedback generation and its impact on revision," *IEEE Transactions on Learning Technologies*, vol. 10, no. 4, pp. 502–513, 2017, DOI: 10.1109/TLT.2016.2612659.

[18] G. J. Hwang, H. Xie, B. W. Wah, and D. Gašević, "Vision, challenges, roles and research issues of artificial intelligence in education," *Computers and Education: Artificial Intelligence*, vol. 1, p. 100001, 2020 , Online avaliable: https://api.semanticscholar.org/CorpusID:226641270.

[19] K. Holstein, B. M. McLaren, and V. Aleven, "Co-designing a real-time classroom orchestration tool to support teacher—AI complementarity," Journal of Learning Analytics, vol. 6, no. 2, pp. 27–52, 2019. DOI: 10.18608/jla.2019.62.3

[20] N. Yannier, S. E. Hudson, and K. R. Koedinger, "Active learning is about more than hands-on: A mixed-reality AI system to support STEM education," *International Journal of Artificial Intelligence in Education*, vol. 30, no. 1, pp. 74–96, 2020, DOI:10.1007/s40593-020-00194-3.

[21] W. Xu and F. Ouyang, "A systematic review of AI role in the educational system based on a proposed conceptual framework," *Education and Information Technologies*, vol. 27, pp. 4195–4223, 2022,DOI: 10.1007/s40593-020-00194-3.

[22] M. H. Al-Atel, I. G. Al-Anzi, and A. S. Al-Ajmi, "The role of artificial intelligence (AI) in education from the point of view of students at the Faculty of Basic Education in the state of Kuwait," *Journal of Educational Studies and Research*, vol. 1, no. 1, pp. 30–64, Jan. 2021. Online available: https://search.shamaa.org/PDF/Articles/KUJsere/JsereVol1No1Y2021/jsere_2021-v1-n1_030-064.pdf.

[23] M. A. Al-Anzi and R. A. Al-Obaikan, "Artificial intelligence in education: A systematic review," *Arab Journal of Educational and Psychological Sciences*, vol. 8, no. 39, pp. 451–472, Jul. 2024, DOI: 10.21608/jasep.2024.362479.

[24] F. Degni, "AI in education: The impact of artificial intelligence on education," Research Proposal, Aug. 2024. DOI: 10.13140/RG.2.2.21373.99048.

[25] W. Holmes, M. Bialik, and C. Fadel, *Artificial intelligence in education: Promises and implications for teaching and learning*. Boston, MA, USA: Center for Curriculum Redesign, 2019. Online avaliable: http://bit.ly/AIED-BOOK.