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PLENARY TALKS

IS ARTIFICIAL INTELLIGENCE THE NEW SAVIOR OF HIGHER EDUCATION?

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Artificial intelligence is increasingly presented as the solution to the structural and pedagogical challenges of higher education. This narrative frames AI as a transformative cure - faster, cheaper and more efficient than traditional academic models. Yet such claims risk obscuring deeper issues: diminishing academic labor conditions, the erosion of human judgment, data ethics and the commercialization of learning. This talk questions whether AI is genuinely poised to improve higher education or whether it simply repackages old problems under the promise of technological salvation.

SCHOLAR OR ACADEMIC TECHNICIAN - WHO SHOULD THE FUTURE OF THE UNIVERSITY RELY UPON - THINKING AND AI

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This paper advances a normative and philosophical argument about the future of the university in the age of artificial intelligence. The argument proceeds from the claim that scholarship is increasingly being replaced by what may be called the "academic technician": a contractual employee oriented toward metrics, productivity, audit cultures and instrumental outcomes. This transformation is situated within broader structural shifts in higher education - marketisation, managerialism, casualisation of labour, performance measurement regimes and now the rapid integration of AI technologies into research and teaching practices. Within this changing context, artificial intelligence does not simply introduce new tools; it intensifies a deeper historical process - the externalization of thinking itself.

Summary. Drawing on philosophical resources including Immanuel Kant, Jacques Derrida, Martin Heidegger, Bernard Stiegler, Michel Foucault, Nizami Ganjavi, Confucius and contemporary higher education theorists such as Ronald Barnett, the paper argues that AI represents as a meta - *hypomnemata* phase in the *pharmakon* of technics - a remedy and poison simultaneously. AI accelerates literature reviews, automates data analysis, assists drafting and shortens research cycles. Yet it also produces fabricated citations, synthetic texts, epistemic instability and a further reduction of thought to calculative processing

The core distinction developed in the paper is between the *academic* and the *scholar*. The academic is defined institutionally: a contracted practitioner whose work is measured through metrics, outputs and compliance with managerial expectations. The scholar, by contrast, is defined ethically and ontologically: one for whom truth-seeking is a vocation; who exceeds contractual minimums; who embodies courage, sincerity, carefulness and responsibility in speech and who recognizes a moral obligation to think deeply about what is, not merely to react to institutional incentives. This normative distinction echoes Derrida's conception of "the university without condition", in which the scholar bears responsibility to deconstruct the tools, assumptions and power structures that shape knowledge production. Every technique carries implicit hierarchies and exclusions; without reflexive interrogation of the tools - including AI - the academic becomes a functionary rather than a thinker. Stiegler's work further illuminates this condition by arguing that technics externalize memory and cognition, potentially eroding the cultivation of interiority and reflection. AI extends this externalization beyond memory into interpretation and generative reasoning. Heidegger's distinction between calculative and meditative thinking is particularly

salient. If AI performs increasingly sophisticated calculative functions, the university must decide whether it will double down on speed and efficiency or recover its commitment to meditative thought - the kind of thinking that questions the meaning of being itself. Along these lines Barnett and Bengtsen's conception of "the thinking university" reinforces this point: the university's core purpose is not information processing, but the cultivation of thought understood as relational, dialogical, ethical and socially embedded.

The paper also draws on Kant's conception of enlightenment as the courage to use one's own understanding publicly. Scholarly freedom is therefore not unrestricted speech but responsible truth-telling grounded in evidence, moral seriousness and communicative care. It is here Foucault's notion of *parrhesia* - truth-telling at risk - becomes central. The scholar is one who speaks truth even when it challenges authority, managerial orthodoxy or technological enthusiasm

The ethical vision of scholarship is further deepened through Nizami's *Makhzan al-Asrar* (*Treasury of Mysteries*), where the true sage is contrasted with the court intellectual who seeks status and wealth. Knowledge, in this tradition, is never merely instrumental; it is spiritually and morally grounded. Similarly, Confucian thought emphasizes the cultivation of the *junzi* - the morally formed person whose learning serves justice and harmony rather than personal advancement.

The paper concludes by suggesting that the age of AI, several moral challenges intensify. Inequalities in access to computational infrastructure create new global and institutional hierarchies. Expensive AI systems advantage well-funded universities, widen global disparities and risk reinforcing gender and cultural biases embedded in training data. The acceleration of the research cycle and AI-assisted peer review further transform academic practices and required competencies. These developments demand a revival of scholarly virtues as well: data literacy, AI competence, computational awareness and above all ethical judgment. For that technical proficiency alone is insufficient. What counts as scholarship in the AI era must include original interpretation, critical independence, intellectual courage and principled restraint in the use of technological tools. Thus, the future of the university is conditional. If it embraces AI uncritically, it risks reducing all knowledge to optimization and output, contributing to what some describe as a technologizing reduction of all things and a shift in humanity's sense of what is and what matters. If, however, it re-centres its mission on thinking - ontological questioning, ethical seriousness, dialogical engagement - it can harness AI's efficiencies while resisting its reductive tendencies.

SECTION TALKS

ARTIFICIAL INTELLIGENCE-BASED APPROACHES IN DIGITAL EDUCATION AND THEIR IMPACT

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This study examines the application of artificial intelligence (AI)-based approaches in digital education environments and their impact on the teaching process. In the modern era, the rapid development of information technologies has led to the emergence of new methods and tools in the education system. In particular, artificial intelligence technologies create opportunities for personalized learning by enabling the formation of teaching strategies tailored to individual student needs.

The study analyzes the functionality of adaptive learning systems, automated assessment mechanisms and intelligent educational platforms. As a result of implementing these approaches, it has been determined that the quality of teaching improves, teachers' workload decreases and students' motivation increases. At the same time, the use of artificial intelligence allows for more effective data analysis and improved decision-making processes in education.

In addition, the study considers existing challenges related to the implementation of artificial intelligence. Issues such as data security, ethical concerns and technological dependency are among the key factors that require attention in this field.

In conclusion, AI-based approaches play a significant role in the development of digital education and have broad potential for future application. The proper and balanced use of these technologies can contribute to making the education system more effective and accessible.

In the 21st century, the rapid development of information and communication technologies has led to fundamental changes in the education system, as in all areas of society. As a result of globalization and digitalization processes, traditional teaching models have gradually transformed, giving rise to more flexible, interactive and technology-based educational environments. One of

the main driving forces behind this transformation is artificial intelligence and machine learning technologies.

AI-based approaches open new opportunities in education, improving the quality of learning while making it more personalized and effective. While traditional education systems apply the same content and methods to all students, artificial intelligence enables the analysis of each student's knowledge level, learning pace and interests, providing individualized learning plans accordingly. For example, adaptive learning platforms identify the topics where students struggle and provide additional materials, tests and explanations in those areas. This approach plays an important role in addressing knowledge gaps.

On the other hand, artificial intelligence significantly facilitates teachers' work. Through automated assessment systems, tests and written assignments can be evaluated more quickly and objectively. For instance, algorithms used in online education platforms analyze students' responses, instantly provide results and offer overall statistics to teachers. This allows educators to devote more time to improving teaching quality and providing individualized support.

Concrete examples of AI applications in education are steadily increasing. For instance, virtual teachers or chatbots can respond to students' questions in real time, providing continuous support throughout the learning process. Moreover, some international educational platforms use AI to monitor student behavior, identify areas of difficulty and provide tailored recommendations. Such technologies play a particularly important role in the development of distance and online education.

However, the implementation of AI-based approaches also raises several challenges. Data privacy and security are major concerns, as these systems collect and process large volumes of user data. Additionally, excessive reliance on technology, the weakening of the human factor and ethical issues are important considerations. For example, biased algorithms in automated decision-making systems may lead to unfairness in the educational process.

The role of artificial intelligence in digital education became even more prominent during the global pandemic. During the transition to distance learning, many educational institutions used AI-based platforms to ensure continuity in the teaching process. This demonstrates that the future development of education will be closely linked to the broader application of AI technologies.

In conclusion, AI-based approaches play a crucial role in the advancement of digital education by making learning more effective, accessible and personalized. However, it is essential to consider existing risks and challenges and ensure the balanced and purposeful use of these technologies. In this regard, comprehensive research and analysis of practical applications are of great importance for the development of modern education systems.

Keywords: Artificial intelligence, machine learning, digital education, adaptive learning, personalized education, intelligent tutoring systems, automated assessment.

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RETHINKING GOVERNANCE THROUGH PROJECT-BASED LEARNING: A FRAMEWORK FOR SUSTAINABLE INNOVATION IN HEALTHCARE AND HIGHER EDUCATION SYSTEMS

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This paper introduces an interdisciplinary framework that rethinks governance in both healthcare systems and higher education institutions through the integration of Project-Based Learning (PBL) as a core structural and operational mechanism. In contrast to conventional governance models that rely on static policy design, fragmented implementation and linear reform cycles, the proposed framework advances a dynamic, learning-based approach centered on continuous feedback, iterative problem-solving and adaptive institutional transformation.

The study is grounded in a comparative analytical methodology that synthesizes insights from healthcare system governance, policy failure cycles and educational innovation literature. In addition, the framework is conceptually developed through reflective governance principles, emphasizing institutional learning, accountability and responsiveness. This approach enables the construction of a flexible and transferable model that bridges disciplinary boundaries and applies to complex, multi-actor systems.

Within this framework, both healthcare and higher education systems are reconceptualized as interactive learning environments. Stakeholders - including policymakers, academic institutions, practitioners and learners - engage collaboratively in structured, project-based cycles that involve problem identification, solution design, real-time experimentation and reflective evaluation. These cycles facilitate co-creation processes and promote evidence-informed decision-making, thereby enhancing system adaptability and resilience.

The integration of Project-Based Learning into governance structures provides a mechanism for aligning theoretical knowledge with practical challenges. In higher education, this alignment strengthens the relevance of academic outputs to labor market and societal needs. In healthcare systems, it supports more responsive and context-sensitive policy design, reducing the recurrence of inefficiencies and reform failures.

Preliminary theoretical implications suggest that the proposed framework can significantly improve institutional responsiveness, accelerate innovation processes and enhance sustainability outcomes across both sectors. By embedding learning mechanisms within governance, the model contributes to the development of more resilient systems capable of navigating uncertainty, complexity and rapid technological change.

This research contributes to the broader discourse on sustainable innovation by establishing a governance-learning nexus that transcends traditional sectoral boundaries. It offers both conceptual and practical insights for policymakers, higher education leaders and healthcare reformers seeking to transition toward more agile, participatory and learning-driven governance systems.

Keywords: Project-Based Learning (PBL), governance, healthcare systems, higher education, sustainable innovation, policy reform, institutional learning, adaptive systems.

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ON TEACHING NATIONAL HISTORY IN HIGHER EDUCATION INSTITUTIONS

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The primary goal of Azerbaijani higher education institutions and universities has always been the training of highly qualified personnel in their respective fields. A young person entering a higher education institution must thoroughly master the relevant subjects and acquire the skill of applying theoretical knowledge in practice. At the same time, a graduate of a higher education institution should not be content with studying only their specialized subjects, but should be able to research, analyze and draw accurate conclusions about the causes of socio-political processes and events occurring in our country and around the world. In particular, they should have a clear understanding of the history of our homeland, the culture, mentality and customs of our people. In the modern era, when the flow of information, including fake news, is enormous and disinformation is widespread, it becomes very difficult to distinguish good from evil. Preserving national and spiritual values is of utmost importance. Therefore, higher education institutions must prepare young specialists who are well-versed in their fields, have a broad outlook and are equally committed to national and spiritual values and a patriotic spirit. From this perspective, teaching the history of Azerbaijan in all higher education institutions, regardless of the students' major, is of great importance. Great Leader Heydar Aliyev clearly expressed the importance of studying the history of the Fatherland. Speaking at a meeting with scientists from the Azerbaijan National Academy of Sciences at the Presidential Palace on January 31, 1997, he emphasized the importance of studying the history of Azerbaijan, emphasizing that the humanities and especially the history of the nation, are the most influential subjects for the general public, the people and the nation: "...in independent Azerbaijan, physics, mathematics, biology, chemistry and other subjects must develop. Each of them has its own unique structure". "But history is essential for every person, from youth to the end of life" (Aliyev, 1998).

The study of the history of the Fatherland, beginning with family and school and ending at the appropriate level at university, not only helps preserve and develop national and spiritual values in the younger generation but also strengthens love for one's homeland, people and country. Active participation in the socio-political life of our country at various events, as well as adequately representing our state and people globally, is the task not only of historians or specialists in the humanities. Every citizen of Azerbaijan, including those working in the technical field and

specialists in the exact sciences, must actively participate in this noble work. The knowledge our youth receive in secondary school is certainly not sufficient to successfully fulfill this highly honorable and simultaneously responsible mission. The teaching of Azerbaijani history must continue at a higher level in higher education institutions. In university classrooms, students should be taught not only events and chronologies, but also values such as patriotism, national thought, national culture and national ideas, with concrete examples. They should also be instilled with the ability to express independent civic positions and build a bridge between the past and the future.

The commitment to national roots, the high patriotism of our youth and the lessons they learned from our history played a crucial role in achieving an unprecedented victory in the 44-day Patriotic War, the most monumental event in the history of modern Azerbaijan. At the opening ceremony held on February 14, 2024, the President of the Republic of Azerbaijan Ilham Aliyev outlined the continued implementation of efforts in this area as a very serious task: “We must educate the younger generation, who, like us, will always be faithful to national traditions and national-spiritual values and their minds will be pure... educating our youth in the national spirit, educating them on the basis of traditional values and the complete eradication of all progressive (in quotation marks) and alien values from our society - this task faces all of us” (Aliyev, 2024).

History should not be viewed simply as a science of describing and analyzing past events. Today, history is a science of both the present and the future. History is not simply a collection of events that have occurred in society, but also a science that studies the causes and consequences of these events and teaches us to learn from them. By studying history, a person learns life lessons, draws conclusions, takes examples of people who were useful to society in the past, assimilates historical knowledge and develops further, improving on this basis. A young person studying history also broadens their horizons and deepens their knowledge. In this regard, the study of history, especially the history of the Fatherland, has great scientific and educational significance.

One of the most important aspects of teaching the history of the Fatherland in higher education is that it is based on the human factor. This subject examines the events and processes that occurred as a result of the actions of the Azerbaijani people. History is not simply a field of science devoted to the study of a problem, but also a way of thinking that guides people to the right conclusion (Jafarov, 2024).

Today, young people studying History and History Teaching at universities face very important challenges. These students acquire knowledge of both general history - the history of countries from ancient times to the present - and important facts and events in the history of Azerbaijan. Furthermore, during their studies, they study additional subjects such as archeology, ethnography, anthropology, historiography, source studies, philosophy and others. By acquiring the necessary knowledge in these disciplines, they must be able to think like historians and acquire the skills to conduct historical research. To achieve this, they must not be content with simply

listening to lectures and participating in seminars, but must also continually and independently improve their knowledge. In this regard, it would be very useful to reintroduce the practice of writing essays, term papers and theses on various historical topics into the curricula of higher education institutions.

Overall, teaching the history of Azerbaijan in higher education institutions contributes to the development of a broad worldview, national identity and loyalty to national values among our youth. The 44-day Patriotic War once again demonstrated the usefulness of education provided in schools and universities. During this war, we saw that our youth thoroughly studied our history, fought bravely, following the example of our heroic ancestors and managed to liberate the occupied territories.

One of the main tasks facing us now is to educate clear-minded youth who will be able to pass on to future generations our sovereignty and territorial integrity, which we have won at the cost of thousands of difficulties and unprecedented sacrifices. It is necessary to raise a new generation that is strong, educated and well-versed in its historical past, capable of withstanding the ideological opposition we currently face. In this regard, it is crucial that our young people studying in higher education institutions, regardless of their specialty, study Azerbaijan's historical path from ancient times to the present day, conduct analysis and draw conclusions.

Keywords: University, national history, qualified personnel, national values, patriotic youth.

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TRENDS IN PROJECT-BASED LEARNING RESEARCH IN GENERAL AND HIGHER EDUCATION: A BIBLIOMETRIC ANALYSIS

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Education is one of the most significant indicators of progress in any society. Therefore, governments have been keen to focus on this field, continuously developing and improving it. It is well-known that acquiring knowledge or mastering a skill can only be achieved through having a strong motivation to do so. Without this motivation, the efforts made in this direction would be futile (Saad, 2021). PBL is recognized as a contemporary educational approach that allows students to acquire knowledge and skills by engaging in real-world projects. This method fosters critical thinking, collaboration and problem-solving abilities. By involving students in practical and experiential learning, PBL creates an environment that stimulates curiosity and creativity. Nevertheless, further research is needed to assess the effectiveness of this educational approach in fulfilling its objectives, particularly regarding the enhancement of creativity among students at different educational levels (Eswaran, 2024).

Bell (2010) emphasized that PBL is an innovative approach that teaches many critical strategies for success in the 21st century. It encourages students to learn through inquiry and to work collaboratively to research and create projects that reflect their knowledge. It also enables them to acquire new, applicable technical skills, becoming proficient, connected and advanced problem solvers. The theoretical connection between PBL and creativity is well-established. PBL creates an optimal environment for creativity to thrive by providing students with autonomy, encouraging inquiry-driven exploration and supporting iterative refinement - elements that are integral to the creative process (Beghetto, 2010). By tackling meaningful problems that lack a single “right answer”, students are encouraged to move past convergent thinking and engage in divergent thinking, which is essential for generating unique ideas and innovative solutions. Additionally, the social constructivist approach of PBL, which fosters collaborative knowledge-building, exposes students to a variety of perspectives, thereby inspiring new ideas and enhancing their creative potential (Guo *et al*., 2019).

Therefore, project-based learning is considered one of the modern educational methods that has proven its effectiveness in developing critical thinking skills, problem-solving abilities and enhancing creativity among students. However, PBL has emerged as a powerful instructional methodology with significant potential to improve these essential skills. A study carried out by Creghan and Adair-Creghan (2015) to explore the effects of a PBL environment on the attendance

rates of economically disadvantaged high school students. Data were collected to compare attendance rates between a school employing traditional teaching methods and another utilizing PBL as its primary instructional approach. The findings indicate that there is substantial evidence supporting the positive impact of PBL on the attendance of economically disadvantaged students. Additionally, these results provide encouraging support for teachers and administrators who intend to implement a PBL environment in their schools in order to address the attendance challenges faced by this student demographic.

Additionally, a meta-analysis by Chen and Yang (2019) concluded that PBL has a significantly positive overall effect on students' creative thinking, especially regarding the fluency, flexibility and originality of ideas. The findings emphasized that the longer the duration of the PBL intervention, the more pronounced the positive effects on creativity became. In another study, researchers observed that elementary students participating in a robotics-focused PBL program demonstrated substantial improvements in their divergent thinking skills, which are a key component of creativity (Çakır & Korkmaz, 2021). The hands-on, trial-and-error nature of these projects created an ideal environment for experimenting with and generating innovative solutions.

Cao’s (2024) study explores the impact of project-based learning (PBL) and self-regulated learning (SRL) on English teaching in Macao. It assesses how PBL enhances the SRL abilities of intermediate EFL learners at the post-secondary level. The research shows that PBL improves students' motivation, metacognition and self-regulated behaviors, with notable gains in motivation and behaviors and some progress in metacognitive strategies. The study concludes that PBL is effective for developing SRL and promotes learner-centered curricula in EFL education.

The PBL is a prominent active learning strategy that focuses on engaging students in applied projects that foster critical thinking and problem-solving. PBL has gained the attention of researchers amidst the shift towards competency-based education and 21st-century skills. In this context, bibliometric studies have emerged as a methodology for analyzing research trends in PBL, contributing to a better understanding of the field's development and future trajectories. Therefore, this descriptive bibliometric study aimed to identify the trends in PBL research during the period 2000 to 2025. A total of 3708 research indexed in the Scopus database were analyzed using the VosViewer software. The results indicated that 2025 was the year with the most published 390 research, PBL was the most used keyword, Xiangyun Du and Aida Guerra were the most authors in PBL, US and China were leading PBL research output and the International Journal of Engineering Education is the most influential journals in the PBL. This study recommended reducing the geographical gap in research output by supporting research in underrepresented countries, promoting international collaboration between authors and universities and expanding PBL research to include various disciplines.

Keywords: Analysis of scientific output, bibliometric studies, competency-based education, project-based learning, research trends, Scopus database.

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ONTOLOGY-BASED FRAMEWORK FOR THE DIGITAL MODERNISATION OF AN ACADEMIC ENGLISH COURSE IN SPEECH-LANGUAGE PATHOLOGY

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The field of speech-language pathology (SLP) has undergone profound diversification, integrating conceptual and methodological resources from medicine, neuroscience, psychology, linguistics, pedagogy and digital learning research, which in turn complicates the structuring of its professional thesaurus and the development of foreign-language academic discourse in initial training. Terminological asymmetries between Russian-language and English-language SLP traditions, reinforced by institutional fragmentation and heterogeneous classificatory practices, weaken the internal coherence of core diagnostic and intervention categories, generate interpretive gaps in reference to clinical labels and procedures and translate into instability and inconsistency in academic writing and translation (Chirkina, 2010; Bochkareva, 2024). In this context, partially overlapping sets of national terms coexist with international diagnostic designations without full conceptual alignment, thereby hindering systematic cross-linguistic mapping and complicating efforts toward curricular standardisation in Academic English for SLP students.

These structural discrepancies are amplified by the parallel use of several national classificatory frameworks and by the increasing influence of international clinical guidelines and corpus-driven evidence in SLP discourse, which together reveal the limitations of purely glossary-based approaches to curriculum design and professional language training (Belyakova & Filatova, 2007; Lopatina, 2018).

Recent logopaedic and didactic research indicates that modelling the SLP professional thesaurus as a dynamic ontological space, rather than as an unstructured inventory of lexical items, provides significant analytical and pedagogical advantages for representing interdisciplinary links, taxonomic hierarchies and the pragmatic roles of key concepts in clinical and academic communication (Minsky, 1975; Fillmore, 1982; Andersen, 2026; Almazova & Andersen, 2025). Within an ontological perspective, terminological units are treated as nodes in a formally specified network of categories, properties, relations and usage scenarios that systematically cross disciplinary and institutional boundaries, making it possible to capture both explicit conceptual dependencies and implicit associative connections between, for example, diagnostic entities, functional descriptors and intervention protocols. Such an approach resonates with contemporary developments in educational ontologies and ontology-aware instructional design, where domain

knowledge is encoded in formal representations to support adaptive sequencing of learning objects, semantic navigation and interoperability among heterogeneous digital learning environments.

At the same time, thesaurus-corpus models of foreign-language training in SLP have demonstrated that combining terminological modelling with corpus-based evidence and discourse analysis enhances students' command of academic genres, stabilises their use of specialised English terminology and reduces the uncontrolled proliferation of quasi-synonymous diagnostic labels in written scientific discourse (Biber *et al*., 1998; Plungian, 2008; Almazova & Andersen, 2026).

The present study aims to elaborate and substantiate an ontology-based framework for the digital modernisation of an Academic English course in SLP education that systematically addresses terminological asymmetry, supports the construction of a coherent bilingual professional thesaurus and fosters the development of foreign-language scientific and discursive competence. The framework extends a previously validated thesaurus-corpus educational model, which revealed substantial deficits in students' professional vocabulary, genre awareness and cross-linguistic transfer, but also demonstrated the high sensitivity of these domains to targeted pedagogical intervention (Almazova & Andersen, 2025, 2026; Andersen, 2025). In the current research, this model is reconfigured as an ontology-driven curriculum architecture in which ontology editors, corpus management systems and large general corpora form an integrated digital ecosystem (Figure 1).

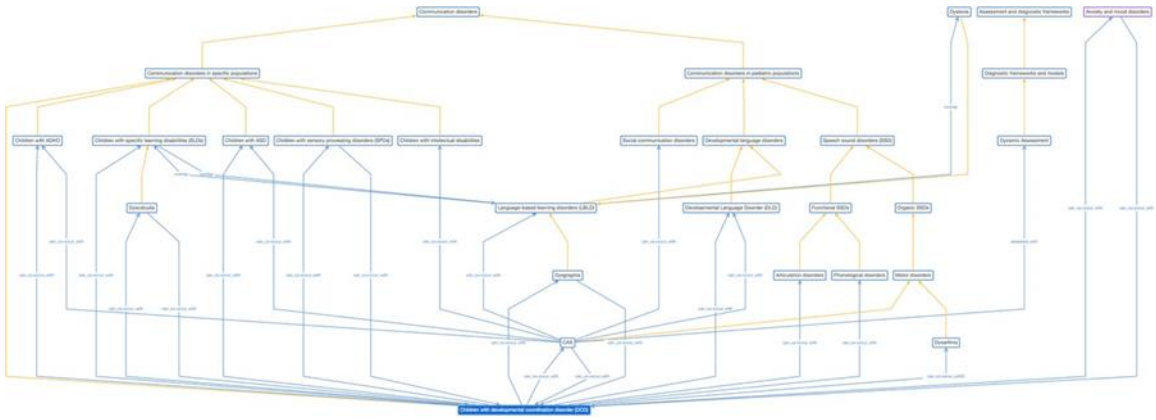

Figure 1. Ontology-based representation of communication disorders and related categories in speech-language pathology (developed using the Protégé ontology editor; Stanford Center for Biomedical Informatics Research, 2023)

Methodologically, the study employs a mixed-methods design combining ontological modelling, corpus linguistics and experimental pedagogy. At the modelling stage, a formal domain ontology is constructed to capture SLP concepts that are particularly salient for Academic English

training, drawing on national and international classifications, standard reference works, clinical guidelines and specialised terminological resources and encoding them in a multi-layered structure that distinguishes core SLP terms, interdisciplinary concepts and genre-specific discourse markers (Seliverstov, 2004; Prikhodko *et al*., 2023; Chuprov, 2012; Kochetkova, 2006). This ontological structure is aligned with corpus data by linking classes and properties to sets of concordance lines, collocational profiles and genre distributions extracted from large general corpora and a specialised SLP corpus, thus providing empirical evidence for typical lexical bundles, syntactic patterns and co-occurrence networks associated with each concept.

The findings indicate that ontology-driven integration of terminological modelling and corpus-based evidence leads to a marked reduction in non-responses and ad hoc solutions in specialised translation tasks, a decrease in the variability of competing translations and a more stable, unambiguous use of English professional terminology. In the ontology-based extension of the model, representing central SLP categories and diagnostic entities as nodes in a formal ontology enriched with corpus-derived examples and collocations enables students to reorganise their professional vocabulary into conceptually coherent clusters, identify “bridge” terms that connect distinct subdomains and recognise fine-grained contrasts between closely related diagnostic labels. Ontology-based visualisations and concept maps operate as cognitive scaffolds that support metacognitive reflection on the structure of the professional field, allow learners to trace the migration of terms across disciplinary and institutional contexts and encourage a more critical, evidence-oriented engagement with classificatory systems and clinical guidelines. Embedding ontological structures at the core of the digital learning environment facilitates the re-use and re-combination of learning objects, enables adaptive pathways through the course content and strengthens interoperability with other modules in defectological education, thereby contributing to systemic digital modernisation of SLP programmes. From the perspective of academic writing, students exposed to the ontology-enhanced curriculum demonstrate more controlled use of genre conventions in English research texts, more consistent application of citation and referencing norms and greater sensitivity to the pragmatic, institutional and cross-cultural dimensions of key professional terms.

Keywords: Ontology-based learning, speech-language pathology, academic English, terminological asymmetry, corpus-based approach, professional discourse, ontology modelling.

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AI AND DIGITALIZATION IN HIGHER EDUCATION: INSIGHTS FROM INTERNATIONAL STEM PUBLISHERS

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In the circumstances of rapidly evolving artificial intelligence and digitalization, both higher education institutions and their partners need to adjust to the new reality. This is of particular importance within STEM disciplines where access to up-to-date, accurate knowledge is key. This presentation explores both the challenges and opportunities associated with the integration of AI in academic publishing and learning environments. Key concerns include academic integrity, transparency, bias in AI-generated content and the advancing role of educators, whereas opportunities emerge in the form of personalized and interactive learning, enhanced research efficiency and improved knowledge discovery.

The presentation examines how leading international STEM publishers and educational institutions are responding to the growing interest in AI through their respective tools and strategic initiatives, using the following organizations as examples:

- *IEEE;*
- *Wolters Kluwer Health;*
- *McGraw Hill;*
- *Neurosurgical Atlas.*

For instance, the *Institute of Electrical and Electronics Engineers* - the "world's largest technical professional organization" - is advancing AI-assisted research workflows with its AI Research Suite on Xplore and enhanced functionality through IEEE DiscoveryPoint, while also foster AI ethical use standards via CertifAIEd certification.

In the medical domain, *Wolters Kluwer Health* integrates AI-powered summaries into their content optimize time spent on research and study, while *McGraw Hill* applies AI to support practical skills of students, professors and clinicians in the innovative digital learning platform Clinical Reasoning. Furthermore, the *Neurosurgical Atlas* team introduces Atlas GPT to assist in specialized clinical education and practice.

By reviewing these approaches, the presentation highlights authoritative practices in AI adoption, including responsible and meaningful AI governance, as well as domain-specific customization. The talk concludes with reflections on how cooperation between publishers,

educators and schools can ensure that artificial intelligence tools support both academic rigor and meaningful learning outcomes in higher education.

Keywords: Artificial intelligence, AI, publishing, digitalization.

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THE IMPACT OF UNIVERSITY-INDUSTRY COLLABORATION ON DEVELOPING AN INNOVATIVE ECONOMY

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Introduction: Relevance of the Topic. In the modern era, intense competition prevails in the global economy and only those who embrace and utilize the latest achievements of science and technology can survive and emerge victorious. Under such conditions, university-industry cooperation is of particular relevance in terms of stimulating innovative activity, as well as creating and implementing new technologies. This cooperation involves uniting the efforts of academic science and the real sector of the economy to ensure innovative development, technological sovereignty and competitiveness.

An innovative economy is characterized as an economic system based on knowledge, technology and creativity. In this economic model, the primary value-creating factors are Research and Development (R&D) activities, human capital and technological innovations. An innovative economy is not limited to the creation of new products and services; it also encompasses the improvement of production processes, more efficient use of resources and digital transformation. Under the influence of scientific and technological knowledge, traditional sectors of material production are transformed and their technological bases are radically changed, as production not based on new knowledge and innovation is considered inefficient and uncompetitive.

"In an innovative economy, under the influence of scientific and technological knowledge, traditional spheres of material production are transformed and radically change their technological base, since production that is not based on new knowledge and innovations turns out to be unviable in an innovative economy" (Boyukkishi *et al*., 2017).

The Role of University-Industry Cooperation. Universities are the primary platforms where scientific knowledge is generated, while industry is where this knowledge is applied. Effective cooperation between these two sectors covers all stages of the innovation cycle - from the emergence of an idea to commercialization. The main directions of university-industry cooperation include:

- Transfer of scientific research results to the real economic sector;
- Creation of new technologies and products;
- Formation of startups and innovative enterprises;
- Training of highly qualified personnel in accordance with labor market requirements.

This cooperation mechanism acts as one of the main pillars of the innovation ecosystem, accelerating the transformation of scientific knowledge into practical application. Consequently, this process accelerates the country's technological development, increases competitiveness and forms a solid foundation for sustainable economic growth.

Research Aim and Objectives. The main purpose of the research is to comprehensively analyze the impact of university-industry cooperation on the formation of an innovative economy in Azerbaijan and to identify existing problems and development opportunities in this direction. To achieve this goal, the following tasks have been set:

- To investigate the theoretical foundations of university-industry cooperation;
- To determine the role of universities in the development of an innovative economy;
- To evaluate the existing mechanisms of university-industry cooperation in Azerbaijan;
- To analyze the impacts of cooperation on the partners;
- To develop practical proposals for more efficient organization of cooperation between universities and industry.

Essence and Forms of University-Industry Cooperation. University-industry cooperation is the process of transferring scientific knowledge to the production and business environment, as well as directing the needs of the real sector toward academic research. This cooperation is based on mutual benefit: universities gain the opportunity to apply their scientific potential, while industry is provided with innovative solutions and qualified personnel. As a result, the commercialization of knowledge accelerates, new technologies emerge and economic development is supported.

This cooperation can be implemented in various forms. One of the most common forms is joint R&D projects, where university scientists and industry experts work together to solve specific problems. Another form is technology transfer and the transfer of patents to industrial enterprises. Additionally, student internship programs, dual education models and research conducted based on industrial orders are important mechanisms. The creation of startups, as well as the activities of innovation centers and technoparks, also play a special role (Malinin, 2025).

The Role of Universities in Forming an Innovative Economy. Universities are not merely educational institutions; they are centers where new ideas and knowledge emerge, scientific research is conducted and innovations are formed.

1. R&D Activity: Fundamental and applied research leads to new knowledge and the improvement of existing production processes.

2. Commercialization: Through technology transfer mechanisms, startups and technoparks, scientific ideas are turned into economic value.

3. Innovation Culture: Universities foster creativity, critical thinking and entrepreneurial skills among staff and students.

Impact of Cooperation on Partners. University-industry cooperation increases the prestige and reputation of both parties.

- For Enterprises: They gain access to scientific results, strengthening their competitiveness through innovative products.
- For Students: Industry-oriented educational programs allow students to gain professional skills and work experience during internships.
- For Universities: Academic institutions strengthen their financial capabilities, allowing teaching staff to increase their income and material interests (Petruzzelli, 2011).

Finally, this cooperation expands innovation-oriented entrepreneurship, revitalizing the business environment and increasing investment attractiveness.

Current Status and Prospects in Azerbaijan. In Azerbaijan, the integration of science, education and production is emphasized at the state level. Technical and specialized higher education institutions are increasingly signing cooperation agreements and joint projects with industrial enterprises.

A notable example is the Memorandum of Cooperation signed between the Azerbaijan University and the "Economic Scientific Research Institute" (public legal entity) under the Ministry of Economy of the Republic of Azerbaijan. According to the agreement, the university's participation in projects implemented by the institute is envisaged.

However, cooperation in Azerbaijan is not yet at the desired level. The main problems include:

- Weak application of research results in production;
- Limited financing mechanisms;
- Insufficient coordination between parties.

In conclusion, while there is positive progress, the further efficiency of this cooperation requires the commercialization of scientific results, strengthening of innovation infrastructure and closer integration of the "state-private sector-university" triangle.

Keywords: Innovative economy, scientific research, cooperation, mutual benefit, technology transfer, innovation centers.

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THE EFFECT OF DIFFERENT METHODS OF FEEDBACK ON L2 WRITING IMPROVEMENT

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This research examined the effects of using rubrics, exemplars and self-assessment as forms of feedback in an L2 writing development course in English with Chinese speakers. The sample consisted of 114 L2 students at a university in Macau. Participants were randomly assigned to treatment groups and provided feedback on an English writing task using either rubrics, exemplars, self-assessment or a control condition. The efficacy of these treatments was examined for both performance and learning.

Wiliam (2018) persuasively argues that we should evaluate feedback not only by its impact on immediate task performance but, more critically, by how it fosters learning that transfers to future tasks. A broad look at the feedback literature reveals that most syntheses emphasize post-feedback gains on the same kind of task - such as an essay, assignment or lab report - following an initial attempt (Bangert-Drowns *et al*., 1991; Crooks, 1988; Hattie & Timperley, 2007; Kingston & Nash, 2011; Kluger & DeNisi, 1996; Shute, 2008). In education, we do sometimes aim to polish performance on a single product (a musical piece, an artwork or a publishable manuscript). However, our larger concern is often the learning that supports such performance: what durable knowledge or strategies does the learner acquire and take forward to the next task?

Prior work shows that exemplars and rubrics can function as effective instructional feedback (Lipnevich *et al*., 2014) and that exemplars can approach the benefits of individualized comments in writing, though students often prefer personalized input (Price *et al*., 2017). Notably, these studies typically assess performance gains on the same task rather than learning demonstrated on a new but related assignment. As Wiliam (2018) notes, relatively few studies evaluate learning as evidenced by subsequent task performance. The present study seeks to help address that shortfall.

Andrade (2010, 2018) maintains that self-assessment primarily serves to generate feedback for learners that improves performance and deepens learning. Her review suggests self-assessment - often supported by rubrics or structured prompts - is generally effective (Andrade, 2018). This raises a categorization issue: when self-assessment is scaffolded by a rubric, should it be treated as self-assessment or as rubric-based feedback? We favor the latter, since all feedback - even individualized teacher comments - requires active cognitive engagement from the learner (Lipnevich & Smith, 2023).

In this study, self-assessment was operationalized in two minimal-support forms: one without additional scaffolds and another with brief encouragement to self-evaluate. Alongside rubric and exemplar conditions, these treatments represent a spectrum of efficient feedback options. We considered independent engagement with feedback processes to be a core long-term goal for learners, regardless of the explicit instructional support available at any given time.

Research Questions. Prior research indicates that rubrics and exemplars can enhance revision performance on the same task, with some evidence that rubrics may be more potent than exemplars. Using L2 essay writing as the outcome, we compare the effectiveness of rubrics, exemplars and two forms of self-assessment for improving performance on a given writing task. We then examine whether these interventions affect performance on the first draft of a subsequent, related task, thereby addressing learning in line with Wiliam's (2018) recommendation.

H1: Rubrics and exemplars will outperform self-assessments in fostering L2 writing development.

H2: Rubrics will be more effective than exemplars in fostering L2 writing development.

By "writing development", we refer both to gains on the same task and to transfer to a subsequent task; both outcomes are analyzed.

Sample. Participants were 115 first-year University of Macau students, aged 18-19. Approximately 34% spoke Mandarin at home, 54% spoke Cantonese and 6% spoke English alongside other languages; the remainder used other varieties of Chinese. Most were from Macau (about 80%), with the rest from Mainland China (about 20%). On average, students had studied English for 13 years, typically starting at ages 5-6. All were enrolled in an English for Academic Purposes course and placed in the highest of three levels based on placement tests administered two months earlier.

Analyses. We evaluated two hypotheses. First, we compared rubric-plus-exemplar conditions against the two self-assessment conditions, examining both revision performance (Draft 1 vs. Draft 2) and transfer to a new task (Draft 1 vs. New Topic). Second, we directly compared rubric versus exemplar on the same two contrasts. In each case, we used repeated measures ANOVAs tailored to the performance and learning comparisons separately, to avoid conflating revision with transfer.

Discussion. This in-situ experimental study combines ecological validity with experimental rigor. The results indicate that rubric and exemplar interventions significantly surpass self-assessment approaches on both revision performance and transfer to a new task. However, rubric-based feedback did not statistically outperform exemplars.

Our outcomes align with earlier work on exemplars and rubrics (Lipnevich *et al*., 2014) and partially with Price et al. (2017), who found rubrics to be superior to exemplars. Our learning results show a slight, nonsignificant edge for rubrics. Conversely, our findings diverge from

Andrade (2018), who reported benefits for self-assessment; in our study, neither self-assessment condition produced notable performance or learning gains. This discrepancy may reflect the minimal scaffolding of our self-assessment conditions and the specific demands of L2 writing development. When foundational knowledge is still forming - as is often the case in second language learning - self-assessment may be more challenging and less productive without stronger supports.

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STRENGTHENING QUALITY, EQUITY AND COMMUNITY ENGAGEMENT IN HIGHER EDUCATION: DRIVERS OF SUSTAINABLE LOCAL DEVELOPMENT

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Introduction. Ladies and gentlemen, it is an honor to participate in this international conference bringing together key stakeholders in higher education at a pivotal moment for our societies. The theme "global perspectives, local impact" invites us to collectively reflect on how global transformations are redefining the mission of universities within their local contexts.

1. What global perspectives for higher education?

Higher education is currently experiencing major global trends:

- Increased internationalization of academic exchanges, research and mobility of students and faculty.

- Digitalization of knowledge and teaching practices, revolutionizing access, learning and assessment.

- Interdisciplinarity and curricular innovation, required to address the complex challenges of the 21st century.

- Public-private partnerships and diversified funding to support research and student entrepreneurship.

These transformations are redefining not only educational models but also the social responsibilities of higher education institutions.

2. Local impact: Universities as drivers of territorial development

While universities operate within a global ecosystem, their impact is first measured locally:

a) Contribution to employability: University programs must be aligned with local labor market needs: technical skills, entrepreneurial mindset and critical thinking.

b) Research addressing community challenges: Universities are becoming innovation hubs tackling local issues such as food security, public health, sustainable energy and climate change.

c) Social cohesion and inclusion: Higher education promotes equity by providing access opportunities to marginalized populations, thereby strengthening social cohesion and justice.

d) Economic dynamism: Through the creation of start-ups, technology transfer and incubators, academic institutions become regional economic engines.

3. From global vision to local action

- Contextualization of programs: Adapting curricula to the sociocultural and economic realities of territories.
- Strengthening institutional capacity: Investing in teacher training, university governance and infrastructure.
- Multi-stakeholder partnerships: Building synergies between universities, public authorities, the private sector and civil society to co-create sustainable solutions.

Conclusion. Higher education cannot be viewed solely in terms of isolated academic excellence. It must be a central actor in responsible local development, guided by an inclusive global vision tailored to the specific contexts of each community. I strongly affirm that the local anchoring of universities, when enriched by innovative global perspectives, constitutes one of the most powerful pillars for building resilient, equitable and prosperous societies.

SUBJECTIVE WELLBEING AND THE IMPACT OF LONELINESS IN ACADEMIA

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In recent years, subjective wellbeing has been the focus of a significant amount of research. Subjective wellbeing is often described according to three main criteria: first, satisfaction with life (this can be evaluated by asking people whether they are satisfied with their lives overall); second, emotions (a low level of negative emotions should lead to a high level of well-being) and finally, psychological well-being and eudaimonic well-being (living a fulfilled life) (Diener, 2000; Argyle, 2001). Since loneliness is also considered to be a subjective and negative experience as a result of few social contacts or intimate relations (Yanguas *et al*., 2018), this paper considers the link between loneliness and the impact on wellbeing in academia. Previous research has established loneliness among university students as a predictor of diminished wellbeing (Douwes *et al*., 2022). However, very few studies have considered diminished wellbeing in relation to lecturers and higher education staff. While Deming (2023) contends that loneliness is essential for writing creativity, this paper seeks to analyse how loneliness in academia can have negative repercussions on academic staff's wellbeing. It will examine in particular how recent transformations of higher education including institutional constraints, virtual meetings and classes, competitive pressures and other factors have led to an increase in loneliness among faculty members. It draws on two comparative case studies of the French and British higher education systems to underline that cultural factors can also play an important role in isolating faculty staff. Measures to mitigate the negative impacts of loneliness which has arisen in the current global competitive arena of higher education will also be discussed.

Keywords: Subjective wellbeing, higher education.

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IKEA EFFECT IN THE EVALUATION OF ACADEMIC ASSIGNMENTS

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The IKEA effect refers to a cognitive bias whereby people tend to overvalue products or outcomes they have contributed effort to. This study examines how this bias manifests in academic settings, specifically in the evaluation of student assignments. The research consists of three studies: the first analyzed 115 final projects and found that academic advisors consistently graded their own students' work higher than did external evaluators - on average, by about 5%. The second and third studies showed that students also tended to rate their own assignments more generously than their peers or instructors did. These findings point to a systematic bias in academic assessment that has implications not only for fairness but also for the long-term integrity of academic evaluation systems. By highlighting the role of subjective involvement in shaping evaluation outcomes, the study contributes to broader discussions about sustainability in education - particularly in the context of maintaining fair, transparent and trust-based assessment practices.

Keywords: Academic assignments, final projects, behavioral economics, IKEA effect.

GULF ENGLISH IN OMAN: A PILOT STUDY OF UNIVERSITY STUDENT PERCEPTIONS AND ATTITUDES

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The Sultanate of Oman is a linguistically- and culturally-diverse society in which a wide range of languages and dialects used by Omani nationals and foreign expatriates are frequently encountered. In the country, Modern Standard Arabic and English generally act as gatekeepers of academic and professional success, status and social mobility. English further serves as the dominant lingua franca, especially in metropolitan areas, in addition to being a common second language across key areas that include business, commerce, entertainment, tourism, recreation, science and so on (Al-Issa & Al-Bulushi, 2012).

Within both Oman and the wider Arab Gulf region, there is increasing evidence of the emergence of a unique variety of World Englishes, termed 'Gulf English' in the literature, with distinct lexical, grammatical, phonological and sociolinguistic characteristics (Alshurafa, 2014; Fussell, 2011). Despite a limited amount of research examining the variety's features and factors associated with its emergence, little attention has been given to the perceptions and attitudes of Arab Gulf citizens towards Gulf English or indeed, to other commonly-encountered non-native varieties (Alzahrani, 2022; Zoghbor, 2014). This is particularly the case in Oman, where there is currently a dearth of published research explicitly focusing on the perceptions and attitudes users display towards Gulf English despite its reported prevalence (Buckingham, 2015; Poole, 2006; Siemund *et al*., 2020; Tuzlukova & Mehta, 2020).

Increasing understanding about perceptions and attitudes towards Gulf English and other English varieties in the country is, according to Elyas and Mahboob (2021), of vital importance as the use of English in the region is intricately tied with economic development, scientific progress and the efficient delivery of higher education. Further, despite the increasing prevalence of World Englishes in the Arab Gulf, the authors state that this area remains both "understudied and undertheorized" even as these varieties potentially impact Arab and national identities, cultural heritage and Arabic language knowledge and use.

While a growing number of scholars have examined the roles English plays across domains in the Arab Gulf, including in terms of its social, cultural and economic impacts (AlBakri, 2017; Elyas & Mahboob, 2021), relatively few have sought to explore either the use of Gulf English specifically in Oman (Buckingham, 2015; Poole, 2006) or Omani perspectives of this and other non-native varieties. The pilot study reported here begins addressing this gap by examining Omani university student perceptions and attitudes towards Gulf English in terms of power, solidarity, personal preference, ease of communication and acceptability. In doing so, it examines the following research questions: 1) What are the perceptions and attitudes towards Gulf English and native and non-native English varieties of university-level students in English-medium programmes in Oman? and 2) How do the variables of participant gender and higher education institution impact these?

To address these questions, an on-line survey utilising embedded audio of English speakers from Kachru's Inner, Outer and Expanding Circles presented with a semantic differential scale eliciting perceptions of 10 speaker traits, followed by a 6-item Likert-response attitudes to speaker scale, was administered to 21 students in two Omani higher education institutions. After determining the instrument's internal consistency with Cronbach alpha coefficients, data was examined through the use of descriptive analysis, including frequency counts, means and standard deviations, before a series of independent samples t-tests were calculated to explore if participant gender and institution had a statistically significant impact on composite scale scores. For this inferential analysis, acceptable probability levels following a Bonferroni correction to compensate for the possibility of enhanced type I error were established at $p \leq 0.01$.

Results indicate that Omani students agree there is a unique English variety spoken in the sultanate and Arab Gulf region. However, despite recognition of the prevalence of Gulf English and their own use of it in a range of situations, participants evinced the most positive perceptions of speakers from the non-Gulf and non-Arab countries of Sri Lanka, the USA and UK. Although students in this investigation believed the Omani speaker of Gulf English would be easy to communicate with, they did not wish to sound either like him or the Jordanian speaker. Moreover, while respondent institution did not impact upon these outcomes, female participants displayed somewhat negative attitudes towards the non-Gulf Arab speaker of English, though their male counterparts had more positive responses.

These results generally indicate the continued valorisation of Inner Circle English in Oman, even if the very positive perceptions of the Outer Circle speaker of Sri Lankan English were unexpected. Further, the finding that all participants expressed a desire to not sound like either the Omani or other Arab speaker while communicating in English raises the question of whether Gulf English and other varieties spoken across the wider Middle East and North Africa (MENA) region would be considered acceptable in more formal settings, including higher education. Moreover,

the fact that female students offered more negative attitudes towards the Jordanian Expanding Circle speaker than their male colleagues offers the intriguing possibility that Omani males and females may display markedly different attitudes to at least some English varieties - a finding that has not been widely reported elsewhere in the literature. Implications for Arab Gulf and MENA university language of instruction policies and the debate about the place of native and non-native Englishes across domains in the region and beyond, are discussed.

Keywords: Gulf English, World Englishes, socio-cultural identity, higher education, Arab Gulf, Middle East and North Africa (MENA).

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THE SOFT POWER OF HIGHER EDUCATION: THE NEW ROLE OF UNIVERSITIES IN THE CONTEXT OF PUBLIC DIPLOMACY

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In the context of globalization, the role of non-traditional actors in the system of international relations has significantly increased. In this context, higher education institutions no longer act only as structures that prepare human capital, but also as important actors that contribute to the formation of the soft power of states and actively participate in the process of public diplomacy. The new role of these institutions within the framework of public diplomacy necessitates the examination of their activities from a new perspective. The presented thesis analyzes the functional role of higher education institutions in the context of public diplomacy. The main purpose of the study is to examine the mechanisms of influence of these institutions on the formation of soft power, as well as the main tools used in this process.

Public diplomacy is a strategic direction of action that encompasses direct or indirect communication processes with the international community to achieve the foreign policy goals of states. Public diplomacy, which was first institutionalized as an official policy tool in the United States during the Cold War, can be explained as "Simply put, public diplomacy is the effort by the government of one nation to influence public or elite opinion of another nation for the purpose of turning the policy of the target nation to advantage" (Potter, 2003).

Although there have been various forms of public diplomacy in history, the term's entry into academic circulation is associated with the name of Edmund Gullion, dean of the Fletcher School of Law and Diplomacy, Tufts University, Massachusetts, USA. One of the founders of the Edward R. Murrow Center of Public Diplomacy under the faculty, Gullion first used the term in its modern sense in 1965. According to Gallion, public diplomacy encompasses areas of international relations that fall outside of traditional diplomacy (Republic of Turkey Presidency Communications Directorate, 2022).

For a more complete explanation of the essence of the concept of public diplomacy, it is necessary to consider the closely related concept of soft power. The concept was introduced into the field of international relations by the American academic and political scientist Joseph Nye in his book "Bound to Lead: The Changing Nature of American Power" published in 1990 and this concept has been dominant in international political discourse for the last 20-30 years. Soft power, defined as "the ability of a state to attract and persuade others through its culture, values, ideas and institutions", has provided a new approach to the power strategies of states in the context of the

collapse of the USSR and the acceleration of globalization. Nye (2004), in his book “Soft Power: The Means To Success In World Politics”, published in 2004, discussed the practical problems of implementing soft power and linked it to public diplomacy. Thus, these two concepts - public diplomacy and soft power - are closely related and public diplomacy is a mechanism or set of activities that activates the country's soft power potential.

In modern times, with the increase in the number of soft power resources, the scope and influence of public diplomacy have expanded and new directions have emerged. One of the new directions is education, science and knowledge-based public diplomacy. This direction is built on the ecosystem of science, education and knowledge and its main components.

The science, education and knowledge ecosystem encompasses the interconnected institutions, people, resources and strategies that connect the processes of knowledge creation, transfer and application. It includes government agencies, educational and research institutions, academies, human capital, knowledge and information infrastructure, government programs, as well as the tools and mechanisms used to implement programs and strategies.

As an important component of the science, education and knowledge ecosystem, mechanisms and tools of higher education institutions such as academic mobility, exchange, scholarship, grant programs, dual diploma initiatives, international cooperation projects, alumni networks, conferences and other scientific events serve to strengthen their position in the global scientific environment. This, in turn, affects the international recognition of the scientific and intellectual potential of the countries represented by these institutions and ultimately, the increase in their soft power and the strengthening of their global position. In other words, higher education institutions, acting as public diplomacy actors, contribute to the recognition of the country's culture and academic environment by foreign students and researchers, to the increase in the visibility of national values at the international level and to the establishment of multilateral cultural relations. Thus, the mechanisms of influence of higher education institutions within the framework of public diplomacy manifest themselves in various directions. These institutions, which are one of the main centers of knowledge production and transfer, are not only involved in the preparation of human capital and the formation of the intellectual potential of society, but also serve to expand the diplomatic, strategic and economic influence of the state and to shape its international image by acting as a platform that promotes cultural dialogue and creates investment opportunities, going beyond classical functions such as academic activity, teaching, research, innovation and social service.

This research paper presents a conceptual-theoretical framework and systematically explains the interrelationship between the role of higher education institutions in the global scientific environment and the soft power of countries. As a future research direction, the analysis

of specific country experiences can serve to empirically test this framework and further substantiate the generalizations obtained.

Keywords: Higher education, public diplomacy, soft power, education, science and knowledge-based public diplomacy.

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LANGUAGE POLICY OF AZERBAIJAN IN THE YEARS OF INDEPENDENCE (ANALYTICAL RESEARCH)

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This study is devoted to the language policy consistently carried out during the years of independence, especially after the restoration of Azerbaijan's independence (October 18, 1991) and the adoption of the Constitutional Act "On the State Independence of the Republic of Azerbaijan". The authors examined language policy as an integral part of national identity, studied the factors influencing its formation and showed that its theoretical and legal aspects are closely related to language ideology and planning. The thesis noted that the transition to the Latin script was also part of the language policy pursued in Azerbaijan.

Introduction: Language policy is one of the main strategic directions that plays an important role in the formation of the state's national identity, cultural security and social integration. After gaining independence, language policy in the Republic of Azerbaijan has become one of the most important components of national state-building. Strengthening the position of the Azerbaijani language as the state language, its promotion in the international arena, as well as expanding its application in all spheres of public life have been one of the priority directions of state policy (Hajiyev, 2012).

After the restoration of state independence in 1991, the Azerbaijani language was accepted not only as a means of communication, but also as one of the main pillars of national ideology, statehood thought and the protection of cultural heritage. One of the main goals of language policy was to ensure the leading position of the Azerbaijani language in state administration, the education system, mass media and scientific activities (Mahmudov, 2012).

Among the main factors influencing the formation of language policy during the period of independence, globalization processes, rapid development of information technologies, expansion of international relations and the formation of a multicultural environment occupy a special place. These factors played an important role in determining the development strategy of the Azerbaijani language and expanding its functional capabilities (Kazimov, 2015).

The legal basis of language policy in the Republic of Azerbaijan is primarily regulated by the Constitution and special legislative acts. The Constitution of the Republic of Azerbaijan, adopted in 1995, established the Azerbaijani language as the state language and legally determined

the state's responsibility to ensure the development of this language (Law of the Republic of Azerbaijan on the State Language, 2002).

The All-Nation leader Heydar Aliyev played a special role in the formation of language policy. During his leadership, the position of the Azerbaijani language as the state language was strengthened, the process of transition to the Latin script was accelerated and important steps were taken towards the development of the normative base of the language (Aliyev, 2001). At the same time, the language policy implemented by the President of the Republic of Azerbaijan Ilham Aliyev in modern times has marked the beginning of a new stage in the protection, development and international promotion of the Azerbaijani language. Within the framework of this policy, the expansion of the application of the language in the electronic environment, the improvement of the terminological system and the observance of language norms in state administration were identified as the areas of priority (Mahmudov, 2020).

All this demonstrates that the language policy implemented in Azerbaijan during the years of independence is a complex and multifaceted state strategy aimed not only at protecting the language, but also at expanding its functional and communicative capabilities.

1. Theoretical foundations of Azerbaijani language policy. The concept of language policy is one of the important research directions in modern linguistics and sociolinguistics. Language policy refers to a system of purposeful measures implemented by the state or public institutions regarding the use, development and regulation of the language (Kaplan & Baldauf, 1997). Language policy consists of three main components:

- Language planning;
- Language ideology;
- Regulation of language practice.

These components determine the state's attitude to the language and its position in society (Kaplan & Baldauf, 1997). The language policy of Azerbaijan was also formed on the basis of these principles and its main goal is the protection and development of the national language. This policy is implemented through both legal and institutional mechanisms (Kazimov, 2015).

2. Legal basis of the Azerbaijani language policy during the period of independence. The following documents constitute the legal basis of language policy in the Republic of Azerbaijan:

- Constitution of the Republic of Azerbaijan;
- Law on the State Language;
- Decree on the Establishment of the Azerbaijani Alphabet and the Day of the Azerbaijani Language;
- State programs in the field of terminology.

These documents create legal bases for the functioning of the Azerbaijani language as the state language (Mahmudov, 2017).

The Law "On the State Language", adopted in 2002, is one of the important normative documents in the field of use and protection of the Azerbaijani language. This law regulates the use of the Azerbaijani language in state administration, the education system and the mass media (Law of the Republic of Azerbaijan on the State Language, 2002).

3. Transition to the Latin script and language policy. One of the most important language policy measures implemented during the period of independence was the transition to the Latin script. This process expanded the international communication capabilities of the Azerbaijani language and accelerated its integration into information technologies (Hajiyev, 2012).

The transition to the Latin script was fully implemented by the decree signed in 2001. This decision is considered one of the important indicators of the modern stage of development of the Azerbaijani language (Mahmudov, 2017).

4. Azerbaijani language policy in the context of globalization. The process of globalization has strengthened the mutual influence of world languages. While this process has, on the one hand, created new opportunities for language development, on the other hand, it has made the issue of protecting national languages relevant (Crystal, 2003).

Taking these processes into account, the Azerbaijani language policy seeks to create a balance between the protection of the national language and international communication (Kazimov, 2015).

Conclusion. The analysis shows that the language policy implemented in the Republic of Azerbaijan during the years of independence is one of the important directions of national state building. This policy is aimed at strengthening the position of the Azerbaijani language as the state language, expanding its functional capabilities and promoting it at the international level.

Keywords: Language policy of Azerbaijan, formation of language policy, important factors, theoretical foundations, legal foundations, globalization and language.

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ENHANCING VOCABULARY AND GRAMMAR ACQUISITION THROUGH ADAPTIVE LEARNING SYSTEMS

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Adaptive learning systems play a crucial role in modern education systems. They include digital platforms that personalize education by adjusting content, pace and difficulty in real time based on the individual behavior and abilities of students (pupils) and are also controlled by artificial intelligence. Through adaptive learning, expanding vocabulary or mastering grammar increases student participation in the lesson, supports students who are particularly weak in this area and develops them to achieve the targeted goal of optimizing learning outcomes.

The main features and components of an adaptive learning system are defined as following:

1) This includes the performance (language processing) and competence (language competence) that Chomsky (1969) once put forward. That is, a three-part educational model: 1) the learner model (monitoring performance and competence); 2) determining the learning goal and 3) the adaptation model (determining adapted paths).

2) Real-time adaptation - in this case, the material that the student is struggling with is adjusted by the system, that is, additional practice or more advanced material is provided for the student if he/she excels;

3) One of the best advantages of the system is that students are continuously provided with feedback, meaning they can get information about their performance and thus be able to correct their mistakes.

The benefits of an adaptive learning system in education can be listed as following:

a) Personalized learning, data-driven skills are at the forefront, which allows students to effectively master learning skills. Therefore, this competency is named *Improved performance* in this system.

b) Specific content related to the learning can motivate students, which makes them not shy away from materials that are sometimes easy and sometimes difficult. This is called *Increased development.*

c) Individualized learning is defined among large groups of students and across different subjects and this is called *Scalable Personalization* (Xu, 2020).

Kurt (2021) writes that adaptive learning is a part of interactive learning that meets and satisfies the needs of students, thereby distinguishing it from a uniform curriculum.

The development of technology can facilitate the implementation of adaptive learning. Three areas in which this training can be applied have been identified: *adaptive content, adaptive sequence and adaptive assessment* (Peña-Ayala, 2012).

The word grammar means "art of writing" in Greek. Grammar is considered to be the most appropriate description of the term.

Grammar in any language:

- It involves the systematic study and description of the language;
- It includes a set of rules and examples regarding the syntax and word structures (morphology) of the language;
- The grammar of the English language includes basic axioms such as verb tenses, articles, adjectives (their correct order), how to form questions, how to distinguish words ending in *-ing*, etc.

Crystal (1995) writes about Grammar: *"Language cannot function without grammar. We can put it simply: people need grammar to communicate effectively. Speakers and listeners, writers and their audiences, must use the same grammatical language to understand one another. In other words, a language without grammar is like a pile of bricks without mortar (to hold them together). Grammar is the study of all the possible contrasts of meaning that can be created within sentences. The "rules" of grammar tell us what is what"*.

Adaptive learning is also observed in the acquisition of grammar in modern times. In grammar, adaptive learning is mainly based on the individual acquisition of the topic (grammar rule) by the grammar learner and on the individualization of language education by adjusting the difficulty of the content in real time based on the errors he/she makes. This replaces one-size-fits-all methods with individualized ways, increasing accuracy and memorization through targeted practice. In this case, it is also considered to be appropriate to use Artificial Intelligence tools.

The main aspects of adaptive grammar learning are as following:

- The first aspect is *real-time adaptation*.
- The second aspect is *personalized learning methods*, where students' individual skill levels are assessed and personalized content is provided for each student.
- The next aspect (third) is called *system components*. This aspect includes a domain model that determines students' tracking skills and grammatical rules.
- *Effectiveness* is known as the fifth aspect. This educational system (adaptive) can lead to significant improvements in grammatical accuracy and higher retention rates.

The fifth and final aspect is known as *instructional strategies*. This includes context-based learning and the use of immediate feedback.

Adaptive grammar learning can lead to the formation of the following cognitive skills:

Entering new information into memory. Obtaining additional information related to the lesson. For example, when preparing for a lesson, a student can obtain the full text of any topic through AL. By reading the obtained text, the student can further improve his/her knowledge of that topic;

Formation of a sense of independence. The student can freely prepare written tasks and topics through artificial intelligence, that is, self-check and correct them.

Increased creativity. At this time, the student can use AL techniques to create new topics, texts, ideas, etc. related to grammar.

Formation of the ability to choose. Selecting and studying examples related to the topic when preparing homework.

AL can automate the process of checking students' knowledge, making it faster and more objective. AL systems analyze students' answers to grammar tests and other tasks and accelerate this process.

Create adaptive learning platforms that individually adapt to the needs and abilities of each student.

Thanks to the use of AL, systems can automatically adapt learning material and tasks to students' knowledge and performance levels.

Adaptive learning is a technique for using data-driven instruction to adjust and tailor learning experiences to meet the individual needs of each student. Adaptive learning systems can track data such as student progress, engagement and performance and use the data to provide personalized learning experiences.

The adaptive learning system of English vocabulary involves helping students increase their vocabulary, improve their learning efficiency and create a desire to learn vocabulary.

The main component of the adaptive learning system is the English vocabulary learning module, which mainly corresponds to the information acquisition and comprehension stage. This module mainly focuses on the application of machine learning methods to assess the characteristics of the learner. The adaptive learning system collects basic information from the behavioral database, such as the average learning time of learners, the average daily vocabulary growth, the total number of vocabulary acquisitions and the average time to answer questions.

Adaptive learning gives some data to help students' adaptation and students are given some time to be able to allow them to be more successful and self-directed at their own pace (Kurt, 2021).

This potentially increases student engagement by providing lessons and activities that are created to the needs of them.

It also provides a structure that includes course objectives, lessons, experiential activities and assessments and shows students how each element of the course relates to the course

objectives. Similarly, students having difficulty mastering a concept, faculty may conclude that some of the instructional elements are not aligned with the objectives.

The system covers relevant and timely data that faculty and administrators can use to determine how targeted subgroups in a course are performing as well. It is a potentially powerful tool for identifying and addressing barriers to equity for minority and poverty-affected students; it allows faculty and administrators to provide timely and targeted support by identifying individual students or even specific sections of a multi-section course that require attention.

Keywords: Adaptive, system, learning, education, student.

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THE DOING AND (UN)DOING OF COLLEGE IDENTITY: A MULTIMODAL ANALYSIS OF THE USE OF SOCIAL MEDIA BY COLLEGE STUDENTS WITH ASD IN GREEK UNIVERSITIES

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Background: Student life can be a period of considerable vulnerability for individuals with Autism Spectrum Disorder (ASD), characterized by prolonged phases of social detachment. Most universities respond to this state, by attending to the physical inclusion of students with ASD while totally ignoring their digital activities - which have now become a fruitful ground for college socialization. Research in this field follows the "physicality principle", focusing mainly on interactions that occur in the classroom context, ignoring multimodal "new literacies" (e.g., memes, avatars, interface customization) an area that captures much of the developing sociality of individuals with ASD. This study then, addresses this gap by examining how autistic students weave the digital modes in the context of their student social life but also how they manage their unfolding online identities.

Objectives: This research develops over three aims: (1) map the semiotic resources (visual, textual, spatial etc) autistic undergraduates use to construct their digital self-presentation or identity; (2) Analyze the relationship between these modes to locate mechanisms of "digital camouflaging" versus authentic self-expressions and (3) Examine the way platform affordances facilitate or hinder social belonging.

Methods: The study employs a Participatory Digital Ethnography design. Data is collected through a "Scroll-Back" interview protocol, where participants (N=15-20) guide researchers through their social media history. Analysis utilizes Multimodal Critical Discourse Analysis (MCDA), a framework developed by Kress and van Leeuwen (2004), applying social semiotic frameworks to analyze the way different modes work together on to make meaningful scenarios.

Anticipated Results: We hypothesize the identification of distinct "multimodal assemblages" used for identity management, such as the strategic use of non-human avatars to mediate eye-contact sometimes identified as "The Digital Shield". Furthermore, the study expects to reveal how "modal dissonance" - where textual captions contradict visual emotional signals - serves as a sophisticated form of digital camouflaging.

Implications: By shifting the analytical lens from deficit-based text analysis to asset-based multimodal analysis, this study underlines the communicative competence of autistic students.

Findings, will inform the development of neuro-inclusive digital learning environments and support services that leverage visual strengths rather than relying solely on text-heavy communication. Findings, will also impact the policies embraced by Universities for helping individuals with ASD broadening the current status of inclusion practices

Keywords: Autism spectrum disorder, multimodality, digital ethnography, camouflaging, higher education, social media.

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DOCTORAL EDUCATION IN GEORGIA: STAKEHOLDER PERSPECTIVES AND IMPLICATIONS FOR EDUCATION POLICY REFORMS

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Doctoral education is increasingly recognised as a strategic priority within higher education systems, particularly in countries undergoing systemic transformation and alignment with European standards. In Georgia, recent developments in doctoral education are closely linked to broader education policy reforms aimed at enhancing quality, internationalisation and relevance to socio-economic needs. This study presents the findings of a comprehensive stakeholder analysis of doctoral education in Georgia, conducted within the framework of the Internationalisation of Doctoral Education in Georgian Universities (IDEG) project, funded by the Competitive Innovation Fund (CIF). The research specifically examines how current practices and challenges in doctoral education inform ongoing and future education policy reforms.

The study adopts a qualitative research design, based on semi-structured interviews with key stakeholder groups, including doctoral candidates, academic supervisors, institutional leaders and employers. This multi-perspective approach enables a comprehensive understanding of systemic issues and policy gaps within the doctoral education landscape. The data were analysed using thematic analysis, with particular attention to areas where institutional practices diverge from national policy frameworks and European Higher Education Area (EHEA) expectations.

The findings indicate that, although doctoral education policies in Georgia are formally aligned with international frameworks such as the Salzburg Principles and the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG 2015), significant gaps remain at the level of policy implementation. One of the key issues identified is the lack of clearly defined and enforced supervision standards. While national and institutional regulations outline general expectations, they do not provide sufficiently detailed guidance or accountability mechanisms, resulting in inconsistent supervision practices. This highlights the need for policy reforms that establish clearer supervision models, quality assurance measures and professional development requirements for supervisors.

Access to research infrastructure and funding also emerges as a critical policy concern. The study reveals disparities across institutions and programmes, with limited and uneven access to research facilities, academic resources and financial support. These challenges suggest the need

for more coordinated national policies that ensure equitable access to research environments and promote resource-sharing mechanisms, including through international partnerships.

Another important dimension relates to the alignment of doctoral education with labour market needs. The findings demonstrate that current policy frameworks insufficiently address the development of transferable skills and non-academic career pathways. Employers emphasise the importance of competencies such as communication, problem-solving and interdisciplinary collaboration, which are not systematically embedded in doctoral programmes. This indicates a need for policy reforms that integrate transferable skills training and strengthen cooperation between higher education institutions and the labour market.

Internationalisation, while recognised as a policy priority, remains largely dependent on externally funded initiatives and lacks sustainable institutionalisation. The study highlights the limited integration of internationalisation at home practices, such as co-supervision, joint programmes and international research collaboration. Policy reforms in this area should focus on embedding internationalisation within institutional strategies and creating incentives for sustained engagement beyond project-based activities.

At the institutional level, the absence of formally established doctoral school structures reflects a broader policy gap. Although elements of doctoral schools exist in practice, they are not supported by a comprehensive regulatory framework. The findings suggest that the development of structured doctoral schools could serve as a key reform mechanism, enabling more coherent organisation of doctoral education, improved support services and stronger quality assurance.

Workload distribution and financial support mechanisms further illustrate the need for policy intervention. Many doctoral candidates face significant challenges in balancing employment and research responsibilities, which negatively affects completion rates and research quality. Policy reforms could address these issues through targeted funding schemes, flexible employment arrangements and incentives for research engagement.

Overall, the study demonstrates that doctoral education in Georgia is at a critical stage of policy development, where formal alignment with European standards must be complemented by effective implementation and system-level coordination. The findings provide evidence-based insights that can inform ongoing education policy reforms, particularly in areas related to supervision quality, research infrastructure, internationalisation and labour market integration.

The paper argues that a comprehensive and coordinated policy approach is essential for strengthening doctoral education in Georgia. By linking stakeholder perspectives with policy analysis, the study contributes to the broader discourse on higher education reform and offers practical recommendations for enhancing the effectiveness, relevance and international competitiveness of doctoral education systems.

Keywords: Doctoral education, education policy reforms, Georgia, stakeholder analysis, internationalisation, higher education policy, supervision, IDEG project.

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APPLICATION OF ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION SYSTEMS (THE CASE OF AZERBAIJAN AND RUSSIA)

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In modern times, the rapid development of digital technologies has led to fundamental changes in the higher education system. In particular, the implementation of artificial intelligence (AI) technologies plays an important role in the transformation of teaching, learning and scientific-research activities. AI tools contribute to expanding educational opportunities, automating assessment processes and increasing the efficiency of academic activity. At the same time, the widespread use of these technologies also makes issues such as academic integrity, ethical norms and the protection of analytical thinking skills. Therefore, the relevance of the paper lies in the need to examine artificial intelligence technologies in the higher education system in Azerbaijan and Russia. The object of the research is artificial intelligence technologies in the higher education system in both countries and the subject is the integration of these technologies into universities. The main goal of the study is to assess the impact of this integration on the educational system in these countries and to identify effective implementation mechanisms. The research is based on legislative documents and international scientific research. During the study, a systematic approach, content analysis and analytical generalization methods are used.

Overall, the initial stage of the use of AI systems was carried out in cooperation with IBM, Google and other technology companies. At that time, AI was mainly used for functions such as supporting distance education, automating assessment, developing adaptive learning content, creating personalized learning opportunities. In the subsequent stage, efforts were carried out on making AI technologies accessible to lecturers and students through tools in higher education institutions. However, the widespread use of AI also introduces certain risks in the educational process. For instance, it may negatively affect the development of analytical thinking and critical analysis skills, creates opportunities for academic misconduct and problems may arise with the accuracy of data and the correctness of references. In general, the integration of AI in higher education can be categorized into four main areas:

- Student support,
- Teaching support,
- Research support and
- Optimization of administrative management (Gerasimenko & Ulyanova, 2025; Gasanova & Romanova, 2024).

Russian higher education institutions have been actively integrating AI into these areas, although the level of implementation and regulation varies significantly across universities. At Lomonosov Moscow State University (MSU), the AI Institute established in 2020 plays a key role in developing research and training in machine learning, natural language processing, computer vision and generative AI models. While MSU does not yet have a unified university-wide AI policy, participation in initiatives such as the AI Alliance reflects its commitment to ethical principles like transparency and data security. At the faculty level, some regulations already exist; for instance, the Faculty of Economics allows the use of generative AI tools in thesis writing, provided that their use is clearly referenced. The Higher School of Economics (HSE) introduced a formal policy on AI in academic work in 2024. This policy defines when and how students can use AI tools and requires disclosure in certain cases. HSE has also allowed the use of tools such as YandexGPT for thesis writing in selected programs, while simultaneously expanding staff training in AI. However, challenges remain, including insufficient digital infrastructure and ongoing ethical and legal concerns. ITMO University has adopted AI tools more actively in technical and applied areas, including the development of the SMILE cloud platform for automating technological and business process modeling. The university also offers courses in data analysis and programming, particularly using Python. The Moscow Institute of Physics and Technology (MIPT) is known for its programs in computer science and permits the use of AI tools in academic writing, although it still lacks a formal regulatory framework governing their use. Bauman Moscow State Technical University (BMSTU) has developed multiple academic programs in AI since 2021 and allows students to use AI tools in thesis preparation in a limited and responsible way, with mandatory disclosure. Moscow State Pedagogical University (MSPU) was among the first institutions to officially permit the use of generative AI tools in thesis writing, while also requiring students to verify AI-generated information for accuracy. Presidential Academy (RANEPA) focuses more on monitoring and detecting AI-generated content through plagiarism detection systems and has also invested in retraining students in AI-related fields. Overall, AI in Russian higher education is being used both as an educational tool and as a strategic development direction. However, key challenges remain, including uneven digital infrastructure, lack of unified regulations, ethical concerns and issues related to academic integrity. These factors indicate that while AI adoption is rapidly growing, universities are still in the process of developing balanced and responsible governance frameworks for its use (Gerasimenko & Ulyanova, 2025).

Also, several initiatives have been undertaken in Azerbaijan regarding this process. A key initiative is the decree of President Ilham Aliyev on the “Artificial Intelligence Strategy of the Republic of Azerbaijan for 2025-2028” adopted on March 19, 2025. The basis of the decree is to accelerate the development of artificial intelligence in the country, strengthen the transition to a digital system, improve public administration in the field of artificial intelligence, expand scientific

research, increase the potential of qualified specialists. Nevertheless, several challenges remain, including ethical concerns related to AI, issues of information security and data protection, as well as a shortage of qualified specialists. In terms of personnel training, the establishment of an Artificial Intelligence Academy, the development of new artificial intelligence programs in higher education institutions and the creation of specialized research centers are identified as priorities (https://e-qanun.az/framework/59218). In accordance with the strategy, a range of institutional measures are currently being implemented in the country's higher education institutions towards the development of artificial intelligence. Thus, AI-related topics are included in the teaching process and scientific seminars, conferences and other events are organized to increase the knowledge and skills of students and lecturers in this sphere. These processes contribute to strengthening digital transformation by accelerating the integration of artificial intelligence in higher education.

The study shows that approaches to the use of artificial intelligence in higher education have changed significantly in recent years. While previously the main focus was on training AI specialists, currently the development of AI skills of lectures and students in all specialties is considered a priority. The universities also accept the use of AI in scientific research and the teaching process. However, ethical issues related to the use of AI, the risk of academic integrity, as well as the weakening of students' independent thinking skills require serious attention. Therefore, the use of AI should be implemented in a balanced way and its role should be defined only as a supporting tool. Consequently, artificial intelligence creates both broad opportunities and certain risks in higher education. The development of effective educational strategies, the formation of ethical rules and increasing AI literacy are the key conditions for the successful development of the future education system.

Keywords: Azerbaijan, Russia, higher education, artificial intelligence, university.

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MONITORING COMMUNITY ENGAGEMENT AND SOCIAL RESPONSIBILITY IN TURKISH HIGHER EDUCATION: TRENDS AND SHIFTS IN NATIONAL INDICATORS (2019-2025)

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Community engagement and social responsibility have become central dimensions of higher education, reflecting universities' expanding roles beyond teaching and research. In Türkiye, these activities are systematically monitored through national evaluation frameworks. Despite the growing prominence of monitoring systems, limited attention has been paid to how changes in monitoring frameworks shape the visibility and interpretation of community engagement activities. This study aims to examine transformations in the monitoring of community engagement and social responsibility in Turkish higher education and to identify trends in key indicators.

The study adopts a descriptive and comparative design based on secondary data analysis. Data were drawn from the University Monitoring and Evaluation Reports published annually by the Council of Higher Education (YÖK) and covering the period 2019–2025. Indicators listed under the heading "Community Engagement and Social Responsibility" were analyzed using a two-step approach. First, changes in the scope of monitored indicators between 2019 and 2025 were examined through document analysis. Second, indicators reported consistently across years were subjected to quantitative trend analysis. Core indicators included institution-based and student-based social responsibility projects, projects targeting disadvantaged groups and accessibility-related initiatives. Quantitative trends were analyzed using descriptive statistics and visualized through tables and figures, with findings interpreted in relation to shifts in the monitoring framework.

An analysis of the *University Monitoring and Evaluation Reports* published by the Council of Higher Education (YÖK) between 2019 and 2024 reveals a clear shift in the scope and structure of indicators used to monitor community engagement and social responsibility in Turkish higher education. Early monitoring frameworks primarily emphasized activity-based outputs, such as the number of social responsibility projects, continuing education activities, career center events and environmental sustainability indicators. From 2021 onwards, the inclusion of indicators related to donations, scholarship coverage and expenditure per student signaled a broader evaluative focus that extended beyond activities to encompass resource allocation and social support mechanisms. This transformation became more pronounced in 2023 and 2024 with the integration of

accessibility-related indicators (e.g., WCAG compliance and disability-friendly resources), science communication activities and student-based social responsibility projects. Overall, these developments suggest a transition from a static, activity-centered monitoring approach toward a more dynamic framework that foregrounds inclusivity, accessibility and social impact. Year-by-year changes in the monitored indicators are summarized in Table 1.

Table 1. Changes in the monitoring indicators for community engagement and social responsibility in Turkish higher education (2019-2025)

Indicator Category / Year	2019	2020	2021	2022	2023	2024	2025
Number of social responsibility projects	✓	✓	✓	✓	✓	✓	✓
Number of certificates issued by Continuing Education Centers and Language Centers	✓	✓	✓	✓	✓	✕	✕
Number of activities conducted by career centers	✓	✓	✓	✓	✓	✕	✕
Number of projects conducted jointly with public institutions	✓	✓	✓	✓	✕	✕	✕
Number of activities targeting disadvantaged groups	✓	✓	✓	✓	✓	✓	✓
“Accessible University”, “Accessible Flag” and disability-friendly awards	✓	✓	✓	✓	✓	✓	✓
Environmental sustainability indicators	✓	✓	✓	✓	✕	✕	✕
Amount of donations received by the university	✕	✕	✓	✓	✓	✓	✓
Proportion of students benefiting from scholarships	✕	✕	✓	✓	✓	✓	✕
Expenditure per student	✕	✕	✓	✓	✕	✕	✕
Proportion of female academic staff	✕	✕	✕	✕	✓	✕	✕
Accessibility indicators (WCAG compliance, disability-friendly library resources, accessibility inventory)	✕	✕	✕	✕	✕	✓	✓
Number of science communication activities	✕	✕	✕	✕	✕	✓	✓

Despite the variability observed in the monitoring framework over time, several indicators were reported consistently throughout the 2019-2025 period. These core indicators include institution-based social responsibility projects, student-based social responsibility projects, projects targeting disadvantaged groups and accessibility-related initiatives such as “Accessible University” awards. This section presents the quantitative findings derived from analyses of these continuously monitored indicators. The findings demonstrate an overall upward trend in community engagement and social responsibility activities. Although the number of institution-based social responsibility projects fluctuated across years, an overall increase was observed over the study period, with particularly notable rises in 2022 and 2025. Student-based social responsibility projects followed a similar trajectory, reaching consistently high levels and displaying trends parallel to those of institution-based projects. Projects targeting disadvantaged groups exhibited higher absolute numbers compared to other indicators and showed marked increases in 2022 and 2025. This pattern suggests that initiatives focusing on disadvantaged

populations occupy a central quantitative position within the broader landscape of community engagement activities in higher education. Indicators related to accessibility further reveal a steady increase in both the number of universities awarded the “Accessible Flag” and the number of accessibility-focused projects over time. The growth observed in accessibility-focused projects, in particular, indicates that inclusive and disability-friendly practices have become increasingly visible within the monitoring system. Nevertheless, the relatively lower absolute values of these indicators compared to other social responsibility measures suggest that accessibility-related efforts tend to follow a more selective and criteria-driven trajectory rather than a purely quantitative expansion. Quantitative trends for the continuously monitored indicators are illustrated in Figure 1.

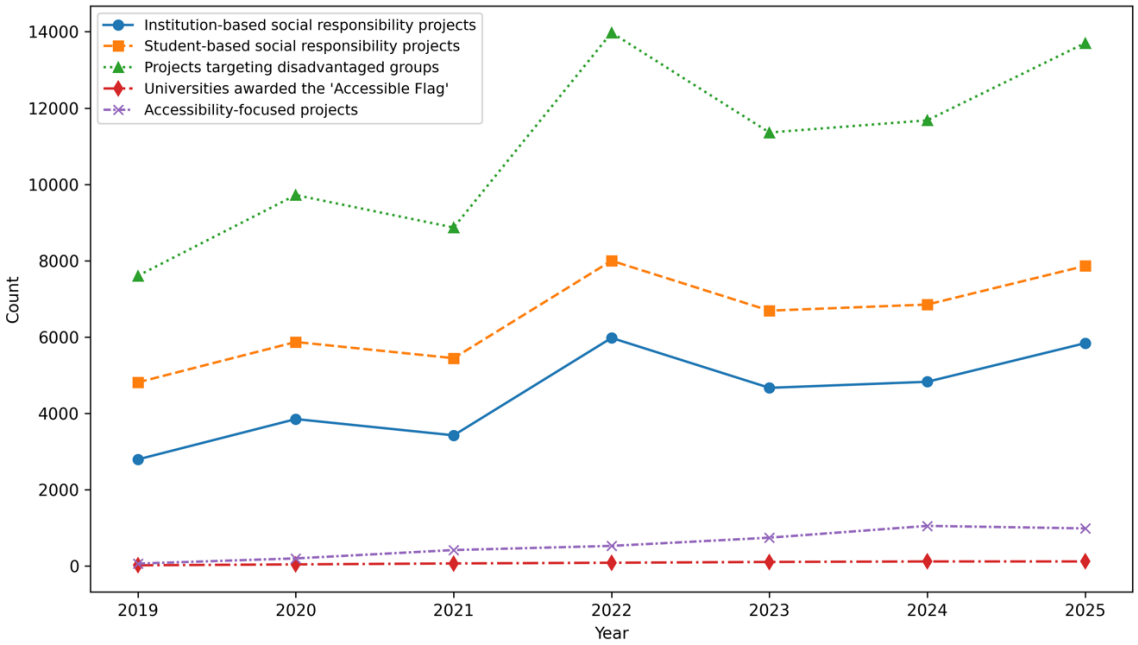

Figure 1. Trends in key community engagement and social responsibility indicators in Turkish higher education (2019-2025)

The results indicate a clear shift in how community engagement and social responsibility are monitored in Turkish higher education, moving from an activity-oriented framework toward a more differentiated approach that increasingly emphasizes inclusivity, accessibility and social impact. Quantitative trends show an overall increase in social responsibility activities, particularly in student-based initiatives and projects targeting disadvantaged groups, highlighting the central role of these areas in universities’ engagement with society. At the same time, the growing visibility of accessibility-related indicators suggests an emerging institutional focus on inclusive practices, although these initiatives remain more selective and criteria-driven than other forms of

community engagement. These findings underline the importance of continuity and transparency in monitoring frameworks for meaningful longitudinal assessment and point to the need for higher education institutions to align their strategies with evolving evaluation criteria.

Keywords: Higher education monitoring, higher education governance, community engagement, social responsibility, quantitative trend analysis, accessibility and inclusion, Türkiye.

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ENTREPRENEURIAL HOSPITALITY EDUCATION: BUILDING INNOVATION ECOSYSTEMS THROUGH UNIVERSITY-INDUSTRY COLLABORATION AND MICRO-CREDENTIALS

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Entrepreneurship education has emerged as a strategic pillar in contemporary higher-education reform agendas responding to rapid structural changes in service-sector economies and the accelerating pace of digital transformation. Within this evolving landscape, hospitality education - traditionally focused on operational competence and service delivery skills - must increasingly reposition itself as an innovation-driven academic domain that supports entrepreneurial mindsets, applied research engagement and flexible competency-based learning pathways. Universities are therefore expected not only to prepare employable graduates but also to cultivate future service innovators capable of contributing to regional economic ecosystems through start-up formation, technology adoption and service-design innovation (World Economic Forum, 2023).

Recent scholarship highlights that hospitality graduates require hybrid competencies combining operational expertise with digital literacy, sustainability awareness and entrepreneurial capability to remain competitive in evolving labour markets (Sigala, 2018). This shift is particularly significant in emerging economies where higher-education institutions are increasingly expected to function as catalysts for local innovation ecosystems through structured university-industry collaboration platforms. Experiential learning environments embedded within hospitality curricula can significantly strengthen students' opportunity recognition skills, innovation capacity and applied problem-solving abilities when aligned with industry mentorship and incubation support structures (Kolb, 1984).

One of the most promising mechanisms supporting this transformation is the emergence of stackable micro-credentials as flexible certification pathways aligned with lifelong learning trajectories and rapidly changing professional skill requirements. Micro-credentials allow hospitality students and professionals to acquire targeted competencies in areas such as digital guest-experience management, sustainable service operations, hospitality analytics and service innovation entrepreneurship without requiring full degree re-enrolment cycles. International policy frameworks increasingly recognize micro-credentials as instruments supporting workforce adaptability, inclusion and employability across evolving service economies (OECD, 2021).

Within hospitality education, competency-based modular learning pathways enable institutions to remain responsive to employer expectations while simultaneously strengthening institutional relevance in competitive higher-education ecosystems.

Equally important is the role of structured university-industry collaboration in supporting entrepreneurial learning environments. Partnerships with hotels, tourism enterprises and service-sector stakeholders provide opportunities for mentorship engagement, innovation labs, applied consultancy projects and student-led incubation initiatives that translate classroom knowledge into real-world service innovation solutions. Evidence suggests that such collaborative ecosystems enhance graduate employability outcomes while strengthening knowledge-transfer mechanisms between higher-education institutions and regional service industries (Thomas & Busby, 2003). For hospitality schools, these partnerships create opportunities to reposition themselves as applied innovation hubs rather than purely teaching-focused academic departments.

This paper proposes a conceptual framework for strengthening entrepreneurial hospitality education through three interconnected transformation drivers supporting institutional innovation ecosystems. The first driver emphasizes embedded industry mentorship models that integrate hospitality professionals into curriculum delivery through structured engagement formats including guest-expert teaching, innovation clinics and co-supervised applied research projects. Such mentorship environments contribute to contextual learning experiences that strengthen entrepreneurial confidence and improve graduate readiness for both employment and venture creation pathways.

The second transformation driver highlights the importance of student-led hospitality innovation laboratories designed to support applied research translation into prototype service solutions addressing emerging sector challenges. Innovation labs function as collaborative learning environments where interdisciplinary student teams experiment with service-design thinking, sustainability solutions and digital-experience platforms in partnership with industry stakeholders. These innovation spaces enable hospitality institutions to bridge theory-practice gaps while supporting institutional contributions to regional development agendas and entrepreneurial ecosystems (Etzkowitz & Zhou, 2017).

The third transformation driver focuses on competency-based micro-credential frameworks aligned with emerging service technologies and evolving professional standards across hospitality and tourism sectors. Stackable credential architectures allow institutions to respond more effectively to dynamic labour-market demands while supporting continuous professional development pathways for both undergraduate learners and industry practitioners. When integrated strategically within entrepreneurship-oriented hospitality curricula, micro-credentials can strengthen graduate adaptability and support institutional positioning within future-ready higher-education systems (OECD, 2021).

Positioning hospitality schools as innovation-driven academic ecosystems contributes not only to graduate employability but also to institutional visibility, regional competitiveness and service-sector transformation capacity. In emerging higher-education environments such as Pakistan, hospitality schools operating within entrepreneurial frameworks can play a critical role in strengthening tourism development strategies, supporting SME growth in service industries and promoting youth entrepreneurship aligned with national economic priorities. The Institute of Hospitality Leadership (IHL) at the University of Management and Technology (UMT) represents a promising institutional case of this evolving model, where curriculum innovation, industry engagement and applied research integration are being aligned to support competency-based entrepreneurial hospitality education pathways.

The study therefore contributes to ongoing discussions on higher-education transformation by proposing a practical ecosystem-based framework for embedding entrepreneurship within hospitality education through structured university-industry collaboration and stackable credential innovation strategies. Such approaches are essential for preparing future hospitality graduates capable of navigating uncertainty, leveraging digital transformation opportunities and contributing meaningfully to service-sector innovation economies.

Keywords: Entrepreneurial hospitality education, university-industry collaboration, micro-credentials, innovation ecosystems, experiential learning, service innovation, higher-education transformation, hospitality leadership,

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ENSURING INTEGRITY IN OPEN AND COLLABORATIVE SCIENTIFIC RESEARCH

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The advancement of scientific knowledge relies not only on innovative research but also on the transparency and integrity of the publication process. Open science, characterized by accessible datasets, open peer review and collaborative platforms, has emerged as a transformative model in scholarly communication. This paper explores the principles of open science and the ethical considerations inherent in scientific publishing. Three key areas are discussed: the significance of open access and reproducibility, challenges related to publication ethics and the role of institutional and researcher responsibilities in maintaining integrity. The analysis highlights that while open science fosters inclusivity and accelerates knowledge dissemination, ethical vigilance remains critical to prevent misconduct, data manipulation and inequitable authorship practices. Recommendations include promoting transparent reporting, standardizing ethical guidelines and integrating training on research integrity for scientists at all career stages. Overall, harmonizing open science principles with ethical publishing practices ensures that research benefits the global scientific community while maintaining public trust.

The landscape of scientific research is undergoing a profound transformation with the rise of open science, a movement that emphasizes transparency, accessibility and collaboration in scholarly communication. Traditional scientific publishing models, characterized by restricted access to journals and limited data sharing, have often impeded the rapid dissemination and verification of knowledge. Open science seeks to address these limitations by promoting practices such as open-access publishing, sharing of research data and methodologies, preprint repositories and open peer review (Fecher & Friesike, 2014). These approaches not only facilitate faster communication of findings but also enhance reproducibility and the potential for collaborative research across institutions and disciplines. While the benefits of open science are significant, they bring to the forefront critical ethical considerations in scientific publishing. The increased accessibility of research data and publications can heighten the risk of intellectual property violations, data misinterpretation and the spread of low-quality or predatory publications (Bouter, 2015). Furthermore, ethical challenges such as plagiarism, duplicate publication and disputes over authorship continue to threaten research integrity. Therefore, open science and ethical publishing are intrinsically linked, as the principles of transparency and openness must be balanced with

rigorous standards of honesty, accountability and fairness (Resnik & Shamoo, 2017). This paper aims to explore the interplay between open science practices and the ethical responsibilities of researchers, publishers and institutions. By examining the principles of open access, reproducibility and responsible research conduct, it highlights how ethical vigilance ensures that open science fulfills its promise of accelerating knowledge while maintaining trust and credibility in the global scientific community.

Open science represents a paradigm shift in how research is conducted and shared. Unlike traditional models, where access to scientific findings is often restricted behind paywalls, open science emphasizes accessibility, transparency and collaboration (Fecher & Friesike, 2014). This approach includes open-access journals, preprint repositories, data sharing and open peer review mechanisms. The benefits are manifold: broader dissemination of knowledge, improved reproducibility and enhanced public engagement with science. However, as the accessibility of research increases, so does the responsibility of authors, reviewers and publishers to adhere to strict ethical standards. The intersection of open science and scientific publishing ethics is thus crucial in safeguarding the credibility and reliability of scholarly communication (Nosek *et al*., 2015). Open science practices directly influence research integrity. Sharing datasets and methodologies allows other researchers to validate findings, detect errors and build upon previous work. For instance, reproducibility crises in psychology and biomedical sciences have demonstrated that hidden methods or selective reporting can undermine trust in research outcomes (Munafò *et al*., 2017). By embracing open science, researchers contribute to a culture of transparency, which is essential for reproducible and reliable science. Furthermore, collaborative platforms encourage multi-institutional partnerships, providing more comprehensive analyses and reducing duplicative efforts. Yet, open science is not free from challenges. Ethical dilemmas arise when sensitive data are shared, intellectual property rights are unclear or open-access pressures lead to predatory publishing practices (Bouter, 2015).

Scientific publishing ethics encompasses the responsible reporting, authorship and dissemination of research. Misconduct, including plagiarism, data fabrication and inappropriate authorship, compromises scientific progress and public trust. Journals and institutions must implement rigorous ethical guidelines and peer-review processes to prevent such misconduct (Resnik & Shamoo, 2017). Open peer review, where reviewer reports are transparent, can further enhance accountability, while clear authorship criteria ensure fair recognition of contributions. Researchers, in turn, must commit to ethical practices such as accurate reporting, proper citation and disclosure of conflicts of interest. Education and training in research ethics play a critical role, equipping emerging scientists with the knowledge to navigate complex scenarios in open and traditional publishing frameworks (Shamoo & Resnik, 2015).

The integration of open science with robust ethical practices provides a framework for responsible and transparent research dissemination. Open access, data sharing and collaborative platforms enhance reproducibility, while adherence to ethical standards prevents misconduct and promotes trust in scientific findings. The scientific community, including authors, editors and institutions, must jointly cultivate an environment where openness and integrity coexist. By implementing standardized ethical guidelines and promoting transparency, science can progress efficiently, inclusively and reliably, benefiting both researchers and society.

Keywords: Open science, scientific publishing, research ethics, transparency, reproducibility, integrity.

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ARTIFICIAL INTELLIGENCE AND THE FUTURE OF HIGHER EDUCATION IN SAUDI ARABIA

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Artificial intelligence has evolved globally from early philosophical ideas about logic and reasoning to today's data-driven, learning systems. The foundations of AI were laid in Europe and United States through Mathematics and computing in 1950s. In the 21st century, the breakthroughs in deep learning and generative AI, made AI a transformative technology which is used across various industries and countries around the world. The aim of digital transformation specifically in the education industry is to further enhance the quality, accessibility and effectiveness of learning by integrating the modern technologies into teaching and administration. Saudi Arabia's National AI journey has rapidly progressed as part of Vision 2030, thus positioning AI and data at the heart of Saudi's economic and technological transformation. The Saudi Authority for Data and Artificial Intelligence (SDAIA) was established in 2019 with the objective to lead the Kingdom's data and AI agenda under Saudi Arabia's Vision 2030. The Saudi National AI Curriculum has been introduced in the 2025-2026 academic year**,** across the whole Kingdom with the objective to integrate the artificial intelligence education at all levels of public schooling. The introduction of AI curriculum in educational industry could enhance the research capabilities, support smart campuses, expand access to education through online and blended learning. The potential drawbacks include the concerns about data privacy and cybersecurity, especially when handling large volumes of student information. In this article we would thoroughly analyse the potential advantages and disadvantages of implementing AI strategy across Saudi Arabia. Furthermore, what steps Saudi Arabia needs to take for the successful implementation of this transformation in higher education institutions in the Kingdom of Saudi Arabia (KSA)?

Keywords: Artificial intelligence, Education industry, Saudi National AI Curriculum, Saudi Vision 2030.

APPLICATION FEATURES OF THE RSA CRYPTOGRAPHIC ALGORITHM IN MILITARY LOGISTICS

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In modern military operations, the efficiency of logistics systems is closely connected with information security. This study examines the use of the RSA asymmetric cryptographic algorithm in military logistics. The theoretical basis of RSA, its working mechanism, advantages and limitations are analyzed. In addition, its use in real systems and possible future development directions are presented.

Introduction. In the modern world, the rapid development of information technologies has created new challenges in the military field. Military logistics systems - such as planning, transportation and management of resources - are now based on digital platforms. This makes cybersecurity very important.

If military logistics information is leaked, the enemy can gain a strategic advantage. If the enemy obtains or changes the data, it can cause serious losses. Therefore, strong cryptographic methods are required to protect information. One of the most important methods is the RSA algorithm.

RSA is a mathematical algorithm based on public key cryptography and is widely used for secure data transmission. It helps protect the confidentiality and integrity of information in both civilian and military systems. The main goals of RSA are:

- Confidentiality;
- Integrity;
- Authentication;
- Non-repudiation.

Characteristics of Military Logistics Systems and Secure Data Transmission. The main functions of logistics include:

- Supply planning;
- Transportation and routing;
- Distribution of resources;
- Inventory management.

Security requirements of logistics systems include:

- Real-time security;

- High reliability;
- Resistance to cyber attacks;
- Confidentiality and data integrity.

Secure data transmission. Using RSA, logistics data is encrypted so that only authorized users can read it. RSA is based on the difficulty of factoring very large prime numbers. The algorithm uses two keys:

- Public key - used for encryption
- Private key - used for decryption

This feature makes RSA suitable for secure communication over open networks. It also solves the problem of secure key sharing, which makes it useful in military systems.

The encryption process has two main stages:

1. Key generation
2. Encryption and decryption

Key generation process

1. Two large prime numbers are chosen (p and q)
2. $n = pq$ is calculated
3. Euler's function is calculated: $f = (p-1)(q-1)$
4. A public key e is chosen, which is relatively prime to f
5. A number d is chosen such that: $ed \bmod f = 1$

Here, e is the public key and d is the private key.

Encryption and decryption

Encryption: $C = M^e \bmod n$

Decryption: $M = C^d \bmod n$

RSA requires calculations with large numbers, so it can be computationally intensive. It can be vulnerable to attacks such as factorization attacks, timing attacks and chosen-ciphertext attacks. Quantum computers may break RSA using Shor's algorithm. Therefore, researchers are studying:

- Post-quantum cryptography;
- Lattice-based cryptography;
- Hybrid security models.

RSA-based solutions are already used in defense industry logistics platforms for secure communication. Future development directions for secure military logistics systems include:

- Post-quantum cryptography;
- Artificial intelligence-based security;
- Energy-efficient cryptographic systems;
- Blockchain integration.

Example. Consider an example based on the algorithm above. In a military logistics system, the command center sends the following message to the supply unit: “Send 100 units of fuel”

This message must be transmitted securely so the enemy cannot read or change it.

Key generation. For simplicity, we choose small numbers: $p = 17$; $q = 11$

Calculate:

- $n = p \times q = 17 \times 11 = 187$
- $f = (17-1)(11-1) = 16 \times 10 = 160$

Choose the public key: $e = 7$

Find the private key:

- $d\ e \equiv 1 \bmod 160$
- $d = 23$

Public key: $(e = 7, n = 187)$

Private key: $(d = 23, n = 187)$

Converting the message into a number

For simplicity: $M = 100$

Encryption

Formula: $C = M^e \ mod\ n$

Calculation: $C = 100^7 \bmod 187 = 11$

Encrypted message: $C = 11$

Decryption

The receiver uses the private key: $M = C^d \ mod\ n$

$M = 11^{23} \ mod\ 187 = 100$

Decrypted message: $M = 100$

Result explanation

- Sent message: 100
- Encrypted message: 11
- Received and decrypted message: 100

The information transmitted securely without any change.

Conclusion. The RSA algorithm plays an important role in ensuring security in military logistics systems. It protects data confidentiality and integrity. However, due to new technologies, especially quantum computing, it is important to develop alternative cryptographic approaches.

Keywords: RSA, cryptography, military logistics, information security, public key infrastructure.

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EVALUATING THE QUALITY OF A MACHINE LEARNING MODEL USING DIFFERENT PERFORMANCE METRICS

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This thesis is devoted to predicting diabetes using a supervised machine learning method. The accuracy of the model is studied using different performance metrics. A confusion matrix is created based on these metrics. The quality of the model is evaluated depending on different ways of dividing the training and test data. The software implementation of the problem uses modules from the Python sklearn library.

In recent years, machine learning has become an essential part of many commercial and research projects. Machine learning makes it possible to obtain knowledge based on data (VanderPlas, 2018; McKinney, 2015; Müller & Guido, 2017).

In this study, some important aspects of predicting diabetes using a supervised machine learning method are explained. The quality of the model is evaluated depending on the random selection of training and test data.

In addition, in this study a confusion matrix is created for different training and test data and the rules for adding the features of a new patient to the model are shown. The datasets used in machine learning are located in the Python sklearn module and researchers from different fields widely use these data. In the sklearn library, datasets related to different fields (digit recognition, classification of iris flowers, cancer prediction, etc.) are preprocessed and stored in a ready-to-use format. This helps specialists save time and effort when testing different machine learning methods and algorithms.

To use the data needed in this study, it is necessary to import it from the sklearn datasets module. To find the relationship between independent variables and to calculate the probability value based on data, the Logistic Regression library is used. This regression is created as a result of combining the linear regression model with the logistic function.

Before applying regression, the data must be standardized. The standardization process consists of two stages. First, the data is normalized, then the standard deviation is calculated. As a result of normalization, the mean of the features becomes 0 and the standard deviation becomes 1. Normalization is calculated by the following formula: $X_{new} = \frac{X-M}{\sigma}$

Here, $X = (X_1, X_2, \dots, X_3)$ - original data, M - mean of the data, $\boldsymbol{\sigma}$ - standard deviation.

The standard deviation is calculated using the following formula: $\sigma = \sqrt{(1/n)\sum(Xi - M)2}$

In model evaluation, the following classification metrics are also used:

Precision - the ratio of correct diabetic predictions to all predicted diabetic cases

Recall - the ratio of correct diabetic predictions to all actual diabetic cases

F1score - the harmonic mean of Precision and Recall and is calculated as:

$$\text{F1score}=2\frac{Precision*Recall}{Precision+Recall}$$

Accuracy - used to measure how correctly the model makes predictions. The formula is:

$$\text{Accuracy}=\frac{(Number\ of\ correctly\ classified\ samples)}{(Total\ number\ of\ samples)}$$

These metrics play an important role in correctly predicting each class. To understand whether the model works correctly and reliably, confusion matrix, which is a data visualization method, is used.

Import seaborn as SNS makes it possible to create the confusion matrix. This matrix shows the types of errors and their distribution. With the help of this matrix, evaluation metrics such as Accuracy, Precision, Recall and F1score are also calculated.

Confusion matrix and its values are used to evaluate how accurate and reliable the model is.

Keywords: Machine learning, training and test data, confusion matrix, normalization, Scikit-learn library.

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AI AND PODCASTS IN L2 LISTENING DEVELOPMENT

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Listening is a fundamental yet challenging skill in second language acquisition, particularly in English as a foreign language (EFL) contexts. For many years, listening was treated as a passive process in which learners were expected to simply receive and understand spoken input. However, contemporary research has redefined listening as an active, complex and meaning-oriented cognitive activity. Within this perspective, learners are not passive recipients but active participants who construct meaning through interaction with linguistic input.

This study explores the role of podcasts and artificial intelligence (AI) tools in enhancing listening skills by situating them within modern theoretical frameworks. From a cognitive perspective, listening involves the interaction of bottom-up and top-down processes. Bottom-up processing includes decoding sounds, recognizing vocabulary and identifying grammatical structures, while top-down processing involves the use of background knowledge, context and expectations to interpret meaning (Field, 2008). These processes work simultaneously, allowing learners to build a coherent understanding of spoken discourse. Therefore, effective listening instruction should support both levels of processing.

In addition to cognitive mechanisms, metacognitive strategies play a crucial role in successful listening. Research shows that skilled listeners actively plan how they will approach a listening task, monitor their understanding during the process and evaluate their performance afterward (Vandergrift, 2007; Goh, 2008). These strategies contribute to greater learner awareness and independence. In this sense, listening development is not only about exposure to input but also about how learners manage and reflect on their listening experience.

The integration of technology into language learning environments provides new possibilities for supporting both cognitive and metacognitive processes. Technology-enhanced language learning allows learners to access authentic materials, interact with content and study independently (Warschauer, 2004). Among these tools, podcasts have become particularly valuable. They offer flexible, accessible and engaging listening materials across a wide range of topics and difficulty levels. Learners can select content based on their interests and proficiency level, which increases motivation and promotes regular practice.

Podcasts are especially effective in supporting extensive listening, an approach that emphasizes frequent exposure to meaningful and enjoyable input. Through repeated and consistent listening, learners gradually improve their comprehension, vocabulary and overall listening

fluency (Renandya & Farrell, 2011). Unlike traditional classroom listening tasks, which are often limited and controlled, podcasts create a more natural and immersive learning experience.

Artificial intelligence further enhances this process by introducing personalization and adaptability into language learning. AI-based tools can analyze learner performance and provide immediate, targeted feedback. For example, speech recognition technologies allow learners to compare their understanding with accurate transcripts, identify errors and receive corrective feedback. According to Luckin (2016), such systems support adaptive learning by adjusting content and feedback to individual learner needs. This not only improves comprehension but also strengthens learner autonomy and confidence.

Moreover, AI tools contribute to the development of metacognitive skills by enabling learners to track their progress, reflect on their performance and modify their strategies. In this way, AI does not simply provide answers but supports the learning process itself. When combined with podcasts, AI tools create a comprehensive learning environment where learners are exposed to authentic input while also receiving structured guidance and feedback.

This study adopts a qualitative, theory-based approach, drawing on key literature in the fields of listening comprehension, metacognition and educational technology. Rather than focusing on statistical measurement, the study aims to provide a conceptual and analytical understanding of how podcasts and AI tools support listening development. The analysis demonstrates that these tools complement each other by addressing different aspects of the listening process.

The findings suggest that podcasts primarily support input exposure and engagement, while AI tools enhance feedback, personalization and self-regulation. Together, they create a balanced and effective learning environment that supports both cognitive processing and metacognitive development. Learners benefit not only from increased exposure to authentic language but also from greater control over their learning process.

In conclusion, listening should be understood as an active, strategic and technology-supported process. The integration of podcasts and AI tools offers a modern and effective approach to developing listening skills in EFL contexts. By combining authentic input, adaptive feedback and learner-centered strategies, these tools significantly enhance comprehension, motivation and autonomy. Therefore, their inclusion in language teaching practices is strongly recommended for improving listening instruction in contemporary educational settings.

Keywords: Listening skills, artificial intelligence, podcasts, metacognition, EFL, technology-enhanced learning, extensive listening.

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THE FUTURE OF HIGHER EDUCATION: DEVELOPING RELATIONSHIPS AND SEX EDUCATION IN UNIVERSITIES, EVIDENCE FROM GEORGIA AND THE UK

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Current debates about the future of higher education often focus on technological change, digital transformation and new models of knowledge production. While these developments are important, universities also play a fundamental role in shaping the social, ethical and personal development of young adults. Relationships and Sex Education (RSE), widely discussed within school education, remains comparatively neglected in higher education contexts. This presentation explores the relevance and potential development of RSE within universities through a comparative perspective, drawing on research conducted in Georgia and the United Kingdom.

The study addresses an important gap in research across the South Caucasus region, where sexuality education is often treated as a culturally sensitive topic and institutional initiatives within universities remain limited. In Georgia, many educational activities related to sexual and reproductive health are primarily implemented by non-governmental organisations rather than higher education institutions. The research adopts a qualitative approach grounded in constructivist perspectives and is based on semi-structured interviews with 18 participants, including academics, medical professionals, policymakers and practitioners working in education and public health.

The findings suggest that many university students demonstrate limited knowledge regarding relationships, sexual health and reproductive wellbeing. Participants noted that students frequently rely on informal sources of information, such as peers or media, which may lead to misunderstandings or incomplete knowledge. Cultural expectations, family values and broader social norms were also identified as influential factors shaping attitudes toward RSE and its potential implementation in universities.

A complementary study conducted in the United Kingdom explored students' perspectives and experiences related to RSE within a higher education college. Although students reported prior exposure to sexuality education during their school years, teaching was often largely focused on biological aspects, with less emphasis placed on relationships, emotional wellbeing and ethical considerations.

The presentation argues that universities have an important role to play in promoting informed decision-making, wellbeing and responsible citizenship by developing culturally sensitive and evidence-informed approaches to RSE within higher education.

DISAGREEING IN ANOTHER LANGUAGE: EXAMINING RESPONSES ACROSS PROFICIENCY LEVELS

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In today's globalized world, the ability to engage effectively in cross-cultural communication has become an essential dimension of language proficiency (Bachman & Palmer, 2010; Hwang *et al*., 2024; Munezane, 2025). Language education has progressively shifted its focus from traditional grammatical and lexical competence toward the development of pragmatic competence, emphasizing learners' ability to use language appropriately in diverse social and cultural contexts (Kreutel, 2007). Nevertheless, fostering pragmatic competence remains a formidable challenge. Empirical research consistently demonstrates that high grammatical proficiency does not automatically translate into corresponding pragmatic success (Bardovi-Harlig & Hartford, 1993; Jianda, 2006). Learners often struggle with nuances of face management, politeness strategies and contextually sensitive communication, elements that native speakers navigate intuitively, potentially leading to misunderstandings in intercultural interactions (Yule, 1996; Lv *et al*., 2021).

Current scholarship is divided regarding the relationship between linguistic proficiency and pragmatic sophistication (Al-Gahtani & Roever, 2012; Taguchi, 2018). Some studies report a positive correlation, while others argue that pragmatic development is more strongly influenced by cultural exposure and interactional experience than by formal linguistic competence or standardized test scores (Farnia & Suleiman, 2009; Khorshidi *et al*., 2016). Much of the existing research has focused on relatively low-risk or formulaic speech acts, such as requests, apologies and compliment responses, leaving a significant gap in understanding how learners handle high-stakes, face-threatening acts such as disagreement (Angouri, 2012; Benyakoub *et al*., 2022). The present study addresses this gap by examining how EFL learners across different proficiency levels respond to disagreement and whether their strategic patterns evolve in tandem with increasing language skills.

Data were collected from EFL learners at elementary, intermediate and high-intermediate proficiency levels using a Discourse Completion Task designed to elicit responses to disagreement scenarios in culturally appropriate contexts. Analysis focused on both the frequency and type of strategies employed, with cluster analysis conducted to identify patterns of strategic orientation across proficiency levels. Findings reveal that language proficiency alone does not significantly

influence learners' choice of disagreement strategies (Al-Harbi & Mahfoodh, 2021; Zhang, 2025). Across all proficiency levels, participants demonstrated a consistent preference for mitigated strategies, emphasizing interpersonal harmony and face-saving over linguistic complexity (Brown & Levinson, 1987). Avoidance strategies were infrequent, while direct agreement and explicit disagreement occurred at moderate and comparable rates across groups. Cluster analysis further indicated that variability in disagreement behavior was better accounted for by strategic orientation than by proficiency level, suggesting that learners may share similar pragmatic tendencies despite differing linguistic abilities.

These results diverge from prior studies that suggest a strong influence of proficiency on pragmatic competence, such as those by Al-Harbi and Mahfoodh (2021), Taguchi et al. (2022) and Zhang (2025) and align more closely with research demonstrating the predominance of culturally and interactionally mediated strategies over proficiency effects (Benyakoub *et al*., 2022; Hägg, 2025). The apparent convergence of strategic behavior across proficiency levels underscores the salience of cultural norms, interactional goals and socialization processes in shaping pragmatic choices (Farnia & Suleiman, 2009; Khorshidi *et al*., 2016).

Two factors emerge as critical for understanding these patterns. First, the type of speech act plays a decisive role. Unlike compliment responses, which involve complex negotiation of modesty, acceptance and multiple pragmatic goals (Yu, 2004; Zhang, 2025), disagreement is inherently face-threatening, with social imperatives heavily constraining acceptable behavior. In collectivist, high-context cultures such as Taiwanese and Jordanian societies, the primary communicative goal in disagreement is the mitigation of interpersonal threat (Gudykunst *et al*., 1996; Hofstede, 2001; Ting-Toomey & Dorjee, 2018). Direct disagreement risks sanction or relational disruption, narrowing the range of socially permissible strategies. This structural constraint likely explains the consistent preference for mitigated disagreement across proficiency levels. Second, cultural norms exert a strong influence on pragmatic behavior. Both the present study and Benyakoub et al. (2022) research demonstrate that learners from distinct linguistic backgrounds adopt similar face-saving strategies, highlighting the cultural embeddedness of pragmatic competence (Farnia & Suleiman, 2009; Kasper & Rose, 2002; Khorshidi *et al*., 2016). Through early and repeated socialization in high-context, collectivist settings, individuals internalize norms that prioritize relational harmony, politeness and social propriety, guiding behavior even in L2 contexts. Mitigation functions not merely as an optional rhetorical choice but as a culturally entrenched strategy guiding appropriate disagreement behavior (Watts, 2003).

Politeness theory provides an additional lens for interpreting these findings (Brown & Levinson, 1987). The theory posits that speakers aim to satisfy universal face needs, mitigating threats to both the hearer's positive face and negative face. In high-stakes speech acts such as disagreement, mitigated strategies emerge as the default option, accessible even to learners with

limited linguistic resources. Consequently, EFL learners converge on similar strategies not because of shared proficiency, but because such strategies offer the safest interactional solution to manage face threats. Importantly, this convergence does not imply that proficiency is irrelevant. Effects of proficiency may manifest at the pragmalinguistic level, where strategies are realized through hedges, discourse markers or syntactic softeners, rather than at the sociopragmatic level of strategy choice (Blum-Kulka *et al*., 1989; Locher, 2004; Bardovi-Harlig, 1999, 2013). This distinction reconciles the apparent absence of proficiency effects in strategy selection with broader claims in interlanguage pragmatics regarding the role of linguistic development (Kasper & Rose, 2002).

Pedagogically, these findings indicate that increasing language proficiency alone is insufficient to alter learners' strategic profiles in disagreement. While most participants were capable of responding appropriately, some demonstrated pragmatic difficulties, signaling a need for explicit, targeted instruction in disagreement strategies. Research demonstrates that media-mediated dynamic assessment can effectively enhance learners' strategic competence in disagreement and other face-threatening speech acts (Rahmani *et al*., 2025). Thus, instructors in higher education contexts are encouraged to integrate such practices into L2 curricula to promote pragmatic awareness and skill development.

Several limitations of this study should be addressed in future research. The absence of a native speaker control group limits the ability to benchmark learners' pragmatic performance against target norms, a methodological standard widely adopted in interlanguage pragmatics research (Kasper & Dahl, 1991). Reliance on quantitative DCT data precluded deeper exploration of learners' reasoning and strategy selection processes, which could be enriched through qualitative methods such as interviews or stimulated recall protocols. Exclusive use of DCT restricts ecological validity. Integrating discourse-analytic methods and conversational data would allow for more fine-grained analysis of disagreement in authentic interactional contexts, capturing sequential and co-constructed aspects of pragmatic performance (Rahmani *et al*., 2025).

In conclusion, this study contributes to the growing literature on L2 pragmatics by demonstrating that EFL learners' strategies for handling disagreement are largely shaped by cultural norms and interactional imperatives rather than language proficiency. Across proficiency levels, learners exhibited a clear preference for mitigated strategies that preserve interpersonal harmony, illustrating the cultural embeddedness of pragmatic competence. These findings highlight the need for pedagogical interventions that explicitly address high-stakes speech acts, emphasizing culturally and contextually appropriate strategies while supporting the development of pragmalinguistic resources. Future research should explore multimodal and longitudinal approaches, integrating qualitative insights to better understand how learners negotiate pragmatics in authentic intercultural communication and to examine whether targeted instructional

interventions can facilitate more flexible and context-sensitive disagreement strategies in L2 settings.

Keywords: Disagreement strategies, pragmatic competence, language proficiency, EFL learners, interlanguage pragmatics.

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THE ROLE OF TEACHER IN THE DIGITAL AGE AND THE INTEGRATION OF DIGITAL TECHNOLOGIES IN EDUCATION

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This thesis examines the role of teachers in the digital age and the transformations occurring in pedagogical activity. Rapid technological development has led to significant changes in education, resulting in the reorganization of teaching processes. Consequently, teachers' functions and teaching methods have evolved considerably. This study analyzes the new roles of teachers within the framework of digital literacy, innovative pedagogical approaches and distance and hybrid learning models. Teachers are now expected not only to deliver knowledge but also to guide students in using digital tools effectively and responsibly. The study also evaluates steps taken in Azerbaijan's education system and presents recommendations for future development. It highlights the importance of adapting teaching practices to technological innovations to improve education quality and meet the needs of the digital society.

Digitalization has generally transformed education into a more flexible, personalized and technology-rich environment. The main carrier and manager of this process is the teacher. In the traditional pedagogical model, the teacher acts as the main source of knowledge and the person responsible for maintaining discipline. The teacher is the dominant figure in the classroom, directly controlling students' learning activities and guiding learners who often play a passive role in the learning process. In this model, the main function of the teacher was to deliver information, while students were expected to receive and memorize it.

In the digital age, this understanding has significantly changed. In modern pedagogical approaches, the teacher is no longer seen only as a provider of knowledge, but as a facilitator of learning, a mentor and an organizer of the learning environment. In a situation where information is widely available, the teacher's role is to guide students toward reliable sources, develop their critical thinking and problem-solving skills and apply personalized teaching strategies (Ibrahimly, 2025). In addition, modern teachers should have the ability to use digital resources, integrate technology into the teaching process and build effective pedagogical communication both in the classroom and in virtual environments. This requires teachers to gain new pedagogical, psychological and technological knowledge. While traditional teacher-student relationships were mainly vertical, in the digital age these relationships have become more horizontal, based on cooperation, shared learning and transparent communication. This situation requires teachers to

possess soft skills such as emotional intelligence, leadership and creativity. Therefore, the digital age has reshaped the concept of teaching and added new qualities such as flexibility, adaptability and innovation to this profession (Ibrahimly, 2025). The important technological skills for modern teachers can be grouped in the following areas: Ability to use educational technologies: Teachers should use various electronic resources such as presentations, video lessons and simulation programs to increase the effectiveness of learning and present topics in an interactive and visual way.

1. Ability to work with digital platforms: Teachers should be able to use learning management systems (LMS), organize online classes, give assignments, evaluate students and provide feedback using digital tools.

2. Multimedia and content creation: Preparing digital materials such as videos, audio files, infographics and interactive tests and using them in lessons is an important indicator of a teacher's technological competence. This requires both technical knowledge and creativity.

3. Digital security and ethical rules: Teachers should be able to protect personal data, follow ethical rules on the internet and raise students' awareness about safe and responsible digital behavior.

The impact of digital tools on the educational process. The integration of digital technologies into the educational process has led to fundamental changes in teaching methodologies. Unlike the traditional education model, modern digital tools have made the learning process more interactive, personalized and flexible. Students now have access to quality educational resources not only within the confines of a classroom but from any location and at any time (Selwyn & Pangrazio, 2018). The impact of digital tools is most evident in the personalization of learning. AI-based platforms offer highly tailored learning strategies that consider each student's learning pace, style and interests. These systems promptly identify a student's strengths and weaknesses, creating conditions for their full potential to be realized. Digital tools also open up new opportunities for teachers. Electronic assessment systems and analytical platforms enable educators to monitor students' academic progress with greater precision, analyze individual development dynamics and promptly adjust the teaching process.

Digital transformation in education. Digital transformation is a complex and multifaceted process that drives fundamental changes in modern education systems. This transformation is not limited to the adoption of technological tools, it also involves the comprehensive restructuring of teaching methodologies, pedagogical approaches and the educational environment. The integration of digital technologies into education completely reshapes students' learning experiences, providing them with more interactive, flexible and personalized learning opportunities. Key components of digital transformation include AI-based learning systems, big data analytics, cloud technologies and interactive learning platforms.

Online education platforms. Online education platforms are among the most significant outcomes of digital transformation. These platforms eliminate geographical limitations, enabling access to quality education from anywhere and at any time. Global platforms like Coursera, edX and Udemy offer millions of users the opportunity to enroll in courses across various disciplines and participate in lectures delivered by leading universities worldwide. In the local context, the development of online education platforms is also being observed. Within the framework of the digitalization of the education system, several national online education resources have been created and the capabilities of existing platforms have been expanded. These platforms serve not only as tools for distance learning but also as supplementary educational resources supporting in-person education. Key advantages of online platforms include personalized learning, interactivity, flexible learning schedules, the use of diverse multimedia resources, real-time feedback and assessment mechanisms. Such platforms allow students to progress at a pace suited to their level of knowledge and utilize additional resources for topics they find challenging.

Artificial Intelligence and machine learning. Artificial Intelligence (AI) and machine learning technologies play a crucial role in creating personalized learning models within the education system. These technologies enable the precise analysis of students' individual learning characteristics, areas of interest and knowledge levels, allowing for the development of highly tailored learning strategies. Adaptive learning systems track students' progress in real time for each topic, identify weaknesses and provide additional resources to address those gaps (Tuomi, 2018).

Digital assessment tools. Digital assessment tools have fundamentally transformed the methodology for evaluating students' knowledge levels in modern education systems. Automated test systems, electronic grade books and analytical platforms enable teachers to monitor students' progress more accurately, efficiently and comprehensively (Siemens, 2017). The primary advantages of these tools are their high degree of objectivity and flexibility. Assessment tools powered by artificial intelligence not only evaluate the correctness of answers but also analyze the student's thinking process, answering strategies and level of subject understanding.

Cybersecurity and data protection. With the digitalization of the education system, cybersecurity issues are becoming increasingly important. Protecting students' personal data on digital platforms and ensuring the security of educational information systems have become key priorities. Cyberattacks, data leaks and the illegal use of personal information pose serious risks in the educational environment. Ensuring cybersecurity requires strong and multi-level protection systems.

Digital tools in education in Azerbaijan. The use of digital tools in education in Azerbaijan has increased significantly in recent years. Government policies supporting the digitalization of education, as well as state programs and infrastructure projects, have accelerated this process.

Many innovative projects are being implemented within the framework of the “Electronic Education” concept. As part of the “Digital Transformation of Education in Azerbaijan” program, important steps have been taken to improve internet access in schools, develop electronic education platforms and increase teachers’ digital skills. Examples of these initiatives include the “Electronic School” information system, distance learning platforms, digital textbooks and electronic grade books. In addition, platforms such as Microsoft Teams, Zoom and Moodle are widely used to support both traditional and distance learning environments. Universities in Azerbaijan also actively participate in digital transformation processes. Distance learning technologies, online courses, virtual laboratories and digital teaching resources help improve the quality of education. Continuous development of technological infrastructure, methodological support for teachers and improvement of digital literacy remain important priorities (Asgarov & Badalova, 2024). Research shows that the integration of digital tools into education not only enriches students' learning experiences but also increases the effectiveness and quality of the education system. The use of digital technologies in education offers important advantages such as personalized learning, better access to educational resources, more interactive teaching methods and the opportunity to use global educational materials. At the same time, some challenges exist in the process of digital transformation. Issues such as cybersecurity, technological inequality, improving teachers’ digital skills and sustainable technological infrastructure require attention. Solving these problems requires systematic planning, continuous government support and active participation of educational institutions. In the future, the development of the education system will focus on expanding digital technologies, increasing the role of artificial intelligence and improving adaptive learning systems.

Keywords: Digital education, learning technologies, digital tools, AI in education, teacher roles, distance learning.

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EDUCATIONAL RESULTS' ASSESSMENT IN PSYCHOLOGICAL AND PEDAGOGICAL DISCIPLINES OF THE PEDAGOGICAL BACHELOR'S DEGREE (MCU EXPERIENCE)

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The university implements a psychological and pedagogical module for all bachelor's degree programs in pedagogical fields of study. The psychological and pedagogical module includes ten academic disciplines, three practices and an integrated exam.

During two years of study (2-3 courses), students master disciplines, undergo practical training and then take an integrated exam. The modular exam consists of two stages: testing and presentation of the educational product. The testing questions are built around solving a pedagogical situation (case study) and include questions from all academic disciplines. In the process of mastering the disciplines, students design educational products that are submitted for defense in the second part of the modular exam. The evaluation procedure for the protection of educational products includes an independent assessment by experts from among university professors and employers.

The presented experimental work, using the example of a psychological and pedagogical module, outlines a way to overcome the underlying problems of pedagogical education. The evidence-based nature and measurability of educational results during the assessment of the quality of mastering the psychological and pedagogical module makes it possible to reasonably make changes to the content and technology of educational bachelor's degree programs, dynamically taking into account the changes that occur in the education system and the deficits that students identify during control measurements.

EMBEDDED OF IOT OBJECTS IN THE DIGITAL EDUCATIONAL PORTAL AND MONITORING OF DATA COLLECTED IN THE CLOUD

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The digital transformation of educational institutions and the comprehensive integration of innovative IT solutions have become focal points of academic discourse in recent years. Currently, the digitalization of education is pivoting toward multifaceted content delivery via interactivity, personalized learning frameworks tailored to individual student profiles and the optimization of pedagogical management through intelligent systems. The implementation of such environments necessitates a complex architecture of several cutting-edge technologies. These include the Internet of Things (IoT) for developing smart infrastructures, cloud computing for the streamlined collection, storage and processing of data and Artificial Intelligence (AI) systems for predictive modeling and data-driven decision-making.

The convergence of cloud computing and IoT has introduced transformative innovations to the educational sector. The socio-economic advantages and functional capacities of this integration, which form the basis of the present study, are currently at the center of global scientific inquiry. The operational principle of Cloud-based IoT systems relies on interconnecting sensors and devices through cloud platforms to facilitate seamless data exchange and analytics. By leveraging this integration, educational organizations can fundamentally re-engineer management processes and instructional methodologies. From a managerial perspective, the gathered data enables the enhancement of campus security, the optimization of resource allocation and the refinement of the learning process through real-time monitoring of student performance and interactive visualization (Gautam *et al*., 2024). However, beyond interactivity and data acquisition, the development of smart classroom systems requires a robust architectural evolution to ensure sustained operational efficiency (Dai *et al*., 2023).

Methods. This research examines the functional logic and implementation of Internet of Things (IoT) objects embedded within a digital educational portal. These elements are designed to enhance the interactivity of instructional content, facilitate the systematic aggregation of sensor data into a cloud-based framework and establish robust methodologies for real-time data monitoring.

The experimental phase of this study involved augmenting the capabilities of a Learning Management System (LMS) specifically tailored for pre-service and in-service educators specializing in cloud computing and IoT technologies. To broaden the scope of educational content

and digital scaffolding, the portal was integrated with a visual environment for the real-time monitoring of IoT objects interfaced from external surroundings. Furthermore, the architecture supports the seamless aggregation, visualization and logging of telemetry data into cloud-synchronized datasets.

The following section describes the process implementation as a five-layer model (Figure 1). It is provided a full cycle from data collection with IoT objects to implementation in the learning process.

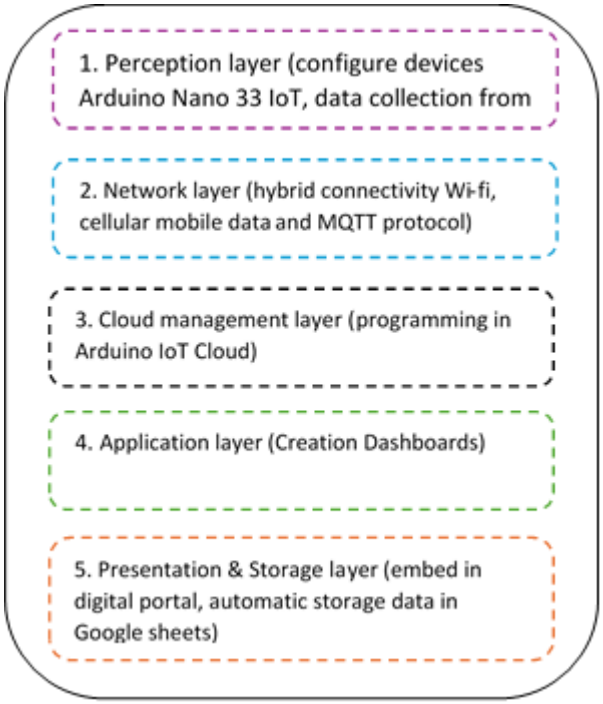

Figure 1. A cycle from data collection implementation in the learning process

Results. The development of the IoT-based visual environment and its subsequent integration into the digital portal utilized a hardware stack comprising the Arduino Nano 33 IoT board and compatible sensors. The software architecture leveraged the Arduino IoT Cloud and Google Workspace platforms, complemented by IFTTT logic-based rules and Webhook services for cross-system interoperability.

The visual interface, illustrated in Figure 1, was designed specifically for instructional modules regarding sensor technologies. Within this framework, users are provided with real-time telemetry of classroom temperature and humidity via a DHT11 sensor. The system facilitates the monitoring of data fluctuations and the sequential logging of sensor outputs to a cloud-based server. Students are tasked with analyzing the functional characteristics of cloud-integrated IoT

systems and proposing further applications for the accumulated datasets. A key prospective stage for processing this collected sensor data involves its deployment as training sets for Machine Learning (ML) models.

During the implementation phase, the DHT11 sensor, interfaced with the Arduino Nano 33 IoT, was programmed via the Arduino IoT Cloud IDE. Network communication for the IoT nodes was orchestrated using the MQTT protocol. Data visualization was executed through the dashboard's Gauge and Chart widgets. To ensure the seamless embedding of these visualization components into the digital portal, custom firmware and integration scripts were developed. Finally, the automated aggregation of sensor-derived data into cloud-based spreadsheets for real-time monitoring was achieved through the configuration of IFTTT applets.

Through this interface, a logic execution command was established to automate data entry into Google Sheets triggered by Webhook conditions. Utilizing the established command protocol, the Arduino IoT Cloud Webhook service was initialized, facilitating the transmission and logging of sensor telemetry to a Google Spreadsheet at 2-second intervals. The Webhook methodology emerges as a critical component in developing efficient, scalable and integrated systems for software engineers, as it ensures an instantaneous, low-latency response to system-wide data updates (Mahadik *et al*., 2025).

Conclusion. The methodologies detailed in this article - specifically the visualization of remote IoT node operations integrated into a digital educational portal, real-time telemetry monitoring and cloud-based data persistence - elucidate the fundamental principles of developing IoT-driven educational platforms that align with contemporary technological standards. By leveraging these techniques, including the orchestration of cross-platform interoperability via Webhook services, it becomes possible to monitor diverse operational and pedagogical scenarios within the learning environment in real time. To further augment the functional capacity of this visual environment, future research may expand into the integration of vision-based IoT modules (camera-equipped boards) and the application of Machine Learning (ML) models for the predictive analysis of accumulated sensor data.

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Keywords: Digital portal, embedded objects, education, Internet of things, cloud, sensors.

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DIGITAL TRANSFORMATION IN HIGHER EDUCATION AND THE STRATEGIC ROLE OF HUMAN CAPITAL IN DEVELOPMENT

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In knowledge economy, where skilled workforce drives progress, it is essential to enhance the national education system's capacity to build up human capital. New digital management methods are currently necessary for countries to achieve higher education-national economy synergy. In this new management paradigm, the primary objective is higher education, where human capital is generated, the tool is digitalization and technical growth and the outcome is the country's macroeconomic progress. The paper suggests promoting and enhancing techniques for the quantitative and qualitative evaluation of higher education within the scope of the macroeconomic growth model. This methodology will encourage the creation of appropriate data analytics and innovative decision-making channels for universities.

Throughout the first 25 years of the twenty-first century, there have been several notable breakthroughs in human civilization. Rapid technological development and digitalization, which have been seamlessly integrated into all aspects of social life, have resulted in the emergence of new approaches and dynamics, both at the micro and macro levels within the countries, as well as in all social, economic and technological relations between countries.

The scientific literature explains the replacement of socio-economic formations in the genesis of modern civilization by particularly such changes in attitudes: when production relations (means of production) fail to provide the expected socio-economic benefit (results) for members of society (object), new approaches or management paradigms were developed at different phases of social progress.

The 21st century is obviously defined by the dynamics of the information society (rapid technological progress and digitalization) and the knowledge economy. The human brain, human potential and human capital now serve as the "locomotive" of economic progress, via controlling and regulating all AI tools, know-how technologies and 5.0 industry (society) relations. Therefore, we firmly believe that new sustainable management ideas and digital management models are crucial for national economies at this stage of the twenty-first century.

Research objectives. As defined, human capital, the primary production component of the knowledge economy, is also crucial to the formation and maintenance of the national economy's competitiveness. In this regard, we argue that challenges that higher education institutions (HEIs) face in developing human capital in accordance with cutting-edge requirements, as well as the

assessment of the economic and social advantages created by HEIs in society, are very relevant topics for present-day scientific research. In this context, this paper's research focus is to put forward proper policies and approaches to raise the contribution of human capital (the primary and ultimate output of the educational system) in national wealth and its role in economic growth.

Theoretical background. Following an extensive review of the literature, it turned out that, while the authors agree on the decisive importance of human capital for economic development under the knowledge economy, specific objects of analysis, such as how and why we should evaluate the readiness of the country's digital infrastructure and higher education sector for the 5.0 industrial society, as well as the overall connection of all these factors with the country's macroeconomic development have not yet been determined in local and foreign literature. Muradov (2025) points out that the quality and social-economic value of education have a synergistic effect on the economy, emphasizing the importance of macro and sectoral regulatory frameworks to boost the formation, capitalization, use and efficiency of human capital in the country. Kryshtanovych et al. (2023) highlight the need for innovative digital transformation and management strategies in higher education institutions, whereas Davidavičienė and Limanovskaja (2025) bring up the need for sustainable digital management models in higher education. Based on these approaches and drawing attention to the significant role that HEIs can play in the country's macroeconomic development, education is suggested to be considered as an economic activity and the study is driven by the intention to generate relevant responses through well-formulated questions within the conceptual framework of "how to use statistical forecasts in planning" (Tobin, 2004), as defined by Nobel Prize-winning economist James Tobin. Another prestigious economic Nobel laureate Lucas (2004) stated, "Mathematical analysis is not one of many ways of doing economic theory: it is the only way" and within this setting, the design of a methodology for quantitative and qualitative assessment of education is proposed. Here, the impact of education quality indicators on GDP components, economic growth and inversely, the role of digitization, as well as the macroeconomic assessment of the synergistic benefits of UN SDG4 "Quality Education" can be measured, the implications of human capital reproduction in economy may be determined, furthermore additional necessary calculations uncovered throughout the study process can be performed. Quantitative and qualitative assessment of education within the context of a macroeconomic development model will encourage the development of suitable data analytics and innovative digital management decision-making tools for universities. Digital technologies will allow the statistical evaluation of relevant analytical data on the results of the teaching and learning process, pedagogical success and student satisfaction; it will also deepen the organization's understanding of the corporate culture of management processes (planning, strategic investment decisions, leadership, control, accountability and etc.)

Results and discussion. The main expected findings of the research will be the empirical confirmation of the following hypotheses:

- In the twenty-first century, data analytics-based strategic management of higher education institutions leads to new perspectives for society and the economy;
- Public education spending should be considered as an investment in human capital, with the long-term impacts of human capital on the economy serving macroeconomic growth in a deliberate manner;
- HEIs' management should develop higher education-economy synergy in the national economy based on quality indicators of educational services and the additional economic value provided.

Muradov (2025) analyzed human capital and the economic environment as strong complementary factors and concluded, via empirical research, that "in the country, initiatives such as updating legislation, building regulatory institutions, improving infrastructure and the business climate, encouraging new ideas and providing state assistance to startups fail to generate a synergistic impact across macroeconomic parameters and sectors". At this point, the key research question may be formulated as follows: Can we propose a new macroeconomic development concept or employment models in a digital society for the country by improving education quality through digital transformation of HEIs, adapting relevant teaching technologies and methodologies to the needs of the knowledge economy (Zamanov & Nazarov, 2025), redefining the role of pedagogical staff in human capital formation and so on?

Primary takeaways from the topic are that if a country's education expenditures are not helpful to build up competent human capital in line with economic requirements, the country's economic potential is lost. If the course of higher education-economy synergy in society is not coordinated with precise levers, an upward trend in the unskilled labor force will impair the country's economic strength in the long run. The advancement of the knowledge economy is dependent on internal (management and human capital development level) and external variables (country's development level, labor market structure and technology progress) and human capital becomes an economic asset only in an advantageous circumstances when utilized wisely. The quality of educational services determines the growth of the national economy, therefore particularly resilient universities in the country, are required for the evolution of a knowledge economy.

Research will contribute to determining the direct and indirect multiplicative economic effects of higher education policies on society, as well as promoting universities' increased role in the human capital generation in the country via digital management model, data analytics and advanced decision-making systems in HEIs.

Conclusion. In today's information society and knowledge economy, the macroeconomic growth model for the national economy should be built on the premise of developing human capital and hence the proportion of higher education institutions in national wealth. Economic growth relies on human capital, which is constrained on solid education policy and the quality of education is driven by sound investments. A resilient macroeconomic growth model may be designed by vision-driven investment in higher education, with university key investment components determined using adequate data analytics.

Keywords: Higher education, macroeconomic development, human capital, data analytics.

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A SYSTEMATIC REVIEW OF PROBLEMATIC ChatGPT USE AND ITS IMPACT ON ACADEMIC SELF-REGULATION AND WELL-BEING

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Generative artificial intelligence (AI) tools, particularly ChatGPT, have rapidly transformed higher education by reshaping how students access information, complete academic tasks and engage in learning processes. These tools provide significant advantages in terms of efficiency, accessibility and personalized support, enabling students to receive immediate feedback, generate ideas and simplify complex academic content. However, alongside these benefits, concerns have emerged regarding their psychological and behavioral implications, particularly in relation to students' cognitive engagement and learning strategies.

In recent years, traditional forms of internet dependency among students have increasingly shifted toward reliance on generative AI tools such as ChatGPT. This transition reflects a broader movement from independent information-seeking behaviors to AI-assisted academic practices, which may reduce students' cognitive effort and increase dependency on automated outputs.

Academic self-regulation refers to essential skills such as goal setting, time management, self-monitoring and reflective learning, which are critical for academic success. However, the widespread and unregulated use of ChatGPT may weaken these skills by promoting overreliance on AI-generated responses and reducing engagement in independent thinking.

In higher education, students are required to perform continuous academic activities, including writing assignments, research and analytical tasks, which are designed to foster critical thinking and problem-solving abilities. Nevertheless, increasing reliance on ChatGPT may lead students to bypass these cognitive processes. In the Azerbaijani context, ChatGPT is among the most widely used generative AI tools due to its accessibility and ease of use, contributing to increased dependency on AI-assisted academic work.

Historically, Azerbaijan, as a post-Soviet country in the South Caucasus region, has been recognized for its strong traditions in literature and intellectual development. However, the rapid integration of AI into academic and social contexts may pose risks to the preservation of these intellectual skills. Behaviors previously associated with internet addiction are increasingly shifting toward AI dependency, representing a new form of digital reliance.

Despite the growing adoption of generative AI, its problematic use and academic consequences remain underexplored. Excessive reliance on ChatGPT may negatively affect students' critical thinking, problem-solving abilities and reflective learning processes.

Consequently, this may lead to a decline in academic self-regulation and negatively impact academic performance and overall well-being.

Although existing studies highlight the benefits of generative AI, there is still a lack of systematic and comprehensive research on problematic ChatGPT use and its relationship with academic self-regulation. In particular, empirical research in post-Soviet and culturally similar contexts, such as Azerbaijan and Türkiye, remains limited. Furthermore, the long-term effects of AI dependency on academic behavior and performance are insufficiently examined, indicating a clear research gap.

This study adopts a systematic literature review methodology following PRISMA guidelines. The literature search was conducted across major academic databases, including Google Scholar, Scopus and Web of Science, using predefined keywords related to generative AI and academic self-regulation.

The initial search yielded 112 studies. After removing duplicates and screening titles and abstracts, 68 studies were retained for full-text review. Following the application of inclusion and exclusion criteria, 32 studies were selected for final analysis. Studies were included if they focused on university students, generative AI use and academic behavior or self-regulation. Due to cultural relevance, studies conducted in Türkiye were also included to ensure regional comparability.

The thematic analysis of the selected studies revealed several key findings. First, ChatGPT use is associated with short-term improvements in academic performance, particularly in task completion and idea generation. Second, a consistent finding is the negative impact on academic self-regulation, including reduced ability to set goals, manage time and monitor progress. Third, AI dependency is emerging as a behavioral pattern, characterized by habitual reliance on ChatGPT even for simple academic tasks. Fourth, excessive use is linked to reduce critical thinking and problem-solving skills, especially when AI outputs are not critically evaluated. Finally, the impact of ChatGPT depends on usage patterns: moderate and guided use may enhance learning, while excessive use leads to negative academic and psychological outcomes.

In conclusion, generative AI tools, particularly ChatGPT, present both opportunities and challenges in higher education. While they enhance efficiency and accessibility, their excessive use may undermine students' academic self-regulation and overall well-being. Therefore, responsible AI use should be encouraged through digital literacy programs and strategies that strengthen self-regulation skills.

This study contributes to the literature by providing a systematic synthesis of existing research and highlighting the psychological and behavioral implications of generative AI in academic contexts. It also emphasizes the need for further empirical research, particularly in underexplored regions such as Azerbaijan, to better understand the long-term effects of AI dependency on student learning and academic development.

Keywords: Problematic ChatGPT usage, academic self-regulation, university students, generative artificial intelligence, digital addiction, higher education.

BALANCING ACADEMIC INTEGRITY AND AI TOOLS IN HIGHER EDUCATION

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The rapid integration of artificial intelligence (AI), particularly generative AI, into higher education presents both transformative opportunities and significant ethical challenges. AI supports personalized learning, adaptive instruction and institutional decision-making, yet its widespread use raises concerns about academic integrity, authorship and data governance. Universities face the challenge of balancing innovation with responsibility: strict prohibition is unrealistic, while uncontrolled use risks weakening academic standards. Effective integration requires clear regulatory frameworks, AI literacy development, redesigned assessment models focused on higher-order thinking and sustained human oversight. For emerging higher education systems, limited infrastructure and uneven digital readiness complicate implementation, yet also create opportunities to design flexible and ethical governance models. Successful AI integration ultimately depends on institutional preparedness, transparency and a commitment to academic integrity and equity.

Introduction. The integration of generative artificial intelligence (GenAI) into education has generated both significant opportunities and serious academic concerns. While early debates focused on the risk of students misusing AI in assessments, current approaches emphasize ethical and transparent integration. AI enhances personalization and efficiency; however, its limitations - particularly inaccuracies and lack of contextual understanding - require strict human oversight. UNESCO (2023) stresses that AI cannot solve fundamental educational challenges independently but should serve as a supportive tool strengthening educators' roles.

AI-driven transformation includes adaptive learning systems, learning analytics for decision-making, predictive models identifying dropout risks, blockchain-based credential verification, AI-supported proctoring and innovative assessment methods measuring higher-order skills (OECD, 2021). Although these developments improve access and efficiency, they may also widen digital inequalities.

The widespread use of AI raises fundamental concerns about authorship, originality and responsibility. Academic integrity - based on honesty, trust, fairness and responsibility (International Center for Academic Integrity, 2021) - is increasingly challenged as AI blurs the line between support and misconduct (European Network for Academic Integrity, 2023). As

UNESCO (2023) notes, prohibition is unrealistic, yet uncontrolled use risks weakening academic standards. Universities must therefore adopt clear governance frameworks and redesign assessment strategies to ensure responsible integration.

Digital Transformation of Higher Education. Digital transformation in higher education encompasses several AI-driven developments in institutional management and teaching. These include learning analytics that support data-informed decision-making, predictive systems identifying students at risk of academic failure, blockchain technologies ensuring secure credential verification, AI-powered proctoring systems and innovative assessment models measuring higher-order cognitive and social-emotional skills (OECD, 2021).

While these technologies enhance efficiency, transparency and institutional performance, their rapid adoption also raises significant concerns. The unethical use of generative AI in academic assignments may undermine the credibility of assessment and certification processes. Academic integrity, grounded in honesty, trust, fairness and responsibility (International Center for Academic Integrity, 2021), becomes more complex as AI blurs the boundary between legitimate support and misconduct. As emphasized by the European Network for Academic Integrity (2023), transparency and proper disclosure are now central to maintaining academic standards.

Universities therefore face a governance dilemma: strict prohibition of AI tools is unrealistic, yet uncontrolled use risks weakening academic rigor and critical thinking skills (UNESCO, 2023). Preserving academic integrity in the digital era requires clear institutional policies, ethical oversight and redesigned assessment strategies aligned with the evolving technological environment.

The Rise of AI in Higher Education. Artificial intelligence has moved from experimental innovation to mainstream institutional practice. Generative systems, adaptive platforms and intelligent tutoring technologies are increasingly embedded in teaching and research (UNESCO, 2023; Luckin *et al*., 2019). AI tools integrated into learning management systems reflect structural digital transformation (EDUCAUSE, 2023).

AI adoption is driven by personalization, efficiency and inclusivity. Adaptive systems tailor instruction to student performance (OECD, 2021), while automation reduces administrative workload (OECD, 2021). AI applications also support accessibility through language assistance and flexible pathways (World Economic Forum, 2023). At the governance level, institutions increasingly integrate AI into strategic planning and quality assurance mechanisms (OECD, 2021; UNESCO, 2023).

This transformation reshapes the educator’s role, shifting from knowledge transmission toward facilitation and ethical oversight. Effective implementation requires AI literacy, critical thinking facilitation and redesigned assessment models emphasizing higher-order reasoning

(Luckin *et al*., 2019; World Economic Forum, 2023). Human-centered policy development is therefore essential (UNESCO, 2023).

Local Context: Implications for Emerging Higher Education Systems. Emerging higher education systems face particular challenges in AI integration, including limited infrastructure, uneven regulatory frameworks and insufficient digital competencies (UNESCO, 2023; OECD, 2021). Digital literacy gaps may further reinforce educational inequalities (World Economic Forum, 2023; OECD, 2021).

However, these systems also have strategic opportunities. By proactively adopting flexible, human-centered governance models that prioritize transparency, capacity building and inclusive access, institutions can align AI integration with modernization and quality assurance goals (UNESCO, 2023). Sustainable implementation ultimately depends on institutional preparedness, contextual adaptation and a firm commitment to academic integrity and equity.

Keywords: Artificial Intelligence (AI), generative AI, academic integrity, digital transformation, governance in higher education.

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WOMEN AND GENDER EQUALITY IN EDUCATION IN THE CONTEMPORARY SOCIO-CULTURAL CONTEXT

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In recent years, although a number of advances have been achieved in promoting gender equality in education, women's representation in leadership positions remains significantly low. This situation creates a notable strategic gap in terms of both the quality of education and the overall development of society. While certain positive changes have been observed globally in this regard, the process varies across regions and educational levels. For instance, a certain degree of gender parity has been achieved in primary education and in some regions, the participation rate of girls even surpasses that of boys. However, gender disparities manifest not only in access and participation but also in learning outcomes.

In most high-income countries, women tend to outperform men in higher education. For example, in Bahrain, there are approximately 140 female students for every 100 male students. In contrast, the opposite trend is observed in vocational education, where male participation clearly predominates.

Leadership and administrative roles within the education system are of critical importance for enhancing both societal development and the quality of education. Nevertheless, according to UNESCO's Global Education Monitoring Report 2025, although women constitute the majority of educators worldwide, they remain significantly underrepresented in leadership and management positions. This imbalance not only hinders gender equality in education but also constrains the future development prospects of educational systems.

Recent data indicate that in 2023, the proportion of women within the global teaching workforce varies by educational level: 93% in pre-primary education, 68% in primary education, 59% in lower secondary education and 52% in upper secondary education. These figures are even less pronounced in leadership roles.

Furthermore, studies conducted across 70 countries reveal that the number of female school principals is, on average, 20% lower than the number of female teachers. In several countries, this gap is even more substantial. For instance, in Japan, the Republic of Korea, South Africa, Türkiye and Vietnam, the proportion of female leaders is less than 30% compared to female teachers. This indicates the existence of systemic barriers hindering women's advancement into leadership positions. Gender disparities in leadership are particularly pronounced at secondary and higher education levels. Even in higher education institutions where women may constitute the majority

of academic staff, their representation at the leadership level remains disproportionately low. In some countries, there are no female university leaders at all.

Another important consideration is that, in order to ensure gender equality in educational content, it is advisable to review textbooks across all levels of education and introduce appropriate revisions. As noted, “the inclusion of female role models in all textbooks, the representation of women in professions traditionally dominated by men, the equal involvement of female and male authors in textbook development and the adoption of an inclusive approach can contribute to maintaining gender equality in educational materials” (Nazirova *et al*., 2022).

Naturally, biological and physiological differences exist between sexes in human society and these differences are immutable. However, this does not imply that the social positions of men and women are fixed.

As is well known, the history of the women’s movement and the achievements gained in this field indicate that the position of women in society has evolved dynamically over time. Recent technological advancements have significantly transformed women’s roles both in domestic life and in the sphere of production. At the core of the concept of gender lies the principle of social equality between women and men.

In certain contexts, gender parity - used as a tool to measure gender balance - can contribute to achieving substantive gender equality. On the other hand, gender equality is closely linked to women’s rights and often necessitates profound structural and societal changes.

The study of gender issues within the socio-cultural environment of Azerbaijan from the nineteenth to the twenty-first centuries is strongly influenced by literary works produced during these periods. The analysis of such artistic examples helps substantiate perspectives in this direction. As an illustrative example, it should be noted that the issue of women occupies an important place in the works of prominent figures of Azerbaijani music, such as Uzeyir Hajibeyli, Muslim Magomayev, Fikret Amirov, Niyazi, Gara Garayev and Arif Melikov. In their operas, operettas and ballets, such as Leyli and Majnun, Asli and Karam, Koroghlu, Arshin Mal Alan, If Not That One, Then This One (Uzeyir Hajibeyli); Shah Ismayil and Nargiz (Muslim Magomayev); Sevil (Fikret Amirov); Seven Beauties and Path of Thunder (Gara Garayev) and The Legend of Love (Arif Melikov), themes of women’s emancipation, their struggle for development and their roles within both family and society are brought to the forefront through the language of music.

Most importantly, “the gender analysis of literary and musical works reflecting the problems, tastes and ideals of the period allows us to trace a transformation from the image of the ‘woman with limited rights’ to that of a ‘woman who affirms herself through struggle” (Manafova *et al*., 2020).

It should also be emphasized that gender equality is an objective in itself, whereas gender neutrality can be regarded as a practical approach and a mindset that facilitates the achievement of this objective.

Keywords: Education, gender equality, women's rights, social development, research.

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HUMAN CAPITAL RISKS AND COMPETENCY-BASED EDUCATION IN AVIATION: STRATEGIC CHALLENGES FOR HIGHER EDUCATION

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The rapid transformation of the aviation industry necessitates a parallel evolution in the academic structures responsible for personnel development. Current industry trends indicate that the primary threat to aviation sustainability is not technological, but the increasing gap in human capital readiness. This paper explores the specific risks associated with personnel shortages, high training costs and the misalignment between academic curricula and operational safety standards. By analyzing the current framework of aviation-focused higher education, the study identifies critical areas for governance reform and quality assurance. The research suggests that implementing competency-based education models can significantly mitigate the professional risks associated with human factors. Furthermore, the integration of university-industry collaboration is proposed as a vital mechanism for ensuring that the global aviation sector remains resilient in the face of future digital disruptions.

Introduction. In the modern era, the link between higher education and sectoral stability has become more pronounced, especially in high-stakes industries like aviation. As aviation systems become increasingly complex, the educational institutions tasked with preparing the next generation of professionals face a dual challenge: maintaining rigorous safety standards while adapting to rapid technological shifts. This research focuses on how human capital risks can be managed through strategic academic interventions and modernized governance models within the university ecosystem.

Human capital risks in the aviation sector. Human capital risk in this context refers to the operational vulnerabilities caused by inadequate training, skill gaps or personnel turnover (Jones & Gibbs, 2008). In the aviation market, these risks are compounded by the high cost of entry and the specialized nature of technical certifications. Traditional educational models often prioritize theoretical knowledge, leaving a practical gap that must be filled by expensive on-the-job training. This creates an economic burden on both the graduates and the industry, leading to a "brain drain" toward sectors with lower barriers to entry.

Table 1. Strategic framework for mitigating human capital risks in aviation education

Risk Category	Impact on Industry	Academic Mitigation Strategy	Expected Outcome
Skill Mismatch	Operational safety gaps and inefficiency.	Implementation of Competency-Based Training (CBT).	Higher graduate employability and safety standards.
High Training Costs	Barriers to entry for talented students.	University-Industry cost-sharing and scholarship models.	Diversified and sustainable talent pipeline.
Digital Gap	Inability to manage AI-integrated cockpit systems.	Integration of Data Analytics and VR Simulations.	Digital-native workforce ready for Aviation 4.0.
Personnel Turnover	Constant need for re-training and loss of expertise.	Focus on "Soft Skills" and Safety Culture (SMS) in curricula.	Increased long-term retention and professional loyalty.

Digital transformation and competency frameworks. The shift toward "Smart Campus" concepts and AI-integrated learning is particularly relevant for aviation education. As discussed by Plan et al. (2022), the psychological readiness and ability rank of students are critical factors in high-pressure professional environments. To bridge the current gap, higher education institutions (HEIs) must move toward a curriculum that integrates:

- Operational Safety Management (SMS): Embedded directly into management and engineering degrees.
- Micro-Certification: Allowing for rapid skill acquisition in specialized areas like drone technology or digital air traffic control.
- Predictive Data Analytics: Using industry data to forecast personnel needs and adjust student intake accordingly.

Conclusion and Local Impact. For a country like Azerbaijan, where the aviation sector is a strategic component of the non-oil economy, the modernization of higher education in this field is a matter of national competitiveness. By aligning local academic standards with global aviation perspectives, the risk of personnel shortage can be mitigated. The study concludes that the future

of aviation education lies in a symbiotic relationship between the industry's operational needs and the university's research-driven innovation.

Keywords: Aviation higher education, human capital risk, competency-based training, educational governance, sectoral labor market, quality assurance in aviation.

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ECO-ORIENTED EDUCATION: GREEN AND SUSTAINABLE UNIVERSITIES

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From "Ivory Towers" to "Living Labs". We live in an era defined by a "planetary emergency". Climate change, biodiversity loss and resource depletion are no longer abstract threats found in textbooks; they are the lived reality of the 21st century. In this context, the role of higher education must undergo a radical transformation. Historically, universities were "ivory towers" of pure theory (Eilert *et al*., 2017). Today, they must become "living laboratories" for sustainable development.

The term "Ivory Tower green policy" (Creighton, 1998) broadly refers to the sustainability and environmental initiatives adopted by institutions of higher education (IHEs), commonly known as "ivory towers". These policies combine operational, academic and community-oriented strategies to reduce environmental impact and promote sustainable practices. Insights from multiple sources highlight several dimensions:

1. Operational and Campus Sustainability. IHEs implement practical measures across facilities and operations to reduce energy, water and material impacts (Fookes *et al*., 2004) including:

- Energy efficiency. Transitioning to renewable electricity, installing motion sensors, retrofitting buildings for LEED certification and reducing fuel consumption in campus vehicles.
- Water management. Metering, leak detection, using stormwater and greywater and resource conservation programs.
- Waste reduction. Composting, recycling, use of local and organic food and minimizing single-use materials.
- Green infrastructure. Establishing community gardens, bike-sharing programs and local food initiatives.

2. Educational Integration and Curriculum. Sustainability is increasingly embedded in undergraduate and graduate education through:

- Dedicated courses and programs. Environmental sciences, Sustainable Design and interdisciplinary sustainability curricula.
- Experiential learning: Students engage in projects such as campus greening, community sustainability programs and renewable energy initiatives.

- Behavioral influence: By participating in sustainability programs, students adopt environmentally responsible practices during their campus years, with the goal of carrying these into adulthood.

3. Institutional Governance and Policy. Successful green policies often require leadership and culture change at all organizational levels:

- Top-down support: Presidents and boards promoting sustainability as a core institutional value.
- Mid-level engagement: Operations managers and academic departments implement sustainability strategies effectively.
- Bottom-up activism: Student and faculty movements catalyze policy adoption and innovations.
- Integration of sustainability into core institutional values ensures longevity and systemic impact rather than treating it as supplementary.

4. Research and Comparative Assessment. Initiatives such as the Greening the Ivory Towers Project (GITP) and the Campus Sustainability Assessment Framework (CSAF) provide tools to measure and benchmark environmental performance. Comparative research shows wide variance in sustainability uptake across institutions and regions, highlighting the importance of monitoring, transparency and continuous improvement. Universities act as laboratories for innovation, where successful interventions can ripple outwards to influence cities and broader society.

5. Societal Impact and Millennial Engagement. IHE sustainability efforts influence lifestyle choices, consumption decisions and civic engagement among students. Programs often aim for long-term behavioral change, including sustainable transportation, local food consumption and energy conservation. Research indicates that while on-campus behaviors improve, translating these habits into post-graduation urban life remains a challenge, particularly in areas such as food systems.

Key Takeaways. Success in greening ivory towers requires multi-level collaboration, combining institutional leadership, staff expertise and active student participation. Sustainability initiatives must integrate into an institution's "DNA" rather than function as temporary or peripheral projects (Vaughter, 2013). Universities increasingly serve as role models for community engagement, innovation in green technologies and education for sustainable living.

Eco-oriented education is not merely adding a "Green Module" to an existing curriculum. It is a fundamental shift in the philosophy of learning. It is about fostering what we call "Ecological Literacy" (Vaughter, 2013). This means ensuring that every graduate - whether they are a lawyer, an engineer, a doctor or an artist - understands the ecological footprint of their professional decisions.

The concept of Sustainable Education (ESD - Education for Sustainable Development) is recognized by UNESCO as a key enabler for all 17 Sustainable Development Goals. It focuses on critical thinking, systemic vision and future-oriented responsibility. We are moving away from the "Anthropocentric" model, where nature is just a resource, toward a "Biocentric" model, where human progress is inextricably linked to the health of the biosphere.

Why does this matter now? Because the "Green Transition' in the global economy requires a new type of human capital. We cannot build a green economy with an old-school mindset. We need professionals who can navigate the complexities of the circular economy, carbon neutrality and ESG (Environmental, Social and Governance) standards.

Leading Global Institutions

1. University of Toronto, Canada - Consistently ranked among the top for sustainability (O'Callaghan, 2025), the university integrates sustainability education across programs, offers a professional MSc in Sustainability Management and presents institution-wide initiatives like Climate Positive Energy and SDG, fostering interdisciplinary research and actionable knowledge mobilization.

2. ETH Zurich, Switzerland - Recognized for environmental initiatives and carbon reduction plans (King, 2024), ETH Zurich operates under the ETH Net Zero strategy targeting full greenhouse gas reductions by 2030 and emphasizes student, academic and operational engagement in sustainability.

3. Lund University, Sweden - Ranked first in the QS Sustainability 2026, Lund excels in environmental impact and governance, implementing Scandinavian traditions of collaboration and openness in its sustainable programs and research.

4. Western Sydney University, Australia - Leading the Times Higher Education Impact Rankings, it scores highly for SDG 12 (responsible consumption) and SDG 15 (life on land), integrating solar-powered infrastructure, EV charging stations and active campus sustainability programs.

5. University of California, Berkeley, USA - Focused on carbon neutrality goals (2025 for energy and buildings), it combines renewable energy projects with extensive research on sustainability and green campus operations (King, 2024).

In conclusion, Eco-oriented education is not a luxury for wealthy nations; it is a survival strategy for all. "Green Universities" are the engines of the new world. They are the places where we will learn to live within the limits of our planet while still advancing as a civilization.

As we look toward the future, let us remember that the most important "Green Technology" is not a solar panel or an electric car - it is the human mind, educated and empowered to protect the only home we have.

Keywords: Planetary emergency, climate change, ivory tower green policy, green management, sustainable education, green curriculum.

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ORGANIZATIONAL AND MANAGERIAL ASPECTS OF JOINT RESEARCH PROJECT FUNDING IN AZERBAIJAN: MECHANISMS AND CHALLENGES

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University-industry collaboration is increasingly recognized as a key driver of innovation, economic development and technological advancement. In Azerbaijan, efforts to strengthen research partnerships between universities and the private sector have gained momentum, but the mechanisms for funding joint research projects remain underdeveloped and fragmented. This study examines the current funding landscape for university-industry research collaborations in Azerbaijan, identifies the main mechanisms employed and explores the challenges that hinder effective collaboration. Using a mixed-methods approach, the research combines analysis of policy documents, government and institutional funding programs and semi-structured interviews with university administrators, researchers and industry partners.

The findings reveal that funding mechanisms in Azerbaijan primarily rely on government subsidies, competitive research grants and to a lesser extent, private sector contributions. While government programs provide essential financial support, they often suffer from limited transparency, bureaucratic delays and insufficient alignment with industry needs. Private sector engagement is hindered by weak trust relationships, low awareness of university capabilities and unclear intellectual property (IP) arrangements. Collaborative projects frequently face challenges in budget allocation, project management and performance evaluation, which can reduce both the efficiency and the impact of research outcomes.

Despite these challenges, there are notable successes, particularly in sectors such as information technology, agriculture and energy, where universities and companies have established pilot projects and small-scale innovation partnerships. These cases highlight the importance of flexible funding models, clear IP policies and continuous communication between partners. The study underscores the need for policy reforms that incentivize private sector participation, streamline administrative procedures and promote capacity building within universities for managing collaborative projects. Strengthening networks between research institutions, industry and government agencies can enhance the overall innovation ecosystem in Azerbaijan, fostering technology transfer and commercialization.

This research contributes to the understanding of funding practices and challenges in emerging innovation systems and provides practical recommendations for policymakers, university administrators and industry stakeholders seeking to improve the efficiency and impact of collaborative research projects. By identifying the gaps and proposing strategic interventions, the study offers a roadmap for advancing university-industry partnerships in Azerbaijan and similar post-Soviet contexts.

Furthermore, the study places particular emphasis on the organizational and managerial dimensions of joint research project funding, highlighting the critical role of governance structures, coordination mechanisms and institutional capacity in shaping collaboration outcomes. It examines how internal organizational arrangements within universities and firms influence decision-making processes, resource allocation and accountability in funded projects. The analysis reveals that the absence of clearly defined managerial responsibilities, standardized project management practices and effective communication channels often leads to coordination failures and inefficiencies. In this context, the research explores the potential of adopting modern management approaches - such as results-based management, integrated project governance frameworks and digital monitoring tools - to enhance transparency, improve performance evaluation and ensure more effective utilization of financial resources in collaborative research initiatives.

To systematize these relationships, the study proposes a conceptual framework (Figure 1) illustrating the interaction between funding mechanisms and organizational performance in joint research projects.

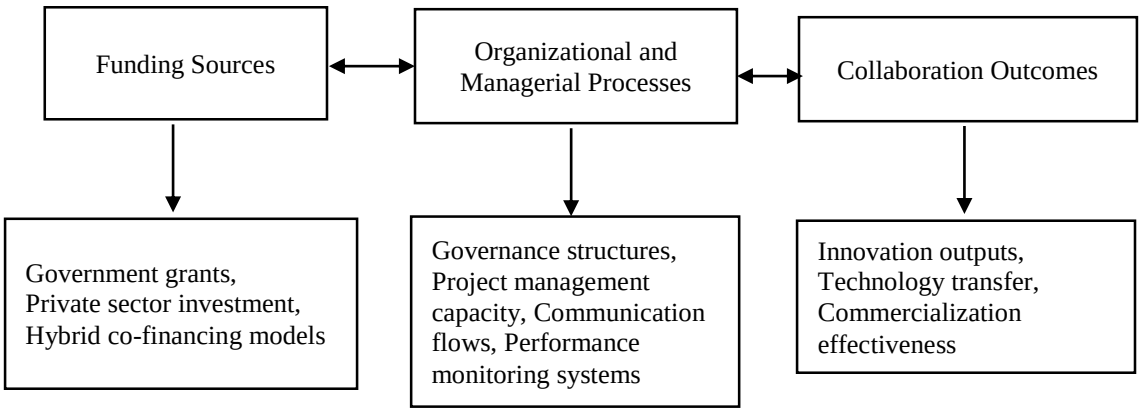

Figure 1. Interaction between funding mechanisms and organizational performance in joint research projects

The model consists of three core components: 1) Funding Sources (government grants, private sector investment and hybrid co-financing models), 2) Organizational and Managerial

Processes (governance structures, project management capacity, communication flows and performance monitoring systems) and 3) Collaboration Outcomes (innovation outputs, technology transfer and commercialization effectiveness). The framework assumes that the efficiency of funding utilization is mediated by the quality of managerial practices and institutional coordination. Weak governance and fragmented management reduce the impact of financial inputs, whereas well-structured organizational systems enhance project efficiency and sustainability. This scheme provides an analytical basis for evaluating how improvements in management and organizational design can amplify the effectiveness of funding mechanisms in Azerbaijan's emerging innovation ecosystem.

Keywords: Research funding, technology transfer, innovation policy, joint projects, public-private partnership.

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THE ROLE OF INNOVATION CENTERS AND TECHNOPARKS IN HIGHER EDUCATION

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In the globalized world, the impact of innovations on economic development and the importance of their application, the development of science-intensive industries have become one of the main goals of each country. The study explains in detail the essence, creation, scientific foundations and types of innovation centers and technoparks. In particular, the report notes the impossibility of achieving the development of an innovative economy without the scientific research centers established in higher education institutions, the application of science and education to production, the development of these areas as a whole and the application of modern technologies in production. In this context, innovation centers and technoparks have begun to occupy an important place in the structure of higher education institutions. It should be emphasized that as development increases, the main source of profit and income is not material resources, but science, knowledge and information resources (scientific and technical achievements, innovations, new technologies, know-how, etc.).

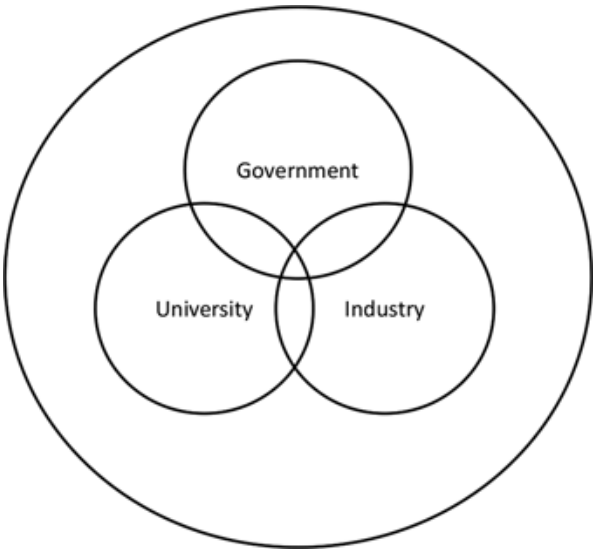
In modern times, universities have played a significant role in stimulating technological change and innovation. The recent decades have witnessed a change in the mission of the universities, namely their social mission in disseminating knowledge and interacting more broadly with the surrounding society, in addition to conduct education and research. This dissemination and interaction are often realized in the form of successful university-industry collaborations (UICs) in the developing countries (Göksidan *et al*., 2018).

There are different reasons explaining why universities may be considered as innovation leaders. These are related to the different mechanisms through which universities contribute to the innovation ecosystem, while adopting a mission-oriented approach: provision of appropriately skilled human capital via teaching (first mission), advancement of scientific and technical knowledge via academic research (second mission) and transfer of knowledge and technology from academia to industry and society via technology transfer (third mission) (https://www.cesaer.org/).

Higher education institutions must collaborate with industry, government and community organizations to tackle complex societal challenges through innovative research and initiatives. By fostering a culture of innovation, higher education institutions strive to empower students with the skills, knowledge and adaptability needed to succeed in an ever-

evolving global landscape while advancing the frontiers of knowledge and contributing to the betterment of society.

Innovation in higher education encompasses continuously pursuing and applying novel ideas, methodologies and technologies to enhance the quality and relevance of teaching, research and administrative practices within academic institutions. The institution is dedicated to innovation, which can be seen differently. This includes revamping curricula to foster cross-disciplinary learning and analytical skills, incorporating digital technologies and online platforms to facilitate customized instruction and teamwork and encouraging hands-on learning opportunities such as internships and research projects to enhance students' overall educational experiences (Göksidan *et al*., 2018).



The Triple Helix Model is a framework for innovation and economic development involving the interaction of three key actors: academia (universities), industry and government. Interactions between universities, industries and governments have given rise to new intermediary institutions, such as technology transfer offices and science parks and Etzkowitz and Ledersdorff theorized the relationship between the three sectors and explained the emergence of these new hybrid organizations (https://en.wikipedia.org/).

A technopark is one of the fundamental and most effective elements for developing innovation activity in the modern economy. It's not just a collection of buildings, but a complex, integrated ecosystem designed to stimulate, support and commercialize scientific and technical developments and startups (https://dayday.az/).

The effectiveness of innovative activity is largely determined by innovative infrastructure. Therefore, the innovative infrastructure is the basic component of the innovative

economy, the innovative potential of society. Innovative infrastructure includes technology parks, innovation centers, technology transfer centers, etc. Depending on the orientation, the innovation infrastructure, which includes technology parks, business incubators, innovation centers, etc. they are institutional subjects, the main purpose of which is the implementation of innovative activity, the commercialization of R&D results and their accelerated advancement in the field of material production, as well as the creation of favorable conditions for innovative development (Boyukkishi, 2017).

Technology parks, which are also known as science parks, research parks, innovation centres and technopoles, are important policy components of research and innovation local ecosystems. The concept of a technology park was initiated in 1951 with the Stanford Research Park that later became the cornerstone of Silicon Valley. In Europe, the first technology parks were created in 1972 with Sophia-Antipolis in France and the science parks at Cambridge University in England to serve the needs of entrepreneurially-minded academics and to promote university-industry collaboration (UNIDO). The International Association of Science Parks (IASP) defines a technology park as "an organization managed by specialized professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions. To enable these goals to be met, a Science Park stimulates and manages the flow of knowledge and technology amongst universities, R&D institutions, companies and markets; it facilitates the creation and growth of innovation-based companies through incubation and spin-off processes and provides other value-added services together with high-quality space and facilities" (https://www.kauffman.org/). Technoparks act as intermediaries between universities, research institutes and businesses, facilitating the transfer of scientific discoveries into commercial products. Creats an ecosystem that attracts and retains highly qualified specialists and organizing seminars, masterclasses and training sessions on current technologies, management and entrepreneurship. Generates a networking environment where entrepreneurs can find co-founders and employees. A technopark is not merely a location but a systemic element in the development of innovation activity. It creates a unique environment that enables ideas to transform into successful projects, attract investments, develop human capital and ultimately contributes to the formation of a sustainable, innovation-oriented economy (https://dayday.az/).

Our research suggests that universities often act as business incubators, allowing students and faculty to meet, form teams and experiment with the idea of bringing technology from research labs to the market. Universities effectively offer spinoffs an incubation period, in which students and faculty have the freedom to develop the technology and form their strategic plans, incrementally reducing the venture's market and technological risk. During their

time at the university, students can work on the initial stages of the spinoff without the opportunity cost of foregoing a paid job. And after a year or two of work on the spinoff as students, they have sufficient information to determine if they will take the risk of working full-time on the spinoff after graduation.

Universities' research and innovation activities contribute to furthering societal challenges and goals, both locally and globally, through the unique capacity of blending multidisciplinary approaches into applied research and innovation domains.

AIM (Azerbaijan Innovation Center) is a dynamic space that brings together tech entrepreneurs, researchers, investors, innovators and key players in the tech ecosystem to transform ideas into groundbreaking products and services. Serving as an urban innovation hub, AIM fosters collaboration, acts as a launchpad for fresh ideas and enables innovators to develop, monetize and scale their ventures. Designed to energize startups, corporations, universities, investors, research labs and government agencies, AIM creates the collaborative environment necessary to drive growth and innovation (https://idda.az/).

The creation of technoparks in higher education institutions in Azerbaijan is a new experience. In order to ensure sustainable development and competitiveness of the economy in our country, expansion of information and communication technologies based on modern scientific and technological achievements and conducting scientific research, modern complexes - High Technology Parks (TechnoParks) are being created. The main structural unit of technoparks is considered to be centers. These include an innovation-technology center, training center, consulting center, information center, marketing center, industrial center, financial insurance center, accounting-audit center and strategic research center.

In the world economy, technoparks are considered the main driving force of the innovative economy. Technoparks play a major role in the formation of new sectors of the national economy and its competitiveness. For example, countries such as the USA, India, China, etc. are grateful to technoparks for their global leadership in the field of Information Communication Technologies (ICT). Since universities, which have become the center of technological knowledge in the modern era, play an important role in building a knowledge-based economy of the information society, the creation of a university technopark unity has also been widely developed in recent years. The operation of the University Technopark in one area with the university campus opens up a unique opportunity for closer ties between the two institutions, support for applied and scientific research work in university life and expansion of joint opportunities. The technology transfer and commercialization offices of the technopark are intended to create new products, increase quality and productivity, reduce costs and provide consulting services (advertising, marketing, training, education, business planning and strategic development services).

The analysis shows that innovation centers and technoparks play an important role in modernizing the higher education system and ensuring economic development. They allow universities to function not only as educational institutions, but also as centers of innovation and entrepreneurship.

The first steps towards the establishment and operation of technoparks in higher education institutions in Azerbaijan began in 2013. Currently, technoparks are operating in the following universities of our republic:

- Baku Engineering University (BMU) Technopark: Established on the basis of the former Qafqaz University, it is one of the first university intra-university technopark activities in the country.
- Western Caspian University Technopark: Established in 2017; mainly focused on the development of student startups (for example, the “Parkingapp” project) and the beneficial application of scientific work to society.
- Azerbaijan Technical University (AzTU) Technopark: Operates with the goal of training highly qualified personnel and presenting research work for the service market.
- UNEC and others: Innovation centers and technopark elements are also being developed at the Azerbaijan State University of Economics (UNEC) and other large universities.

The analysis shows that innovation centers and technoparks act as important institutional tools in the transformation of the modern higher education system. They expand the traditional educational function of universities, creating conditions for the commercialization of scientific research, promotion of innovative activity and formation of an entrepreneurial environment.

Innovation centers strengthen the practical application of knowledge by stimulating the creative potential of students and researchers, while technoparks create economic value by ensuring the integration of this process with industry. As a result, university-industry cooperation is strengthened, the startup ecosystem develops and the production of high-tech products expands.

In general, these structures are of strategic importance in terms of improving the quality of higher education and increasing the competitiveness of the national economy. Therefore, strengthening their activities and systematic development should be considered a priority direction.

Keywords: Innovation, technopark, education, university industry, economic growth.

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THE TRANSFORMATION OF UNIVERSITIES' SOCIAL RESPONSIBILITY AND UNIVERSITY-SOCIETY RELATIONS IN THE CONTEXT OF DIGITAL CAPITAL

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In the twenty-first century, digital transformation has fundamentally reshaped the functions of the higher education system and the mechanisms of its interaction with society. The widespread diffusion of information and communication technologies has expanded the role of universities beyond the confines of the academic environment, transforming them into key institutions actively engaged in addressing social challenges.

In this context, the concept of universities' social responsibility has significantly broadened, encompassing not only teaching and research functions but also social inclusion, the promotion of equal opportunities and active engagement with society. Digitalization, in this regard, generates both new opportunities and emerging risks (Castells, 2010).

Within contemporary sociological approaches, "digital capital" is defined as a multidimensional social resource characterized by individuals' access to digital technologies, their technological competencies and their positions within online environments (Ragnedda & Ruiu, 2020). Drawing on Pierre Bourdieu's theory of capital, this concept provides a theoretical framework for explaining new mechanisms of social inequality in the digital environment (Bourdieu, 1986).

Higher education institutions represent one of the primary sites for the formation of digital capital. Universities not only provide students with academic knowledge but also develop digital literacy, analytical thinking and information-processing skills. From this perspective, the higher education system functions as a mechanism for both the production and redistribution of digital capital.

However, inequalities in access to digital resources also generate disparities within higher education itself. Students with limited access to technologies often find themselves in disadvantaged positions within the educational process (Van Dijk, 2020).

The social responsibility of universities in the contemporary era is closely linked to ensuring digital inclusion. Digital inclusion extends beyond the provision of physical access to technologies; it also encompasses the development of the skills necessary for their effective use (Van Deursen & Van Dijk, 2014).

In this regard, the key functions of universities include the following:

- The organization of digital literacy programs for socially vulnerable groups;
- The creation and dissemination of open educational resources (OER);
- The expansion of access to education through online learning platforms;
- The implementation of projects aimed at developing digital skills in cooperation with local communities.

These activities indicate that university-society relations are undergoing a qualitative transformation. Universities are no longer merely institutions for knowledge transmission but have become active institutional actors that promote social change.

The unequal distribution of digital capital leads to the emergence of new forms of social stratification. This process is also evident within the higher education system and significantly affects university-society relations.

Digital inequality manifests itself in the following dimensions:

- Disparities in access to educational resources;
- Inequalities in the use of online learning opportunities;
- Limited access to academic and professional networks;
- Reduced competitiveness in the labor market (OECD, 2019).

Under these conditions, the social responsibility of universities cannot be limited to the provision of education alone; it also requires the development of systematic strategies aimed at reducing digital inequality.

Modern universities must adopt innovative approaches to ensure a more equitable distribution of digital capital. In this regard, the following strategic directions are of particular importance:

- The institutionalization of digital inclusion policies;
- The implementation of AI- and data-driven educational models;
- The strengthening of university-industry-society collaboration;
- The development of lifelong learning platforms;
- The establishment of regional digital education centers.

These approaches enhance the social impact of universities and contribute to making their engagement with society more sustainable and effective.

The analysis demonstrates that digital capital has become one of the key determinants of social equality within contemporary higher education systems. Universities act as crucial institutional actors that can either mitigate inequalities or under conditions of unequal distribution, contribute to their intensification.

From this perspective, the social responsibility of universities should encompass strategic actions aimed at ensuring digital inclusion, supporting socially vulnerable groups and strengthening university-society interactions. In the context of digital transformation, the role of

universities extends beyond the academic sphere and becomes critically important for fostering broader social development.

Keywords: Digital capital, universities' social responsibility, social inequality, digital inclusion, higher education, university-society relations.

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GENDER BIAS IN MULTI-SOURCE FEEDBACK TOOLS FOR GRADUATE EVALUATION: EVIDENCE FROM OMAN

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This study investigates the presence of gender bias in the data collection instruments used for Key Performance Indicator (KPI) 4 at the College of Education, Sultan Qaboos University. These instruments: Student Perception Survey, Employer Survey and Completer Survey. Given the psychometric imperative for measurement fairness, this research examines the tools for Differential Item Functioning (DIF) across gender and tests for measurement invariance in their factorial structures. The findings indicate that, overall, the majority of items function adequately for both genders. However, the analysis revealed specific items exhibiting statistically significant DIF, with a tendency for bias favoring males more frequently than females. The study concludes that while the instruments are largely appropriate, targeted revisions of the identified biased items are necessary. Recommendations include a thorough review and reformulation of these items by expert panels to ensure gender neutrality and calls for further in-depth research to explore the underlying causes of bias and refine evaluation tools in teacher education.

GENERATIVE AI IN TRAVEL PLANNING: SHAPING TRAVEL DECISIONS, HABITS AND BEHAVIORAL PATTERNS

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This presentation discusses preliminary findings from an ongoing research project that examines the role of generative artificial intelligence (GenAI) in shaping contemporary travel planning among young travelers. In recent years, the rapid development of generative AI tools - such as ChatGPT, Google Gemini and other AI-based planning platforms - has significantly transformed the way individuals search for information, compare travel options and organize trips. These technologies increasingly function as personalized travel advisors, offering recommendations tailored to user preferences, travel constraints and behavioral patterns.

The study investigates how the use of generative AI influences travel habits, destination choices and broader decision-making processes. Particular attention is given to the extent to which AI-assisted planning affects behavioral characteristics of travelers, including their information search strategies, perceived convenience of planning, openness to new destinations and attitudes toward sustainable travel practices. The research also explores whether interaction with AI-generated recommendations may reshape travel preferences and encourage more reflective and conscious travel decisions.

Preliminary findings suggest that generative AI is not only a functional tool supporting trip organization but also an influential factor shaping travelers' behavioral patterns and decision-making styles. The use of AI-based systems may lead to changes in how travelers evaluate destinations, select transport modes and consider environmental impacts when planning their trips. At the same time, generative AI may increase the efficiency of travel planning by reducing information overload and simplifying complex decision-making processes.

By providing initial empirical insights, this study contributes to the emerging academic discussion on the intersection of artificial intelligence, tourism and changing consumer behavior. The findings highlight the growing importance of AI-driven technologies in influencing travel attitudes, preferences and behavioral characteristics and they underline the potential of generative AI to reshape the future of travel planning and tourism experiences.

Keywords: Generative AI, travel decision-making, travel behavior, tourism planning.

TOXIC SUPERVISION IN HIGHER EDUCATION

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With issues like increasing student dropout rates, low productivity and compromised quality, research in higher education is faced with a number of paralyzing challenges in India. This study aims to locate the role of toxic academic supervision in relation to decreased quality of research. Following a sequential mixed method design, the research begins with a quantitative analysis, which is then followed by an in-depth qualitative exploration. The results of mediation analysis in this study reveal that students who experience toxic research supervision have a weak sense of identification and are also poor at self-disclosure, which results in increased distress and reduced engagement and productivity. Moreover, identification and self-disclosure have also been found to partially mediate the relationship between toxic supervision and distress. Furthermore, a thematic analysis of this study provides a detailed behavioural profile of toxic academic supervisors and highlights the consequences of such supervision with regard to students' well-being and productivity. In terms of theoretical contributions, the study provides evidence that the concept of toxic leadership has applicability outside of the organizational context; in the educational sphere as well and that the toxic leadership scale can be successfully used to assess the severity of toxic supervision within the academic domain and corrective actions can be taken to mitigate the effect of such supervisory style on students. The study not only highlights the repercussions of toxicity in academia and higher education but also provides a detailed and in-depth description of the personality traits and behavioural idiosyncrasies of toxic supervisors, which can help in the early identification of toxic tendencies and can enable us to mitigate and prevent toxicity from the academic space and to ensure a conducive environment for students in higher education. Overall, the present research has important implications for researchers, academicians as well as policymakers.

Keywords: Research, higher education, toxic supervision, mixed method design.

POST-PANDEMIC CHALLENGES AND OPPORTUNITIES IN EDUCATION: A HUMANITIES AND ENGLISH LITERATURE PERSPECTIVE WITHIN PAKISTANI CULTURAL CONTEXTS

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Background and Rationale. The COVID-19 has transformed the education practices globally. The education systems, teaching pedagogical practices and socio-cultural engagements with the knowledge have been reimagined all over the world. In Pakistani context, the virtual revolution not only reveals certain systematic inequalities rather it unveils technological disparities and epistemological shift in teaching and learning practices across disciplines including Humanities and English Literature. The virtual revolution involves different aspects such as transition from traditional classrooms to the virtual teaching and learning forums like Google Classroom, Flip Classroom and Learning Management Systems. In addition to this, the technological revolution has also brought a significant upheaval in the students' motivation to peruse Humanities and Literature studies. From Humanities perspective, education is not only a technical process to provide employability rather it is an ideological sphere where education provide cultural and ideological avenues for shaping identity, power and discourse. Post-pandemic education in Pakistan raises certain critical inquiries regarding the relevance of critical theories and the confluence of digital with the humanities. This study situates post-pandemic educational challenges and opportunities in the Pakistani context and examines how humanities and literature disciplines contribute to understanding and reshaping educational practices particularly in the underdeveloped societies.

Post-Pandemic Challenges in Education in the Pakistani Context. The study highlights few significant challenges:

Digital Divide and Educational Inequality. One of the few significant challenges in Pakistani after pandemic, is the digital divide and educational inequality. There is a huge disparity between urban and rural areas of Pakistan in terms of internet availability and access. Students of urban areas have greater access to the digital facilities as compare to the students of rural areas. It affects their academic performance which leads to psychological well-being. Students who cannot access internet face anxiety, depression as a result of their low academic performance (Sami, 2025). In humanities and particularly literature, where critical understanding develops through

dialogue, discussions and interactive sessions, the unavailability of comprehensive communication between teachers and learners badly affects the teaching and learning experience.

Cultural and Gender-based Issues. The shift in teaching mode from physical to digital brings cultural and gender-based challenges. In Pakistani socio-cultural context, teachers and students face privacy challenges. They complain about the cyber security and personal information breech. In addition to this, there are gender based issues face by female teachers and students who deal with the domestic and household responsibilities along with online teaching and professional duties. Parents on the other hand, also complain about the effectiveness of the online medium of teaching. The concern about lack of the application of practical knowledge. Students get rare opportunities to practice their skills in online teaching modes (Abid *et al*., 2020).

Low Student Involvement and Anxiety. Students pay less attention to the studies and most of the times they remain passive. Most of the times students complain about the technical glitches such as cameras and microphones not properly working. The interruptions in internet connectivity and poor technical support results in students' low involvement in academic activities. Students also complain about the frustration and anxiety they feel while struggling with these issues in their online teaching and learning process (Shafi *et al*., 2023).

Crisis of Humanities and Literary Education. There is a decline in humanities and particularly literature studies in post- pandemic Pakistani socio-economic context. It is considered that higher education policies in Pakistan are mostly focused on the technical skills rather than literary and critical thinking. The focus of the education is more on utility purposes such as employability and market-driven technical skills. As a result, the knowledge of languages has entirely diminished. With the change in inclination towards languages and literature, creative work and analytical thought is dwindling from the Pakistani society. Pakistanis are no longer in the intellectual capacity to challenge any external narratives. They conceive themselves in the external narratives (Haq, 2017).

A Critical Humanities and English Literature Framework in the Pakistani Cultural Milieu. According to *The World Humanities Report Humanities in Pakistan* 2022 the situation of humanities is very disappointing in Pakistan. Humanities have been suffering since last three decades due to some policies of the higher education commission. Educational authorities and universities deliberately support and fund science and technological fields which leads to less focus on policy development in humanities, arts and literature fields. This decline make up the public perception about humanities as less valuable field of study to explore. Pakistan Higher Education Commission imposes uniform publishing and evaluation standards for the Humanities and scientific and technical fields (Kamran, 2022). Similarly *The World Humanities Report Humanities United States 2024* reveals the complex negotiation of Humanities with the political scenarios, market forces and institutional frameworks. However, despite struggling situations the

humanities in United States is strongly embedded in to the liberal arts frameworks (Shulman & Tobin, 2024). Despite the data available regarding overall decline in the fields of studies of humanities and literature, it is significant to understand the need of the revival of the fields of humanities and literature particularly under developed countries such as Pakistan. However, in the time of need, humanities is very much significant to inculcate critical consciousness, ethical reasoning and socio political awareness. English Literature deals with texts as ideological and cultural artifacts where analytical skills, critical inquiry and interpretative understanding play the part in making understanding. Theoretical frameworks in literary criticism are significant to make individuals question the set narratives. Literature also become a crucial site where diverse social, political and national identities are negotiated and contested. Humanities and literature also spread empathy and ethical consideration. Humanities play a crucial role in nurturing tolerant, empathetic and responsible citizens. Critics such as Martha Nussbaum also favor the need of humanities in the contemporary times. She also raises her voice against the marginalization of humanities in the contemporary economic driven market.

Conclusion. Literature and Humanities are the center for learning and teaching experience. In Pakistani social context it should be the main focus not a peripheral field of study. Reasserting the humanities and literature is essential for developing the responsible and culturally informed citizens. Despite different educational challenges in post pandemic Pakistani society, the need for the revival of Humanities and literature along with the study of language is very much a matter of urgent attention.

Keywords: Humanities, Pakistani social milieu, critical thinking.

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FROM ATTITUDES TO ACTION: FACULTY READINESS AND INCLUSIVE PRACTICES FOR STUDENTS WITH AUTISM SPECTRUM DISORDER IN GREEK HIGHER EDUCATION

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Autism Spectrum Disorder (ASD) is a neurodevelopmental condition characterized by persistent differences in social communication and interaction, alongside restricted or repetitive patterns of behavior, interests or activities (American Psychological Association, 2023; Kouznetsov *et al*., 2023; Murphy *et al*., 2016). A defining feature of ASD is its marked heterogeneity, as individuals present diverse cognitive abilities, functional profiles and varying levels of required support (Thomaidis *et al*., 2020). This variability creates important challenges for educational planning and inclusive practices, particularly within higher education contexts where standardized pedagogical approaches and implicit academic expectations often prevail (Fabri *et al*., 2022; Murphy *et al*., 2016; Waisman *et al*., 2023).

Contemporary diagnostic frameworks further emphasize this heterogeneity. The Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR) conceptualizes ASD as a spectrum within neurodevelopmental disorders, highlighting varying levels of support needs rather than discrete diagnostic categories. Similarly, the International Classification of Diseases (ICD-11) adopts a unified diagnostic framework that prioritizes functional impact and individual differences, replacing earlier subtypes such as childhood autism and Asperger's syndrome with a single autism spectrum classification (American Psychiatric Association, 2022; Lord *et al*., 2018; WHO, 2019). These diagnostic developments reinforce the need for flexible, inclusive and student-centered approaches within educational environments.

At the same time, epidemiological data indicate a steady increase in the global prevalence of ASD (Kouznetsov *et al*., 2023). Although comprehensive national prevalence data for adults in Greece remain limited, available studies align with broader European trends and suggest that an increasing number of individuals on the autism spectrum are entering higher education institutions (Von Below *et al*., 2024). This development highlights the growing responsibility of universities to respond effectively to neurodiversity and to ensure equitable access, participation and academic success for students with ASD (Fabri *et al*., 2022; Waisman *et al*., 2023).

Within this evolving landscape, the inclusion of students with ASD in higher education has become a central issue in international debates concerning equity, accessibility and the future role

of universities (Fabri *et al*., 2022; Waisman *et al*., 2023). While global policy frameworks increasingly promote inclusive education, empirical research consistently demonstrates that successful implementation depends not only on institutional policies but also on the attitudes, preparedness and instructional practices of academic teaching staff (Gurbuz *et al*., 2019). Faculty members play a pivotal role in translating inclusive principles into everyday teaching, assessment and interaction with students (Waisman *et al*., 2023). Despite this critical role, empirical research examining faculty readiness and inclusive teaching practices, particularly in Southern European contexts such as Greece, remains comparatively limited. Consequently, there is a clear need for context-specific empirical evidence that explores how academic staff perceive and implement inclusive practices for students with ASD within national higher education systems.

The present study aims to examine faculty attitudes, perceived readiness and inclusive teaching practices regarding students with ASD in Greek higher education institutions. In particular, the study investigates the relationship between faculty perceptions, perceived self-efficacy and institutional support in shaping the implementation of inclusive teaching practices. Grounded in inclusive education theory and the social model of disability, the research adopts a quantitative design based on a structured questionnaire administered to academic teaching staff across Greek universities. By moving beyond the assessment of attitudes alone, the study seeks to explore how individual and institutional factors interact in influencing the translation of inclusive intentions into concrete pedagogical practices.

Data were collected from a diverse sample of academic staff (n=100) representing multiple disciplines and institutional contexts. The survey was conducted between September and December 2025, with participants recruited through personal e-mail invitations. The questionnaire examined several key dimensions, including knowledge and awareness of ASD, attitudes toward inclusion, perceived self-efficacy and readiness to support students with ASD, reported use of inclusive teaching strategies and perceptions of institutional support and barriers. Data analysis was conducted using the statistical software Jamovi and included descriptive statistics, correlation analyses and inferential tests aimed at identifying patterns and predictors associated with the adoption of inclusive practices.

The findings indicate that faculty members generally express positive attitudes toward the inclusion of students with ASD (M = 4.63, SD = 0.64), reflecting a broader international trend toward increasing awareness and acceptance of neurodiversity in higher education (Vincent & Fabri, 2020; Von Below *et al*., 2024). However, their perceived readiness to support these students was considerably lower (M = 2.67, SD = 1.05) and only 21% of participants reported having received formal training on ASD. A substantial proportion of participants reported limited formal training related to ASD and inclusive pedagogy (Waisman *et al*., 2023), highlighting an important gap between supportive attitudes and practical competence. These findings align with previous

international research identifying a persistent discrepancy between positive dispositions toward inclusion and the availability of the knowledge and skills necessary to implement inclusive practices effectively (Anderson *et al*., 2018; Cai & Richdale, 2016; Gurbuz *et al*., 2019; Von Below *et al*., 2024).

A particularly significant finding concerns the role of faculty self-efficacy. Regression analyses indicated that perceived self-efficacy was a significant predictor of the reported implementation of inclusive teaching practices ($\beta = 2.11$, $p = .034$). However, the effect of training was no longer statistically significant when self-efficacy was included in the model. This suggests that professional development initiatives may contribute to inclusive practice primarily by strengthening instructors' confidence in their ability to effectively support students with ASD. These results are consistent with the theory of self-efficacy proposed by Bandura (1997), which emphasizes that individuals' beliefs in their capabilities strongly influence their behavior, motivation and performance. Previous research has similarly demonstrated that higher levels of teacher self-efficacy are associated with greater willingness to implement inclusive strategies and to respond to diverse learning needs within higher education contexts (Barrera & Moliner, 2025).

By providing empirical evidence from Greek higher education institutions, this study contributes to an underrepresented area within the international literature on ASD inclusion in universities. By quantitatively linking faculty attitudes, self-efficacy, institutional support and teaching practices, the findings highlight the need to move decisively "from attitudes to action" through structured faculty training, institutional capacity-building and policy-driven initiatives that support inclusive pedagogy. In doing so, the study contributes to the growing global discussion on inclusive higher education by offering context-specific evidence from Southern Europe.

The findings carry important implications for higher education policy makers, university leadership and faculty development programs. Strengthening professional training on ASD, embedding inclusive pedagogical principles within academic practice and fostering supportive institutional cultures are essential steps toward developing universities that are genuinely accessible and inclusive. Ultimately, the study highlights that moving from supportive attitudes to effective inclusive action requires systematic professional development, sustained institutional commitment and the strengthening of faculty self-efficacy in supporting students with ASD.

Keywords: Autism spectrum disorder, inclusion, higher education, faculty attitudes, teaching practices, Greece.

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A TRIPLE HELIX INNOVATION ECOSYSTEM MODEL FOR STRENGTHENING COLLABORATION: A CASE OF ONE ZIMBABWEAN UNIVERSITY

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Universities in developing economies are increasingly required to act as catalysts of innovation, industrialization and socio economic transformation. In Zimbabwe, the Education 5.0 policy framework places universities at the center of national development, yet collaborative structures linking academia, industry and government remain underdeveloped. This study examines these gaps through the case of one Zimbabwean university, with the aim of designing a context specific Triple Helix Innovation Ecosystem Model capable of strengthening institutional collaboration and enhancing innovation outcomes. Guided by the Triple Helix Innovation Theory, which conceptualises innovation as a product of recursive interactions between universities, industry and government, the study evaluates the university's current research environment, partnership dynamics and structural constraints. A mixed methods research design is employed, comprising document analysis, semi structured interviews with university executives, industry partners and government officials and survey data from academic staff and students. Qualitative data are analyzed thematically, while quantitative responses are examined through descriptive statistics to identify patterns, opportunities and barriers in the existing collaboration landscape. Findings indicate that despite strong alignment with national innovation priorities, collaboration is undermined by limited research funding, weak commercialization pathways and fragmented partnership governance. Nevertheless, the university demonstrates considerable potential through its disciplinary diversity, community engagement strengths and emerging research initiatives. Based on these insights, the study proposes a four pillar Triple Helix innovation ecosystem model. The proposed model provides a practical and adaptable framework for strengthening collaborative innovation within Zimbabwean higher education and offers a scalable blueprint for similar universities across the region seeking to enhance their contribution to socio economic development.

Keywords: Triple Helix model, innovation ecosystem, collaboration, Education 5.0, research capacity, Zimbabwe, higher education development.

UNIVERSITY AUTONOMY IN TRANSITION: COLONIAL LEGACIES AND NEOLIBERAL TRANSFORMATIONS IN INDIA

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The modern university emerged in nineteenth-century Europe as a defining institution of modernity. It was distinguished from its medieval predecessors by three foundational principles: the unity of teaching and research, the ideal of academic freedom and the centrality accorded to philosophy as a reflective and integrative discipline. As this model of the university proliferated beyond Europe and was adapted to diverse socio-political contexts, it encountered a range of structural and intellectual challenges. In Indian universities the British model of university swer domesticated during colonial period, first three universities were established in 1857 immediately in the aftermath of 1857 revolt. Therefore, the governing structures of the universities were tightly controlled. The British also intended to limit the mobilisation along the nationalist freedom struggles, inside the universities. However, post 1920s the university campuses witnessed a series of protest and demonstration. The governing mechanisms of the universities in India are still driven by colonial govern mentality and state intervention has assumed new dimensions and modalities. Three major education policies in India in last seventy five years present a clear trajectory of scarce change in governance of universities in terms of autonomy, but vast changes have been introduced to accommodate neoliberal imperatives.

These challenges of governance, accountability and autonomy have been further exacerbated under the conditions of a neoliberal political economy, which has increasingly sought to reorient the culture, purposes and objectives of universities toward market-driven imperatives. These changes are often in tension with the normative ideal of university autonomy. Against this backdrop, the present paper seeks to examine the historical evolution of the university and critically engage with the challenges confronting its contemporary functioning in terms of concerns related to autonomy, with particular emphasis on the experience and trajectories of universities in India.

Keywords: Universities, neoliberalism, autonomy, governance.

ON ORNAMENTAL WOMEN: EXAMINING GENDER PERFORMATIVITY WITHIN UNIVERSITIES IN INDIA

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This paper is based on primary data which was collected in the process of ongoing research which that seeks to examine the process of gendered citizenship within educational spaces as a process within higher education institutions (HEIs) in general and universities in particular. The fieldwork for this research was conducted in three public universities located in the territory of Delhi, India. Public universities were chosen as the field keeping in view, the onus of public welfare on the state and its institutions. This paper is based on the narratives of participants in response to the one of the research questions, namely, "What are the substantive aspects of membership, rights and participation within university structures?". The social construction of gender dictates certain roles, rules and norms of being and becoming for both men and women. This is more concerning in the case of women, as, faculty members which are women within such institutions do not just have to bear the brunt of one; either conforming to gender roles or being directed to do so; rather, they are at the intersection of performativity and ornamentalism. The theme derived from participants' narratives is 'ornamental women in academia'.

The issues of gender inequality extend to women in different roles within the universities. In the same vein, female faculty members in Indian universities are facing what can be understood as 'ornamentalism'. Anne Anlin Cheng argues - "I offer ornamentalism as a conceptual lens through which to attend to the afterlife of a racialized and aestheticized object that remains very much an object, even as the human stakes remain chillingly high. At the most basic level, ornamentalism, with its almost homophonic echo of Orientalism, names for me the critically conjoined presences of the oriental, the feminine and the decorative". Cheng's theorisation of ornamentalism is an important starting point for us. This paper understands ornamentalism as- the commodification and fetishisation of women by making performativity the accepted way of being within academic institutions. This paper seeks to examine the reproduction of gender-based inequalities through reinforcing and aggrandising gender performativity. The research adopts a qualitative methodology wherein; the case study method has been used for an in-depth examination of the emerging theme(s) and an interview schedule was developed to conduct the same. The narratives obtained are the result of in-person, semi-structured, open-ended, in-depth interviews. The broader significance of this paper is that it seeks to examine the 'ornamentalism' as a process

within HEIs and attempts to provide an understanding of how gender-based inequalities are present in the micropolitical practices which manifest as a process within educational spaces. At the very foundation of public education in India are the ideas of constitutional and social justice, equity and inclusion and thus, it becomes imperative that we enquire into the substantive aspect of welfare delivery in these institutions.

Keywords: Ornamentalism, performativity, gender, universities, inequalities.

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STRATEGIC ASSESSMENT OF THE DIGITAL LITERACY LEVEL OF UNIVERSITY TEACHERS

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The 21st century is an era that emphasizes the importance of new skills and competencies in every sense. The skills of this century include critical thinking, problem solving, effective communication, collaborative work, information and technology literacy, flexibility, adaptability, global skills and financial literacy. Technological self-confidence is defined as individuals who are skilled and confident in using information and communication technologies and play an effective role in accessing information. This competence is also expressed as "being technologically literate, being able to use technology in lessons, guiding students to use technology effectively, organizing the learning environment in a way that students can use technology and collaborating online with colleagues". As can be seen, adapting to the innovations brought by technology to education is among the 21st century skills and technological literacy is considered one of the most important skills of the century (Öz, 2021). This situation is thought to point to the digital transformation process that we have often heard in recent years (Bond *et al*., 2018).

Digital transformation is a process that emphasizes the accessibility of learning environments and the ability of students to access information anytime and anywhere with mobile technology with the emergence of the digital world. In this context, it has been concluded that the services, management and curriculum offered by educational institutions should also be changed according to the needs of individuals through digitalization. This transformation also emphasizes the importance of distance education (Balyer & Öz, 2018). Because distance education has long been applied as a model that can meet changing social and technological demands at all levels of education. In addition, it provides students with access to a wide range of educational resources without being tied to a specific place or time limit and creates a more flexible structure than formal education by bringing together students and teachers from different places. Therefore, with digitalization, learning environments have transcended the boundaries of schools and campuses and become platforms where both traditional and distance learning are used together.

In order for education to adapt to the needs of this era, learners and teachers in the 21st century must have certain characteristics. Students, who are called digital natives, have characteristics such as the ability to acquire information, readiness for lifelong learning, creative and critical thinking, problem-oriented thinking, effective communication, effective use of technology and collaboration skills (Taşlıbeyaz, 2019).

Teachers, who are considered digital immigrants, must have the knowledge and experience to organize the learning environment, take into account the characteristics of learners, participate in the continuous learning process, develop themselves and use technology intensively in any part or all of the lesson (Dağhan *et al*., 2017). To fulfill this task, today's teachers from primary education to higher education must have the skills called technological self-confidence. Digital literacy is necessary to access accurate information using the internet, which is needed and used in every aspect of life today and to effectively use various software technologies in education and professional life.

Kurbanoğlu and Akkoyunlu also examined the impact of the development of information and communication technologies on the processing, storage and transmission of information in their studies and stated that information has gained a global function as a result of these developments. The increase in access to information and its presentation to individuals in many different ways has facilitated access to information and at the same time led to the formation of a complex network. As Bundin (2004) also noted in his study, this network has required individuals to learn all the environments they need to use to access information, to be skeptical of the information they obtain, to be able to form it and to have the skills to present it. Seidel (1998) emphasizes the importance of technological literacy for individuals; argues that individuals should not only use technology, but also be active citizens who can shape the future with technology and actively participate in the technological efforts of their nations. In the future, regardless of their status, individuals who are not sufficiently digitally literate will not be able to access the ever-expanding knowledge base and will have difficulty keeping up with evolving global technologies. It would be a mistake to define digital literacy narrowly as the ability to use digital devices and software. Escheth (2004) touched on the complex emotional and cognitive skills necessary for effective digital literacy. Escheth (2004) defined digital literacy most succinctly as “the skills to survive in the digital age”. Ng (2012) defines an individual’s level of digital literacy as the ability to adapt to current technological advances. According to Gilster (1997), digital literacy is the ability to understand and use information presented on a computer through various sources. Yoram (2004) states that digital literacy encompasses five types of literacy: visual, reproductive, multiple, information and socio-emotional literacy (Onursoy, 2018).

Digital literacy encompasses the complex cognitive, sociological and emotional skills that users need to function effectively in the digital environment. In addition, the spread of disinformation, which plays an active role in the creation of internet risks, increases the importance of digital literacy. This new industrial and technological era, also known as Industry 4.0, has various characteristics, but the ability to create a new type of literacy is one of its most important features. The most important types of digital literacy that emerged in this period and that societies should adopt are: “network literacy”, “computer literacy”, “scientific literacy”, “geographic

literacy", "environmental literacy", "multicultural literacy", "electronic literacy", "economic literacy", "critical literacy", "information technology literacy", "media literacy", "visual literacy", "graphic literacy", "internet literacy", "cultural literacy", "library literacy", "technological literacy", "television literacy", "consumer literacy", "web literacy", "visual literacy", "advertising literacy", "cultural literacy", "TV literacy". "Literacy", "digital literacy", "financial literacy" and other types of literacy. In addition, one of the most important aspects to consider is digital literacy.

Although today's "new generation" does not have difficulty using digital technologies, the degree to which they use them consciously is debatable. On the other hand, the ability of children and young people to use information technologies consciously is significantly linked to their school education. It is important for children and young people to acquire desirable behaviors related to information technologies at an early age and for relevant private and public institutions, especially teachers and universities, to have well-trained personnel in this field to instill these behaviors in children and young people. In this context, studies on the level of digital competence of teachers working in pre-university education, as well as studies aimed at determining the level of information technologies and therefore, digital literacy of academics in universities, should be considered an important issue.

The study of the digital literacy level of university teaching staff is not just about measuring their technological skills. The real issue is to determine how these skills affect the teaching process and to what extent they are consistent with the overall development direction of the higher education institution. If the assessment is limited to collecting indicators, the process will not yield practical results. This is where the concept of strategic assessment becomes important. It involves systematically identifying the digital skills of teaching staff and then using the results to make concrete decisions. For example, in which areas there are weaknesses, in which areas additional training is needed, which faculties or specialist groups are at a lower level in the use of digital tools - the answers to such questions should be included in the planning process. Otherwise, the assessment remains merely formal.

The teaching staff in higher education institutions is not a single, homogeneous group. Differences in age, specialization, academic experience, attitude to technology and individual motivation levels directly affect digital literacy indicators. Therefore, applying the same type of training or development programs to everyone will not always yield effective results. A strategic approach allows for an analysis of the current situation, identification of gaps and creation of a phased development plan. On the other hand, digital transformation is no longer an episodic process in the higher education system. The digitization of teaching materials, the use of online platforms, the electronicization of assessment mechanisms and the widespread introduction of hybrid education models have made digital competence a prerequisite for teachers. In this context, the strategic assessment of digital literacy also functions as a quality assurance issue. That is, it is

not only about the presence of skills, but also about their continuous development. Therefore, the strategic assessment of the level of digital literacy of university teachers acts as a bridge between measurement and management. This approach ensures that the results are used not only for reporting, but also for improvement. As a result, digital literacy is assessed not as an individual characteristic, but as a means of institutional empowerment.

Keywords: Digital literacy, ınformation, technology/technological, education, skills.

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PAKISTAN'S HIGHER EDUCATION LANDSCAPE AND LEADERSHIP CHALLENGES

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Higher Education in Pakistan has expanded greatly in the last two decades. There are more than 250 universities/higher education institutions across the country, serving approximately 2 million students (Arooj, 2025). The mushroom growth of universities and degree awarding institutions has pushed public sector universities into deep financial crises driven by reduced state funding and rising operational costs (Murtaza, 2024). Higher education leaders face the unprecedent demands-do 'more' (that is enroll more students, start new programmes, teach more, provide staff and students with better facilities) with 'less' resources (reduced state funding, fewer classrooms/labs and staff) while maintaining quality. By prioritising explanatory depth and insider perspective, this study examines the lived experiences of vice chancellors and rectors in public sector universities in Pakistan while dealing with unprecedented demands that the institutions and successive governments have placed upon them. My key focus remains to unpack how vice chancellors and rectors respond to financial crisis, internal and external demands, foster culture of resilience and long-term sustainability in this challenging time. The data for the study comes from qualitative interviews with 20 male and female vice chancellors/rectors of public sector university. The data were collected during vice chancellors' forums in Islamabad, Pakistan. The forum brings together vice chancellors and rectors from across Pakistan. The respondents were purposively included-representing senior and newly appointed vice chancellors and rectors from general and specialized universities. The study engages 'commodification of education' from the broader Marxist theoretical lens for the informed analysis of field data (Naidoo, 2005). The collected data is subjected to thematic analysis which allowed reading through the data set, identification of patterns, creation of codes and arrangement of them into themes (Braun & Clarke, 2006). The overall conclusion I reach from the study is that the challenging time in higher education in Pakistan demands the higher education leaders to lead with 4Cs-Character, Competence, Confidence and Courage.

Keywords: Higher education, financial crisis, vice chancellors, commodification of education, Marxist theoretical lens, rectors.

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