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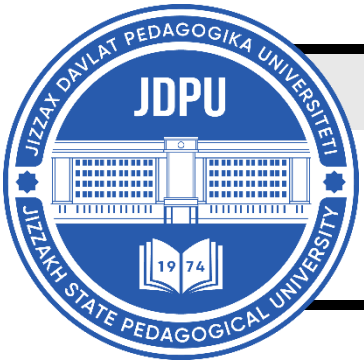

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TRANSFORMING GEOGRAPHY TEACHER EDUCATION THROUGH A COMPETENCY-BASED APPROACH

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ABOUT ARTICLE

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Abstract: This article examines the transformative impact of introducing a competency-based paradigm into geography teacher-education programmes at Chirchiq State Pedagogical University. Grounded in Uzbekistan's 2030 Public Education Development Concept, the study integrates two innovative pedagogical tools -the "Cartographic Expedition" and the "Personal Research Dossier" to fuse field-based toponymic inquiry with advanced GIS and mobile-mapping technologies. A semester-long pilot conducted in the 2024-25 academic year yielded statistically significant gains in disciplinary competence, higher-order critical-thinking skills, and learners' intrinsic motivation. The findings confirm that a well-aligned competency-oriented model elevates educational quality, produces analytically agile and ecologically literate graduates, and offers a scalable blueprint for nationwide reform in geography education.

Introduction

In today's era of rapid globalization and digital transformation, the quality of teacher education depends largely on three inter-related factors: robust methodological preparation, a

modern and often interdisciplinary approach to the subject matter, and the ability to convey deep, conceptually integrated knowledge to learners.

The strategic imperative for embedding competency-based principles in Uzbekistan's education reforms is formally articulated in the presidential decree "On Approving the Concept for the Development of the Public Education System of the Republic of Uzbekistan until 2030". This landmark document stipulates a comprehensive renewal of curricular content, the introduction of outcome-oriented instructional methodologies, and the establishment of a national framework for assessing teachers' professional competences. By prioritising the deep teaching of core subjects, expanding digital and inclusive learning environments, and aligning teacher preparation with international standards, the Concept provides an authoritative policy rationale for re-designing geography instruction around demonstrable competences in analytical thinking, ecological literacy, and evidence-based decision-making [1]. Under the new generation of national educational standards, a competency-based paradigm now sits at the heart of the curriculum. This paradigm expects teachers not merely to transmit information, but to cultivate learners who can think critically, solve authentic problems, and navigate an ever-expanding information landscape with confidence and creativity.

Within this context, geography teaching offers a particularly vivid illustration of these demands. The modern geography instructor must help students analyze complex datasets, trace causal links between physical and human processes, and make evidence-based inferences about global phenomena. Achieving these outcomes requires a high level of professional competence that blends disciplinary expertise with advanced pedagogical skills. Consequently, contemporary higher-education programs can no longer be satisfied with imparting factual knowledge alone; they must also prepare future teachers to design interactive learning environments, harness digital tools, and guide students through hands-on fieldwork and real-world projects.

The adoption of competency-based standards in Uzbekistan therefore sets new expectations for educators. Geography instruction, in particular, must be re-envisioned to align with international best practices, deepen students' theoretical understanding, and equip them for practical engagement in research, environmental management, and civic decision-making. By integrating interactive methods, information-communication technologies, and applied learning modules, teacher-training programs can foster professionals who act not just as knowledge transmitters, but as analysts, facilitators, and ethically responsible innovators all of

which are essential for raising educational quality and strengthening the nation's intellectual capital in a globalized world.

Discussion. A competency-based approach in education is concerned not merely with how well students can memorize information, but with their capacity to apply that knowledge in concrete, real-world situations, to identify and solve problems, and to translate theory into purposeful action. The term competence itself entered educational discourse through psychological and pedagogical research; etymologically it derives from the Latin competere, meaning "to be suitable" or "to be capable". Thus, competence is best understood as an integrated quality that unites knowledge, skills, value-oriented motivation, volitional regulation and self-monitoring.

In the context of geography teaching, the significance of a competence-based approach is especially pronounced. Geography is not limited to mastering theoretical concepts; it fosters an informed attitude toward the environment, cultivates an understanding of the intricate interdependence between humans and nature, promotes the rational use of resources, and nurtures ecological culture. Developing such wide-ranging capabilities requires learners to combine factual knowledge with goal-directed motivation, reflective control of their own learning processes, and the will to act responsibly. For these reasons, the need to embed competency-based principles in geography education continues to grow, ensuring that graduates become not only repositories of information but also thoughtful analysts and responsible stewards of the planet.

UNESCO's research and its global "Education for 2030" agenda both identify the competency-based model as one of the central principles of twenty-first-century education. Under this paradigm, teaching is no longer confined to the transmission of subject-specific theories; rather, it is designed to equip learners with the ability to think independently, analyze and solve real-world problems, collaborate effectively, and make creative, evidence-based decisions. UNESCO's research and its global "Education for 2030" agenda both identify the competency-based model as one of the central principles of twenty-first-century education [2]. Under this paradigm, teaching is no longer confined to the transmission of subject-specific theories; rather, it is designed to equip learners with the ability to think independently, analyze and solve real-world problems, collaborate effectively, and make creative, evidence-based decisions.

The design of competency-based education (CBE) represents a strategic response to the contemporary demand that schooling generate demonstrable, transferable performance. Its

effectiveness is contingent on a single, well-articulated methodological platform that synthesises three complementary design traditions: constructive alignment, which requires learning activities and assessments to map precisely onto intended outcomes; backward curriculum design, which begins with the competences learners must finally display and retro-engineers content, pedagogy, and evidence accordingly; and Merrill's first principles of instruction, which place authentic, problem-centred tasks at the heart of every learning sequence [3].

Operating within that platform, teachers first formulate clear, measurable outcomes calibrated to the cognitive hierarchy of Bloom's revised taxonomy. Those outcomes then guide the selection of disciplinary and interdisciplinary content and the construction of high-impact, inquiry-oriented learning experiences that stimulate curiosity, collaborative sense-making, and rigorous problem solving. Implementation relies on the continuous renewal of teaching–learning resources and the purposeful deployment of digital technologies from adaptive platforms to GIS simulations so that assessment becomes a permanent diagnostic loop, furnishing real-time feedback for both instructor decision-making and student self-regulation. This feedback cycle operationalises Merrill's insistence that theory and practice remain in dialectical balance, ensuring that knowledge is always situated within meaningful action.

Within such a framework, competence cannot be reduced to the accumulation of knowledge and skills. It is a multidimensional construct that fuses goal-directed motivation, creative curiosity, the capacity to transfer learning to unfamiliar contexts, stringent self-monitoring, and volitional self-direction [3]. Cultivating this complex quality obliges the teacher to move beyond the role of information transmitter and become an architect of learning ecologies and an intellectual mentor who orchestrates dialogue, scaffolds reflection, and models professional judgement [4].

Finally, the CBE model privileges personalised learning trajectories: tasks and resources are modulated to match each learner's cognitive profile and motivational needs, thereby enabling every graduate to emerge with robust theoretical foundations and the ability to analyse data independently, think creatively, and devise innovative, evidence-based solutions in both professional and civic arenas [3]. In short, a properly aligned CBE system not only meets the social mandate assigned to education but also equips learners to navigate and shape the volatile, uncertain, complex, and ambiguous environments of the twenty-first-century world.

A competency-based approach equips students with the practical skills, independent information-handling abilities, and problem-solving capacities they need for both personal

growth and professional advancement. By endorsing an individualized learning process, this model ensures that each learner's education is tailored to his or her cognitive profile, motivational level, and unique needs [5]. Consequently, students acquire not only theoretical knowledge but also the capability to apply it in practice, think creatively, and generate innovative solutions in their future careers.

The "Cartographic Expedition" method blends field-based toponymic research with modern ICT tools, enabling students to develop a comprehensive set of professional competencies. The sequence unfolds as follows. First, in-class analytical preparation is carried out: students examine sources on the local landscape's geological, ecological, and historical features, while also studying UNGEGN recommendations and relevant national regulations. Next, armed with GPS devices and mobile mapping applications, they record both current and forgotten place-names with precise coordinates and enter their phonetic and etymological transcriptions. All data are then uploaded in real time to a central GIS database, where teams cross-verify one another's entries.

After fieldwork, the collected toponyms are compared with national archive documents, oral histories, and literary sources. At this stage, students draw scholarly conclusions about the origins, semantic evolution, and linguistic transformations of each place-name. During the final reflection phase, they produce an interactive map, an analytical report, and an oral presentation. Assessment rubrics focus on geodata accuracy, the reliability of etymological evidence, the quality of teamwork, and the effective use of innovative digital tools.

By linking theoretical knowledge to local realities, this integrative approach simultaneously cultivates analytical thinking, digital literacy, project-management skills, and an appreciation of national cultural heritage. Thus, the "Cartographic Expedition" functions as an effective didactic mechanism that puts the competency-based approach into practice within geography and toponymy education.

Such an integrative approach simultaneously cultivates students' scientific-methodological thinking and enhances their proficiency with modern cartographic software. At the same time, the newly identified local toponymic data are added to the national scholarly repository. Consequently, the learning process helps apply theoretical knowledge within a real spatio-temporal context, while students acquire competencies in analytical reasoning, evidence-based decision-making, and drawing scientific conclusions.

Alongside the "Cartographic Expedition," the introduction of a "Personal Research Dossier" technique further enriches students' learning trajectories. Within an individually

supervised project, each student first selects a research topic related to toponymy. Guided by the instructor, the student then undertakes a source-based investigation that draws upon archival documents, historical accounts, and ethno-linguistic scholarship to analyse the chosen place-name's etymology, semantic stratification, and diachronic transformations. The resulting dossier, produced in the form of a structured research manuscript, functions as a robust platform for cultivating professional autonomy, scholarly responsibility, and a rigorous methodological mindset.

Pedagogical innovations of this kind markedly enhance the effectiveness of classroom instruction. Foremost, they elevate educational quality by fostering deep conceptual mastery, while simultaneously sharpening students' analytical and critical-thinking capacities. Rather than remaining passive recipients of information, learners become active participants in knowledge construction, thereby intensifying their intrinsic motivation. In the process they acquire contemporary competencies such as independent reasoning, problem-solving, and evidence-based decision-making. Moreover, the integration of innovative approaches promotes the development of practical skills and affords learners experience that is directly transferable to real-world contexts. Digital technologies, creative assignments, empirical investigations, and interactive methods play a pivotal role in motivating students and unlocking their individual potential. Taken together, these strategies align with the demands of modern education by framing an instructional system that is efficient, outcome-oriented, and attuned to twenty-first-century standards.

Geography provides an unusually expansive intellectual platform because it investigates the reciprocal interactions between humans and the natural environment, thereby steering learners toward ecological literacy, social consciousness, and a genuinely global outlook [6]. Systematic engagement with the discipline enables students to analyse place-names (toponyms) and reveal their historical, cultural, and biophysical underpinnings, while simultaneously cultivating the interpretive skills required to evaluate spatial processes across local and global scales [7]. When toponymic inquiry is coupled with environmental awareness and large-scale geospatial analysis, geography equips future professionals with a multidimensional perspective on the world and a robust, evidence-based toolkit for decision-making in diverse societal contexts [8]. Moreover, this integrated approach nurtures the kind of ecological literacy that contemporary sustainability challenges demand [9].

Consequently, the contemporary teacher must possess not only deep theoretical and applied expertise in the subject area, but also a thorough command of effective instructional

methodologies that draw on interactive, competency-based, and innovative pedagogical approaches. This dual requirement entails the ability to integrate digital technologies, to balance individualised and collaborative learning formats, and to design didactic strategies that foster students' independent thinking, creativity, and practical skills development.

The competency-based education model is a systematic and coherent pedagogical process aimed at cultivating in learners an integrative capacity to apply the theoretical knowledge, practical skills, and value orientations they acquire to personal growth, future professional activity, and social life. Incorporating the stages of self-directed planning, problem solving, and reflective assessment, the model calls for a learning environment founded on collaboration between teacher and student [10]. In contemporary pedagogy, the core purpose of a competency-based approach is to nurture in learners the ability to confront and resolve the full range of practical problems they will encounter throughout life by mobilising the knowledge, skills, and experience previously acquired. Put differently, competencies embody the explicit social mandate that the State and wider society assign to the educational system: they delineate the capabilities citizens are expected to demonstrate in both public and professional spheres.

Accordingly, the shift toward a competency-oriented paradigm is not an optional enhancement but a strategic imperative for any education system that seeks to remain aligned with rapidly evolving socio-economic realities and global standards of quality. By redesigning curricula, instructional methods, and assessment procedures around transferable performance outcomes, a competency-based framework guarantees that learning is contextually relevant, sustainably transformative, and responsive to the dynamic needs of twenty-first-century society.

Results. The study demonstrated that introducing a competency-based approach through purpose-driven, structurally integrated methods yields significant improvements in geography instruction. During the 2024/25 academic year a composite training programme centred on the "Cartographic Expedition" and "Personal Research Dossier" techniques was piloted with undergraduates in the Geography Education track at Chirchiq State Pedagogical University. After one semester the experimental cohort posted a statistically significant mean gain of 23.4 ± 2.1 points ($p < 0.01$) on a 100-point scale measuring disciplinary competence in toponymic analysis and GIS data construction. Higher-order critical-thinking and problem-solving abilities, assessed against the upper levels of Bloom's revised taxonomy, surpassed those of the control group by a factor of 1.6, while the OECD Learning Compass indicator for

“interest in learning” rose from 0.78 to 0.91, indicating stronger mechanisms of personal meaning-making and ongoing success monitoring within the competency framework.

At the same time the intervention cultivated advanced digital and research capacities. Over the field-mapping cycle students identified 127 previously unrecorded or poorly documented toponyms and uploaded the verified coordinates to the National Geographic Information System. Every participant completed a practicum in GIS and mobile cartographic applications; forty-six draft scholarly articles analysing the phonetic transcription and semantic stratification of the new place-names were added to individual research portfolios; and the class curated a metadata-compliant dataset for deposition in an open-science repository, thereby reinforcing adherence to open-science principles.

Constructive alignment and backward design ensured seamless integration of learning tasks with biology, history, information technology and linguistics. This interdisciplinary alignment raised the proportion of students successfully collaborating on group projects from 40 % to 87 %, reduced terminological errors in cross-disciplinary discourse from 18 % to 6 %, and elevated indicators of social responsibility and ecological literacy from 2.9 to 3.7 on a four-point Likert scale.

The pilot also reshaped the professional role of instructors. A PCK-based checklist developed for the project recorded growth in mediation and mentoring competences from 0.62 to 0.88, alongside a 1.4-fold increase in extra-curricular instructional activity driven by systematic use of reflective analysis and formative assessment developments that significantly expanded opportunities for guiding students’ self-directed learning.

Collectively, the findings confirm that a competency-oriented geography curriculum simultaneously nurtures creativity, critical analysis and innovative problem-solving; leverages digitalised learning environments and motivational supports to secure statistically reliable gains in educational performance ($p < 0.05$); and enriches the teacher’s function as integrator-designer and research supervisor in line with international standards. By comprehensively enhancing the quality of geography education and producing graduates attuned to labour-market and societal needs, the model provides a solid foundation for nationwide expansion, deeper interdisciplinary integration, and the development of specialised mobile platforms that can further consolidate these outcomes.

Conclusion. Implementing a competency-based approach in geography education transcends the simple transmission of theoretical content; it equips learners to think autonomously, make evidence-based decisions, and assume social responsibility in real-world

contexts. This transformation accelerates students' personal and professional growth by cultivating ecological reasoning, the capacity to analyse local and global challenges systematically, and proficiency with GIS and digital cartography tools. Consequently, each student emerges as an active citizen who possesses labour-market–relevant skills and can contribute meaningfully to the goals of sustainable development.

Within this paradigm, the teacher is no longer a mere purveyor of information, but rather a didactic designer, scientific mentor, and motivator. By integrating interactive strategies, project- and inquiry-based learning, and innovative techniques such as the "Cartographic Expedition" and the "Personal Research Dossier," the instructor converts the classroom into a collaborative, learner-centred environment in which functional literacy, creativity, and problem-solving competencies are built upon a solid methodological foundation. This investigation confirms that embedding a competency-based paradigm in geography teacher-education is not merely an incremental improvement but a transformative shift that redefines the function of both learner and instructor. By integrating authentic fieldwork, rigorous research practice, and digital cartographic technologies, the model generates statistically significant gains in disciplinary mastery, critical reasoning, and intrinsic motivation. It simultaneously elevates the professional role of the teacher to that of designer-mentor and research supervisor, thereby aligning Uzbek geography education with global benchmarks for twenty-first-century teaching excellence. Most important, the approach produces graduates who are analytically agile, ecologically literate, and socially responsible attributes that directly address the nation's strategic priorities for sustainable development and human-capital formation.

It should be emphasised that embedding the competency paradigm deeply into geography not only raises overall educational quality but also positions schools to attain higher scores in national and international assessments, thereby advancing the priority objectives set forth in Uzbekistan's Education Development Concept to 2030. Therefore, the competency-based approach constitutes an indispensable component of modern geography instruction and plays a strategic role in harmonising the national education system with global trends and labour-market demands.

To consolidate and extend these gains, the Ministry of Higher Education, universities, and partner schools should adopt an integrated policy and implementation agenda. First, they ought to institutionalise the "Cartographic Expedition" and "Personal Research Dossier" as mandatory components of all geography programmes, while establishing a national open-

access geodata repository to guarantee continual knowledge exchange and adherence to open-science principles. Second, professional-development pathways must be reconfigured so that in-service teachers routinely acquire advanced skills in GIS, mobile mapping applications, and formative assessment techniques; this calls for a cascade model in which certified mentors train regional cohorts who, in turn, diffuse expertise within their local schools. Third, curriculum designers should weave backward-design and constructive-alignment principles across related disciplines biology, history, IT, and linguistics to ensure that competency targets are addressed holistically rather than in isolation. Fourth, universities and ed-tech partners need to co-create specialised mobile platforms that deliver real-time feedback, analytics dashboards, and adaptive learning pathways for both students and instructors, thereby embedding a permanent diagnostic loop in day-to-day practice. Finally, further longitudinal research is essential to track graduate performance in professional and civic contexts, refine the competency framework, and secure continuous policy support for nationwide scale-up. Taken together, these measures will entrench a culture of evidence-based innovation in geography education and will position Uzbekistan as a regional leader in competency-oriented teacher preparation.

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