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Implementation of artificial intelligence in the system for detecting academic dishonesty in Ukrainian secondary and higher education institutions

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ABSTRACT

Artificial intelligence (AI) systems in education and science require special attention due to the rapid development of digitalization. The article aims to determine the effectiveness of modern AI systems based on a comparative analysis of AI methods and to develop scientifically sound prospects for their widespread implementation in Ukrainian education. The author applied the PRISMA scientific approach to achieve the proposed goal, which allowed the selection of the necessary scientific sources (50) and their systematization for further analysis. The results show that natural language processing, latent semantic analysis, word embeddings, stylometry analysis, text analysis and separation, graph methods, and data integrity checks are used to check for dishonesty. These methods are also used to determine the authorship of a text, identify suspicious moments in texts, and detect plagiarism and borrowings. Other modern programs allow you to identify the facts of academic dishonesty and plagiarism, even when the text is paraphrased. The main problem is the possibility of circumventing the main algorithms by changing the structure of the text or generating false positive results. For the modern educational system of Ukraine, it is proposed that a high-quality, clear state strategy be formed, teachers' digital literacy be developed, AI tools be introduced into teaching and teacher training methods, and teachers be trained to use platforms for automated assessment and personalization of learning. The conclusions indicate that this issue will require further updating due to the development of technology.

Keywords: Education, Science, Plagiarism, Artificial Intelligence, Integrity, Research Activities, Students

1. Introduction

As a result of the rapid development of artificial intelligence (AI) technologies, various spheres of human activity, including education, have changed significantly. In Ukrainian secondary and higher education institutions, the problem of academic dishonesty is a significant challenge. On the other hand, academic integrity – a set of ethical principles and rules defined by the Law of Ukraine "On Higher Education", this Law and other laws of Ukraine, which should guide participants in the educational process during learning, teaching and conducting scientific (creative) activities to ensure confidence in learning outcomes and/or scientific (creative) achievements [1].

Adherence to these principles requires commitment and dedication from the educational institution. Traditional methods of combating academic dishonesty are often not effective enough, which requires the introduction of new technological approaches. For this reason, it is essential to use AI technologies to detect plagiarism, cheating, additional third-party assistance, etc. [2]. Thus, using AI in academic dishonesty detection systems opens up new opportunities to ensure transparency in higher education institutions, which determines the relevance of studying this issue.

However, the involvement of AI technologies in detecting academic dishonesty in education also causes discussions among researchers. In particular, some scholars point out that machine learning algorithms and detailed text analysis make it possible to detect plagiarism or cheating clearly [3]. However, other scholars emphasize the risk of inaccuracy of such systems, which leads to false conclusions [4]. In addition, there are ethical problems. The risk of over-automation may affect the bias of the data obtained and the lack of confidentiality [5]. Thus, additional research is required to identify all the opportunities and challenges of using AI. It is also essential to conduct a detailed, systematic review of existing mechanisms for identifying dishonesty and determining their effectiveness through comparative analysis.

The research problem identifies the main opportunities for using AI technologies and the challenges of using AI to detect academic dishonesty in Ukrainian educational institutions [6]. At the same time, the primary focus of this work is to analyze AI technologies, identify key programs for detecting plagiarism and dishonesty, and assess their reliability. In addition, the study aims to present the primary AI methods used to combat academic dishonesty. This study aims to determine the effectiveness of modern AI systems based on a comparative analysis of AI methods and to develop scientifically based prospects for their widespread implementation in Ukrainian education. Therefore, the main research questions for this systematic review are as follows.

1. What thematic clusters of AI analysis and academic integrity are present in the scientific discourse?

2. What AI methods are used to detect academic dishonesty?

3. How effective are the existing programs?

4. What are the challenges and prospects of AI technology implementation in Ukraine?

Academic dishonesty is currently among the biggest challenges in the development of modern educational processes. Artificial intelligence's emergence and active evolution have created additional opportunities for further detection and counteracting such violations. First, researchers identify such challenges as plagiarism, deliberate or accidental data fabrication, forgery, or special templating of research results to fit pre-established conclusions, etc.

The importance of such a literature review is to demonstrate the most relevant research versions of defining the role and systems of AI in ensuring academic integrity, studying modern digital tools and technologies, and potentially assessing the effectiveness of such tools in the future. The study of the impact of artificial intelligence on the detection of academic dishonesty has its own history and main vectors of development [7]. L. Gribble and J. Wardrop have drawn attention to different interpretations of the definition of academic dishonesty as a term used in legal documents [8]. As a result, different ideas are formed about the impact of digitalization on this process.

It is also worth noting that Z. Khan has traced essential changes related to the impact of digitalization on the educational and scientific processes [9]. The global impact of digitalization on education is expressed in quick access to the necessary information, which is associated with the significant digitization of information [10]. At the same time, this phenomenon has a reverse process: access to information does not force students to study, but less motivated ones can cheat and compile their research from different sources [11]. The consideration of individual cases of academic dishonesty has repeatedly reinforced the emphasis on this danger.

R. A. Rahman et al. have emphasised the importance of using specific AI tools and technologies, including monitoring compliance with academic integrity standards [12]. A. Rajput et al. actively emphasize that using AI systems to detect violations of academic integrity is quite effective [13]. S. K. Ramamoorthy et al. have studied individual cases related to the use of various plagiarism checking systems (Turnitin, Grammarly, Unicheck software), active use of natural language processing (NLP) algorithms, or machine learning technologies (to determine their effectiveness) [14]. Studies have demonstrated in some detail that such systems have all the necessary capabilities to identify paraphrased text, detect hidden forms of plagiarism, and counteract the generation of texts using AI (e.g., ChatGPT).

An equally important area of research is attempts to use AI systems to search for and detect information fabrication and falsification of scientific results [15]. For example, big data technologies allow for the rapid analysis of large amounts of information, and established anomaly detection algorithms designed to identify atypical or fabricated data in scientific research have quickly opened up opportunities for finding scientific

misconduct. V. Shabunina et al. have also discussed the possibilities of identifying the advantages and disadvantages of using AI systems [16].

For example, one of the most significant advantages of AI is the speed of processing large amounts of digital data, the ability to accurately detect violations, and ensure direct objectivity in the analysis (since, without special intervention in the program code, the operation of digital systems is entirely objective).

However, M. Sozon et al. have also suggested considering certain limitations in using AI [17]. For example, such digital systems can generate false positive conclusions during plagiarism checks because they cannot recognize some complex cases of paraphrasing or compilation from multiple sources. In addition, the proper use of AI capabilities requires acquiring appropriate digital competencies and education and training for staff to interpret the results adequately.

Scientists have also focused on identifying prospects and further areas of research on this issue [18]. J. Van Der Laan actively discussed the need for further improvement of AI algorithms, including the need to increase the effectiveness of their use to counteract academic dishonesty [19]. A. Zasluzhena, in deep learning and neural networks, suggests using digital capabilities to improve the ability to recognize contexts and writing styles in individual texts, significantly complicating the possibilities for falsifying results [20].

Another critical area of work is the transition to integrated systems that combine various methods to detect academic misconduct. Therefore, researchers generally consider artificial intelligence an essential tool for overcoming academic dishonesty. Researchers proposed effective and innovative solutions to detect various types of violations.

2. Research method

2.1. Research design

This study is based on a systematic review of various scientific materials: articles, monographs, book chapters, conference proceedings, and policy briefs. This type of research was chosen because it allows for a critical assessment of the implementation of AI in detecting academic dishonesty. In addition, this type of research allowed us to summarize the prominent opinions of scholars on the use of AI in education. The systematic review also allowed for collecting the most relevant data from peer-reviewed journals. This makes the research more reliable and valid.

2.2. Materials and sample

All materials were collected based on purposeful criterion sampling. The study includes various scientific materials: scientific articles, chapters from collective materials, policy briefs, and conference proceedings. The criteria for including these scientific materials were related to the coverage of the use of AI to detect plagiarism, exam cheating, automated assessment, etc. The research involved scientific sources from different regions, but the emphasis was placed on including articles that dealt with the realities of EU countries or Ukraine. The primary language of publications is English. However, Ukrainian-language sources are included if an English-language summary is available. Table 1 shows the primary inclusion criteria.

Table 1. Criteria for including scientific sources

Criteria	Name	Description
C.1.	Type of sources	Different types of sources: monographs, scientific articles, conference materials
C.2.	Peer reviewed	Peer-reviewed articles. Articles should be published in reputable journals
C.3.	Time range	From 2018 to 2025
C.4.	Geographical range	The geographical range is broad, but the focus is on including materials from the EU and Ukraine
C.5.	Language of writing	Primary language: English.
C.6.	Thematic relevance	Describing the peculiarities of using AI in education to detect dishonesty

Source: Author's development.

At the same time, the exclusion criteria concerned thematic inconsistency; in particular, those publications that described general problems of academic integrity development without considering AI's capabilities were rejected. In addition, uncritical reviews and unverified preprints were not eligible for inclusion

Publications written before 2018 were also not considered. Table 2 describes the main exclusion criteria.

Table 2. Exclusion criteria

Criteria	Name	Description
C.1.	Source type	Non-critical reviews and preprints are not included
C.2.	Incomplete texts	Limited access to full papers
C.3.	Time range	Publications before 2018 were excluded.
C.4.	Description of outdated technologies	Publications describing only traditional methods of verifying academic integrity were excluded
C.5.	Language of writing	Publications written in languages other than English and Ukrainian were rejected
C.6.	Thematic relevance	Papers that described only general problems of academic integrity without considering the technological aspect

Source: Author's development.

2.3. Instruments and procedure

The PRISMA methodological approach was chosen for this systematic review, allowing for a qualitative selection of scientific literature and its verification and screening. The PRISMA method was also chosen because it allowed for including comprehensive sources based on a criterion-based selection, thus ensuring data transparency. First, the central scientometric databases were selected for analysis: Scopus, Open Alex, and Google Scholar.

The following keywords were included in the search queries of these databases: "artificial intelligence", "academic dishonesty", "plagiarism", "cheating", "opportunities", "risks", "EU countries", "Ukraine", and "advantages and disadvantages of using AI". 4368 results were found in total. At the initial stage of the screening, all duplicates and articles that lacked scientific novelty were rejected (1574). This resulted in 2794 items. First, the title and keywords were checked, and all papers that did not correspond to the chosen topic were rejected (-891). This resulted in 1903 positions.

Next, the publication's content, abstract, and main results were checked. All articles that did not correspond to the content had no scientific novelty or theoretical significance and were rejected. A total of 1114 items were not included. At the last stage of the screening, 789 publications were received, to which the previously created inclusion and exclusion criteria were applied. In total, there were six criteria related to the type of source, peer review, period (2018-2025), geographical range (mainly EU countries and Ukraine), language (mainly English), and thematic and content relevance. Figure 1 clearly shows collecting, screening, and rejecting scientific materials.

2.4. Data analysis

Thematic analysis was used to analyze the data. The software used for this purpose is Google Sheets. It was used because this tool has a user-friendly interface for systematizing data and building tables. In particular, the data was systematized by the following parameters: author, year of publication, main tools for detecting dishonesty, advantages, and disadvantages.

This made it possible to summarize the work of other authors and formulate clear ideas about the possibilities of using AI to detect malpractice in the education system. The study also used Vos Viewer software to create visual graphs demonstrating AI research dynamics in education.

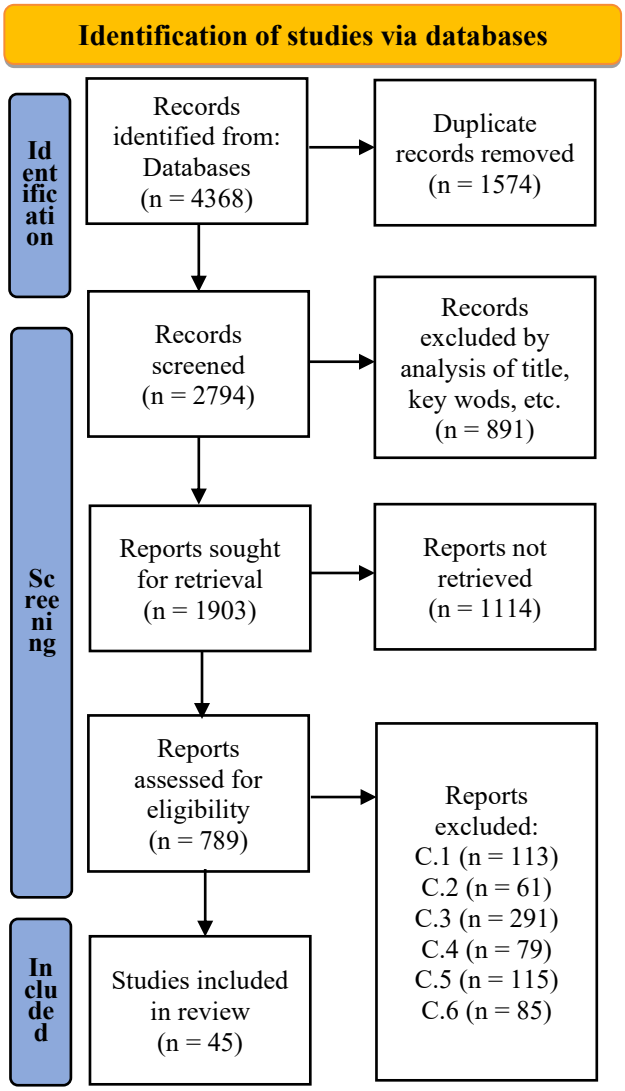

Figure 1. The process of data collection

Source: Author's development.

3. Results and discussion

3.1. Results

In the modern scientific and educational space, academic integrity is an essential moral and ethical principle that serves as a guideline for improving the quality of education. As a rule, this is because participants in the educational process become more open to new values and the latest social standards [21].

Academic integrity corresponds to the basic ethical standards of behavior created in the modern scientific community, including researchers, teachers and students. Therefore, academic integrity plays a key role in maintaining trust between all members of the educational process [22]. For this reason, each participant in the educational process should contribute to developing an environment of integrity in Ukraine's scientific and educational sectors.

The current legislation of Ukraine has formed clear principles of academic integrity and identified the main violations of academic integrity [1], in particular: 1. Falsification of scientific results; 2. Academic plagiarism, self-plagiarism; 3. Cheating; 4. Writing off; 5. Briber; 6. Biased assessment.

In the modern scientific discourse, the number of scientific papers on this issue has increased significantly in recent years. Analyzing the OpenAlex platform data from publications for 2018-2025, 4 clusters were obtained.

The first cluster concerned academic integrity and ethics in education (15 terms, mainly focusing on fraud, legal aspects, honesty and psychology).

The second cluster concerned AI and technology in education. Key concepts included cognitive environment, computer science, AI knowledge, and programming. Thus, all terms were related to the technological aspect.

The third socio-pedagogical cluster included pedagogy, social studies and sociology. This cluster is less represented in the scientific discourse on AI and academic integrity.

The last cluster was the contextual and interdisciplinary cluster, which indicated research in a general direction [23].

Figure 2 shows the leading 4 clusters and their directions in the current scientific discourse. These clusters indicate the most popular topics of AI research in the educational system.

Considering cluster 1, which is the most popular, academic integrity includes up to 15 keywords related to academic integrity, academic dishonesty, academic law, etc.

These concepts form the basis for studying academic integrity and indicate violations of the basic rules: plagiarism and cheating. They define the basic principles of honesty in education.

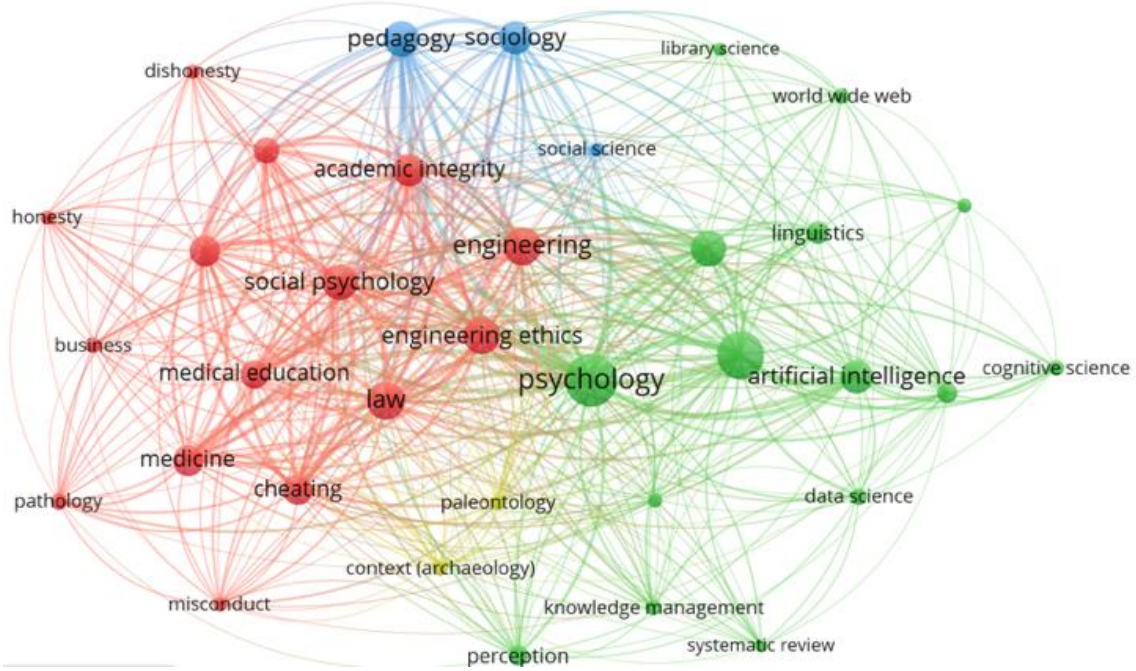

Figure 2. The main clusters of study of AI and academic dishonesty in modern scientific works

Source: Author's development.

Figure 3 shows these connections in detail. Thus, modern works need a detailed understanding of academic integrity. They also indicate the responsibility for violations of academic integrity for all participants in the educational process.

However, despite this, traditional methods are not always effective in modern digital education. For this reason, it is essential to use AI to detect plagiarism and cheating [24]. AI methods are widely used to detect dishonesty and analyze texts, images, codes, and other scientific materials. The key methods include Natural Language Processing (NLP) (which involves analyzing text similarity using semantic and syntactic comparison).

Latent Semantic Analysis (LSA) can recognize paraphrased plagiarism [25]. Stylometry Analysis allows for the analysis of the writing style to identify authorship. In addition, AI technologies can classify text into original and fake documents [26]. GPT-based detection allows for the recognition of generated texts based on GPT chat.

AI technologies also allow for the detection of facilitation and data fabrication [27]. At the same time, programs based on clone detection can effectively find duplications between students or research papers.

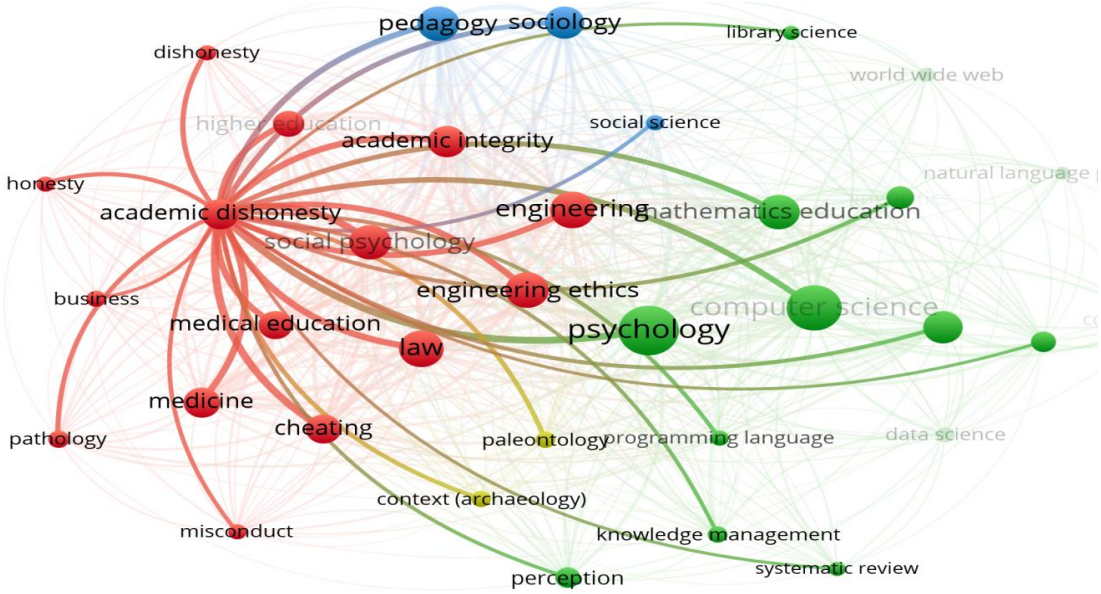

Figure 3. Main academic areas related to academic dishonesty

Source: Author's development.

Table 3 shows the primary AI methods that help fight academic dishonesty in secondary and higher education.

Table 3. Primary AI methods that influence the detection of academic dishonesty in secondary and higher education

AI methods	Possibilities	Authors
Natural language processing (Best suited for use in schools)	Identifies textual authorship and plagiarism Writing style analysis	[10], [6], [21], [19], [23], [25], [28]
Latent Semantic Analysis (LSA) Word Embeddings (Best suited for use in schools)	Allows detecting semantic plagiarism, verifying authorship, and identifying AI-generated texts	[8], [11], [23], [25], [27], [29], [30], [33]
Stylometry Analysis (Best suited for use in universities)	Determination of writing style, identification of authorship changes	[23], [25], [33], [37]
Text analysis and separation (SVM, Random Forest, XGBoost) (Best suited for use in schools)	Detecting suspicious moments in texts, detecting plagiarism, and borrowings	[25], [31], [35], [38], [42]
Graph methods (Graph Neural Networks) (Best suited for use in universities)	Analyzing writing style, establishing connections between authors	[12], [36], [37], [38], [41]
Data Integrity Checks (Best suited for use in universities)	Image verification, detection of altered images, and borrowings	[27], [39], [41], [42]

Source: Author's development.

Turnitin and Grammarly allow for text checking and detecting plagiarism and borrowings from AI. At the same time, GPTZero, OpenAI Text Classifier, and AI Content Detector allow for semantic plagiarism analysis and authorship verification; JStylo and Writeprint affect the analysis of the author's style and identify clear borrowings. Neo4j, NetworkX, and SciPy Graph allow connections between authors to be made and abnormal borrowings to be identified. ImageMagick, Forensically, and FotoForensics allow the identification of borrowings in generated images and the detection of fake graphs and images [28], [43].

R, Python (Pandas, NumPy), and SPSS allow for the establishment of the reliability of data and the falsification of sources [29]. However, the scientific literature indicates that these platforms are not always

practical. In particular, there is a problem that they do not always effectively identify borrowing or plagiarism when the text is paraphrased in structure. There is also the problem of false positives [30]. This happens when the system incorrectly labels a text as plagiarized. In these situations, you should use different checking programs. Table 4 summarizes the main advantages and disadvantages of modern plagiarism detection software.

Table 3. Primary AI methods that influence the detection of academic dishonesty in secondary and higher education

Name	Opportunities	Disadvantages
Turnitin, Unicheck, Grammarly, Copyscape	Detection of text plagiarism High matching accuracy	Less effective at detecting synonymous substitutions or paraphrasing
GPTZero, OpenAI Text Classifier, AI Content Detector	Identify texts generated by chats	Not always able to detect borrowing effectively AI models constantly evolve, so not all applications can effectively recognize AI
JStylo, Writeprint, Authorship Attribution	Qualitatively recognize the author's style	The analysis requires a large number of texts
PCA, PyOD, Forensically, FotoForensics	Enable detection of fake images	Disguised fakes are difficult to detect in these applications

Source: Author’s development.

Thus, given the broad capabilities of AI programs to detect academic integrity, they should be implemented in the Ukrainian secondary and higher education system. However, several challenges should be considered when implementing AI technologies in Ukrainian education. First, there is the problem of insufficient digital infrastructure. Many schools cannot implement the latest technological solutions. In addition, there is a lack of funding to purchase AI software. On the other hand, there is a challenge to teachers' low digital competence. Many teachers do not have sufficient digital competence to work with AI tools [31]. The lack of mandatory digital education courses for teachers also seems to be a significant problem in the pedagogical space. From a legal point of view, the lack of a unified educational strategy for AI remains a significant obstacle to the widespread use of AI in the education system [32]. In addition, there is no clearly defined state program for introducing AI in educational institutions [33]. Thus, introducing AI into Ukrainian education to support academic integrity is a complex process that requires additional support from the state. For widespread use in Ukrainian educational institutions, a clear state strategy should be developed that would define the following areas:

1. Main priorities and goals of using AI;

2. Areas of funding for AI-based programs;

3. Basic rules for regulating academic integrity in AI tools;

4. Ethical standards of AI application.

In addition, it is also worth considering that many Ukrainian teachers do not have sufficient digital literacy to use AI-based platforms [34]. For this purpose, it is proposed that special courses for teachers' professional development be developed, and AI tools should be introduced into teaching methods [35]. Special attention should also be paid to training in using platforms for automated assessment and personalized learning. These areas will influence the broader use of AI in the education system, including the qualitative detection of academic dishonesty.

3.2. Discussion

The study's main problem was characterizing the main possibilities of using AI technologies and identifying the challenges of using AI to detect academic dishonesty in Ukrainian educational institutions. This systematic review demonstrated modern scholars' interest in using AI for education from 2018 to 2025. The area of academic integrity included coverage of problems with plagiarism, cheating, and text fraud. By analyzing

publications from the OpenAlex platform, the academic integrity cluster combined up to 15 keywords related to academic integrity, academic dishonesty, academic law, integrity, social responsibility, technology, psychology of dishonesty, etc. The defined concepts form the basis for studying academic integrity and indicate violations of the basic rules: plagiarism and fraud. They also define the basic principles of honesty in education. Similar violations have also been identified in other scientific works. The next task was identifying the primary AI-based methods used to expose dishonesty in modern education. Thus, it was determined that natural language processing, latent semantic analysis, word embeddings, stylometry analysis, text analysis and separation, graph methods, and data integrity checks are used to check for dishonesty.

In particular, they are essential for determining the authorship of a text, identifying suspicious moments in texts, and detecting plagiarism and borrowings. Other researchers have also pointed out the possibilities of AI [18], [27], [36]. Other studies have also pointed to the active use of AI technologies to detect academic dishonesty [37]. In particular, studies have shown that the active use of AI algorithms can detect plagiarism and automatically generated materials [38], [41]. The following research question concerned the effectiveness of existing programs. It was found that these systems, although they have extensive capabilities for detecting plagiarism, borrowing and fraud, have several drawbacks. The main drawback is that modern verification resources are expensive for educational institutions, and free versions are ineffective.

The study draws attention to the importance of using such software as Turnitin, Unicheck, Grammarly, Copyscape, GPTZero, OpenAI Text Classifier, and AI Content Detector to detect plagiarism and borrowing, GPTZero, OpenAI Text Classifier, and AI Content Detector to identify text written with AI. Other scholars have also mentioned these platforms, particularly in the studies of B. Jagish et al., who pointed out the importance of using Turnitin and Grammarly, which are reliable for analyzing student work because they support most educational platforms [33]. This was also emphasized by P. Baron, who described in detail the work with Turnitin to detect plagiarism [23]. Phuangsuwan et al. also highlighted the importance of using tools such as Grammarly and Copyscape to detect plagiarism and check grammar [39]. Other authors also drew attention to the use of GPTZero, OpenAI Text Classifier and other systems to check the text generated by a bot. K. Schaaff et al. pointed out the importance of using these platforms and identified the main differences between bot-generated and human-generated texts [40]. In addition, Iqbal et al. recognized the importance of JStylo and Writeprin in verifying the authorship of publications, which also correlates with this study, which describes the potential of these programs in more detail [42]. Hence, the artificial intelligence technologies play a vital role in ensuring academic integrity. They are particularly effective in authorship verification, identifying suspicious textual patterns, and detecting plagiarism and content borrowing.

Several studies have highlighted the potential of AI in this domain [18], [27], [36], with more recent research emphasizing AI's role in detecting academic dishonesty [37], including plagiarism and AI-generated content [38], [41]. In order to evaluate the effectiveness of these technologies, this study examined various existing tools and their practical applications. Although these systems offer extensive capabilities such as plagiarism detection and authorship verification, they also face significant limitations, including the high cost for educational institutions and the limited functionality of the free versions. To facilitate the comparison of these tools, Table 4 provides an overview of widely used AI-based platforms.

Table 4. Comparison of modern AI methods (strengths/weaknesses)

Platform	Function	Strengths	Weaknesses	Main Studies
Turnitin	Plagiarism detection	Widely used, integrates with LMSs	Expensive licensing	[23], [33], [38]
Grammarly	Grammar check, limited plagiarism	Real-time feedback, user-friendly	Limited academic database	[33], [39]
Copyscape	Web plagiarism detection	Strong online text comparison	Not focused on academic sources	[18], [39]
GPTZero, OpenAI Classifier, AI Content Detector	AI-generated text detection	Useful in distinguishing human vs. AI content	Accuracy varies with newer models	[13], [18], [39], [40], [42]
JStylo, Writeprints	Authorship attribution	Linguistic profiling, stylometric analysis	Requires large text samples	[38], [41], [42]

Source: Author's development.

The last task was to identify the main challenges of using AI to detect dishonesty in the Ukrainian secondary and higher education system and identify the main promising areas for the broader use of AI in Ukraine. It was found that the main problems relate to insufficient funding, the need for additional competence of teachers, low digital literacy of teachers in using AI programs, and the lack of adequate legal regulation of AI in education. Other scholars also focus on these issues [42], [44]. However, other authors have drawn attention to several challenges not disclosed in this study [45], [46].

In particular, some authors pointed to the problem of ethical issues. The active use of AI may raise concerns about privacy and trust between students and teachers [23], [47]. In addition, other authors have acknowledged that the constant development of AI makes it challenging to develop detectors that can effectively detect new forms of fraud [48]. However, despite these issues, the authors still recognize the effectiveness of these systems in combating plagiarism, academic fraud, attribution, etc.

The study also acknowledges that promising areas for introducing AI into Ukraine's educational system [49] include precise legal regulation, clear standards for using AI in education, and additional support for teachers using AI-based platforms. In general, the problem of legal regulation of AI in education is standard, as other scholars from other countries have also drawn attention to it [50].

The problem of developing digital literacy among teachers remains the same [51]. Therefore, the theoretical value of this work is to identify the main possibilities of using AI-based programs to check academic integrity. At the same time, the practical value of the study is to develop further recommendations for implementing AI in the Ukrainian education system.

3.3. Limitations of study

However, this study also has certain limitations. Firstly, the analysis includes only English-language works with a small percentage of Ukrainian-language works. However, foreign language studies are entirely ignored. In addition, the narrow date range, from 2018 to 2025, made it difficult to trace the historical development of AI in Ukrainian education [52].

A notable limitation is also that the paper does not address the possibilities of using AI tools in different educational environments, in particular, in urban and rural schools, or in institutions with different levels of technical support. This affects the risk of generalizing the conclusions. In addition, there are also technical limitations of the AI tools used. In particular, some of them have a high rate of false positives – that is, they classify human texts as AI-generated or, conversely, do not detect generated text. This is especially true for new models that are constantly adapting to detection methods.

In addition, in modern practice, users use evasion tactics that allow them to bypass verification systems. Such actions reduce the effectiveness of even the most advanced algorithms. Finally, the human factor should be considered. The interpretation of verification results remains subjective and depends on the level of training of the teacher, his awareness of AI tools, and general digital experience. Combined with the lack of clear regulations on the use of AI in Ukrainian education, this creates additional barriers to the effective implementation of technologies.

4. Conclusions

Thus, this study has shown that in 2018-2024, in the field of academic integrity and ethics in education, the authors focused on academic integration, academic dishonesty, academic law, integrity, social responsibility, technology, psychology of dishonesty, and fraud. Given the development of modern technologies, traditional methods of detecting dishonesty in education are not always effective, hence the need to use AI.

The study indicates that natural language processing, latent semantic analysis, word embeddings, stylometry analysis, text analysis and separation, graph methods, and data integrity checks are used to check for dishonesty. These methods are also used to determine the authorship of a text, identify suspicious moments in texts, and detect plagiarism and borrowings.

Modern plagiarism detection software is generally adequate. They work well in academic environments and detect plagiarism even when the text is paraphrased. However, the main gaps include the possibility of circumventing the basic algorithms by changing the structure of the text and the problem of false positives.

4.1. Recommendations

The current educational system in Ukraine faces significant challenges to the widespread use of AI, and these challenges require a response from the government. These challenges include underfunding educational institutions using AI systems and asking the right questions. To overcome these challenges, the study suggests the following steps:

1. Developing a high-quality, clear state strategy that would define the scope of AI use, its educational goals, and key ethical issues.

2. Developing teachers' digital literacy by developing special teacher training courses.

3. Implementation of AI tools in teaching and training methods.

4. Detailed training of teachers in the use of platforms for automated assessment and personalization of learning.

4.2. Future work

The difficulties to trace the historical development of AI in Ukrainian education remain relevant for future research. In particular, the following studies will describe the historical development of AI in educational institutions worldwide and involve scientific materials written in different languages. Also, future research will be viewed through the prism of further technological development [53], which can significantly improve the situation by effectively detecting academic dishonesty. This will help ensure fairness and transparency in the scientific and educational processes.

Declaration of competing interest

The authors declare that they have no any known financial or non-financial competing interests in any material discussed in this paper.

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Author contribution

The contribution to the paper is as follows: O. Hryn, A. Shevel: study conception and design; N. Shcherbyna: data collection; O. Kubrak, K. Zadorozhnyi: analysis and interpretation of results; K. Zadorozhnyi: draft preparation. All authors approved the final version of the manuscript.

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