

ARTIFICIAL INTELLIGENT: POSITIVE AND NEGATIVE ROLE IN EDUCATION MANAGEMENT

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Abstracts

Technology always has positive and negative effects. To minimize unwanted effects, work around this. The research aims to explore AI's positive and negative roles in Education management. The data collection technique is a literature study. Data analysis was carried out by identifying the benefits of AI in Education and its impact on the quality of education. The study results show that AI has a positive role in education management, such as presenting a more innovative learning process and speed in organizing and managing learning activities and increasing the quantity and quality of lecturers' scientific work. However, AI harms social interaction between pupils and teachers. It can potentially imprison the learning community (lecturers, teachers, students) in a state of convenience, undermining the critical thinking innovation it should have had thus far. This study found that AI improves schooling. It must be maintained to maintain learning citizens' social interaction and inventive thinking.

Keywords:

Artificial Intelligence, Education Management

Introduction

Education is one of the essential fields in the development of a country's human resources. Education management is vital in managing and organizing various aspects of the education system. Education management manages and organizes various aspects of education to achieve set goals. Good education management is essential in ensuring the effectiveness and sustainability of the education system. When education management does not work well, the impact can be detrimental to all stakeholders in the world of education, including students, teachers, educational institutions, and society.

Effective education management is the key to achieving optimal educational goals. In a complex and dynamic educational environment, good education management plays a vital role in: 1) Learning Planning: Effective education management involves careful learning planning, including the development of relevant curricula, selection of effective teaching methods, and accurate evaluation. 2) Resource Management: Good educational management involves efficiently allocating limited resources, including human, financial, and physical resources. 3) Human Resource Development: Qualified teachers are one of the essential aspects of successful education. 4) Use of Technology: Using technology in education management can increase the efficiency and effectiveness of the educational process.

The evolution of computers and information and communication technology over the years has led to the creation of artificial intelligence. This was made possible by the convergence of these two fields. Artificial intelligence (AI) has experienced rapid development in recent years, and its impact is felt in various sectors, including Education (X. Chen et al., 2020; Hwang et al., 2020). According to Coppin (2004), A.I. refers to the capacity of machines to learn and respond to their environments, answering questions and solving problems in ways that are typically associated with human intelligence. Another definition of artificial intelligence is the study of intelligence behavior in humans, animals, and machines with the goal of engineering that behavior into an artifact, such as computers and computer-related technology (Whitby, 2008). According to Chen et al. (2020), Artificial intelligence is the most advanced form of computers, technology, machines, information, and communication technology. It lets computers work close to or like humans. Along with the development and use of new technologies in education, artificial intelligence has also been made and is used a lot in schools.

AI in education has provided various benefits and new potential to improve the learning experience (L. Chen et al., 2020; X. Chen et al., 2020; Chiu et al., 2023). One of the most notable developments of AI in Education is its ability to personalize learning. AI can individually adjust learning materials, difficulty levels, and teaching methods by analyzing student data and learning patterns. It allows students to learn according to their needs, potential, and preferences, increasing learning effectiveness and student motivation. It is in line with research (Razzaq, 2019), which identified the benefits of AI in providing learning content tailored to student needs, providing individualized feedback, and identifying students' level of understanding. In addition, AI has also expanded the accessibility of education. Through an online learning platform powered by AI, students can access learning materials anytime and anywhere, even in remote areas or with geographical limitations. It opens up more flexible and inclusive learning opportunities, enabling everyone to obtain a quality education without barriers. The application of AI in education management has also increased administrative efficiency. AI can automate administrative tasks, such as data processing, scheduling, and managing student attendance. It helps reduce the workload of teachers and administrative staff, allowing them to focus on more value-added activities, such as direct interaction with students and developing innovative learning strategies.

While it has great potential in advancing education management, the use of AI also presents challenges and concerns that need to be addressed. Some of the negative impacts of AI in education management include 1) Dependence on Technology: If AI becomes the only teaching or assessment method used, there can be a loss of crucial human interaction in education. Excess reliance on technology can also reduce flexibility and adaptability in the face of unexpected changes. 2) Reliability and Error: AI bases decisions and recommendations on algorithms developed by humans. If the algorithm is imprecise or inaccurate, it can result in errors in the AI system's assessment, evaluation, or recommendation. 3) Student data privacy. AI needs student data to analyze and generate personalized learning recommendations. Therefore, the protection of student data and privacy must be well guaranteed so that no misuse or invasion of privacy has the potential to harm students.

Several research teams have done systematic reviews to point out a common problem with AI in education: the lack of a link between AI techniques and their theoretical foundations, which has a big impact on how well AI works in education (Ouyang & Jiao, 2021). It fits with research Zawacki-Richter et al., (2019) by looking at 146 research articles on the use of AI in higher education. Zawacki-Richter et al., (2019) came to the conclusion that the lack of critical reflection has theoretical, pedagogical, and ethical effects on the use of AI in higher education.

Based on the explanation above, the researcher wants to examine AI's positive and negative role in education management.

Methods

This research will use a qualitative approach to gain a deep understanding of AI's positive and negative role in education management. The qualitative approach will enable researchers to explore deeper perspectives, experiences, and interpretations of education stakeholders related to the use of AI in education management. The library research approach involves reading, analyzing, and documenting a wide variety of literature or reading materials that are related to the topic matter. This information is then screened via a theoretical lens and poured into a frame of mind. Library research methods are used to find more facts to compare the differences and similarities between theory and practice in problems about the ideas and functions of education management.

Secondary data is obtained and collected from existing sources such as books, journals, encyclopedias, papers, articles, and documents, both printed and electronic, and other sources of information about the use of AI in education management.

Data analysis will be conducted using thematic analysis methods for qualitative data obtained from interviews and observations. The data will be encoded, categorized, and analyzed to identify key themes related to AI's positive and negative role in education management. These themes will be explained, compared, and conclusions drawn to form research findings.

Results and Discussion

Finding

Education can't be separated from the skills and dedication of its teachers because it is guarded by fields like management and leadership. So, innovation in higher education leadership and management is necessary to reach quality education goals that promote the social, economic, and democratic values and principles needed in modern society (Al-Husseini et al., 2021). Management is one of the most important parts of a professional system. It is thought to be one of the most important ways to tell if a country is rich or poor (Sauphayana, 2021). It decides whether the organization will live or die, succeed or fail. When we think of a business, we think of the people in charge. So, it is seen as the most important part of any venture.

Innovations in educational management in higher education institutions are becoming increasingly prevalent worldwide. Organizational goals are more likely to be met when new ideas and improvements are made to existing methods, structures, approaches, or process management. It is made up of leaders and managers who try new things. When compared to other innovations, leadership innovation is the only one that can make big, long-term changes in how well an organization works. In order to be innovative in management, you need to have and improve your management skills and be willing to take responsibility for making changes that boost progress and performance.

In this case, education management is run as a separate institution from the rest of the system's management. So, the management of an educational institution is a thorough process that aims to: 1) make sure that people get practical, high-quality training and education by making the educational process and its parts work as well as they can; 2) Setting up guidelines for education (whose level of opportunities are available to achieve the set objectives); 3) ensure that the education process is unified, that it is seen as a legal system, and that its principles, contents, forms, and methods are all the same; 4) Management of educational organizations using all available resources, such as staff, technology, primary materials, information and financial resources, organizational structure, etc (Al-Ababneh & Alrhaimi, 2020).

Education management information systems (EMIS) are one thing that can be done to make education management better. An education management information system, also known as an EMIS, is a data-driven model that can be used in data collection and analysis to provide information that can help with making informed decisions and supporting planning, management, and monitoring in the education system, particularly in Higher Education. As a result, educational leaders now have the ability to make management decisions thanks to new systems that integrate technology, people, processes, and procedures. EMIS also increases the processing of data in a timely manner, as well as its relevance, dependability, and completeness of information, all of which promote the practical execution of duties associated with higher education (Sauphayana, 2021).

The Educational Management Information System (EMIS) is a useful innovation tool that aims to enhance educational administration in higher education. In addition, the technology makes it possible to automate education management, which concurrently boosts learners' and teachers' leadership and decision-making abilities (Martins et al., 2019). As a result, EMIS is extremely important from a strategic point of view in locations where there are difficulties associated with physical surveillance. For instance, Education Management Information Systems (EMIS) could improve education monitoring in underdeveloped nations to ensure high levels of accountability, transparency, and creativity between students and teachers. Martins et al. (2019) conducted a survey of 250 academic leaders and discovered that there is a favorable correlation between the sharing of university information and innovation.

There are frequently hiccups and obstacles encountered throughout the process of implementing EMIS in educational institutions. One of the challenges that the adoption of EMIS encounters in the higher education sector is the high cost that is required to build and operate EMIS (Wyk et al., 2015). In a similar manner, the quality of the input in EMIS is directly proportional to the quality of the output because EMIS is largely dependent on the processes carried out by computers. As a direct consequence of this, the allocation of funds for innovative endeavors and leadership within PT is constrained by financial considerations, which makes it challenging to launch or continue to operate EMIS. As a result, the majority of EMISs that aim to improve innovation and leadership in higher education either do not succeed or do not succeed very well. In order to properly use EMIS in higher education, one of the hurdles that must be overcome is the demand of trained staff as well as training on how to use EMIS. In order for leaders to be able to make sound judgments, they need the authority to engage with the system while simultaneously gathering, evaluating, and interpreting information.

Analysis

Artificial Intelligence in Current Education

The fast development of computing and information processing techniques has sped up the development and use of artificial intelligence (AI). AI tries to make computers do tasks by simulating intelligent human behaviors like inference, analysis, and decision-making (Duan et al., 2019; Topol, 2019). AI is now used in many areas, such as recognizing images and voices, making decisions, processing natural language, and translating between languages. It is used in many ways, such as computer programs, applications, control systems built into equipment, and robots. For example, some robots can talk to people through technology that tracks their eyes and ears (Lathuilière et al., 2019) And in the medical field, it can help doctors find possible diseases or make decisions by analyzing a lot of data (Li et al., 2020; Zhu, 2020).

Along with the fast growth of technology, Artificial Intelligence (AI) has had a big effect on many parts of human life, including how we manage education. AI has changed how people learn, how they access education, how it is evaluated, and how it is run. AI in Education (AIEd) has opened up new ways to design useful learning activities and make better technology-enhanced learning apps or environments (Hwang et al., 2020).

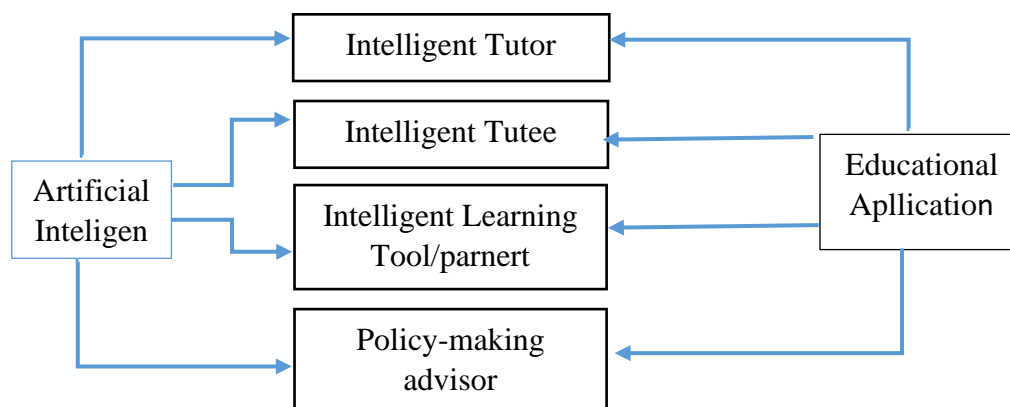


Figure 1. Framework for the roles of AIEd.

1. *Intelligent Tutor*. It could be the biggest group of AIEd apps. Included are an intelligent tutoring system, an adaptive/personalized learning system, or a system for making suggestions. Several meta-analytic studies have demonstrated the effectiveness of intelligent guidance systems in promoting learning outcomes (Ma et al., 2014; Steenbergen-Hu & Cooper, 2014)
2. *Intelligent tutee*. Studies in this area don't come up very often because most AI-based education systems are focused on helping students instead of giving them chances to act as tutors or advisors. Nevertheless, engaging learners in the context of helping others (i.e., AI students) understand complex concepts can be an excellent approach to promoting their higher-order thinking competence and level of knowledge. Although no research has aimed to develop intelligent tutees intentionally and explicitly, many AI models and techniques can learn knowledge and experience from interactions with humans. The learning capabilities of AI models and methods can facilitate the development of intelligent tutees in the future.
3. *Intelligent Tool/Partner*. From the point of view of constructivism and student-centered learning, it is important to give students an intelligent learning tool or partner. Such devices can help learners collect and analyze data efficiently and effectively, allowing them to focus on critical points or higher-order thinking (e.g., inference and prediction) rather than low-level tasks (e.g., editing and calculation). Some tools can even analyze and present data in "intelligent" ways to help learners think deeply and discover the valuable implications underlying the data. For example, traditional Mindtools, such as concept mapping tools, help learners to organize knowledge by passively linking relationships between concepts. Conversely, an intelligent concept mapping tool can advise or guide learners and evaluate concept maps developed during the concept mapping process.
4. *Policy-making advisor*: In the past year, AI techniques have been used to help shape and inform policy and legal changes (Gasser & Almeida, 2017). Therefore, it is possible and feasible to develop policy-making advisors for policy development in education. With the help of AI technology, policymakers can more precisely understand trends and problems in education settings from macro and micro perspectives, which can help them build and evaluate effective education policies (Tsai et al., 2019).

In addition to bringing changes to learning activities, AI is a changemaker in HR Planning, Organizing, Implementing, and Evaluating Human Resources.

a) *The Role of AI in HR Planning*:

AI can significantly contribute to human resource (HRM) planning by assisting in data analysis, identifying workforce needs, and developing effective HR strategies (Kot,

2019). It is in line with the results of research conducted by Hernandez (2020), where AI has changed how companies manage HR by optimizing employee recruitment, selection, and retention. Through data analysis, AI can process thousands of applications quickly, screening potential candidates based on predetermined criteria. In addition, AI can also help in conducting assessments of candidates' skills and personalities through online tests and virtual interviews.

- b) *The Role of AI in HR Organizing*: AI can be used in HR organizing by assisting in employee attendance management, task scheduling, and productivity analysis. It aligns with research results (Amini, 2019), highlighting how AI can assist in selecting optimal work schedules, identifying schedule conflicts, and optimizing employee productivity. AI is used to manage and organize schedules considering individual preferences and qualifications, thereby increasing the efficiency of the HR organization.
- c) *The Role of AI in HR Implementation*: AI can help in HR implementation by providing virtual assistants or chatbots that can provide information and guidance to employees and automate routine tasks.
- d) *The Role of AI in HR Evaluation*: AI can be used in HR evaluation by assisting in employee performance analysis, turnover prediction, and career development plan development. An example is Salary Calculation: AI plays an essential role in processing salary calculations accurately and efficiently. By analyzing attendance, hours, overtime, benefits, and tax data, AI can calculate employee salaries automatically and reduce the risk of human error. It helps companies manage payroll more efficiently (Lehner et al., 2022; Moses, 2018).

In addition, AI plays a role in Decision Making, where AI has sophisticated data analysis capabilities and can present deep insights from the collected data. Thus, AI can help business leaders make more informed and evidence-based decisions. By leveraging big data and machine learning algorithms, AI can predict market trends, consumer behavior, and future business outcome (Yoon, 2019).

While it has great potential in advancing education management, the use of AI also presents challenges and concerns that need to be addressed. Some of the negative impacts of AI in education management include:

1. *Dependence on Technology*: Over-reliance on AI technology can result in over-dependence. If AI becomes the only teaching or assessment method used, essential human interaction in education could be lost. Excess reliance on technology can also reduce flexibility and adaptability in the face of unexpected changes.
2. *Reliability and Errors*: AI makes decisions based on and recommendations on algorithms developed by humans. If the algorithm is imprecise or inaccurate, it can result in errors in the AI system's assessment, evaluation, or recommendation. Therefore, there needs to be attention to the validity and reliability of AI systems used in education.
3. *Digital Divide*: AI in education management can deepen the digital divide between students with access to technology and those without access. If there is no effort to ensure equitable access to AI technology, students from low economic backgrounds or remote areas could fall behind in benefiting from using AI in learning.
4. *Ethics and Decision Making*: Decisions made by AI systems in education management can raise ethical questions. For example, how does an AI system decide the allocation of student resources or grading policies? Clear ethical guidelines in using AI are necessary to ensure fair decisions and consider human aspects.
5. *Teacher Role Replacement*: Excessive use of AI in education management can lead to a reduction in the role of teachers. Human interactions involving emotional and social understanding and complex contextual assessments remain essential in education.

Therefore, it is crucial to maintain a balance between the role of AI and the role of humans in education.

The benefits of AI and overcome the challenges of using AI in education management, a careful and sustainable approach must be implemented. Some steps that can be taken include:

1. **Policy and Guideline Development:** Governments and educational institutions must develop clear policies and guidelines for using AI in education management. These guidelines should cover aspects of data privacy and security, ethics of using AI, and protection against the digital divide.
2. **Training and Skill Development:** Education teachers and staff need to be provided with adequate training in using AI in education management. They should understand how to utilize AI effectively in teaching and administrative practices.
3. **Monitoring and Evaluation:** It is essential to continuously monitor and evaluate the implementation of AI in education management to ensure its impact aligns with expectations. Evaluation can be done by measuring student achievement, user satisfaction, and the effectiveness of AI technology implementation.
4. **Data Privacy and Security Compliance:** AI systems used in education management must meet strict data privacy and security standards. The protection of student data should take precedence, and effective monitoring and control mechanisms should be implemented.
5. **Integrating AI with Human Interaction:** Maintaining a good balance between AI's and humans' roles in education is essential. Deep human interaction and fostering emotional connections remain important in effective learning.

AI in education management can benefit significantly through a holistic and sustainable approach. By optimizing the advantages of AI and addressing emerging challenges, education can take a step forward in achieving better educational goals and providing more effective learning experiences for students.

Conclusion

Artificial intelligence (AI) in education management offers potential challenges that must be carefully considered. AI's positive role in education management is improving learning personalization, fast and accurate data analysis, and administrative efficiency. AI also helps in improving student interaction and engagement in learning. However, the negative role of AI in education management includes student data privacy risks, technology dependence, and ethical concerns regarding decision-making. Excessive use of AI can also reduce human interaction in education, present a digital divide, and raise issues of fairness in assessment.

Therefore, applying AI in education management requires a balanced and thoughtful approach. There needs to be clear policies and guidelines to protect data privacy and security and ensure fairness and transparency in decision-making. By optimizing the benefits of AI and addressing existing challenges, education management can harness the potential of this technology to achieve the goal of more effective, inclusive, and sustainable education.

References

- Al-Ababneh, H. A., & Alrhaimi, S. A. S. (2020). Modern approaches to education management to ensure the quality of educational services. *TEM Journal*, 9(2). <https://doi.org/10.18421/TEM92-46>
- Al-Husseini, S., El Beltagi, I., & Moizer, J. (2021). Transformational leadership and innovation: the mediating role of knowledge sharing amongst higher education faculty.

- Chen, L., Chen, P., & Lin, Z. (2020). Artificial Intelligence in Education: A Review. *IEEE Access*, 8. <https://doi.org/10.1109/ACCESS.2020.2988510>
- Chen, X., Xie, H., Zou, D., & Hwang, G. J. (2020). Application and theory gaps during the rise of Artificial Intelligence in Education. In *Computers and Education: Artificial Intelligence* (Vol. 1). <https://doi.org/10.1016/j.caeai.2020.100002>
- Chiu, T. K. F., Xia, Q., Zhou, X., Chai, C. S., & Cheng, M. (2023). Systematic literature review on opportunities, challenges, and future research recommendations of artificial intelligence in education. *Computers and Education: Artificial Intelligence*, 4, 100118. <https://doi.org/10.1016/j.caeai.2022.100118>
- Coppin, B. (2004). *Artificial Intelligence Illuminated*. Jones and Bartlett.
- Duan, Y., Edwards, J. S., & Dwivedi, Y. K. (2019). Artificial intelligence for decision making in the era of Big Data – evolution, challenges and research agenda. *International Journal of Information Management*, 48. <https://doi.org/10.1016/j.ijinfomgt.2019.01.021>
- Hernandez, D. L. , M. T. S. (2020). The Impact of Artificial Intelligence on Human Resource Management: A Systematic Review. *Journal of Applied Human Resource Management*, 6(3), 127–142.
- 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. <https://doi.org/10.1016/j.caeai.2020.100001>
- Kot, T. (2019). Artificial Intelligence Techniques in Human Resource Planning. *Scientific Journal of Silesian University of Technology. Series Organization and Management*, 141(1), 103–112.
- Lathuilière, S., Massé, B., Mesejo, P., & Horaud, R. (2019). Neural network based reinforcement learning for audio–visual gaze control in human–robot interaction. *Pattern Recognition Letters*, 118. <https://doi.org/10.1016/j.patrec.2018.05.023>
- Lehner, O. M., Ittonen, K., Silvola, H., Ström, E., & Wührleitner, A. (2022). Artificial intelligence based decision-making in accounting and auditing: ethical challenges and normative thinking. *Accounting, Auditing and Accountability Journal*, 35(9). <https://doi.org/10.1108/AAAJ-09-2020-4934>
- Li, J., Li, P., & Niu, W. (2020). Artificial intelligence applications in upper gastrointestinal cancers. In *The Lancet Oncology* (Vol. 21, Issue 1). [https://doi.org/10.1016/S1470-2045\(19\)30721-1](https://doi.org/10.1016/S1470-2045(19)30721-1)
- Ma, W., Adesope, O. O., Nesbit, J. C., & Liu, Q. (2014). Intelligent tutoring systems and learning outcomes: A meta-analysis. *Journal of Educational Psychology*, 106(4). <https://doi.org/10.1037/a0037123>
- Martins, J., Branco, F., Gonçalves, R., Au-Yong-Oliveira, M., Oliveira, T., Naranjo-Zolotov, M., & Cruz-Jesus, F. (2019). Assessing the success behind the use of education management information systems in higher education. *Telematics and Informatics*, 38. <https://doi.org/10.1016/j.tele.2018.10.001>
- Moses, S. , S. R. (2018). Automating Payroll with Artificial Intelligence: A Case Study in the Finance Industry. *International Journal of Artificial Intelligence in Finance*, 2(1), 23–35.

- Ouyang, F., & Jiao, P. (2021). Artificial intelligence in education: The three paradigms. *Computers and Education: Artificial Intelligence*, 2, 100020. <https://doi.org/10.1016/j.caeai.2021.100020>
- Sauphayana, S. (2021). Innovation in higher education management and leadership. *Journal of Educational and Social Research*, 11(6). <https://doi.org/10.36941/jesr-2021-0137>
- Steenbergen-Hu, S., & Cooper, H. (2014). A meta-analysis of the effectiveness of intelligent tutoring systems on college students' academic learning. *Journal of Educational Psychology*, 106(2). <https://doi.org/10.1037/a0034752>
- Topol, E. J. (2019). High-performance medicine: the convergence of human and artificial intelligence. In *Nature Medicine* (Vol. 25, Issue 1). <https://doi.org/10.1038/s41591-018-0300-7>
- Tsai, Y. S., Poquet, O., Gašević, D., Dawson, S., & Pardo, A. (2019). Complexity leadership in learning analytics: Drivers, challenges and opportunities. *British Journal of Educational Technology*, 50(6). <https://doi.org/10.1111/bjet.12846>
- Whitby, B. (2008). *Artificial Intelligence: A beginner's guide*. Oxford, U.K.: Oneworld.
- Wyk, C. V. A. N., Data, P., Integration, D., Identifiers, U., & Quality, D. (2015). An overview of Education data in South Africa: an inventory approach. *An Overview of Key Datasets in Education in South Africa*, 5(2).
- Yoon, K. , L. J. , & P. Y. (2019). Artificial Intelligence in Decision Making: The Role of Human Values. *Journal of Business Ethics*, 159(1), 1–17.
- 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? In *International Journal of Educational Technology in Higher Education* (Vol. 16, Issue 1). <https://doi.org/10.1186/s41239-019-0171-0>
- Zhu, H. (2020). Big data and artificial intelligence modeling for drug discovery. In *Annual Review of Pharmacology and Toxicology* (Vol. 60). <https://doi.org/10.1146/annurev-pharmtox-010919-023324>