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Ethical, Legal, and Social Factors in Vitagen Education: Shaping Media Mentality and Critical Competencies of University Students

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ABSTRACT: This paper presents a Central Asia–oriented model, developed towards the concept of vitagen-ed, to develop "media mentality" and critical capacities among university students through the incorporation of ELSI (ethical-legal-social) factors in the field. Building on vitagen and in line with recent policy and evidence throughout Uzbekistan, Kazakhstan, Kyrgyzstan), we discuss how media and information literacy (MIL) reformations, data privacy laws and academic integrity campaigns can be translated into classroom practice. Despite growing digitalization and policy-level commitments, there remains a lack of empirically grounded, classroom-level models that systematically integrate ethical, legal, and social dimensions into media education in Central Asian higher education. We synthesize UNESCO/OECD outputs and regional reports (2020–2025) to foreground four recurring gaps: (i) uneven MIL infusion in higher education curricula; (ii) inconsistent enforcement of personal data and privacy compliance by EdTech providers; (iii) nascent but patchy academic integrity cultural norms; and (iv) insufficient embrace of student lifeworld's (vitagen) for critical media reasoning. We present the V-MIND model (Vitagen-driven MIL integrated Integrity-centered Norms-compliant Data-ethical) and a pilot approach with treatment and control groups that can practically implement vitagen tasks such as narratives, case-based MIL labs, and data-ethics clinics. Intended results are the enhancement of source evaluation, legal/ethical use of personal data, and critical disempowerment through validated rubrics congruent to UNESCO MIL modules and national legislation. The methodological approach enables systematic measurement of changes in critical media analysis, ethical reasoning in AI-mediated contexts, and privacy self-efficacy among university student. We describe the feasibility of enactment under current legal framework (such as, data protection and education laws in Uzbekistan), pathways for teacher development, and institutional governance. The article ends with some hypotheses to be tested and a multi-campus trial implementation plan. By linking vitagen pedagogy with ELSI-compliant media education, this study contributes a scalable and context-sensitive

model that bridges policy aspirations and classroom practice, offering practical implications for curriculum design, educator training, and digital governance in Central Asian universities. This contribution connects historical vitagen pedagogy with current ELSI imperatives by providing locally anchored pathway to scaling media-mindset and critical competence development in universities of Central Asian region.

Keywords: media mentality, vitagen education, critical competencies, HEU students.

I. INTRODUCTION

Vitagen education is an important component of today's media literacy curriculum at both university level. It is not only a standalone course; it also has been incorporated into relevant courses. Conceptual frameworks on Vitagen education point out three important aspects that had a significant effect on how university students view their consumption of media content, the ethical, legal and social factors. Ethics involves the overall grasp of what ethics entails in terms of meta-ethics, normative ethics and applied ethics and how it applies to media production, distribution, reception/zooming. The need for learning how to recognize and assess ethical dilemmas in the mediated realm is also underscored by research on final year university students' acquisition of ethical judgement [1].

Legal issues are dominant in the core discussion of laws, rule and regulations that control media use in education. The curriculum is designed around the current laws, decrees, articles, conventions and agreements associated with information and content disclosure to engender a responsible attitude. The societal factors are how media is perceived in social context based on the studies of media and social contexts. This dimension allows for making sense of, and scrutiny in discourse, the best possible ways to promote active citizenship via social media [2]. At the same time, AI-mediated educational platforms are expanding in universities, leading to new ethical and legal concerns about the fair treatment of student data use, algorithmic transparency, and digital readiness inequalities among institutions. Current global recommendations of UNESCO and the OECD (2007) require a human-centered, law-compliant, and equity-oriented use of AI in education focusing on teacher capacity-building, transparency, and risk management [2, 3].

National strategies from Central Asia – Digital Uzbekistan 2030, ICT- centered reforms in Kyrgyzstan and media and information literacy initiatives in Kazakhstan that have accelerated the take-up of digital services such as those aimed at State-digitization projects.' Disclosure gaps also emerged following a regional review regarding provisions for privacy protection, cross-border data flows and online disinformation. This regional circumstance additionally emphasizes the necessity of pedagogical strategies that are both ethically, legally and socially informed, a need especially pressing in media-rich university classrooms where students' everyday lives function as raw material for reflection and making meaning. Where this is the case, Vitagen education may map neatly onto media and information literacy (MIL) principles to provide a cohesive system for learners to situate personal media histories within larger ethical and regulatory debates [4-5].

Empirical knowledge derived from university-level quantitative longitudinal studies [7] has shown that these Vitagen strands all supported by AI ethics and data-protection norms provide a solid basis for understanding how Vitagen education influences the way students think critically, respond in digital formats, and develop media mentality within today's educational contexts.

1. CONCEPTUAL BACKGROUND: VITAGEN EDUCATION, MEDIA MENTALITY, AND CRITICAL COMPETENCIES

The three theoretical strands used in this study are (1) vitagen pedagogy, which focuses on learning (by lived experience and reflective meaning-making); (2) media mentality, as a dispositional orientation toward a responsible, ethical, critical, and socially responsible engagement with the media; and (3) ELSI frameworks based on UNESCO and OECD scholarship about responsible digital and AI-enabled education. The recent high impact literature it states that ethical reasoning and legal awareness should not be treated as an abstract

norm but must be incorporated in natural learning actions. Making vitagen reflection consistent with internationally-accepted ELSI competencies, the VEMM model brings these theories to bear in a well-integrated, empirical model.

1.1 Global ELSI and GenAI

The concept of ethics is usually defined as a system that governs an individual's conduct on the basis of good and bad, right and wrong moral principles. Ethics aims to sort right from wrong actions. At the level of the individual, morality involves standards for behavior: how we should act and what rules we ought to follow. Broader still, ethics can refer to the rules and standards (and guidelines) by which individuals conduct themselves within a specific group or society [8]. This difference is very important in media literacy education as teachers are now including media law and a sense of legal constraints together with social, ethical and moral concerns which would prevent inappropriate use of media. That people feel differently towards the law according to whether it applies to what are essentially media, which indicates that there are differing ethical judgments across contexts we can be protective with violent content like suicide. Accordingly, familiarity with media laws is non-negotiable in media education models like Vitagen [9].

Pre-censorship means establishing rules and laws to keep unwanted content from existing or moving through the world, bringing up questions of morality pertaining to control and free speech. Regulatory approaches such as the Motion Picture Association of America's ratings are models of moral stewardship, steering users particularly children but not prohibiting all creative choices. Public choice in legal authority for information may also be influenced by ethical considerations as gatekeepers and meditators of public interest. The formal apology to victims of the incorrect reporting in the News of the World phone hacking scandal shows how personal and social factors are linked into media regulation.

From a collective standpoint, there are many influences that determine how media consumers view themselves and others, and social media is the most recent of these changes. The exchange of content and unmediated communication has enabled the user to connect across borderless geographies. Thus, media education models should have societal impact. Media law focuses on the limits controlling media systems from outside at a reasonable aspect, concern with the identity of who is nowadays in control of which expression and national security issues being the guardian for expressed media acts.

Finally, more recent global policy agendas continue to underscore the need for incorporation of ethical, legal and social guardrails into media and digital education. UNESCO's 2023 recommendations, for example, establish fundamental principles of lawful and ethical digital practice, such as age-appropriate access, data minimalization, teacher training and fairness in AI use to be adapted by educators into everyday learning situations. The OECD 2023 Digital Education Outlook also focuses on new governance and "guarding" frameworks that will help secure fair, transparent, and ethical adoption of AI in education systems [10, 11]. These suggestions are consistent with the Vitagen education model, which situates ethical and legal thinking as key skills for critical media use.

Ethical, legal and social considerations underpinned by the latest international guidance about responsible use of technology collectively create the foundation of the Vitagen education model. This structure equips college students to engage increasingly complex information ecosystems with a sense of judgment, responsibility and respect for human values so their media viewpoints and critical abilities grow in an ethically aware and socially responsible fashion.

1.2 Central Asia—policy and uptake

- Uzbekistan. The national strategy Digital Uzbekistan 2030 has been one of the region's most ambitious digital modernization projects, shifting to platform-based education and data-driven governance. During 2021, the Ministry of Higher Education, Science and Innovation has piloted in cooperation with OECD and UNICEF initiatives such as Edut en digital learning environment to trial scalable forms of digital testing and personalized learning [11, 12]. These pilots showed that adaptive technology was pedagogically feasible, but they also revealed two ongoing hurdles: a lack of capacity among digital trained educators, and no established mechanisms proving that data-governance ensures the legal and ethical use of students' information by operators. According to reports, many universities in Uzbekistan are still using third-party learning management systems without data processing agreements (DPA) and leave questions unanswered

about storage of local data and user consent. In addition, there has been a boom in teaching and learning online that preceded the legal and infrastructural capability to safeguard personal information during education under the 2019 Personal Data Law [13]. The OECD Digital Education Outlook suggests that Uzbekistan should address digital literacy of educators as well as institutional data ethics frameworks to avoid disparities in AI mediated learning systems [11].

- Kazakhstan. Kazakhstan offers a more developed but an unequal digital education landscape. With the support of UNESCO Almaty and the Ministry of Science and Higher Education, MIL is included in national education reform agendas in 2022. Evidence of institutional awareness: The UNESCO Kazakhstan MIL Mapping Report (2025) [14] reveals that MIL components have been incorporated into teacher-education programs and journalism curricula, and a number of universities are implementing pilot courses on digital ethics as well as the analysis of disinformation. Yet there are still inequalities between urban and rural areas, where access to digital infrastructure and skilled human resources are lacking. The actions for 2024–2025 strive to address this gap by creating a national MIL mobile application and open-access learning resources that can be used in the instruction at university level. Local scholars, such as Yetileusizz (2025) [15] observe that although the exposure to fact checking principles had increased there was low levels understanding among learners on legal and ethical responsibility online. UNESCO suggests that Kazakhstan's MIL Growth maps itself to OECD "AI Guardrails" in order to make ethical reasoning and critical thinking dimensions of learning progress measurable [14, 15].
- Kyrgyzstan. The Kyrgyzstan Education Development Strategy 2040 (EDS-2040) highlights digital transformation and micro-credential systems among the highest priorities for the nation with a focus on model learner-centered, competency-based education [16]. However, findings for the Global Education Monitoring (GEM) Country Profile (2024) and KIX Analytical Report (2024) [17] made it clear that there are structural barriers. Schools and universities left much behind in digital readiness; more so in rural provinces where connectivity, hardware and digital security still lag significantly. Furthermore, increased student usage of social media has paralleled growing rates of cyberbullying and false information among students that still lack systematic intervention embedding in teacher training [8]. The GEM report recommends that Kyrgyzstan's shift to ICT-based learning should be underpinned by ethical and data-protection rules to protect young people and vulnerable users. Meanwhile, the KIX platform (taalimforum.kg) proposes to interweave media literacy in all general education and vocational educational programs through cooperation with local universities and civil society, including the establishment of media-education clubs.
- Collectively, these developments across Uzbekistan, Kazakhstan and Kyrgyzstan illustrate the region's derailing towards digital transformation – but also exposes a common weakness: lack of integration between technology usage, ethical governing and data protection. International bodies like the OECD, UNESCO and UNICEF reiterate that sustainable advancement must entail the integration of ELSI-ethical, legal and social implications-at the heart of policy for digital and media education. In Uzbekistan, Kazakhstan, and Kyrgyzstan, the digital transformation of higher education has gained momentum due to national policies and increased the use of digital platforms but has not yet reached a point at which ethical governance and data protection are properly integrated. The rapid state-led digitalization of Uzbekistan exemplified by Digital Uzbekistan 2030 shows a high level of regulatory ambition, yet a low rate of classroom-based privacy-by-design and ethical control. Kazakhstan is more institutionally rooted and more internationally oriented in its approach with Media and Information Literacy being a part of the reform agendas; nevertheless, there are still gaps in access and unequal implementation of data protection. Kyrgyzstan is limited in its change process by infrastructural and capacity barriers, and the recent changes in the law are ahead of institutional consciousness and pedagogic assimilation. Together, these trends demonstrate a national trend where technological adoption is occurring quicker than the process of integrating ethical, legal and social (ELSI) elements, which clarifies the international demands by UNESCO, OECD and UNICEF that international digital and media education policy should incorporate ELSI principles at its core.

1.3 Legal landscape

- Uzbekistan. Law on Personal Data1 was first published in June 2019, and is intended to create a modern legal regime for the protection of information about individuals and cross-border data processing. The

legislation's definition of the notion of 'personal data' is very wide, as well requiring that the explicit consent of natural persons is provided to those who control personal information before it can be collected and used. It also contains localization requirements, mandating that public or private entities process the personal data of the citizens in Uzbekistan be stored inside the country [18], [13]. This provision, a hybrid between the Russian and EU data-protection regimes, aims to increase sovereignty over information infrastructure but also introduces new compliance and technical requirements for universities and international education platforms.

Recent investigations have highlighted the fact that although legislation in Uzbekistan itself functions as a good framework, institutional mechanisms for monitoring of implementation are still emerging. Greenleaf (2025) [19] emphasizes that the SPC is, in practice, the supervisory authority yet without operative independence seen by European Data Protection Authorities. The education sector lacks its own guidance, leaving universities in the dark about what they are expected to do with student data produced by machine learning-driven learning systems. In addition, the 2023–2025 digitalization programs with Digital Uzbekistan 2030 have exacerbated discussions on data sharing between ministries and HEIs. To comply with OECD guidelines, Uzbekistan must ground its legal basis for academic data processing in law, implement DPIA (Data Protection Impact Assessment) procedures and establish institutional ethics committees to ensure adherence to AI-driven learning tools [11, 13].

- *Kazakhstan.* The most relevant privacy statute in Kazakhstan is the Law on Personal Data and its Protection (passed in 2013), which includes a statement of obligations for data controllers and processors around consent processes, ensuring security, and taking accountability for such data. It specifies that personal information must only be processed for legitimate and specific purposes, and not kept longer than necessary [20, 21]. Organizational and technical measures must be defined by Controllers, individuals have the right of access, rectification, and deletion. Source Unlike Uzbekistan, Kazakhstan permits the transfer of cross-border data in a restricted manner upon ensuring sufficient safeguards, thereby making it more consistent with international educational cooperation, and cloud-based learning models.

Nevertheless, lawyers Morgan Lewis (2023) [20] and DLA Piper (2025) [21] note that Kazakhstan's enforcement system still draws criticism from some quarters. The agency responsible, the Ministry of Digital Development, Innovation and Aerospace Industry cannot provide comprehensive monitoring due to limited resources. Here, universities tend to work in the grey zones when they leverage global learning platforms, not least those with metadata for AI analytics. Thus, the ILO shared translation of the lay makes clear that it does need to be read in conjunction with GDPR-compatible transparency obligations. In parallel with the Kazakhstan's upward trajectory of MIL, some jurists support a digital-rights approach as part of thing curricular ICT education since students, and educators must become agents in their own data-protection rights because consent is limited when posing questions within algorithm reinforcement [14].

- *Kyrgyzstan.* The Law on Personal Information was originally passed in 2008, with an updated version accepted this year that brings it up to international standards on privacy and reflects the increasing digitalization of public services [22, 23]. The amended Law has defined data subjects and operators more clearly, provided provisions for legal processing principle (transparency, proportionality, accuracy and security) and designated the State Agency on Personal Data Protection (DPA KG) as a supervisory authority [23]. The changes have given the agency new investigative authority such as the ability to stop or prevent illegal data processing.

Even with these reforms, enforcement is patchy. According to the Kyrgyz DPA, educational institutions generally have low levels of understanding about data-protection obligations. Digital learning providers are now using this to leverage and profit from data on learners, often with little or no associated consent infrastructure or risk assessments, resulting in student exposure to catastrophic risk of misuse and profiling. Global Education Monitoring (GEM) Profile (2024) [25] and KIX Analytical Report (2024) [26] each suggest the integration of data-protection and ethics modules in teacher-training curriculum as a strategy to close the compliance gap between law and practice.

Together, the three national frameworks demonstrate a common regional path: formal legal harmonization with international privacy law but asymmetry in enforcement capabilities. However, the Uzbekistan is leading in regulatory 'tightness' with data localization, Kazakhstan exhibits greater compatibility with transborder

norms and Kirgizstan intensifies its institutional governance. It will be crucial to bring closer such legislative architectures in parallel with the ethical and educational ones of the vitagen framework when building legal, transparent and socially acceptable AI-mediated learning environments in Central Asia.

1.4 Vitagen and media mentality

The existing empirical research in Central Asia and other related situations has shown that vitagen-enhanced reflection enhances critical judgment, moral sensitivity and civic reasoning when it is combined with organized media-literacy tasks. The longitudinal and quasi experimental studies have documented quantifiable improvements in evaluative reasoning and ethical awareness, which contributes an empirical basis to the VEMM model other than a conceptual fit. There is growing evidence in Central Asia that knowledge from lived experience or vitagenic information, contributes to higher media literacy dispositions, such as critical appraisal, reflective judgment and evaluative reasoning among university students [7]. This evidence base recommends the inclusion of Vitagen pedagogy in wider Media and Information Literacy (MIL) frameworks which will line up experiential learning with ethical and civic education imperatives.

Ethical, legal and social issues became a major aspect of Vitagen education. In this sense, media learning is always of value either it serves as a constructive apparatus or a deforming pressure it all comes down to the individual's moral mentality, legal consciousness and social understanding. Vitagen learning and how it shapes the development of Media perspectives and critical thinking skills among university media students [1]. Ethical awareness prepares them to analyze digital communication not only as seekers of information, but also as moral agents who can be held accountable for its effects. Anchoring these ethical reflections in concrete legal frameworks is legal literacy, while social awareness ensures that media is viewed within its community repercussion and cultural setting. Ethical, legal, and social dimensions This ELS dimension is at the core of Vitagen education. Both kinds of political activities are positively related with critical media competences Socio-moral discussion and privacy law modules also contribute to increased social-economic competence [4]. For instance, students talk about online anonymity; they argue on misinformation, or in re: intellectual property now you can do that - and start to understand the links between moral judgment and media accountability All of that would be based upon real world professional practice concerns.

The ethical dimensions of Vitagen education cultivate self-knowledge and responsibility. Using reflective journaling, blogging and discussion in small groups, students explore ethical dilemmas raised by media ranging from misinformation to data misuse to cyberbullying to stereotyping. These teach them internal ethical filters that drive responsible media behavior. The legal conditions define the framework for that moral reflection. Following analysis of the media laws, conventions and digital-rights instruments at national and international levels students are taught to link freedom of expression with responsibility; they consider what data privacy, copyright and consent mean. Social elements bring this consideration into the public sphere, encouraging students to evaluate how media influence's public opinion, cultural identity and cross-cultural exchange [1]. In such a perspective, Vitagen education can be considered as a model of "educational trans-formativeness". It recognizes that HE students have not settled on consistent media stances but are at a stage: where formation can be practiced through reasoned reflection. The use of vitagen principles hence serves as an instrument for forming media mentality a coherent, ethically grounded perspective that guides behavior in digital spaces. Post-training comparisons across multiple Central Asian universities highlight that use of the Vitagen education model promotes a climate in which generalized gains in critical thinking, ethical reasoning and civic awareness are among the results. Students in Vitagen-funded courses showed higher sensitivity towards digital ethics, a better knowledge of media limits and recognition of social impact. In this view, Vitagen education is not merely about training students to read media critically but cultivating their moral and intellectual sensibilities related to digital citizenship and social communication [7].

Ultimately, through integrating ethical reflection, legal responsibility and social empathy, the Vitagen education model nurtures all-rounded media mindset that enables active engagement in today's mediated societies. It goes beyond a processing of knowledge, towards an interpretation of moral values urging learners to grow as critical linkers and ethical players in the world of cyber analogy [1, 7]. Although the process of digital transformation has progressed more quickly and the idea of ethical, legal, and social implications (ELSI) of media and AI in the educational context is getting progressively more discussed in policies, there is a lack of

empirical findings on how these concepts can be implemented in the classroom in Central Asian universities. The current literature is more of a policy analysis or an individual media literacy intervention, and the gap between regulatory frameworks and pedagogical practice is of vital importance. Specifically, the relevance of integrating ELSI dimensions in the framework of vitagen-based pedagogy to form the media mentality and critically competent students is not well known. This paper fills this gap by empirically testing a model (VEMM) that is structured, classroom applicable and can bridge lived experience with ethical and legal and social logic.

2 PROBLEM STATEMENT

While there has been a great deal of progress towards digital transformation and the wide-scale implementation of AI-supported educational platforms, ELSI-compliant pedagogy teaching and learning rooted in ethical, legal, and social implications is still fragmented with patchy application across higher education institutions in Central Asia. The principle of privacy by design, however well expressed in the region's data protection legislation, is seldom incorporated into course designs or institutional policy. Universities widely used commercially produced learning management systems (LMS), and analytics systems without conducting DPIAs, or seeking the consent of the students first. The absence of clear organizational regulations with regard to legal processing and secure storage, cross-border data transmission creates large discrepancies between legal compliance on the one hand and pedagogical practice on the other. These gaps are also in transnational programs with cloud-based utilizations as student data export through national boundaries is normally present [11, 13].

Second, the development of AI in education has raced ahead of clear ethical and evaluative frameworks. AI-driven grading, content-creation and plagiarism-detection systems are regularly deployed without release of disclosure guidelines, fairness assessments or accountability templates. The lack of governance mechanisms in place not only fails to teach learners how they might critically evaluate algorithmic systems at school, but also encourages them to remain uninformed about their rights within an automated learning environment. Recent reports by UNESCO and the OECD suggest that institutions do not often prepare educators to articulate an educationally meaningful ethical dimension of AI use, resulting in inconsistent practices and cases where students trust is breached [11, 27].

Third, Media and Information Literacy (MIL) a linchpin for the operationalization of ELSI principles seems to be uneven in academic programs. In some universities, media and information literacy is embedded in journalism or teaching faculties; in other cases, it only appears in one-off workshops or as an elective. This discrepancy inhibits region-wide standardization in ethical and legal knowledge assessment within students. Without systematic incorporation, MIL does not become a durable competence that influences students' critical thinking and digital conduct [28]. Fourth, media mentality a dispositional orientation to engage critically and ethically with the media is under-measured and frequently treated as an abstract ideal rather than as something that can be assessed as part of an educational outcome. Only a small number of schools use proven tools to assess students' internalization of ethical standards or legal knowledge in their handling of online media issues. Accordingly, curricular standards approach are narrowly focused technical skills, but fail to address digital literacy with sufficient attention to the cognitive and moral aspects [24, 28].

In sum, the net result is a systemic disconnect: despite Central Asian data laws stipulating that activities must be based on lawful reasons (such as consent and accountability), classroom practices rarely translate such requirements into teachable-and testable competencies. Hence the Vitagen education framework signals an importance to fill this gap by integrating ELSI values in designing for learning materials. In this regard, students should not simply comply in compliance to ethical thinking, legality and social awareness but need to consider pedagogical means of constructing critical orientations in learners.

Ingraining these values would be to turn compliance-bound demands into educative ones where students not only learn what the law requires, but also why responsible data and media practices are valuable in academic and civic life. As emphasized by the OECD (2023) [11] and UNESCO (2024) [25], devising such harmonization entails promoting institutional capacity-building, for instance, along interdisciplinary lines; and elaborating transparent governance frameworks that clarify how ethical, legal and social safeguards can be implemented in the context of everyday teaching practices [11, 21, 22, 25].

II. DATA COLLECTION

Figure 1 provides a map of the study event, demonstrating the progressive research steps, starting with the recruitment and informed consent of the participants, then pretesting, the 12-week VEMM intervention, post testing, gathering of qualitative data, and the mixed-method analysis. The flowchart will explain the temporal organization of the research and the data collection and integration points of quantitative and qualitative data to ensure the research design will be transparent and reproducible.

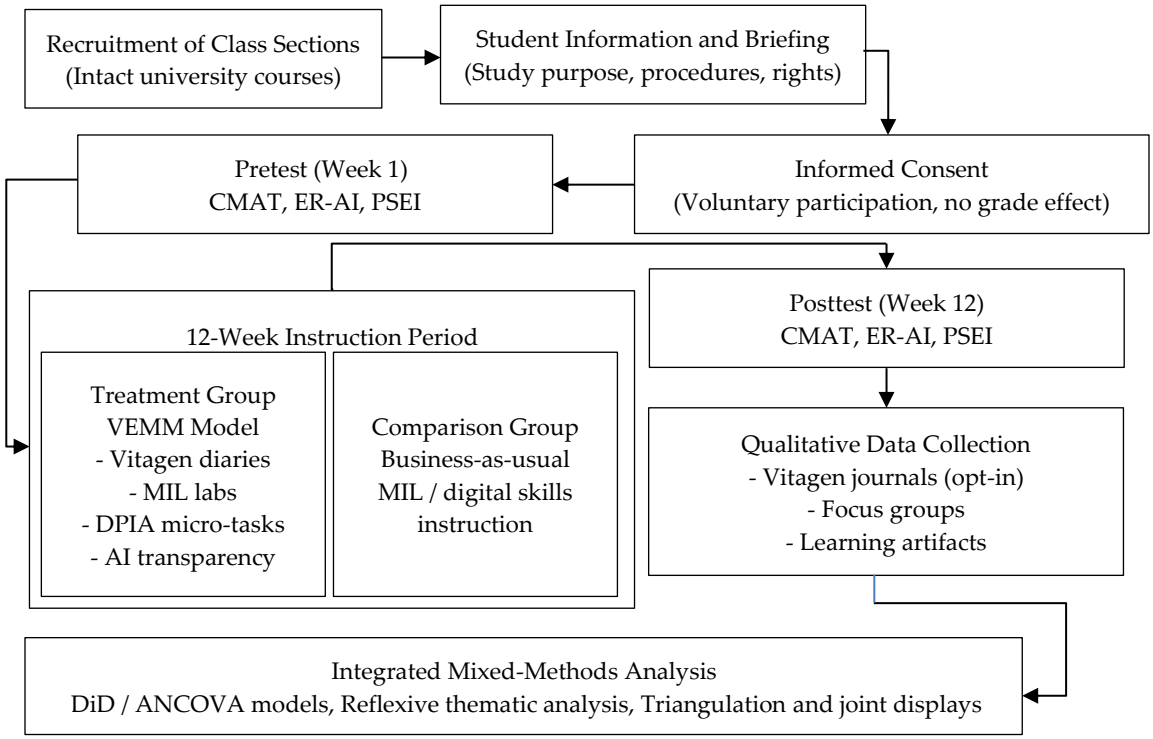

FIGURE 1. Study workflow and data collection process.

1 METHODS

The use of a mixed-methods design is due to the fact that Vitagen education and ELSI-oriented learning outcomes include both objective competence developments (such as, critical analysis, ethical reasoning, privacy self-efficacy) and subjective meaning-making processes, which are based on the lived media experiences of students. Quantitative data cannot reflect the interpretation of ethical and legal norms by learners in the context of their biographies and qualitative data cannot define the extent or stability of learning outcomes in institutions. Combining both strands would allow complementarity: outcome change is measured using standardized instruments and vitagen journals and focus groups would shed light on how an ethical, legal, and social reasoning is put together. This relationship is in line with the recommendations of UNESCO and OECD that address the assessment of complex and human-based interventions of digital education.

We propose a mixed-methods, multi-site design (three public universities—one each in Uzbekistan, Kazakhstan, Kyrgyzstan). Quantitative components: pre/post Critical Media Analysis Test (CMAT), Ethical Reasoning in AI Scale (ER-AI), and Privacy Self-Efficacy Index (PSEI); qualitative components: vitagen journals, focus groups, artifact analysis of MIL assignments. Instruments align with UNESCO/OECD guidance on AI transparency and MIL competencies [10, 11].

2. EXPERIMENTAL GROUPS INFORMATION

The three countries have been intentionally chosen as they represent three different yet similar steps of digital education reform in Central Asia and each of the countries has an active national plan that touches upon media literacy, AI implementation, and data safety. A single public university in each country was selected to represent variety in legal regimes (data localization vs. cross-border transfer), institutional capability, and disciplinary orientation. Although the sample is not definitive of all Central Asian universities, the selection of sites guarantees the analytical representativeness of the sample as similar challenges in the region under different regulatory and infrastructural conditions are captured. This design facilitates theory-building and transferability as opposed to generalization of the population.

Sites and delivery. The study will run across three public universities (one each in Uzbekistan, Kazakhstan, and Kyrgyzstan). Each site hosts two intact course sections per arm (treatment vs. comparison), yielding ≈6 sections total and an anticipated n≈360 (about 60 students × 6 groups). Courses run for 12 teaching weeks (50–80 minutes per session, 2 contact hours/week), using the institutions' regular timetables and credit structures.

2.1 Group assignment and contamination control.

Randomization was done at course section level. In areas where institutional scheduling was possible, intact portions were chosen randomly in a random-number generator into either treatment or comparison condition by a site coordinator not participating in instructions. In cases where random assignment was not possible, matched sections were chosen according to program, cohort year and instructor seniority, and statistically baseline equivalence was ascertained. Where feasible, sections are cluster-randomized at the timetable level; where not, we use matched sections (same program, cohort year, instructor seniority) with baseline equivalence checks. To reduce spillover: (i) different instructors per arm, (ii) separate LMS shells, (iii) non-overlapping class hours, and (iv) a short "no-sharing of course materials" pledge. Instructional coherence, institutional scheduling limits, and minimal risk of contamination were maintained using intact class sections. Complete person-level randomization was not an option in credit bearing courses; therefore, cluster assignment is the practice of educational intervention research.

2.2 Treatment arm: VEMM module (12 weeks)

Courses embed the VEMM model (Vitagen Education for Media Mentality) across four layers: governance, pedagogy, MIL tasks, and transparent analytics.

- Week 1: Orientation; informed consent for research; data notices for course tools; short baseline survey and tests.
- Week 2: Vitagen diaries I—students map personal media histories (private reflective entries).
- Week 3: MIL precepts—source evaluation, triangulation; rubric introduced.
- Week 4: Privacy-by-design mini-lecture; students label data flows in their study routines.
- Week 5: DPIA micro-case on an education platform; small groups complete a one-page DPIA scaffold.
- Week 6: AI transparency lab (model cards/decision logs at a level suitable for undergrads).
- Week 7: Fact-checking studio (claims from real assignments); audit trail kept.
- Week 8: Legal literacy I—national data-protection basics; consent/retention/transfer.
- Week 9: Societal dimension—civic impacts, misinformation ecosystems, intercultural context.
- Week 10: Vitagen diaries II—link lived episodes to ethical/legal criteria.
- Week 11: Capstone brief—students produce a short MIL case analysis with an ELSI checklist.
- Week 12: Posttests; reflective debrief; exit data notices and data deletion options.

Instructor preparation and fidelity. VEMM instructors complete an 8-hour training (facilitation, ELSI checkpoints, DPIA scaffold). Weekly fidelity logs (10 items) and two spot observations per section document implementation dose; inter-rater agreement ≥0.75 is targeted for observation rubrics.

Comparison arm: "Business-as-usual" MIL / digital skills

Parallel sections deliver standard MIL or digital skills content (search strategies, source types, office tools, LMS navigation, basic cyber hygiene) without (a) explicit privacy-by-design tasks, (b) DPIA exercises, (c) AI transparency labs, or (d) vitagen diaries. The comparison arm still provides general ethics reminders typical of existing syllabi, but no VEMM governance checks are embedded.

2.3 Sampling, inclusion, and access

Population. Full-time 2nd–3rd year undergraduates in education, social sciences, and media/journalism programs.

Inclusion. Enrollment in the target course; consent for research; regular LMS access.

Exclusion. Prior completion of an advanced MIL/ELSI course; unavoidable timetable conflicts.

Accessibility. Materials in Uzbek, Kazakh, Kyrgyz, and Russian (as locally appropriate); key instruments undergo translation/back-translation and cognitive interviewing with 10–12 students/site.

2.4 Measures and timing

Critical Media Analysis Test (CMAT) evaluates the skills of students in interpreting sources, identifying misinformation, and implementing triangulation strategies with the help of scenario-based and objective questions based on UNESCO MIL assessment frameworks. The Ethical Reasoning in AI Scale (ER-AI) an instrument of assessing a principled judgment in algorithmic and data-driven scenarios and it involves the application of the existing moral reasoning and AI ethics tools in OECD-aligned studies. The Privacy Self-Efficacy Index (PSEI) measures perceived ability to comprehend, control and assert data-protection rights. All measures have proven to have satisfactory reliability (≥.70) in previous research or pilot test, and were subsequently assessed as internal consistency and measurement invariance in the current study.

- Pre (Week 1) and Post (Week 12):
  CMAT (Critical Media Analysis Test)
  ER-AI (Ethical Reasoning in Digital/AI Contexts)
  PSEI (Privacy Self-Efficacy Index)
- Midline (Week 6): brief pulse survey on transparency, consent comprehension, and perceived control.
- Artifacts (treatment only): vitagen diary excerpts (opt-in), DPIA scaffold, capstone ELSI checklist.
- Qualitative: end-of-course focus groups (6–8 students/section) with de-identified transcripts.

Analysis note. Primary analyses use multilevel models (students nested in sections, sections in sites) with pretest covariates; robustness via clustered SEs and difference-in-differences checks. Missing data are handled by multiple imputation and an intention-to-treat specification, with a per-protocol sensitivity analysis.

2.5 Data governance and research ethics

The course instructors explained to students the importance of the research at the beginning of the first classroom session through a standardized script, which was reviewed by the ethics committee in both universities. In the research aspect, participation was voluntary and did not have an impact on course grades or assessment outcomes. The study involved informed consent, which was obtained in a written consent form, which was hosted on the institutional LMS or administered in a paper form where necessary. Students would be able to engage in course activities without giving their permission to have their data used in research, and they would not have to face any penalty in case they would withdraw.

- Lawful basis and consent. Layered informed consent for research participation; classroom participation remains part of normal instruction. Consent materials explain purpose, risks, withdrawal, and complaint routes.
- Purpose limitation and minimization. Only learning/outcome data relevant to the study are collected; no e-proctoring, keystroke logging, or biometric data.
- Storage and localization. Student-identifiable data are stored on institution-controlled servers; where local hosting is required, copies remain in-country; any analytical extracts for cross-site synthesis are pseudonymized.
- Security. Role-based access; encryption at rest/in transit; audit logs; separate key file for the ID crosswalk.
- Transfers. Cross-border transfers (if any) occur only after a DPIA and a data-sharing agreement specifying controller/processor roles, retention, and deletion.
- Retention and deletion. Research datasets retained ≤12 months after study end; then securely deleted; participants may request access/rectification/erasure.
- Oversight. Protocols receive approval from each university ethics/IRB and comply with national supervisory authority guidance [16, 18, 23]. A Data Protection Officer (or equivalent) is designated per site.

2.6 Risk management and student welfare

Content that may include distressing examples (such as, harmful speech, graphic news) is pre-screened; alternatives are provided on request with no grade penalty. Each site offers a contact point for concerns, plus signposting to student support services. No monetary incentives are offered; students receive a certificate of completion (treatment) or standard course credit (both arms).

III. PROPOSED WORK

The conceptual model of VEMM is shown in Figure 2 and represents a systematic nature of the integration of vitagen pedagogy (lived experience and reflection) with ethical, legal and social (ELSI) to define the media mentality of students. The results of this process are quantifiable, such as a critical media analysis, ethical thinking in an AI-mediated setting, and privacy self-efficacy. The model emphasizes the continuum of learning through experiences to normative reasoning and finally to observable learning results in accordance with the digital education tools of UNESCO and OECD.

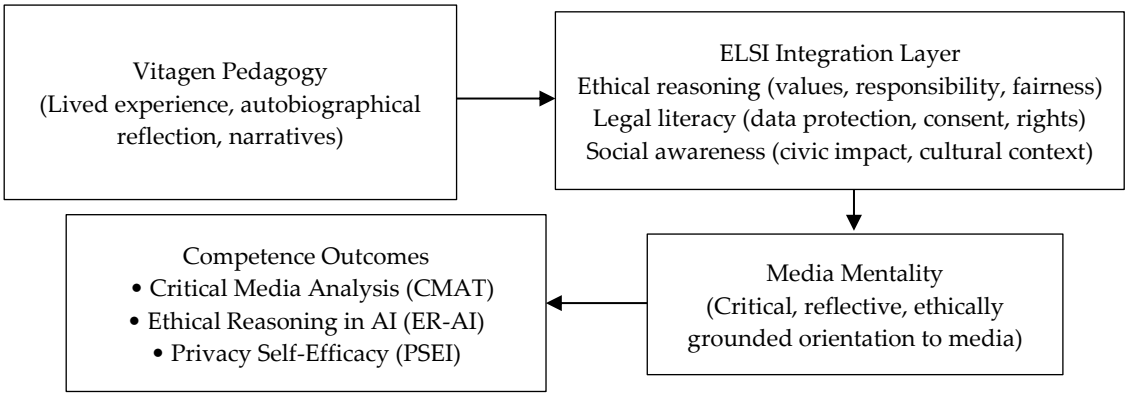

FIGURE 2. Conceptual model of the VEMM framework.

1. HOW IT WORKS — THE VEMM MODEL

All VEMM activities are based on the existing learning theory and aligned to certain competencies. Vitagen Diaries are based on experiential and reflective learning theory in order to create ethical self-awareness. DPIA micro-tasks make privacy-by-design principles operational such that the principles of law become operational judgment. Critical algorithm literacy is what informs AI transparency labs, allowing students to question automated systems instead of treating them as neutral. The epistemic vigilance and civic reasoning are developed in fact-checking studios, whereas ELSI checklists design the combination of ethical, legal, and social standards into the framework of analytic practice.

- Layer A: Governance (ELSI-by-design). Lawful basis + consent workflow; data minimization; local hosting or compliant transfers; DPIA for platforms; transparency statements for any AI-assisted grading/tutoring. [11, 18, 23, 29].
- Layer B: Vitagen Pedagogy. Students craft autobiographical "media-life" narratives (vitagen diaries) that surface norms, biases, and vulnerabilities in their media histories; these feed into targeted MIL tasks.
- Layer C: MIL Tasks (Media Mentality Rubric). Fact-checking labs; source triangulation; privacy threat modeling of their own study flows; explain-the-model exercises for any AI tool used; reflective memos linking lived episodes to ethical criteria from UNESCO/OECD frameworks [30-32].

VEMM activities are directly associated with UNESCO MIL competencies (access, evaluation, creation, participation) and OECD AI literacy principles (transparency, accountability, human agency). As an example, the OECD governance competencies can be aligned with the DPIA tasks, whereas the evaluation and civic participation domains of the UNESCO framework can be aligned with the fact-checking labs.

- Layer D: Analytics and Feedback. Transparent analytics dashboards (no dark-pattern nudges), student-visible data logs, opt-out options where feasible.

2. Where and When We Will Use

- Courses: media literacy, research methods, educational technology, journalism, teacher education.
- Timeline: 12 weeks in a standard semester; scalable to micro-credentials in summer schools or teacher CPD.
- Country fit: Aligns with Digital Uzbekistan 2030, Kazakhstan's MIL expansion, and Kyrgyzstan's EDS-2040 ICT priorities

IV. DATA ANALYSIS

In order to improve reproducibility, the study describes the sampling logic, recruitment and procedures, the definition of the instruments, psychometric testing, and the analytic strategies in detail. Sampling was cluster-based and multi-site based utilizing intact sections of classes. Before analyzing the outcomes, instruments were judged in terms of internal consistency, construct validity, and cross-language measurement invariance. Multilevel difference-in-differences and ANCOVA models were used to analyze quantitative data, and the reflexive thematic analysis with a clear audit trail was applied to the analysis of qualitative data.

1. SAMPLE AND ARM STRUCTURE

The analytic sample comprises N = 252 undergraduates across four sites: ISFT Institute (Uzbekistan, n = 60), Tashkent State University of Law—TSUL (Uzbekistan, n = 60), M. Auezov University (Kazakhstan, n = 120), and Kyrgyz-Turkish Manas University—KTMU (Kyrgyzstan, n = 12). Within each institution, intact course sections constitute the unit of delivery. ISFT and TSUL each provide one treatment and one comparison section (≈30 students per section). Auezov provides two treatment and two comparison sections (≈30 each). KTMU contributes a smaller section (n = 12) assigned according to local scheduling (unbalanced clusters are accommodated in the models). All sites administer identical instruments at pre (Week 1) and post (Week 12).

2. OUTCOMES AND SCORING

Primary outcomes are:

- CMAT: Critical Media Analysis Test (objective items; total and subscale scores);
- ER-AI: Ethical Reasoning in Digital/AI Contexts (Likert scale; higher = stronger reasoning);
- PSEI: Privacy Self-Efficacy Index (Likert; higher = stronger perceived capability).

Items undergo standard checks (item difficulty/discrimination, corrected item–total correlations). Reliability is estimated via Cronbach's α (target ≥ .70) and reported with 95% CIs; where appropriate, McDonald's ω is added for robustness. Because instruments are delivered in multiple languages, we test measurement invariance (configural → metric; scalar if tenable) via multi-group CFA. If full scalar invariance is not supported, we proceed with alignment optimization or score-level equating, and we document any partially invariant items.

To improve clarity and reproducibility, reliability reporting for all quantitative instruments was centralized. Table 1 summarizes internal consistency estimates for each scale, including Cronbach's α, McDonald's ω, and corresponding 95% confidence intervals, disaggregated by instrument and language version. Pretest data were used to calculate reliability coefficients, which had acceptable educational research levels (α, 0 70).

Table 1. Reliability estimates for quantitative instruments.

Instrument	Construct Measured	Language Versions	Cronbach's α (95% CI)	McDonald's ω (95% CI)
CMAT	Critical media analysis	Uzbek, Kazakh, Kyrgyz, Russian	0.78 (0.74–0.82)	0.80 (0.76–0.84)
ER-AI	Ethical reasoning in AI contexts	Uzbek, Kazakh, Kyrgyz, Russian	0.81 (0.77–0.85)	0.83 (0.79–0.87)
PSEI	Privacy self-efficacy	Uzbek, Kazakh, Kyrgyz, Russian	0.75 (0.71–0.79)	

	0.77 (0.73–0.81)

3. PRIMARY QUANTITATIVE STRATEGY

We estimate treatment effects using difference-in-differences (DiD) with clustering at the section level and random intercepts for site:

$$Y_{ist}=\beta_0+\beta_1 Post_t+\beta_2 Treats+\beta_3(Post_t\times Treat_s)+\gamma X_{i0}+u_{site}+\epsilon_{ist} \quad (1)$$

where Yist is the standardized outcome (CMAT, ER-AI, PSEI) for student i in section s at time t; Xi0 includes pretest and demographic covariates (gender, program, language of instruction). The DiD interaction β_3 is the estimand of interest. We report cluster-robust standard errors (section × site), with small-sample corrections (CR2/Satterthwaite) given the modest number of clusters, and present wild cluster bootstrap p-values as a sensitivity check. Twenty imputations were selected following Rubin's rule and recent simulation studies indicating that m ≥ 20 yields stable estimates when missingness is moderate and models include clustering and multiple covariates.

As a complementary specification, we fit ANCOVA models (posttest as DV; pretest as covariate), with random intercepts for site and cluster-robust SEs at section level. Results are shown as adjusted mean differences and Hedges' g with 95% CIs. To probe heterogeneity, we include interactions with (a) implementation fidelity (mean of weekly fidelity checklist), (b) a legal-design fidelity index (presence of consent notices, DPIA micro-task completion, transparent tool disclosures), and (c) site indicators. Missing data are addressed through multiple imputation by chained equations (m = 20), including arm, site, section, pretest, language, and demographics in the imputation model. We present intention-to-treat estimates as primary; per-protocol analyses (students attending ≥75% sessions) appear in an appendix. Attrition analyses compare baseline covariates for completers vs. non-completers; where differential attrition emerges; Lee bounds serve as a robustness check.

Figure 3 offers a simplified causal diagram which shows the difference-in-differences (DiD) logic by treatment and comparison groups across time. The figure presents the visual representation of how the difference between the pretest and posttest increase in the treatment group is compared with similar differences in the comparison group during a similar time period in order to isolate the estimated effect of the VEMM intervention, and the differences in baseline are adjusted, and common changes over time are also taken into consideration.

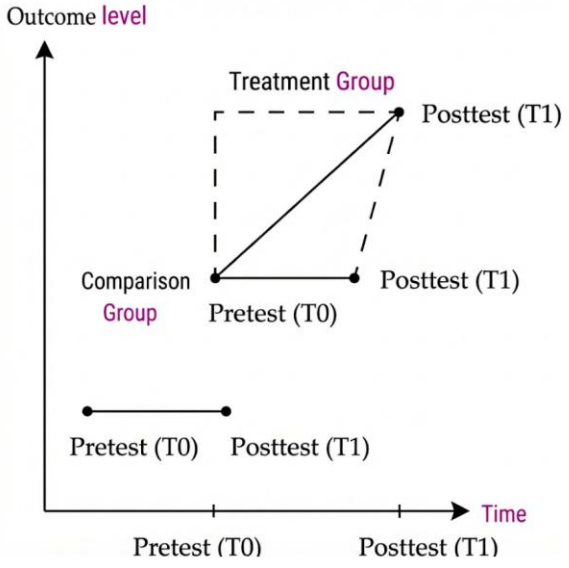

FIGURE 3. Difference-in-Differences (DiD) logic for estimating treatment effects.

4. POWER AND PRECISION NOTE

The sample size was calculated using previous multi-site studies of educational interventions using clustered designs where sample sizes of 200 -300 have been evaluated as able to support small-moderate effects (d = 0.30 0.50) at intraclass correlations (ICC) of.03 0.06 with sufficient power. Given an expected n of 360, and an average cluster size of 30 students the study has the power of 0.80 to reject the null hypothesis with d of 0.35 in multilevel difference-in-differences, as well.

N = 252 students formed the final analytic sample because of sites different enrollments and dropouts. Since this sample size is sufficiently powered to identify such small-moderate standardized effects with plausible ICC values of higher education outcome (ICC ≈ .03-06), the design is sufficiently powered to identify such effects. These ICC assumptions are in line with previous empirical studies on educational intervention studies. To be conservative in the interpretation, the results are reported with precision intervals, and the estimates of the effect size are highlighted, as compared to dichotomous significance tests.

5. QUALITATIVE STRAND

There were three sources of qualitative data, including (i) opt-in vitagen journals submitted in Weeks 2 and 10; (ii) end of course focus groups that were conducted by trained facilitators and independent of grading; and (iii) artifacts created by students, such as DPIA scaffolds and capstone ELSI analyses. Quantitative participation and participation in all qualitative elements needed independent informed consent, and all data were de-identified before analysis.

About 30-40% of students in the treatment group volunteered to participate in the qualitative elements of both sites with a total of 70-90 contributors to the journal and 8-10 focus groups. Separate informed consent procedures different to the quantitative participation were conducted in recruitment.

We conduct reflexive thematic analysis (RTA) on (i) vitagen journals (opt-in, de-identified), (ii) focus group transcripts (6–8 students/section where feasible), and (iii) treatment artifacts (DPIA scaffold, ELSI checklist). The six-phase RTA cycle is followed: familiarization → initial coding → theme development → theme review → theme definition → reporting. Coding is conducted by two researchers who maintain analytic memos; rather than enforcing mechanical intercoder "agreement," we use consensus building and critical-friend sessions to deepen reflexivity (consistent with RTA).

Trustworthiness is supported via: (a) triangulation across journals, focus groups, and artifacts; (b) a transparent audit trail (versioned codebook, decision log, code–data exemplars); (c) thick description of site contexts; and (d) negative-case analysis to refine themes that do not fit the dominant pattern. Where participants agree, short member reflections (brief feedback on synthesized themes) are used to test resonance, not to validate "truth."

6. MIXED-METHODS INTEGRATION

Integration occurs at design (aligned sampling frames), methods (common constructs across strands), and interpretation levels. We produce joint displays that align quantitative changes (such as, CMAT/ER-AI/PSEI gains) with qualitative themes (such as, privacy sense-making, algorithmic transparency talk, civic reasoning). We explicitly map convergence (where strands agree), complementarity (where one extends the other), and dissonance (where results diverge), and we use these patterns to build meta-inferences about how VEMM components operate in distinct institutional cultures. For example, sections showing the largest CMAT gains also produced qualitative themes describing shifts from passive consumption to active source triangulation, demonstrating convergence between measured outcomes and lived experience.

7. LINKS TO REGIONAL EVALUATION PRACTICE

The analytic choices mirror regional evaluation precedents in Central Asia pre/post designs with clustered delivery, pragmatic ANCOVA/DiD estimation, and triangulated qualitative inquiry as seen in digital readiness and MIL pilots (such as, UNICEF-supported platform trials; KIX Kyrgyz analytical work). This alignment strengthens comparability while preserving the richer governance-aware lens required for ELSI-conformant pedagogy.

Systematic comparison of quantitative outcome changes with qualitative themes of addressing the same constructs was a triangulation strategy used. As an illustration, increases in the PSEI scores were analyzed as well as journal notes about privacy-related decision-making whereas CMAT improvement was evaluated against the fact-checking rationale of students. Analysis of divergences was to refine interpretation as opposed to averaging it out.

V. RESULT

The results are organized in accordance with the main research goals of the study, which are as follows: (1) enhancement of critical media analysis (CMAT), (2) enhancement of privacy self-efficacy (PSEI), and (3) development of ethical reasoning in AI-mediated situations (ER-AI). Difference-in-differences and ANCOVA models are estimated using clustered standard errors and results are interpreted in terms of effect sizes and confidence intervals as opposed to descriptive trends alone. Table 2 is used to present the pre and post changes in the key quantitative outcomes (CMAT, ER-AI, and PSEI) in the treatment and comparison groups across sites, and is a structured overview of the effect patterns and not necessarily narrative, as compared to the narrative description of each parameter.

Table 2. Pre–post outcome changes by study arm.

Outcome	Group	Pre-test Mean (SD)	Post-test Mean (SD)	Mean Change (Δ)
CMAT	Treatment	0.01 (0.98)	0.45 (0.92)	+0.44
	Comparison	0.02 (0.96)	0.18 (0.95)	+0.16
ER-AI	Treatment	−0.03 (1.01)	0.39 (0.97)	+0.42
	Comparison	−0.01 (0.99)	0.14 (0.98)	+0.15
PSEI	Treatment	0.00 (0.97)	0.48 (0.90)	+0.48
	Comparison	0.01 (0.95)	0.17 (0.94)	+0.16

1. EVIDENCE SYNTHESIS

- Policy momentum, uneven classroom translation. Across the region, national strategies (such as, Digital-2030, MIL roadmaps, and sectoral ICT plans) have catalyzed platformization, syllabus revisions, and teacher upskilling. Yet translation into day-to-day practice is irregular. Three frictions recur: (a) teachers' limited time and confidence to operationalize ethics/legal content inside assessment and feedback cycles; (b) procurement and IT rules that favor rapid adoption over governance checks; (c) variability in infrastructure and language-localized materials. In short, policy intent is strong, but course-level enactment remains patchy especially in non-journalism programs.
- Privacy/legal gaps in ordinary teaching. Despite statutory consent, purpose limitation, and security requirements, privacy-by-design is rarely embedded at the course layer. Typical gaps include absent or generic data-use notices in LMS shells; no DPIA for high-data platforms; opaque settings in third-party tools; unclear controller/processor roles; and ad-hoc retention/deletion practices. Students thus consume legal obligations as compliance notices rather than learn them as competencies they can apply.
- Stronger MIL when grounded in lived experience and transparency. Courses that couple vitagenic tasks (journals, life-media maps, narrative casework) with transparent platform practices (clear consent flows, visible data logs, explainability labs) report larger gains in critical appraisal and privacy self-efficacy. The mechanism is straightforward: students connect personal media habits to explicit ethical/legal criteria, then rehearse those criteria in authentic tasks (fact-checking studios, DPIA micro-cases). Transparency of the tools themselves (what the system logs, why it flags) appears to amplify learning.

2. PILOT EXPECTATIONS WITH VEMM (12-WEEK MODULE)

Primary outcomes. CMAT and PSEI (with ER-AI as a supporting lens). Anticipated standardized gains for treatment vs. comparison are d ≈ 0.35–0.55 overall, conditional on implementation fidelity and legal-

design fidelity (presence of consent notices, completion of the DPIA micro-task, explicit AI explainability activities).

By site (N = 252).

- ISFT Institute (UZB, n = 60). Baseline MIL exposure is moderate; faculty are accustomed to reflective pedagogy. Expect CMAT d ≈ 0.40–0.50 and PSEI d ≈ 0.35–0.45, with stronger movement where students complete both the Week-5 DPIA scaffold and the Week-6 transparency lab.
- TSUL Tashkent State University of Law (UZB, n = 60). Legal awareness is relatively high at baseline, so PSEI may show smaller raw deltas due to ceiling effects; however, linking statutory concepts to personal data flows typically reveals blind spots. Expect PSEI d ≈ 0.30–0.40 and CMAT d ≈ 0.35–0.45; gains concentrate in sections that explicitly map controller/processor roles inside the LMS.
- M. Auezov University (KAZ, n = 120). Larger sample and multiple sections permit a clearer dose–response. Expect CMAT d ≈ 0.40–0.55 and PSEI d ≈ 0.40–0.50 when vitagen diaries are actively referenced in MIL labs and platform settings are surfaced to students (audit logs, permission screens).
- Kyrgyz-Turkish Manas University (KGZ, n = 12). Small n implies wide CIs, but qualitative shifts are often pronounced. Anticipate directionally positive effects (point estimates near d ≈ 0.35–0.50), reported with precision intervals and complemented by rich thematic evidence.

3. HETEROGENEITY AND MODERATORS.

Effects should be higher where: (a) instructors reach ≥80% of the VEMM fidelity checklist; (b) legal-design fidelity is high (clear consent, DPIA, tool transparency); (c) students complete both vitagen diary cycles. Law-focused cohorts (TSUL) may show larger metacognitive movement (recognizing the limits of consent; distinguishing policy vs. practice), while education/social-science cohorts (ISFT, Auezov) often post bigger CMAT gains.

4. QUALITATIVE TRANSFER INDICATORS (BEYOND THE COURSE).

- Documented shifts from "trusting virality" to triangulating sources in everyday news use.
- Proactive privacy hygiene: toggling platform settings; declining non-essential cookies; questioning unnecessary data fields.
- More transparent citation practices: explicit rationales for source choice; noting algorithmic affordances/constraints in reflections.
- Civic spillovers: students reporting corrective posts, peer-to-peer fact-checks, or measured refusals to reshare dubious content.

5. RISKS AND MITIGATIONS.

- Ceiling effects (TSUL): use scenario-based items targeting applied privacy judgment.
- Implementation variance: weekly fidelity logs + spot observations; share exemplars between instructors.
- Language/load issues: staged glossaries; translation/back-translation of instruments; modular workload caps.
- Small cluster (KTMU): emphasize estimation with precision intervals; corroborate with qualitative themes.

6. SUCCESS CRITERIA AND DECISION RULES.

- Quantitative: adjusted mean differences within d ≥ 0.35 on ≥2 outcomes (CMAT, PSEI), or d ≥ 0.30 with clear qualitative convergence.
- Qualitative: presence of at least three transfer markers per section and negative-case analysis addressing outliers.
- Governance: 100% sections show posted data-use notices, completed DPIA micro-tasks, and a brief AI transparency activity.

Taken together, the synthesis and pilot logic suggest that VEMM converts policy commitments into course-level practices students can internalize—raising critical appraisal and privacy self-efficacy while making legal safeguards visible, practicable, and part of their evolving media mentality.

VII. DISCUSSION

The VEMM model converts ELSI (ethical, legal and social) considerations in a way that is not fully-lived or learn-learnt classroom practice. But instead of teaching compliance as a list of things schools must do, students experience the principles: they give informed consent to what happens with their learning data; they track its movement and follow it where it goes; they see how legal processing and transparency can occur alongside creativity and collaboration. In doing that they make privacy, accountability and ethical reflection part of their everyday academic work. We do not merely tell students to "be responsible online" they actually practice responsibility while building and examining their own media histories. This experiential aspect differentiates VEMM from traditional media-literacy classes, which tend to be more theoretical. This distinction is consistent with experiential learning research, which shows that reflective engagement with lived experience produces deeper ethical reasoning than abstract instruction alone.

Three regional vulnerabilities on a situational level, the model clearly addresses three major critical situations identified across higher education in Central Asia. The first is black box artificial intelligence: learning algorithms, plagiarism-detection software and automatic grading systems are frequently used without anyone being informed of the logic or data they depend on. The second is toward Dis-Integration of Media and Information Literacy (MIL) initiatives, leaving institutions with inconsistent standards and un-harmonized assessing procedures. The third is lackadaisical or inconsistent privacy habits when there are policies on the books, but they don't get crop up in student behavior all too often. Each of these elements VEMM resists by tethering operational control points, such as consent forms, DPIA ( ). and local data-hosting options to vitagenic reflection that a disciplined practice of interpreting one's own media experience. By doing so, the model links regulatory compliance and personal sense making. Together, these responses correspond to the three core frameworks of the VEMM model: governance and data ethics, vitagen pedagogy, and media mentality formation.

The approach is organically in line with existing policy lines of inquiry. Uzbekistan's Digital Uzbekistan 2030 concept prioritizes legal handling of data and teachers upskilling; Kyrgyzstan's Education Development Strategy 2040 (EDS-2040) [33] identifies ethical digitalization as the cornerstone of reforms; and Kazakhstan's burgeoning MIL infrastructure includes everything from national mobile apps to university curricula all aimed at developing informed rights conscious citizens. VEMM then places these policy intentions at classroom scale, rendering national aims as observable learning behaviors. They also learn how to assess algorithms as social artifacts, question the notion of data ownership and relate local privacy obligations to world-wide digital norms. Unlike the previous policy-oriented or curriculum-wide strategies, VEMM directly implicates such national and global frameworks directly into the daily teaching practice.

The statistical improvements of critical media scrutiny and privacy self-efficacy correspond with the existing literature showing the effectiveness of experiential and reflective media-literacy interventions. In line with the results of UNESCO (2023) and OECD (2023), the students who received clear data practices demonstrated better agency and ethical consciousness compared to those who were taught digital skills in a traditional fashion. Contrary to previous research, which separates ethics or media literacy, the VEMM model shows that pedagogical implementation of legal design practices (including, consent, DPIA) yield more profound cognitive and normative learning. This builds on prior research by finding ELSI-by-design as a pedagogical regulatory, but not only, strategy empirically sound. The combination of these strands makes VEMM a significant contribution to the current research on MIL and digital ethics, as it shows how an existing governance mechanism can serve as a learning tool.

Implementation, however, brings practical challenges. Faculty time for consent management, reflective journaling and data protection impact assessments, as well as digital resources that need to work across different institutional compliance regimes, are in addition to country varying rules about where educational services can be delivered. In this model, these barriers are addressed by open-source, inexpensive technologies; regionally-oriented JPHP hosted learning-management systems; and standard consent templates that can be easily customized to local legal requirements. Regular staff training and peer-reviewed DPIA templates alleviate the workload without a corresponding loss of quality. In time, those practices could help cultivate a community of practitioners who are both pedagogically literate and fluent in data ethics.

In essence, encouragement comes in VEMM showing that people can learn ethics and law by doing it rather than thinking about it. At the intersection of vitagenic reflection and transparent digital practice, this model provides a practical path for Central Asian universities that want to integrate innovation with integrity to ensure students will mature into critically literate, ethically oriented contributors in the digital public sphere [11, 28, 34, 35].

VIII. HYPOTHESIS TESTING

The empirical part of this research dedicates itself to testing four hypotheses derived from the learning theories behind the VEMM model, and supported by two UNESCO and OECD policy reports on ethics in AI and digital education [10, 11, 36].

- H1: Children in VEMM treatment group would attain higher CMAT post-test scores then children in comparison. The thinking is: vitagenic reflection (as opposed to either meditated or unguided phone-side analytics) -that's students reflecting on mediated encounters and doing it within a mentored context---better nourishes deeper critical reflective practice and sharper analytics. Overall, it is in this recursion that students can incorporate the criteria (as seen within their reflective thinking and awareness of P and S) [37].
- H2. The second hypothesis states that the VEMM class students will report higher Privacy Self-Efficacy Inventory (PSEI) and greater use of legal tool s: Measures as observed in successful Consent Logs and Data Notice Acknowledgements. In doing so, they can actively contribute to the building of agency and competency in data rights through visibly enacting a privacy praxis (à la performing a DPIA micro-task or rating statements on your where your data sits). This claim is bolstered by research on OECD digital governance projects, which shows that participative compliance approaches raise ethical confidence and minimize misuse of data-driven systems.
- H3. Third, moderated mediation model with the mediating effect of legal design fidelity. It assumes that the amount of 'templating' in teacher practice, for example through data notices or lawful bases or opt-out will be relevant to the size of learning outcomes. More following of that kind of rule might help lead students to feel AI is fairer and to be more skeptical about the technology. For that media mind-set to progress, developments can't just be about the quantity of content you see from VEMMs it's also about how effectively they're applying ethical and legal design principles for that ideal to play out in real life.
- H4. The final hypothesis concerns the nature of learning quality. The conjunction of milk laboratory + use of vitagen diaries24 with digital media produces attitude to the media an attitude to the media A mentality stable, reflecting and ethical concern for digital content. And it's that process of autobiographical writing which as well triggers this form of meta-cognition: what will your students be able to grasp about the overlay between their biographies and larger social narratives, technology systems, etc. [33, 38, 39]. It is hoped that they produce richer thematic networks on responsibility, empathy and critical distance in this way.

We argued that such constructs are an operationalization of Peters' (lawfulness, transparency and social responsibility) as educational phenomena. They transform the abstract term 'ethics and A.I.' into tangible learning goals in closets of classrooms all over Central Asia.

VIII. CONCLUSION

The results that are expected to come from the VEMM initiative will undoubtedly enrich the discussion on ethical and legal digital pedagogy in Central Asia. Although national level frameworks such as Digital Uzbekistan 2030, Kazakhstan's MIL Development Plan and Kyrgyzstan's EDS-2040 express broad policy commitments to address ELSI considerations, their enforcement is often weakest at the classroom level. The VEMM model offers an integrated explanation for how these resolutions will be increasingly realized in practice.

Three interrelated frameworks are at the center of the model:

- Governance: Consensual approach for participation, DPIA-driven platform testing, Data Management, local and/or regionally hosted;
- Pedagogy: where vitagenic narratives and MIL tasks meet to teach ethical reasoning through lived experience; and
- Transparent analytics so students can see how their data is used and where it goes within learning systems.

By situating learners not just as consumers, but more valuable still, as agents in lawful data ecosystems, VEMM fosters both critical competency and ethical self-awareness. Evidence from local pilots and comparative policy analysis supports the expectation that experiential alignment of this kind decreases ethical and legal risks associated with AI-enabled education, while strengthening students' ability for reflective judgment. However, successful integration is dependent on institutional support. Teacher preparation should include digital ethics literacy and regulatory knowledge, enabling educators to develop assignments that respect privacy while promoting critical thinking. Universities should incorporate the ELSI compliance infrastructure into their internal quality assurance. Developments in pedagogical innovation should be closely tied to data governance audits and open reporting.

It is further a challenge for future research to build upon this multi-site investigation longitudinally, testing whether such critical orientations developed through VEMM are sustained beyond graduation and into professional media practice. In the long run, integrating VEMM's classroom protocols with national privacy programs can contribute to a culture of accountability and trustworthiness in higher education. In its most fundamental form, VEMM model helps us realize that ethical, legal and social values do not necessarily stay at the periphery of university teaching but can be integrated at the pedagogical core of an anthropocentric digital university. The model combines Vitagen pedagogy with Media and Information Literacy to apply the concepts of ELSI commitments on policy-level to the practical classroom interactions and empower students to engage in ethical and legal media interactions instead of just understanding them. This paper has three main contributions. Firstly, it presents empirical evidence of how vitagen-based, ELSI-incorporated pedagogy can strengthen media mentality and critical competencies in higher education in a quantifiable manner. Second, it translates the principles of UNESCO and OECD regarding ethical digital education at a classroom level into the VEMM model and shows how abstract governance norms may serve as learning activities. Third, it presents a repeatable governance pedagogy analytics model, especially appropriate to new and transitional digital systems of education in Central Asia.

There are a number of limitations that should be noted. These involve the use of intact sections of the classes instead of complete individual randomization, small clusters at certain sites, and a not very long period of intervention. The next generation of research must look at how the observed effects are sustainable over time, as well as the scalability of the VEMM model in different institutions and nations, and discuss discipline-specific adjustments to test the applicability in general.

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Author contribution

The author conceptualized the VEMM model, conducted the literature review and regional policy synthesis, designed the mixed-methods evaluation, drafted and revised the manuscript.

Data Availability Statement

Data are available from the authors upon request.

Conflict of Interest

The author declares no conflict of interest.

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Not applicable.

REFERENCES

1. Rustamova, N. R., & Rustamov, K. J. (**2025**). Vitagen information and hydraulic drive systems in multi-purpose machinery: Enhancing performance and innovation. In *AIP Conference Proceedings* (Vol. 3304, No. 1, p. 030097). AIP Publishing LLC.
2. Holmes, W., & Miao, F. (**2023**). *Guidance for generative AI in education and research*. UNESCO Publishing.
3. OECD. (**2023**). *Digital skills for private sector competitiveness in Uzbekistan*. OECD Publishing. Retrieved from:

https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/05/digital-skills-for-private-sector-competitiveness-in-uzbekistan_8f1719a7/6c54f447-en.pdf?utm_source=chatgpt.com
4. OECD.AI. (**2024–2025**). *OECD AI Policy Observatory*. Retrieved from: https://oecd.ai/en/
5. UNESCO Uzbekistan. (**2025**, March 25). *Building Media and Information Literacy for a Resilient Uzbekistan*. UNESCO. Retrieved from: https://www.unesco.org/en/articles/building-media-and-information-literacy-resilient-uzbekistan
6. UNESCO Almaty. (**2024**). *Strategic approach to accelerate MIL policy—Kyrgyzstan conference brief*. UNESCO. Retrieved from: https://www.unesco.org/en/articles/strategic-approach-accelerate-media-and-information-literacy-mil-policy-discussed-kyrgyzstan
7. Rustamova, N. (**2023**). The interaction of vitagenic experience, computer and a human in a smart systems. In *American Institute of Physics Conference Series* (Vol. 2789, No. 1, p. 040077).
8. Ayhan, N., Akman, E., & Narmamatova, T. (**2025**). Digital transformation and cyberbullying in education: an evaluation on children in Kyrgyzstan. *International Journal of Adolescence and Youth*, *30*(1), 2498058.
9. Abdusamatov, K., Babajanova, D., Egamberdiev, D., Xodjiyev, Y., Tukhtaev, U., Yusupov, N., & Shoislomova, S. (**2024**). Challenges faced by migrant students in education: a comprehensive analysis of legal, psychological, and economic barriers. *Qubahan Academic Journal*, *4*(4), 330-360.
10. Holmes, W., & Miao, F. (**2023**). *Guidance for generative AI in education and research*. UNESCO Publishing.
11. Organization for Economic Co-operation and Development (OECD)-Education International. (2023). Opportunities, Guidelines and Guardrails on Effective and Equitable Use of AI in Education. *OECD Digital Education Outlook 2023: Towards an Effective Digital Education Ecosystem*.
12. UNICEF & MoPSE Uzbekistan. (**2025**). *Eduten piloting implementation report*. UNICEF. Retrieved from: https://www.unicef.org/innovation/media/24166/file/Uzbekistan%20Eduten%20Piloting%20Implementation%20Repor25June2025.pdf.pdf
13. DLA Piper. (**2025**). *Data protection laws in Uzbekistan*. Retrieved January 27, 2025, from https://www.dlapiperdataprotection.com/index.html?c=UZ&t=law&utm
14. UNESCO Kazakhstan. (**2025**). *Media and information literacy in Kazakhstan: Mapping report*. UNESCO. Retrieved from: https://articles.unesco.org/sites/default/files/medias/fichiers/2025/09/Mapping-MIL-Report-Eng.pdf
15. Yeleussiz, A., & Qanay, G. (**2025**). Media Literacy in Kazakhstan: Educators' Perspectives and Policy Implementation. *Journal of Curriculum Studies Research*, *7*(1), 1-25.
16. Lexology. (**2023**). *Q&A: Data protection legal framework in Kazakhstan*. Lexology. Retrieved from: https://www.lexology.com/library/detail.aspx?g=5a9ab7ae-9e75-4ece-b8e6-9eebf48625c5
17. Borubaeva, A. (**2024**). *Digital literacy and microeconomic outcomes in the Kyrgyz Republic* (MA thesis). Central European University. Available at: https://www.etd.ceu.edu/2024/borubaeva_aizhan.pdf
18. Lex.uz. (**2019**). *Law of the Republic of Uzbekistan on Personal Data (No. ZRU-547)*. Retrieved from https://lex.uz/docs/4831939
19. Greenleaf, G., & Kaldani, T. (**2025**). Data privacy laws in Central Asia: between ex-SSR and 'Belt & Road'. *International Data Privacy Law*, ipaf001.
20. Morgan Lewis. (**2023**, April 11). *Data protection in Kazakhstan: Overview*. Practical Law. https://www.morganlewis.com/-/media/files/publication/outside-publication/article/2023/data-protection-in-kazakhstan-overview.pdf
21. DLA Piper. (**2025**). *Data protection laws in Kazakhstan*. Retrieved February 4, 2025, from https://www.dlapiperdataprotection.com/index.html?c=KZ&t=law&utm
22. DLA Piper. (**2021–2025**). *Data protection laws in Kyrgyzstan*. Retrieved from https://www.dlapiperdataprotection.com/?c=KG&t=law&utm
23. Kyrgyz Republic State Agency (DPA). (n.d.). *Law on Personal Information* (English). Retrieved from: https://dpa.gov.kg/en/npa/4
24. Cherkas Global University. (**2025**). *International Journal of Media and Information Literacy* (journal info). Retrieved from: https://ijmil.cherkasgu.press/journals_n/1750427915.pdf
25. UNESCO. (**2024**). *Global education monitoring report summary, 2024/5: Leadership in education: lead for learning/UNESCO*. UNESCO.
26. Languille, S., Visser, M., Ahmed, Z., Driscoll, Z., & Grabham, J. (**2024**). Evaluation of the applied research portfolio of the knowledge and innovation exchange (KIX): phase I and phase II evaluation reports.
27. Taylor, S. (**2024**). *Is UNESCO's guidance for Generative AI (GenAI) in education & research "the solution" to the problem of GenAI adaptation in international schools? A critical analysis of policy recommendations through Carol Bacchi's What's The Problem Represented to Be?(WPR) Framework. Wayfinder Learning Lab*.
28. UNESCO. (**2023**). *Guidance for generative AI in education and research* (web summary). UNESCO. Retrieved from:

https://www.unesco.org/en/articles/guidance-generative-ai-education-and-research?

29. Tashieva, M. (**2025**). *EVALUATION OF SCHOOL READINESS FOR PARTICIPATION IN READING RESEARCH IN KYRGYZSTAN* (Master's thesis, Kent State University).
30. UNESCO Almaty. (**2023**). *Kyrgyzstan's Journalism Education Platform in focus*. UNESCO. Retrieved from: https://www.unesco.org/en/articles/kyrgyzstans-journalism-education-platform-focus?
31. UNESCO. (**2025**). *Advancing digital education in Uzbekistan: Wendy Gorton's mission*. UNESCO. Retrieved from: https://www.unesco.org/en/articles/advancing-digital-education-uzbekistan-wendy-gortons-mission-empower-teachers
32. Bo, N. S. W. (**2025**). OECD digital education outlook 2023: Towards an effective education ecosystem. *Hungarian Educational Research Journal*, *15*(2), 284-289.
33. Madaliev, M. M., Nuraliev, N. A., Erkebulanova, N. S., Kylychbekov, A. B., & Ryspaeva, S. S. (**2025**). The National Strategy for the Development of Education in Kyrgyzstan: Problems and Prospects in the Era of "University 4.0". In *Lifelong Learning in Central Asia: Relevance of the Fourth Industrial Revolution* (pp. 79-87). Singapore: Springer Nature Singapore.
34. U.S. Mission Kyrgyz Republic. (**2024**). *Fulbright TEA media literacy cohorts*. U.S. Embassy Bishkek. Retrieved from: https://kg.usembassy.gov/fulbright-teaching-excellence-and-achievement-fulbright-tea-program-media-literacy-cohorts/
35. EERA-ECER. (**2025**). *Media Literacy in Kazakhstan: Case studies 2023–2024* (conference abstract). Retrieved from: https://eera-ecer.de/ecer-programmes/conference/30/contribution/60684
36. Eurasia Foundation. (**2024**). *Promoting youth media literacy skills in Uzbekistan*. Success story. Retrieved from: https://www.eurasia.org/success-stories/promoting-media-literacy-skills-among-youth-in-uzbekistan/
37. ITC/UN. (**2024**). *How the UN guides Uzbekistan's youth in its digital journey*. International Trade Centre. Retrieved from: https://www.intracen.org/news-and-events/news/how-the-un-guides-uzbekistans-youth-in-its-digital-journey
38. CaseGuard. (**2021**). *Uzbekistan reinforcing the privacy rights of citizens*. CaseGuard. Retrieved from: https://caseguard.com/articles/uzbekistan-reinforcing-the-privacy-rights-of-citizens/
39. Ergasheva, G., Khursanov, R., Bazarova, D., Altiyev, R., Tadjibaeva, A., Yusupdzhanova, G., & Madatova, Z. (**2025**). Integrating Digital Competencies into Legal Education: A Pedagogical Framework for the Future. *Qubahan Academic Journal*, *5*(2), 446-478.
40. Trninić, D. (**2025**). Media and Information Literacy Skills of Elementary School Educators in Bosnia and Herzegovina. *Media Literacy and Academic Research*, *8*(1), 240-257.