Journal of Artificial Intelligence Practice (2024)
Clausius Scientific Press, Canada

DOI: 10.23977/jaip.2024.070413
ISSN 2371-8412 Vol. 7 Num. 4

Exploration and Research on the New Ecosystem of Artificial Intelligence + Security Education

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Keywords: Artificial intelligence; security education

Abstract: The development of artificial intelligence has brought unprecedented opportunities for security education in universities. The author combines artificial intelligence with security education to explore the feasibility and security measures of building a new ecosystem of Artificial Intelligence + Security Education. Artificial intelligence has unique advantages in developing intelligent security education courses, improving teaching methods, and enhancing teaching evaluation. While leveraging its advantages, there are also many challenges. One of them is the low degree of integration between education and information technology, mainly manifested in the large gap between teaching concepts and artificial intelligence basic technologies, and technological development is at a bottleneck stage. Additionally, as data security and privacy protection issues become increasingly prominent, it is necessary to establish sound data security protection measures and privacy protection systems to securely and effectively protect learners' personal privacy and behavioral data. Based on the above issues, the author proposes the following measures for improvement. First, the security education faculty team should be improved and the cultivation of educational work philosophy should be strengthened. Second, the security education system construction should be continually improved in accordance with data security and privacy protection requirements.

1. Introduction

1.1 Research Background and Significance

The integration of artificial intelligence and security education will be a major trend in future development. Utilizing artificial intelligence technology can establish a more efficient, intelligent, and personalized new ecosystem for security education, better serving society and individual safety. It is crucial to propose feasible solutions around the potential, opportunities, and challenges of building a new ecosystem for security education based on artificial intelligence. This not only helps enrich the content of security education in universities and promote its modernization but also enhances the targeting, effectiveness, and outcomes of security education, training more individuals with the knowledge to protect themselves and possessing certain security skills. With the development and expanding application of artificial intelligence technology, its use in the field of security education will become increasingly important. In the future, new security education

methods and approaches suitable for different groups and scenarios will undoubtedly emerge.

1.2 Points of Integration between Artificial Intelligence and Security Education

The combination of artificial intelligence and security education can open up new development spaces for contemporary education. Artificial intelligence can effectively enhance the teaching quality of security education in areas such as personalized education, interactive education, intelligent assessment, and feedback.

Personalized education is a major focus of applying artificial intelligence to security education. Traditional education often follows a one-size-fits-all approach, making it difficult to achieve uniform learning outcomes. In contrast, artificial intelligence can efficiently gather factors such as students' individual learning habits, foundational levels, and mastery levels to tailor personalized education plans for them. For instance, based on intelligent recommendation systems, students can be recommended security education resources related to their interests and hobbies, facilitating the design of personalized teaching plans. This approach can also boost students' desire to participate and their motivation to learn.

Furthermore, the attention to bidirectional interactive learning in security education based on artificial intelligence has been increasing. Technologies such as natural language processing and virtual reality enabled by artificial intelligence can create simulated environments where students can practice and engage in practical security education. This interactive learning approach enhances students' learning experiences, hones their practical skills, and improves the effectiveness of security education.

Intelligent assessment and personalized feedback represent another highlight of the integration of artificial intelligence and security education. Traditional assessment methods in security education typically involve manual grading and subjective evaluations, which may suffer from subjectivity and lack of standardization. Artificial intelligence technology can effectively monitor students' learning data regularly and objectively evaluate their achievements using learning algorithms and big data analysis methods. Leveraging feedback on areas for improvement, personalized assistance can be provided to students, optimizing learning outcomes through direct feedback on issues and one-on-one teaching-style support.

The integration of artificial intelligence and security education has injected new vitality into modern security education. It not only enables the personalization, interactivity, and tailored teaching in security education through methods such as personalized instruction, interactive teaching, intelligent assessment, and feedback but also provides strong support for the cultivation of high-quality talents with strong security awareness and skills. With the rapid development of technology and the continuous expansion of application areas, the application of artificial intelligence in security education is indispensable and should not be underestimated.

2. Construction of the New Ecosystem of Artificial Intelligence + Security Education

2.1 The Application of Artificial Intelligence in Course Development

The curriculum development process in security education is particularly crucial. Traditional curriculum development is labor-intensive and time-consuming, and AI-assisted curriculum development offers a feasible solution to streamline the existing curriculum development process. Through technologies like deep learning, artificial intelligence can extract key data from massive information, such as security risks and preventive measures. This capability will provide course designers with a "sixth sense" for course design.

In addition to the efficient development of course content, artificial intelligence technology can

also provide personalized customization features. Because different students have varying learning needs and backgrounds, providing content that meets their specific learning requirements will enhance learning outcomes. This goal, which is unattainable in traditional modes, can be achieved through artificial intelligence technology. Students' diverse learning records, academic interests, and other information will be collected and integrated, and personalized learning resources will be pushed to each student accordingly, effectively addressing the challenges of complex learning resources and matching difficulties.

Furthermore, artificial intelligence technology can be combined with virtual reality, augmented reality, and other technologies to create new learning environments for security education. This approach allows students to directly engage in security operation skill practice in safe virtual real-world environments. This almost "zero-distance" learning helps students experience immersive learning, potentially leading to a better understanding and mastery of relevant security operation skills.

2.2 The Role of Artificial Intelligence in Innovating Teaching Modes

In the process of security education, traditional methods generally focus on teachers as the main body and students as the object, that is, teacher-led teaching. However, the development of artificial intelligence technology has transformed this phenomenon. The application of artificial intelligence technology has optimized the traditional teaching mode. It not only can achieve personalized and differentiated teaching according to students' different knowledge bases and learning interests, but also can better stimulate students' interest in learning and initiative.

Natural language processing is the foundation of artificial intelligence technology. Artificial intelligence can "understand" students from the surface of language. Machine learning enables artificial intelligence to infer students' learning abilities and needs based on their learning history, learning scenarios, and other information. Big data analysis allows artificial intelligence to analyze learning outcomes from a higher dimension. The realization of these technologies provides possibilities for personalized teaching.

Under the teaching philosophy of artificial intelligence, teaching methods are comprehensively supported by technology. It can provide real feedback from students to help teachers flexibly adjust the learning progress. It can also promote student interaction and collaboration to achieve personalized learning. With the continuous development and improvement of artificial intelligence technology, the teaching of security education in the new era will become more efficient, personalized, and diversified.

2.3 Implementation of Artificial Intelligence in Educational Assessment and Feedback

To ensure the effectiveness of security education in implementation, it is necessary to establish a scientific and comprehensive evaluation and feedback mechanism that covers multiple aspects and utilizes diversified assessment methods to fully and objectively reflect students' levels of safety awareness[1]. Artificial intelligence systems utilize various cutting-edge technologies such as machine learning in teaching evaluation and feedback, enabling real-time recording of learning activities and generating data reports related to them. These data reports include basic data such as learning time and progress during the learning process, as well as existing student knowledge, preferences for learning certain subjects, and potential learning difficulties.

The learning assessment function can evaluate learning outcomes based on collected learning data using algorithm models and other means. Artificial intelligence also features real-time feedback capabilities. After analyzing a student's learning status in a timely manner, the system provides relevant data feedback to the student, prompting adjustments to learning strategies or

processes. Additionally, artificial intelligence possesses dynamic adjustment capabilities. Teachers can make timely adjustments to teaching content, methods, and other aspects based on learners' feedback.

The application of artificial intelligence in educational assessment and feedback can enhance the scientific nature and effectiveness of security education, promoting the implementation of personalized education.

3. Challenges and Countermeasures of the New Ecosystem of Artificial Intelligence + Security Education

3.1 Challenges in the Integration of Technology and Education

The integration of artificial intelligence with security education faces difficulties in the alignment of education with technology. This challenge is not only a technical issue but also associated with reforms in many educational aspects such as teaching concepts, methods, and content.

From the perspective of teaching practice, there still exist mismatches between the technical innovations in artificial intelligence development and the needs of security education. Despite significant advancements in areas such as image recognition and natural language analysis, there are still unresolved issues regarding how artificial intelligence technology can be better utilized for security education and how AI can be applied to instructional design in security education.

Conceptual shift is also a significant obstacle in the process of combining artificial intelligence with security education. Traditional security education is teacher-centered, focusing solely on the dissemination of knowledge points, which fails to adequately meet the diverse needs of students. In the era of artificial intelligence, security education similarly requires a "teacher", but the "teacher" itself takes on a different role, that of an academic guide and assistant. This presents a challenge for teachers who currently place excessive emphasis on knowledge transmission.

Efforts to bridge the gap between technology and education are imperative. On one hand, continuous improvement and innovation of technology are essential to reduce the difficulty of technology application and lower costs, making it easier to meet the practical needs of security education. On the other hand, advocating for and prompting a shift in educators' mindset is crucial in helping individuals better accept and utilize new technologies, further exploring the feasibility of diversifying teaching content and methods.

3.2 Data Security and Privacy Protection

Currently, artificial intelligence has brought new challenges to humanity in aspects such as privacy, security, and ethics, which are worth deep consideration and research[2]. Nowadays, with the widespread application of big data technology, cloud computing, and other technologies, students' personal information and learning behavioral data are extensively collected and stored. These data hold significant value for training algorithms and improving teaching efficiency, but they also pose risks of information leakage.

To better achieve data security and privacy protection, measures can be taken in several areas. Firstly, it is essential to establish a sound data security management system. Processes of data collection, storage, usage, and sharing can be standardized, corresponding data security protection measures can be implemented, strict data security management regulations can be formulated, relevant parties' responsibilities can be constrained, and the legality and compliance of their data can be ensured. Secondly, enhancing data encryption and storage protection measures is crucial. We can utilize advanced encryption technologies to encrypt important data for secure transmission and storage. Additionally, an organization can enhance its data security by implementing a robust

storage management mechanism, which includes regular data backups and backup recovery testing to ensure data can be restored in case of loss. Lastly, an organization can enhance data security by establishing monitoring and auditing mechanisms for data usage. This can be achieved by setting up comprehensive data access permissions, strictly controlling workflows, and regularly auditing and monitoring data users to prevent illegal dissemination and usage of collected data.[3]

Furthermore, to ensure the effectiveness of the above measures, it is vital to enhance students' awareness of data security and privacy protection. Schools can provide targeted education and guidance on data security and privacy protection through curriculum teaching and student organization activities, helping students understand the importance of consciously protecting their information data.

3.3 The Role Transformation and Training of Teachers

As artificial intelligence technology continues to integrate into the field of security education, the status and competency of teachers will undergo significant changes. Teachers will not only be "mentors" but also "learning partners" and "supporters". They must possess higher subject knowledge and technical capabilities and embrace the educational philosophy of "self-improvement" and "lifelong learning".

In this regard, teachers should have a diversified knowledge structure. Firstly, they should understand relevant knowledge, concepts, and methods related to cybersecurity. Secondly, teachers need to have a certain foundation in the application of artificial intelligence technology. Additionally, teachers should also have some data analysis skills. Artificial intelligence technology can be applied to teaching optimization, learning assessment, personalized learning services, etc. In their teaching practice, teachers need to better utilize various data and information.

To enhance teachers' awareness of "learning while progressing and teaching afterwards", it is necessary to promote teacher training and guidance. Educational institutions and schools can regularly organize various types of teacher workshops, inviting industry professionals and technical experts to conduct special lectures for teachers and students on new concepts, applications, and trends in "artificial intelligence". Through case analysis, hands-on practice, and other methods, teachers can deeply understand the clever integration of artificial intelligence with security education activities throughout the teaching process.[4]

In addition to organizing professional learning, schools can encourage teachers to actively engage in practical research on the integration of artificial intelligence and security education. Schools can organize related projects, topics, or teacher-initiated applications to cultivate teachers' concepts of developing integrated courses on artificial intelligence and security education. Through practice, teachers can better understand and grasp the unique value of artificial intelligence in security education and continuously summarize experiences and explore methods in practice. Through research, teachers will gradually build academic viewpoints and achievements on the existing issues in the integration development of artificial intelligence and security education.[5]

4. Conclusion

In the process of integrating artificial intelligence with security education, the technical advantages and development potential of artificial intelligence are fully demonstrated. Through artificial intelligence technologies such as deep learning and natural language processing, security education courseware tailored to learners' individual learning situations can be provided reasonably and efficiently. These technologies can also enrich the forms and content of courses, better meeting students' needs for course formats. Additionally, incorporating technologies like virtual reality and augmented reality in the development of security education courses allows students to learn in more

realistic environments, gaining knowledge of security technologies that are closer to reality.

The integration of artificial intelligence into security education holds great promise, with its value and advantages benefiting a wide range of areas. This integration will greatly assist in promoting innovative development in security education courses. To enhance educational services, optimize educational approaches, deepen teaching evaluation and feedback reforms, further advancement in the integration of artificial intelligence and security education is required. However, attention must also be paid to the coordinated development of educational technologies, strengthening privacy management in data security, contemplating the challenges and strategies related to the role of teachers in the era of artificial intelligence, in order to achieve the sustainable development of artificial intelligence combined with security education.

References

[1] Yang Lujing, Hao Baoquan. Exploration on Strengthening National Security Education in Ideological and Political Courses in Universities. China Higher Education, 2023, (Z3): 55-58.

[2] Wang Lan. A Study on Strengthening Teacher Training in Artificial Intelligence Ethics and Security Education. China Modern Educational Equipment, 2022, (12): 1-3.

[3] Li Jianlong. Remaking Relationships: The Reconstruction of the "Technology-Humanities" Relationship in the Modernization Process of Chinese Higher Education [J]. China Distance Education, 2024, (12): 50-62.

[4] Shi Li, Han Lingling, Zhang Lele. The Current Situation and Countermeasures of Artificial Intelligence Empowering Ideological and Political Education in Higher Education Institutions [J]. Western Quality Education, 2024, (23): 49-53.

[5] Chen Shuwei. Real Challenges and Path Choices for the Development of Vocational College Teachers' Teaching in the Era of Artificial Intelligence [J]. Vocational and Technical Education, 2024, (35): 56-60.