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METHODOLOGICAL OPPORTUNITIES AND EFFECTIVENESS OF USING ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN TEACHING MATHEMATICS

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Abstract

This article examines the methodological opportunities and effectiveness of using artificial intelligence technologies in teaching mathematics in higher education, with particular attention to the needs of students in economic universities. The study emphasizes that artificial intelligence is not only a technical innovation, but also a pedagogical tool that can support individualized learning, adaptive assessment, analytical thinking, and the development of mathematical competence. In the context of mathematics education, artificial intelligence systems make it possible to diagnose students' learning difficulties, offer personalized tasks, provide instant feedback, and visualize abstract mathematical concepts through interactive digital environments. The article also analyzes the role of AI-based platforms in improving students' motivation, independent learning skills, and ability to apply mathematical methods to economic, financial, and statistical problems. Special attention is given to the methodological balance between traditional mathematical instruction and intelligent digital tools, because effective learning requires not only technological support but also sound didactic design. The research highlights that the integration of artificial intelligence into mathematics teaching can increase the quality of learning outcomes when it is used purposefully, ethically, and in accordance with educational objectives.

Keywords: Artificial intelligence, mathematics teaching, methodological opportunities, adaptive learning, digital education, mathematical competence, higher education, intelligent learning systems.

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Introduction

MATEMATIKA FANINI O‘QITISHDA SUN’IY INTELLEKT TEXNOLOGIYALARIDAN FOYDALANISHNING METODIK IMKONIYATLARI VA SAMARADORLIGI

Annotatsiya:
Ushbu maqolada oliy ta’lim tizimida, xususan iqtisodiyot yo‘nalishidagi oliy o‘quv yurtlari talabalariga matematika fanini o‘qitishda sun’iy intellekt texnologiyalaridan foydalanishning metodik imkoniyatlari va samaradorligi tahlil qilinadi. Tadqiqotda sun’iy intellekt faqat texnik yangilik emas, balki individuallashtirilgan ta’lim, adaptiv baholash, analitik tafakkur va matematik kompetensiyani rivojlantirishga xizmat qiluvchi pedagogik vosita sifatida talqin etiladi. Matematika ta’limi jarayonida sun’iy intellekt tizimlari talabalar duch keladigan o‘quv qiyinchiliklarini aniqlash, shaxsiylashtirilgan topshiriqlarni taklif etish, tezkor teskari aloqa berish hamda mavhum matematik tushunchalarni interaktiv raqamli muhit orqali vizuallashtirish imkonini yaratadi. Maqolada sun’iy intellektga asoslangan platformalarning talabalar motivatsiyasi, mustaqil ta’lim ko‘nikmalari hamda matematik usullarni iqtisodiy, moliyaviy va statistik masalalarga tatbiq etish qobiliyatini rivojlantirishdagi o‘rni ham yoritiladi. An’anaviy matematik ta’lim bilan intellektual raqamli vositalar o‘rtasidagi metodik muvozanatga alohida e’tibor qaratiladi, chunki samarali o‘qitish faqat texnologik yordamga emas, balki puxta didaktik loyihalashga ham bog‘liqdir. Tadqiqot natijalari sun’iy intellektni maqsadli, axloqiy va ta’limiy vazifalarga mos ravishda qo‘llash matematika ta’limi sifatini oshirishga xizmat qilishini ko‘rsatadi.

Kalit so‘zlar: sun’iy intellekt, matematika o‘qitish, metodik imkoniyatlar, adaptiv ta’lim, raqamli ta’lim, matematik kompetensiya, oliy ta’lim, intellektual ta’lim tizimlari.

Introduction

The rapid development of artificial intelligence has created new methodological conditions for teaching mathematics in higher education. Mathematics has always been one of the fundamental disciplines for the formation of logical reasoning, analytical thinking, quantitative interpretation, and problem-solving competence.

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For students of economic universities, mathematical knowledge is especially important because economics, finance, accounting, management, econometrics, business analytics, and forecasting are directly connected with mathematical models, statistical methods, optimization procedures, probability theory, and data analysis. However, traditional methods of teaching mathematics do not always fully correspond to the diverse learning needs of students, especially when learners have different levels of prior preparation, different speeds of mastering abstract concepts, and different abilities to connect mathematical theory with practical economic situations. In this context, artificial intelligence technologies offer new opportunities for improving the quality, flexibility, and effectiveness of mathematics education.

The use of artificial intelligence in mathematics teaching should not be understood only as the replacement of the teacher by digital systems. On the contrary, the methodological value of artificial intelligence lies in its ability to strengthen the teacher's pedagogical work, expand instructional possibilities, and make the learning process more adaptive. AI-based educational platforms can analyze students' answers, identify typical errors, recommend additional exercises, generate individualized learning trajectories, and provide immediate feedback. This is especially important in mathematics, where one misunderstood concept can negatively affect the mastery of later topics. For example, if a student has difficulties with functions, derivatives, or systems of equations, artificial intelligence tools can detect these weaknesses and propose tasks that gradually move from simple operations to more complex applications.

In economic education, mathematics must be taught not only as a theoretical discipline, but also as an applied instrument for solving professional problems. Artificial intelligence can support this process by creating interactive simulations, visual models, and context-based tasks related to demand and supply analysis, marginal cost, profit maximization, investment evaluation, risk assessment, and statistical forecasting. Such an approach helps students understand that mathematical formulas are not isolated abstract constructions, but analytical tools that can be used to interpret real economic processes. As a result, the connection between mathematical content and future professional activity becomes clearer and more meaningful for students.

Another important aspect is the development of independent learning skills. Modern students often use digital resources outside the classroom, but not all of

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these resources provide methodically correct explanations or reliable feedback. Artificial intelligence systems, when selected and organized properly, can guide students in independent study, help them repeat difficult topics, check solutions, and compare different methods of solving the same problem. This contributes to the formation of self-regulation, responsibility, and cognitive activity. At the same time, the teacher remains the central figure who determines educational goals, selects appropriate tools, explains conceptual foundations, and ensures that technology serves pedagogical objectives rather than replacing them.

Therefore, the integration of artificial intelligence into mathematics education requires a scientifically grounded methodological approach. It is necessary to determine which AI tools are appropriate for particular mathematical topics, how they influence students' understanding, how they can be combined with traditional teaching methods, and what ethical, didactic, and organizational conditions should be considered. The relevance of this article is determined by the growing need to modernize mathematics teaching in higher education and to prepare economically oriented students for professional activity in a digital and data-driven environment.

Literature Review

The scientific literature on artificial intelligence in education shows that AI technologies are increasingly considered an important component of digital pedagogy, adaptive learning, and data-based instructional management. In mathematics education, researchers emphasize that artificial intelligence can support both cognitive and methodological aspects of learning. Since mathematics requires gradual conceptual development, accuracy of reasoning, and systematic practice, AI-based learning environments are viewed as effective tools for diagnosing learning gaps, organizing differentiated tasks, and providing immediate feedback. These functions are especially relevant in higher education, where students often enter university with different levels of mathematical preparation and different experiences of solving applied problems.

One of the central ideas in the literature is adaptive learning. Adaptive systems use algorithms to analyze students' responses, learning pace, mistakes, and achievements. Based on this analysis, the system can select tasks of appropriate difficulty and recommend additional materials. In mathematics teaching, such adaptation is methodologically valuable because the subject has a hierarchical

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structure. A student who has not mastered basic algebraic transformations may face serious difficulties in understanding limits, derivatives, optimization, or probability models. Artificial intelligence can help identify such hidden weaknesses earlier than traditional assessment methods and can support the teacher in organizing individual learning pathways.

Another important direction discussed in recent studies is intelligent tutoring systems. These systems imitate some functions of a human tutor by explaining solution steps, asking guiding questions, checking intermediate results, and correcting errors. In mathematics, the possibility of checking not only the final answer but also the process of reasoning is particularly significant. A student may obtain an incorrect answer because of a computational mistake, a misunderstanding of a formula, an incorrect interpretation of a problem condition, or an inability to choose an appropriate method. AI-based systems can classify these errors and offer targeted recommendations. This allows the learning process to become more analytical and less dependent on mechanical repetition.

The literature also pays attention to visualization and simulation. Mathematical concepts such as functions, graphs, limits, derivatives, integrals, matrices, probability distributions, and optimization models are often difficult for students because they require abstract thinking. Artificial intelligence tools, combined with dynamic visualization platforms, can help students observe mathematical relationships in changing conditions. For economic university students, this creates opportunities to connect mathematical theory with professional contexts. For example, students can explore how a change in price affects demand, how marginal indicators influence profit, or how statistical models are used in forecasting. Such examples strengthen the applied orientation of mathematics education.

At the same time, researchers warn that artificial intelligence should not be used without pedagogical control. The effectiveness of AI depends on the quality of instructional design, the teacher's methodological competence, the accuracy of digital content, and the ethical organization of data use. If AI tools are used only for automatic solution generation, students may become passive users rather than active thinkers. Therefore, the literature stresses the importance of combining artificial intelligence with problem-based learning, teacher explanation, collaborative work, and reflective analysis. The teacher must guide students to

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understand why a particular method is used, how a solution is justified, and how mathematical reasoning can be applied to real economic processes.

Overall, the reviewed literature confirms that artificial intelligence has considerable methodological potential in mathematics education. It can individualize learning, improve feedback, strengthen visualization, support independent study, and connect mathematical knowledge with economic practice. However, its effectiveness depends on purposeful integration into the educational process, clear learning objectives, and the preservation of the teacher's leading didactic role.

Methods

The methodological basis of this study is formed by a qualitative and analytical approach aimed at identifying the pedagogical value of artificial intelligence technologies in mathematics teaching. The research is focused on the conditions of higher education, especially economic universities where mathematics serves as a foundation for professional subjects such as statistics, econometrics, financial analysis, management decision-making, accounting, business forecasting, and data analytics. The study does not treat artificial intelligence as an isolated technological phenomenon, but examines it as a methodological instrument that can influence the structure, content, organization, and assessment of mathematics learning.

The research design includes theoretical analysis, comparative pedagogical interpretation, and modeling of possible instructional situations. The theoretical analysis was used to examine the relationship between artificial intelligence, digital education, adaptive learning, and mathematical competence. Through this method, the study identifies the main functions of AI in the educational process, including diagnosis of learning difficulties, personalization of tasks, automatic feedback, visualization of abstract concepts, and support for independent learning. The comparative approach was used to compare traditional mathematics teaching methods with AI-supported instructional models. This made it possible to clarify the advantages and limitations of both approaches and to determine how they may complement each other in the classroom.

A special methodological focus was placed on the didactic suitability of artificial intelligence tools for teaching mathematical topics that are important for students of economic specialties. These topics include functions, limits, derivatives,

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optimization, matrices, probability theory, mathematical statistics, regression analysis, and basic elements of mathematical modeling. Each topic was considered from the point of view of how artificial intelligence can support explanation, practice, assessment, and applied interpretation. For example, in teaching derivatives, AI-based platforms may help students understand not only the mechanical procedure of differentiation but also the economic meaning of marginal indicators. In teaching probability and statistics, AI tools may generate individual datasets, check calculations, and help students interpret results in connection with real economic problems.

The study also uses pedagogical modeling to describe the structure of an AI-supported mathematics lesson. In this model, the teacher first defines the learning objective and explains the conceptual basis of the topic. Then students work with AI-supported digital tools to solve differentiated tasks, receive feedback, and analyze their mistakes. After that, the teacher organizes reflection, discussion, and generalization so that students do not rely only on automatic answers but understand the mathematical logic behind the solution. This model emphasizes that artificial intelligence should be integrated into the lesson as a supporting didactic mechanism, while the teacher remains responsible for methodological guidance, content accuracy, and educational meaning.

The effectiveness of artificial intelligence technologies was evaluated through several pedagogical indicators. These include students' ability to understand mathematical concepts, solve applied problems, correct mistakes independently, connect mathematical methods with economic content, and demonstrate increased motivation toward learning. Attention was also given to ethical and organizational aspects, such as responsible use of digital tools, academic honesty, data privacy, and the need to avoid excessive dependence on automatic solution generators. Thus, the methods of the study combine theoretical, comparative, and didactic analysis in order to determine how artificial intelligence can be used effectively and responsibly in mathematics education.

Results

The analysis shows that the use of artificial intelligence technologies in teaching mathematics creates several significant methodological results. First, AI-supported learning environments make it possible to organize differentiated instruction more effectively. In traditional mathematics classes, the teacher often

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has to work with students who have different levels of prior knowledge, different learning speeds, and different abilities to understand abstract material. Artificial intelligence tools can help reduce this difficulty by identifying students' individual mistakes and offering tasks that correspond to their actual level of preparation. As a result, students who need additional practice receive more basic exercises, while stronger students can work with more complex applied problems.

Second, the integration of AI improves the quality of feedback in mathematics learning. In many cases, students do not receive immediate explanation of their mistakes, especially when the group is large and the teacher has limited time. AI-based systems can analyze answers instantly and show where the error occurred. This is particularly important in mathematical topics that require step-by-step reasoning. When students solve equations, build graphs, calculate derivatives, work with matrices, or interpret statistical indicators, they need to understand not only whether the final answer is correct, but also whether each stage of the solution is logically justified. Immediate feedback helps students correct misunderstandings before they become stable learning difficulties.

Third, artificial intelligence technologies increase the applied orientation of mathematics education for students of economic specialties. The study indicates that AI tools can generate practical tasks connected with financial calculations, optimization of resources, demand and supply analysis, probability assessment, statistical forecasting, and interpretation of business data. This strengthens the relationship between mathematical theory and professional training. Students begin to see mathematical formulas not only as abstract academic material, but also as instruments for solving economic and analytical problems. Such methodological orientation increases motivation because learners better understand the practical value of mathematical knowledge.

Fourth, AI-supported visualization contributes to deeper understanding of complex mathematical concepts. Many students experience difficulties when studying functions, limits, derivatives, integrals, probability distributions, and regression models because these topics require a high level of abstraction. Digital and AI-based tools can present these concepts through graphs, dynamic models, simulations, and interactive examples. When students observe how a function changes, how a parameter influences a graph, or how statistical data form a trend, their conceptual understanding becomes more stable. Visualization also supports

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students who have difficulty mastering mathematics only through verbal explanation and symbolic notation.

Fifth, the use of artificial intelligence develops students' independent learning skills. AI platforms allow students to repeat topics, solve additional tasks, check answers, and receive explanations outside the classroom. This expands the educational process beyond the limits of regular lessons and encourages students to take more responsibility for their learning. At the same time, the results show that independent work becomes effective only when students are given clear instructions and when the teacher explains how to use AI tools properly.

The study also reveals several limitations. Excessive dependence on artificial intelligence may weaken students' ability to think independently if they use digital tools only to obtain ready-made answers. Therefore, the most effective result is achieved when AI is combined with teacher explanation, classroom discussion, written solution practice, and reflective analysis. In this model, artificial intelligence supports the educational process, while the teacher preserves the leading methodological role.

Discussion

The results of the study indicate that artificial intelligence technologies can significantly enrich the methodology of teaching mathematics, especially in economic higher education where students need to master both theoretical knowledge and applied analytical skills. The main methodological value of AI lies in its ability to make the learning process more flexible, individualized, and practice-oriented. In traditional mathematics instruction, the teacher usually explains the same material to the whole group, although students may differ greatly in their level of preparation. Artificial intelligence makes it possible to respond to these differences more accurately by offering adaptive tasks, additional explanations, and individual feedback. This creates more favorable conditions for students who need repeated practice and for those who are ready to solve more complex problems.

At the same time, the effectiveness of artificial intelligence in mathematics education cannot be reduced only to technical functionality. AI tools become pedagogically meaningful only when they are integrated into a clear methodological system. The teacher must determine the purpose of using a particular digital tool, the place of AI in the lesson structure, the type of tasks

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students should complete, and the form of reflection after digital work. Without such guidance, artificial intelligence may turn into a mechanical answer generator that reduces students' intellectual activity. Therefore, one of the most important methodological requirements is to preserve the active role of the learner and the leading didactic role of the teacher.

For students of economic universities, the use of artificial intelligence in mathematics teaching is particularly relevant because modern economic activity increasingly depends on data, algorithms, forecasting, optimization, and analytical modeling. Mathematics should therefore be taught not as a set of isolated formulas, but as a language for describing and solving economic problems. AI-supported tools can help teachers create tasks that reflect real professional situations, such as analyzing market indicators, calculating marginal values, estimating risk, modeling profit, or interpreting statistical data. Such tasks strengthen the connection between mathematics and future professional competence, which is essential for increasing students' motivation.

Another important issue is the development of critical thinking. Artificial intelligence can provide quick answers, but mathematics education must teach students to justify, compare, verify, and interpret solutions. Therefore, students should be encouraged to analyze AI-generated explanations, identify possible errors, and compare different solution methods. This approach transforms AI from a simple technical assistant into a means of developing mathematical reasoning. In this sense, the teacher's role becomes even more important, because students need guidance in evaluating the reliability and correctness of digital outputs.

The discussion also shows that ethical and organizational factors must be considered. The use of AI in education raises questions related to academic honesty, data privacy, equal access to digital resources, and the danger of excessive dependence on automated systems. Universities should develop methodological recommendations for responsible use of AI tools in mathematics learning. Students should understand when AI can be used for practice, explanation, and self-checking, and when independent reasoning is required.

Thus, artificial intelligence has strong potential to improve mathematics education, but its effectiveness depends on balanced implementation. It should support conceptual understanding, applied problem solving, feedback, and

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independent learning, while maintaining the teacher's methodological control and the student's active intellectual participation.

Conclusion

The integration of artificial intelligence technologies into mathematics teaching represents an important methodological direction for improving the quality and effectiveness of higher education. In the context of economic universities, this issue has particular relevance because mathematical knowledge forms the basis for professional disciplines connected with economic analysis, finance, statistics, econometrics, management, forecasting, and data-based decision-making. The study shows that artificial intelligence can expand the possibilities of mathematics education by supporting individualized learning, adaptive assessment, instant feedback, visualization of abstract concepts, and the development of students' independent learning skills.

The main pedagogical value of artificial intelligence lies in its capacity to respond to students' individual learning needs. Mathematics is a discipline in which each new topic is closely connected with previous knowledge. If students have gaps in algebra, functions, equations, or basic statistical concepts, they may experience serious difficulties in mastering more complex topics. AI-supported systems can help identify such gaps at an early stage and provide differentiated tasks according to the student's actual level. This makes the learning process more flexible and allows the teacher to organize instruction more effectively.

Another important conclusion is that artificial intelligence can strengthen the applied orientation of mathematics education. For students of economic specialties, mathematics should not remain an abstract theoretical subject. It must be connected with real professional tasks such as profit analysis, optimization of resources, risk assessment, investment calculation, demand forecasting, and interpretation of statistical indicators. AI-based tools can generate practical situations, visualize economic processes, and help students understand the professional meaning of mathematical methods. This contributes to stronger motivation and deeper comprehension of mathematical content.

At the same time, the effectiveness of artificial intelligence depends on the teacher's methodological guidance. AI technologies should not replace the teacher or reduce mathematics learning to automatic answer generation. Their role is to support explanation, practice, self-checking, reflection, and applied

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problem solving. The teacher remains responsible for defining educational goals, selecting appropriate digital tools, explaining theoretical foundations, organizing discussion, and developing students' critical thinking. Students should learn not only to use AI systems, but also to evaluate their outputs, justify solutions, compare methods, and understand the logic of mathematical reasoning.

The study also confirms the importance of ethical and organizational conditions. Responsible use of artificial intelligence in mathematics education requires attention to academic honesty, data privacy, equal access to digital resources, and prevention of excessive dependence on automated systems. Therefore, universities should develop clear methodological recommendations for the use of AI tools in teaching and learning.

In general, artificial intelligence technologies have considerable potential to improve mathematics education when they are applied purposefully, systematically, and pedagogically correctly. Their effective use can increase students' mathematical competence, support independent learning, strengthen professional orientation, and prepare future economists for activity in a digital analytical environment.

References

1. Baker, R. S., & Inventado, P. S. (2014). Educational data mining and learning analytics. In J. A. Larusson & B. White (Eds.), Learning analytics: From research to practice (pp. 61–75). Springer.
2. Borba, M. C., & Villarreal, M. E. (2005). Humans-with-media and the reorganization of mathematical thinking: Information and communication technologies, modeling, visualization and experimentation. Springer.
3. Bray, A., & Tangney, B. (2017). Technology usage in mathematics education research: A systematic review of recent trends. Computers & Education, 114, 255–273.
4. Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. IEEE Access, 8, 75264–75278.
5. Drijvers, P. (2015). Digital technology in mathematics education: Why it works or does not. In S. J. Cho (Ed.), The proceedings of the 12th International Congress on Mathematical Education (pp. 135–151). Springer.
6. Hattie, J., & Timperley, H. (2007). The power of feedback. Review of Educational Research, 77(1), 81–112.

ISSN: 3072-4708
Volume 01, Issue 02, May, 2026
Website: https://omegajournals.org
Licensed under a Creative Commons Attribution 4.0 International License.

7. Holmes, W., Bialik, M., & Fadel, C. (2019). Artificial intelligence in education: Promises and implications for teaching and learning. Center for Curriculum Redesign.
8. Hwang, G. J., Xie, H., Wah, B. W., & Gašević, D. (2020). Vision, challenges, roles and research issues of artificial intelligence in education. Computers and Education: Artificial Intelligence, 1, 100001.
9. Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günnemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., Stadler, M., Weller, J., Kuhn, J., & Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. Learning and Individual Differences, 103, 102274.
10. Luckin, R. (2018). Machine learning and human intelligence: The future of education for the 21st century. UCL Institute of Education Press.
11. Mayer, R. E. (2020). Multimedia learning. Cambridge University Press.
12. NCTM. (2014). Principles to actions: Ensuring mathematical success for all. National Council of Teachers of Mathematics.
13. OECD. (2021). OECD digital education outlook 2021: Pushing the frontiers with artificial intelligence, blockchain and robots. OECD Publishing.
14. OECD. (2023). OECD digital education outlook 2023: Towards an effective digital education ecosystem. OECD Publishing.
15. Popenici, S. A. D., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. Research and Practice in Technology Enhanced Learning, 12, Article 22.
16. Siemens, G., & Baker, R. S. J. d. (2012). Learning analytics and educational data mining: Towards communication and collaboration. Proceedings of the 2nd International Conference on Learning Analytics and Knowledge, 252–254.
17. UNESCO. (2021). AI and education: Guidance for policy-makers. UNESCO Publishing.
18. UNESCO. (2023). Guidance for generative AI in education and research. UNESCO Publishing.
19. VanLehn, K. (2011). The relative effectiveness of human tutoring, intelligent tutoring systems, and other tutoring systems. Educational Psychologist, 46(4), 197–221.

ISSN: 3072-4708
Volume 01, Issue 02, May, 2026
Website: https://omegajournals.org
Licensed under a Creative Commons Attribution 4.0 International License.

20. Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education: Where are the educators? International Journal of Educational Technology in Higher Education, 16, Article 39.