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MODERN APPROACHES TO THE ASSESSMENT OF ACADEMIC ACHIEVEMENTS IN HIGHER EDUCATION INSTITUTIONS: A SYSTEMATIC REVIEW OF THE LITERATURE

Abstract: The impact of global trends in the world educational space related to digitalization actualized the issues of improving approaches to teaching and assessing the academic achievements of future specialists. The pedagogical design of academic achievements' assessment is comprehensive and requires a systematic review of research to identify effective practices. The purpose of this study is to conduct a systematic literature review to identify strategies and methodologies for assessing academic achievements in teaching and learning in higher education between 2004 and 2024.

The study was conducted in accordance with PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) recommendations. A systematic literature review was conducted to identify, evaluate, interpret and analyze available research on learning assessment practices. The analysis focused on the research question and identified topics related to the approach to the assessment of academic achievements.

The analysis identified two key themes: the assessment of academic achievements in digital and traditional environments. In the context of each environment, appropriate assessment strategies and methodologies are applied. These results provide an idea of effective practices for assessing academic achievements in universities. The results of this study have important implications for educators and curriculum designers. The study highlights the importance of considering new approaches to assessing academic achievements, taking into account the current features of education systems. Using these findings, educators and curriculum designers can improve the quality of assessment of academic achievements in teaching and learning.

Keywords: Academic achievement, systematic literature review, evaluation, assessment, higher education.

Introduction

The appearance and evolution of technology had led to many changes in education, particularly the way of teaching, learning, and evaluating. At present, many educational technologies that have proven themselves for decades are losing their relevance. The reason is the gap between educational technology and the lifestyle of students (Bile, 2022). Today, traditional technologies and methods are perceived by students as boring, outdated, and irrelevant (Dennen et al., 2020).

In addition, traditional educational technologies no longer provide significant learning outcomes because students are increasingly living and interacting online (Cladis, 2020). Since testing and giving feedback can be implemented in a digital learning environment very effectively compared to traditional methods of assessing education (Morgan, 1979), it is not surprising that many researchers and educators are using computers, mobile devices and the Internet as a medium for testing and providing feedback.

In the context of changes in educational technology, innovative approaches to assessing

academic achievements are needed to more effectively motivate and engage students in the learning process.

This paper examines the components necessary for effective assessment of academic achievements as a pedagogical approach in digital and traditional environments. The main purpose of the study is to provide a concept of academic achievements and strategies for their evaluation. Exploring key aspects of the assessment process, considering methodologies and strategies, and the application of modern approaches, this article shows how assessment of academic achievements can be implemented in an educational context to improve learning outcomes.

This review is intended for researchers interested in a deeper understanding of the assessment of academic achievements; representatives of ministries of education involved in the development of curriculum standards; the administration of the university, involved in the process of assessing educational achievements, and, of course, teachers-practitioners who directly implement the assessment procedure to improve the quality of the learning process, which will lead to a more effective and successful education.

Literature review

Assessment in the educational process occupies a key place, not only to confirm the learning outcomes, but also to form feedback between the teacher and students. Assessment in education is defined as a system-forming factor that affects the effectiveness of the entire system.

One of the first researchers to reveal the importance of assessment in the psychological and pedagogical sphere was B.Ananyev. As early as the 1930s, he concluded that without evaluation, educational activities could not be properly organized. At the same time, the quality of assessment of educational and cognitive activities, the result of which is educational achievements, is important. In this study, learning achievements are understood not only as learning outcomes, including skills, and competencies, but also as the results of extracurricular activities (Sergeeva et al., 2013).

Nowadays, academic achievement includes not only a student's academic success but also other skills achieved in the learning process. For example, in Kazakhstan, since 2022, an integral social GPA has been introduced in a pilot mode in some universities. The result of the training will be a symbiosis of academic, research and social GPA - Integral Grade Point Average (IGPA). This measure is aimed at increasing the motivation of students to participate in project, research, sports, social and volunteer activities at the university and, as a result, the development of related competencies.

The IGPA is a comprehensive assessment of a student's academic achievements, calculated as the level of a student's academic achievement and is the sum of the values of the shares of 0.5 of academic achievement, 0.35 of research skills, and 0.15 of the student's social competencies.

The IGPA is calculated using the formula:

$$IGPA = GPA*0,5 + iROS*0,35 + SCI*0,15$$

In this formula, GPA represents the weighted average assessment of the student's level of academic achievements for a certain period (the ratio of the sum of the products of credits by the digital equivalent of the final grade points for all types of academic work to the total number of credits for these types of work for this period of study); iROS (Indicators of Research-Oriented Study) is a set of skills and competencies of a student acquired in the process of research and project activities, measured by indicators and demonstrated by their

average score of research skills; SCI (Social Competition Indicators) is a set of skills and competencies of a student acquired in the process of social activities, measured by indicators and demonstrated by his average score of social competencies.

Social activity develops many competencies and skills, thereby increasing the competitiveness of graduates (Zulpykhar, 2023). At the same time, educational achievements should be assessed by effective methods that keep pace with the processes of transformation and digitalization of educational systems.

In general, the assessment of academic achievement, as an important part of the educational process, has three key functions. First, the assessment provides information about the success of the teacher and students (Burton, 2001). Second, assessment of academic achievement has a stimulating function for students to continue their education (Cole 1993). Thirdly, the analysis of the assessment makes it possible to determine how well the teacher has qualitatively approached (Taras, 2010).

The researchers emphasize that the qualitative assessment process should be carried out on the basis of predetermined criteria available to both the teacher and the student. Also, the quality of the assessment procedure can be increased by students' initial self-assessment of the results of their activities (Khuseinova et al., 2018).

In Kazakhstan, universities use a modular-rating approach to assessing students' academic achievements. The technology of assessment of educational achievements is determined by the requirements of the competency-based approach and represents a complex process of forming an assessment of educational achievements, in which the data obtained during practical classes, testing, practical work, exams, etc., are integrated and presented in a certain scale. It is calculated as the ratio of the sum of the products of credits and the final grade in the discipline (in numerical terms) to the amount of credits for the current period of study.

Table 1
Point-Rating Assessment in Universities of Kazakhstan

Evaluation by letter system	Digital Equivalent	Points (% content)	Evaluation according to the traditional system
A	4,0	95-100	Excellent
A-	3,67	90-94	
B+	3,33	85-89	Good
B	3,0	80-84	
B-	2,67	75-79	
C+	2,33	70-74	
C	2,0	65-69	Satisfactorily
C-	1,67	60-64	
D+	1,33	55-59	
D-	1,0	50-54	
FX	0,5	25-49	Unsatisfactorily
F	0	0-24	

Teachers determine the methods and forms of assessment that they use in the teaching process. Assessment tools are prescribed in the syllabuses of academic disciplines based on learning outcomes and competencies defined in educational programs. Assessment of learning outcomes is based on criteria that determine the success of learning material. Researchers Shevchuk (2018), Zhakiyeva (2022), Primbetova (2011), Iskakov (2018) and others were engaged in assessment issues in Kazakhstani universities.

In addition, the environment in which the assessment process takes place is important. New approaches to learning, associated with the widespread use of digital technologies, require new approaches to assessment. The use of digital tools for assessing educational achievements was researhed by Barringer (2018), Wang (2020), Shumilova (2022), Andriani et al.(2024) and others.

In the traditional environment, the issue of developing methods for assessing the components of educational achievements, in particular, such a complex category as learning outcomes, remains relevant. Authors I.A. Zimnyaya, V.N. Mikhelkevich, I.V. Sibikina, Y.G. Tatur, A.V. Khutorskoy and others developed and studied methods for assessing learning outcomes.

At the same time, the transformation of education, changes in teaching methods, and digitalization require regular study and analysis of the effectiveness of evaluation procedures. The purpose of this systematic literature review was to identify empirical evidence demonstrating what modern approaches are used to assess students' academic achievement. The systematic review was guided by the following research questions:
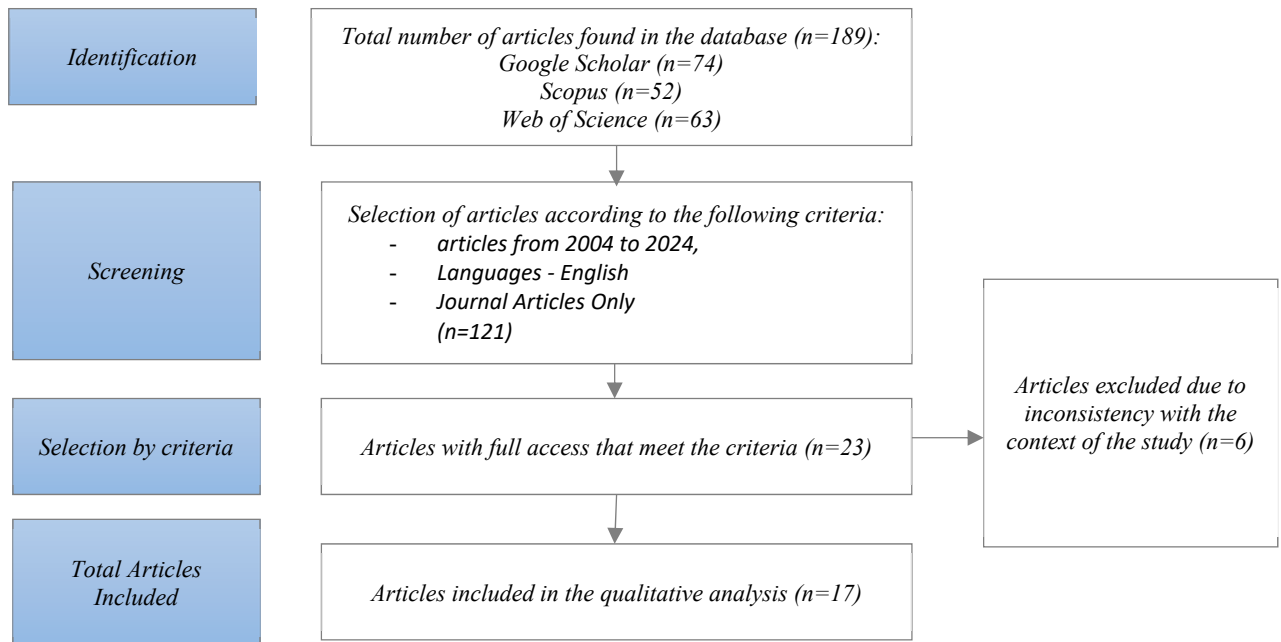
1. What modern approaches are used to assess educational achievements?
2. What methods and strategies for assessing learning outcomes have a positive impact on students' motivation to learn?

Methodology

Systematic Literature Review (SLR) is a method of identifying, evaluating, interpreting, and analyzing existing research findings related to a specific topic, research question, or phenomenon. The purpose of this study is to conduct an SLR to summarize and analyze the literature on modern approaches to the assessment of academic achievements in higher education institutions.

The review was conducted in accordance with the PRISMA guidelines (Moher, 2020), which consist of four stages: identification, screening, selection by criteria, and inclusion of selected articles. The identification phase involves searching for relevant articles by keywords in databases. The screening phase involves the initial selection of articles based on predetermined criteria, and the selection phase consists of a thorough evaluation of the articles to ensure that they fully meet the inclusion criteria. The final stage is the inclusion of the selected material in the study itself, where the selected articles are analyzed. There are a number of advantages to using PRISMA as a guide for conducting SLRs, as its search procedures are systematic, provide a clear understanding of the process, and facilitate the evaluation of sources of information (Mohamed et al., 2020). Figure 1 illustrates the SLR process in this study.

Figure 1
Research Data Retrieval and Selection Process

Identification	Total number of articles found in the database (n=189): Google Scholar (n=74) Scopus (n=52) Web of Science (n=63)	
Screening	Selection of articles according to the following criteria: - articles from 2004 to 2024, - Languages - English - Journal Articles Only (n=121)	
Selection by criteria	Articles with full access that meet the criteria (n=23)	Articles excluded due to inconsistency with the context of the study (n=6)
Total Articles Included	Articles included in the qualitative analysis (n=17)	

The first step in conducting an SLR using PRISMA is the identification process, in which the main keywords are expanded by identifying and listing synonyms to get as many articles as possible from the database. The authors used Google Scholar, Scopus, and Web of Science databases to generate search strings for the keywords "assessment and learning achievements", "assessing and learning achievements" from 2004 to 2024 using the Publish or Perish program by Harzing (2007). As a result, 189 papers were obtained at the first stage: 74 papers in Google Scholar, 52 papers in Scopus, and 63 papers in Web of Science.

The second stage is the selection process, whereby articles found in the database are selected or excluded based on criteria defined by the authors. Eligible articles are referred to as "included articles" and those that do not meet the criteria are removed and referred to as "excluded articles". The inclusion and exclusion criteria are shown in Table 2.

Table 2
Criteria for inclusion and deletion of articles

Criteria	Inclusion	Exception
Types of articles	Journals (scientific articles)	Conference proceedings, book chapters, review articles
Language	English	Other languages
Chronology	From 2004 to 2024	Published before 2004

The next stage of the research process was to determine the type of documents - as a scientific "article" in the database, and the language - English, duplicate articles were excluded. As a result, 121 articles were selected.

The authors then analyzed the distribution of articles by year of publication, subject

area, authors, countries, and university-affiliated authors. Of the 121 articles, 98 were excluded for reasons such as irrelevance to the context of the study (higher education), lack of access to the full text, as well as lack of awareness of the results and comprehensive understanding of the topic in the abstracts.

The selection of articles according to the stated criteria was carried out in the Rayyan program (Ouzzani et al., 2016).

The next step in the SLR process was the selection phase, in which 23 papers were selected. Articles were carefully evaluated by reviewing titles, abstracts, methods, results, and discussions to ensure that they meet the inclusion criteria and meet the current objectives of the study (Figure 2).

The selection of articles for review was carried out in three stages. The first stage included the selection of titles and abstracts, the second stage included the analysis of articles based on established selection criteria and the systematization of the results in a table, and the third stage included reading and summarizing all the results in one document.

Several analyses have been conducted, including sample bibliometric analyses (Thelwall, 2008), categorical meta-trend analyses (Thelwall, 2008; Zhang & Aslan, 2021) and inductive content analysis (Zhang & Aslan, 2021). The authors included only those articles that were relevant to the research questions and excluded those that did not consider the practices of assessing academic achievement.

After excluding the articles that were not applicable to the study of approaches to the assessment of educational achievement, there were 17 articles that were used for analysis in this study.

Results and discussion

As a result of the study, 189 documents were received, and only 17 of them met the inclusion criteria and were analyzed.

As shown in Figure 2, the first relevant scientific article in this review was published in 2009. It can be noted that in recent years there has been a slight increase in interest in this topic (3 articles in 2021 and 2023).

Figure 2
Distribution of articles by year of publication
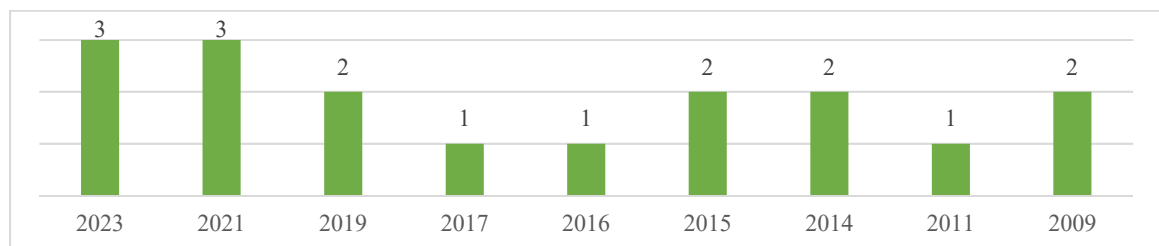
The research was conducted among university students in various fields of study. Some studies included more than one discipline (e.g., J Klein, 2014) or no discipline (e.g., L Zheng et al., 2016). Thus, the number of disciplines in which research was conducted may differ from the total number of selected articles.

Figure 3
*Distribution of articles by field of education*
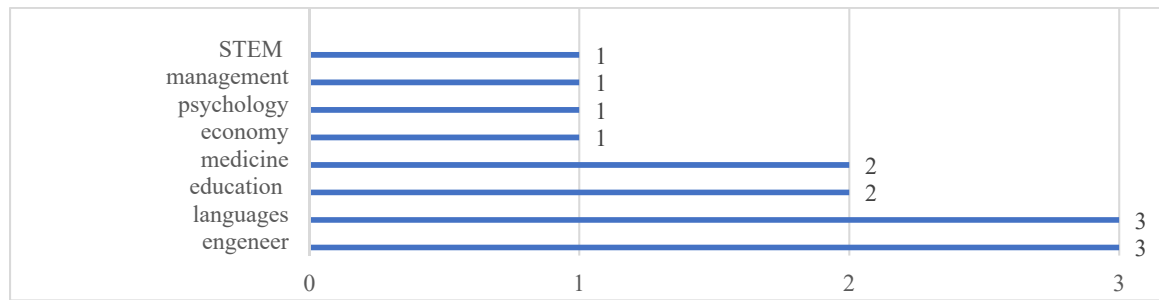
Studies on learning assessment included digital tools and the use of traditional methodologies in digital environments (8) and offline tools (9). Digital tools included the use of mobile apps in assessing student learning; online exams, online presentations, online quizzes, case studies, and report submissions; formative assessment online and with technical support; Using ChatGPT to improve the grading process. Tools such as the Online Self-Assessment Questionnaire (CSAQ), the Test Taking Skills Scale (TTSS), the Student Assessment Fear Scale (SEAS) and the Foreign Language Learning Self-Esteem Scale (FLLSE) were also studied for language learning in an online environment.

Strategies for assessing learning achievement that can be applied in traditional offline environments included in this study included: a flipped classroom learning infographic; mutual evaluation, including two-stage assessment; use of standard grades (Z-score) testing; use of survey tools; self-assessment and re-evaluation of academic performance. Among all the studies, the largest part was taken up by the study of the impact of self-assessment on academic achievement (4 articles) using both classical and digital tools.

The studies included in the review were conducted in the USA (3), China (2), Australia (2), Croatia (2), Cyprus (1), Israel (1), Indonesia (1), United Kingdom (1), Albania (1), Turkey (1), Russia (1), Sri Lanka (1). The sample sizes in the studies varied, and data were mainly collected through experimentation and surveys.

Figure 4
Distribution of articles by research methods
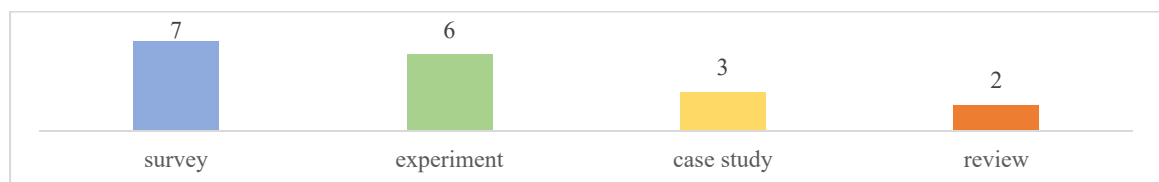
The results of the systematic review showed that the assessment of educational achievements has not lost its relevance in recent decades, in particular through the development and implementation of new approaches and methodologies. The reviewed studies include justification for the effectiveness of the use of assessment in the learning process.

A systematic review of the assessment of learning achievements has identified two main areas that determine the design of the assessment process – the digital environment and the traditional offline environment. In each of these environments, it is possible to explore

approaches to assessing students' learning achievements that will most effectively ensure the quality of learning. The possibilities of assessment today are not only in determining the level of assimilation of educational material and readiness for professional activity. A review of studies found that one of the key components of various assessment procedures is to increase students' motivation to study and complete, which in turn improves the quality of education and the success rate of graduation.

Modern assessment of academic achievement expands the possibilities of digital learning by providing regular interaction and feedback for students and teachers. These studies explore a variety of assessment methodologies, such as mobile apps; use of traditional methods in the online environment (exams, presentations, reports, questionnaires, etc.); rating scales. A relatively new approach that needs to be explored in conjunction with ethical standards is to use the power of ChatGPT to improve the assessment process.

The use of mobile applications in the assessment process has a positive effect on the development of students' cognitive motivation through the use of a variety of learning resources with applications. Given the modern realities of the lives of students who spend a lot of time online, mobile applications provide the convenience of learning activities, since students can work with the application both in the classroom and at home (Lebedeva, 2023). An additional positive effect is the development of digital competence and literacy of young people.

Tools for student feedback in the assessment process used online can have a significant impact on students' academic performance (Chan, 2024; Zlatovic, 2015). Assessing the student's participation in the learning process through online subject discussion with their classmates and teachers, for example through the Edmondo platform, in "flipped learning" provides the opportunity for the teacher to gain additional information about the student's engagement, while providing a flexible approach (Bicen, 2019). Also, tools that include various types of online testing, online questionnaires, have a positive effect on the motivation of students. In addition, the choice of assessment format is interrelated with the learning strategy that students will use. The results of the Zlatovic study showed that the use of closed online tests for multiple-choice assessment mainly stimulates the emergence of a superficial learning strategy. On the contrary, choosing online assessment in the form of an essay stimulates students to develop deep learning strategies.

Artificial intelligence is one of the newest tools being introduced into the education system, including the process of assessing educational achievements. Universities widely use tools such as proctoring and anti-plagiarism programs to improve the quality of assessment. Relatively recently, another tool has appeared - ChatGPT (Chat Generative Pre-Trained Transformer), the extensive capabilities of which can transform and improve the assessment process at the university. Author Nicolic et al. (2021) conducted a study that used ChatGPT to assess the effectiveness of existing assessment tools and methodologies in higher education. ChatGPT can be used to provide students with instant feedback on assignments and assessments, allowing them to quickly identify where they need to improve their skills. In particular, this will be especially helpful for students who need extra support outside of class. In addition, ChatGPT can be used to grade assignments and provide feedback, reducing instructors' time to grade work.

Methods when students independently assess each other's academic achievements – peer assessment, mutual assessment – remain relevant. At the same time, it is necessary to organize this process in the most efficient way, and digital technologies can enhance the result. L Zheng (2016) combined and implemented a two-stage peer assessment and a series of collaborative learning activities. The format of the training was aimed at helping students develop knowledge and skills, familiarizing and carefully studying the work of their classmates, as well as analyzing and reviewing their own work through an application on mobile phones.

The results showed that two-step peer assessment using a mobile phone significantly increased students' academic performance, their awareness and critical thinking skills, and metacognitive awareness.

Also, the way in which the grades are presented, which reflect academic achievements, can have an impact on the motivation and competitiveness of students. In the study at the Israeli university, in addition to the main scores, the standard score of J Klein (2014) was also included in the statement. Typically, universities measure academic achievement on a scale ranging from A-F, 0-100, or 1-20. These grades reflect actual results without any statistical conversions, and in the absence of comparative information about the achievements of other students, they can be misinterpreted. In order to provide a more complete assessment of academic outcomes, it was suggested that a standard score be added to the progress report to indicate the relative position of students in their group. The results showed that students who are informed about their academic status become more competitive. Awareness of a student's status in comparison to other students contributes to personal achievement more than group interaction.

Formative assessment boils down to assessment that aims to provide students with feedback on the state of their knowledge to help them guide their further learning efforts. Even though formative online assessment, also called formative web assessment (Henly 2003), web quizzes and online quizzes they are positively received in higher education. The introduction of online formative assessments with feedback (correct answer) has had a significant impact on students' academic achievement, resulting in high levels of student satisfaction, improved performance in final exams compared to previous years, and increased workload efficiency through the application of technology (Nickol, 2009; Petrovic, 2017).

The researchers paid special attention to the use of self-assessment by students, which, according to the studies studied, has a positive effect on many aspects of learning (Andrade, Yan, Prasad). Self-assessment, carried out according to predetermined criteria, can be used as a formative one in the learning process, Andrade (2009). At the same time, such self-assessment is used not for assessment as a result, but in the process itself, thereby allowing you to identify the student's strengths and weaknesses in the subject in order to make improvements and contribute to quality learning.

In general, regular feedback during the assessment process can help identify students who are experiencing certain difficulties in the learning process. By analysing data related to student achievement, educators can provide additional support to these students during the process, adjusting the educational trajectory and thereby ensuring student-centered learning.

Modern methods of assessing educational achievements allow the teacher to solve a wide range of problems, while improving the educational results of students. Based on the results obtained, the authors offer a number of recommendations for the development of methods for assessing students' academic achievements:

1) The use of a standard assessment, as well as the ability to include this information in official gradesheets, could be useful both for students to increase motivation to learn, but also for employers in evaluating and ranking candidates, especially in an era of grade inflation.
2) The use of assessment methodologies that provide continuous operational feedback, such as formative assessment, will have a positive impact on motivation to learn and early identification of learning gaps.
3) The expansion of assessment tools through digital methods will allow the development of digital competencies of both students and teachers.
4) The introduction of self-assessment procedures used in the assessment process has a positive impact on both the assessment process and learning in general.
5) Consideration of the possibility of using artificial intelligence, in particular,

ChatGPT, for assessment procedures will strengthen their effectiveness and optimize the work of the teacher.

It should be noted that this review is limited in scope due to the selection criteria set out in the "Methodology" section. The choice of source databases and specific search engines used in this review also contributed to its methodological limitations. Studies that did not match the selected keywords as a descriptor for the title of the articles, as well as those that were not indexed in the original databases, were not included in this review.

In future reviews on similar topics, the scope of the search may be expanded to include other authoritative databases, specialized journals, or peer-reviewed conference proceedings. In addition, the application of different search strategies, keywords, selection and exclusion criteria can result in more relevant scientific publications for wider review.

Conclusions

In today's world, the assessment of knowledge and the assessment of educational achievements must be flexible and adaptive in order to take into account the rapidly changing conditions and requirements of education. A systematic review of the literature showed current trends in the development of assessment of educational achievement in digital and traditional environments. In the context of each of the environments, appropriate assessment strategies and methodologies are applied, which gives an idea of effective practices for assessing academic achievements in universities.

The results showed that it is necessary to use various assessment methods, such as exams, projects, written work, testing both in a traditional format and with the use of digital technologies - mobile applications, online tools, which will allow the teacher to fully assess the skills and knowledge of students and take into account their different ways of learning. The use of technology for assessment and feedback procedures will allow for more dynamic and flexible assessment methods, allowing students to track their learning progress in a timely manner.

Modern realities have raised the question of the introduction of artificial intelligence in education. In particular, the capabilities of such a tool as Chat GPT can be used not only for the assessment and analysis of learning outcomes, semantic analysis of the text of answers, but also for improving the assessment methods themselves.

The results of this study have important implications for educators and curriculum designers. By using the findings, educators and curriculum developers can improve the quality of assessment of learning achievement in teaching and learning, which will have a positive impact on the quality of learning.

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Conflict of Interest Statement

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References

Andrade, H., & Valtcheva, A. (2009). Promoting Learning and Achievement Through Self-Assessment. *Theory Into Practice, 48* (1), 12–19. https://doi.org/10.1080/00405840802577544

Barringer, D. F., Plummer J. D., Kregenow J. & Palma, C. (2018). Gamified approach to teaching introductory astronomy online. *Physical Review Physics Education Research, 14,* 2469-9896. https://doi.org/10.1103/PhysRevPhysEducRes.14.010140 /

Taras, M. (2010). Assessment for learning: assessing the theory and evidence. *Procedia - Social and Behavioral Sciences, 2(2)*, 3015-3022. https://doi.org/10.1016/j.sbspro.2010.03.457

Khuseinova A.A., Kovaleva S.V. (2018). Educational Evolution in Learning Quality Management. *Socio-Cultural Problems of Education Development in Project Management: Collection of Scientific Works of the Scientific and Practical Conference with International Participation*, 331-337.

Bicen, H., & Beheshti, M. (2019). Assessing perceptions and evaluating achievements of ESL students with the usage of infographics in a flipped classroom learning environment. *Interactive Learning Environments*, *30*(3), 498–526. https://doi.org/10.1080/10494820.2019.1666285

Bile A. Development of intellectual and scientific abilities through game-programming in Minecraft. (2022). *Education and Information Technologies.* https://doi.org/10.1007/s10639-022-10894-z.

Burton, N. (2001). Predicting success in college: SAT studies of classes graduating since 1980. *College Entrance Examination Board, New York.* https://files.eric.ed.gov/fulltext/ED562836.pdf

Chan, J.K.Y., Ng, P.M.L. (2024) Examining the role of human and technological factors for interactive online collaborative learning. *Education and Information Technologies.* https://doi.org/10.1007/s10639-024-12770-4

Cladis, A. (2020). A shifting paradigm: An evaluation of the pervasive effects of digital technologies on language expression, creativity, critical thinking, political discourse, and interactive processes of human communications. *E-Learning and Digital Media.* 17(5), 341–364. https://doi.org/10.1177/2042753017752583.

Cole, W.(1993) . By rewarding mediocrity we discourage excellence. *The Chronicle of Higher Education,* 18, B3-B4.

Dennen, V.P., Choi, H. & Word, K. (2020). Social media, teenagers, and the school context: a scoping review of research in education and related fields. *Education Tech Research Dev* 68, 1635–1658. https://doi.org/10.1007/s11423-020-09796-z

Harzing, A.W. (2007) Publish or Perish. https://harzing.com/resources/publish-or-perish

Henly, D.C. (2003). Use of Web-based formative assessment to support student learning in a metabolism/nutrition unit. European Journal of Dental Education, 7, 116-122. https://doi.org/10.1034/j.1600-0579.2003.00310.x

Klein, J. (2014). Assessing university students' achievements by means of standard score (Z score) and its effect on the learning climate. *Studies in Educational Evaluation, 40*, 63-68. https://doi.org/10.1016/j.stueduc.2013.12.002.

Lebedeva, M., Taranova, M. & Beketov, V. (2023). Assessment of academic achievements in m-learning. *Education and Information Technologies* 28, 5945–5965. https://doi.org/10.1007/s10639-022-11423-8

Moher D., Page M.J. (2020). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. https://doi.org/10.1371/journal.pmed.1003583

Mohamed, R., Ghazali, M., & Samsudin, M. A. (2020). A Systematic Review on Mathematical Language Learning Using PRISMA in Scopus Database. *Eurasia Journal of Mathematics, Science and Technology Education, 16*(8), 1868. https://doi.org/10.29333/ejmste/8300

Morgan, MRJ. (1979) MCQ: An interactive computer program for multiple-choice self-testing, *Biochemical Education, 7(3),* 1979, 67-69. https://doi.org/10.1016/0307-4412(79)90049-9.

Ouzzani, M., Hammady, Y., Fedorowicz, Z., and Elmagarmid A. (2016). Rayyan - a web and mobile app for systematic reviews. *Systematic Reviews 5:210.* https://doi.org/10.1186/s13643-016-0384-4.

Nicol, D. (2009). Assessment for learner self-regulation: enhancing achievement in the first year using learning technologies. *Assessment & Evaluation in Higher Education*, *34*(3), 335–352. https://doi.org/10.1080/02602930802255139

Nikolic, S., Daniel, S., Haque, R., Belkina, M., Hassan, G. M., Grundy, S., and Sandison, C. (2023). ChatGPT versus engineering education assessment: a multidisciplinary and multi-institutional benchmarking and analysis of this generative artificial intelligence tool to investigate assessment integrity. *European Journal of Engineering Education*, *48*(4), 559–614. https://doi.org/10.1080/03043797.2023.2213169

Petrovic, J., Pale, P., Jeren, B. (2017) Online Formative Assessments in a Digital Signal Processing Course: Effects of Feedback Type and Content Difficulty on Students Learning Achievements. *Education and Information Technologies, 22* (6), 3047-3061. https://doi.org/10.1007/s10639-016-9571-0

Prasad, K., Aladini, A., Normurodova, N.Z. (2023). Take language assessment easy: the mediator impacts of self-assessment, test-taking skills in predicting student evaluation apprehension, foreign language learning self-esteem, and language achievement in online classes. *Lang Test Asia* 13, 34. https://doi.org/10.1186/s40468-023-00246-0

Thelwall, Mike. (2007). Bibliometrics to webometrics. *Journal of Information Science*, 34. 1-18. https://doi.org/10.1177/0165551507087238

Wang A. I., Tahir R. (2020). The effect of using Kahoot! for learning – A literature review. *Computers and Education, 149*. https://doi.org/10.1016/j.compedu.2020.103818 //

Yan, Z. (2019). Self-assessment in the process of self-regulated learning and its relationship with academic achievement. *Assessment & Evaluation in Higher Education*, *45*(2), 224–238. https://doi.org/10.1080/02602938.2019.1629390

Zhang, K., & Aslan, A. B. (2021). AI technologies for education: Recent research & future directions. *Computers and Education: Artificial Intelligenc*e, 2, 100025 *(14)* https://www.researchgate.net/publication/374911827_Learning_analytics_in_formative_assessment_A_systematic_literature_review.

Zheng, L., Nian-shing, C., Xin, L., and Ronghuai, H. (2016). The impact of a two-round, mobile peer assessment on learning achievements, critical thinking skills, and meta-cognitive awareness. *Internation*al Journal of Mobile Learning and Organisation, 10:4, 292-306 https://doi.org/10.1504/IJMLO.2016.079503

Zlatović, M., Balaban, I., Kermek, D. (2015). Using online assessments to stimulate learning strategies and achievement of learning goals. *Computers & Education, 91,* 32-45. https://doi.org/10.1016/j.compedu.2015.09.012.

Zulpykhar Zh., Abdikhalyk Zh. (2023). Social integral GPA (SSCI) as a factor in increasing the competitiveness of future specialists. *Higher Education in Kazakhstan, 2023.* https://doi.org/10.59787/2413-5488-2023-42-2-35-42

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