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Future geography teacher training in Czechia and Ukraine: a comparative analysis of two universities

The purpose of the article is to explore the current experience of geography teacher training in Czechia and Ukraine based on the experience of the University of West Bohemia and V.N. Karazin Kharkiv National University.

The main material. In the Czech educational system, becoming a qualified teacher typically involves completing a three-year Bachelor's program (180 credits) followed by two-year Master's program (120 credits) while in Ukraine a Bachelor's program lasts for four years (240 credits) and a Master's program lasts for one and a half years (90 credits) or 2 years (120 credits).

Geography teacher training at the Department of Geosciences of the University of West Bohemia is offered at the Master's level (following a preparatory Bachelor's program) and allows for combinations with other teaching subjects. The Bachelor's program in Geography for Education emphasizes academic preparation in geographic and pedagogical foundations, preparing students for advanced study. It includes fieldwork, a research-based thesis, and a state exam. The follow-up Master's program focuses heavily on geography teaching methodology and includes regionally oriented subjects, three stages of pedagogical practice, and innovative training using a virtual reality-based classroom simulator. The final state exam uniquely simulates real teaching, requiring students to demonstrate both their geographic knowledge and teaching competencies.

Geography teacher training at the School of Geology, Geography, Recreation and Tourism of V.N. Karazin Kharkiv National University is offered at both Bachelor's and Master's levels through specialized programs combining geographic, pedagogical, and practical components. The Bachelor's program prepares students to teach Geography, Nature Study, and Economics, focusing on core geographic knowledge, pedagogy, and substantial fieldwork. The Master's programs offer two tracks – one with a natural science focus and another with an economic orientation – allowing students to deepen their expertise and teaching skills. Both levels emphasize pedagogical practice and conclude with the public defense of a thesis.

Conclusions. The analysis of geography teacher training in Czechia (University of West Bohemia) and Ukraine (V.N. Karazin Kharkiv National University) demonstrates both the progress that has been made and the challenges that remain. Both countries have established strong foundations for preparing future geography teachers, with a focus on integrating pedagogy and content knowledge, practical experience, and fieldwork. Looking ahead, further modernization of curricula, increased use of VR technology, and international cooperation will be key to ensuring that geography teachers are well-prepared to meet the demands of 21st-century education.

Keywords: *geography teacher training, future educators, comparative education, professional development, teacher competencies, Czechia, Ukraine.*

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Introduction. Education is a strategic resource of socio-economic development of society, improving national security and interests, strengthening the authority of the state in the international arena [1]. Training of future geography teachers is crucial for ensuring high-quality education in both the Czech Republic and Ukraine. Geography, as a subject, plays a significant role in developing students' understanding of the world, promoting spatial awareness, and fostering environmental responsibility. Also, we should not forget the role of geography in the patriotic education of youth, which is of particular importance for Ukraine because of the war with the Russian Federation. Teacher training is always an ongoing and evolving process [9]. In recent years, both Czechia and Ukraine have focused on improving geography teacher education programs, addressing global educational challenges, and aligning their systems with European standards.

Initial conditions. Czech Republic's education system is structured around the Bologna Process. Teacher training programs, including geography, are housed within faculties of education, faculties of pedagogy, or faculties of sciences at universities. Students typically pursue a bachelor's degree followed by a master's degree, where the bachelor's one is designed to provide theoretical knowledge in geography, while the master's degree is more focused on pedagogy and methodology of teaching.

In the Czech educational system, becoming a qualified teacher typically involves completing a Bachelor's program followed by a Master's program. The Bachelor's program lasts for three years (180 credits) and provides foundational knowledge of geography. However, a Bachelor's degree alone does not confer teaching qualifications. To become a fully qualified secondary school teacher, one must complete a subsequent two-year Master's program (120 credits). Graduates of the Master's program are then eligible to teach in primary and secondary schools.

The University of West Bohemia (UWB) is a well-respected public university located in Plzeň, Czechia. Established in 1991, it is the leading educational and research institution in the West Bohemia region, offering a diverse range of study programs in engineering, humanities, economics, law, and applied sciences. The university consists of nine faculties, covering disciplines such as mechanical and electrical engineering, computer science, arts, education, law, economics, and design.

The University offers comprehensive programs for training teachers through its Faculty of Education which consists of 12 departments and 2 educational centers. In terms of geography teacher training, this is provided by the Center for Biology, Geosciences and Environmental Education (CBG). The center strives to be a functional center of biological, geological, and physical-geographical research not only in the region but also internationally and consists of 2 departments: the Department of Biology and the Department of

Geosciences, where, respectively, future geography teachers are trained.

The Department of Geosciences focuses mainly on subject-related didactic research, especially on finding and overcoming the critical spots of the curriculum and also on the methodological correct creation of virtual field trips and their implementation in the educational process. The Department provides Bachelor's and Master's study programs which last three or two years respectively. By studying these programs, students get the knowledge and skills to become a primary school or upper secondary school teacher [2].

Ukraine's education system also follows the Bologna Process framework. Teacher training programs, including geography, are offered by two main types of educational institutions: classical universities and purely pedagogical ones [7]. Students typically begin with a Bachelor's degree, which mainly focuses on providing theoretical knowledge in geography, followed by a master's degree that emphasizes pedagogy and teaching methodology.

Similar to the Czech system, in the Ukrainian educational system, becoming a qualified teacher generally requires completing both a Bachelor's and a Master's program. The Bachelor's program lasts for four years (240 credits) and provides foundational knowledge in geography along with introductory pedagogical courses. However, a Bachelor's degree alone does not grant full teaching qualifications. To become a certified secondary school teacher, graduates must complete a one-and-a-half to two-year Master's program (90–120 credits). The Master's program deepens pedagogical and methodological competencies, preparing graduates to teach geography in secondary schools.

V.N. Karazin Kharkiv National University (KKNU) is one of the oldest and most prestigious educational and research institutions in eastern Ukraine. This public university, located in the heart of Kharkiv – the second-largest city in Ukraine – was founded on November 17, 1804. Renowned for its academic excellence, research, and innovation, KKNU is recognized as a leading educational institution in Eastern Europe.

However, Russian military aggression has caused severe challenges in maintaining the educational process at KKNU. Due to its close proximity to the Russian border, the university's facilities have suffered significant damage. Despite these hardships, KKNU continues to operate. Many faculty members and students have been displaced, either becoming internally displaced persons (IDPs) within Ukraine or seeking refuge in other countries. As a result, since February 24, 2022, all teaching has been conducted remotely. While some staff members still work from campus, most teachers and all students are attending online classes from home.

Distance learning at KKNU is complicated by frequent air raids, missile strikes, shelling, regular

power outages, and an unstable internet connection. The situation in the Kharkiv region remains tense, making it one of the most heavily affected areas of Ukraine. A return to full-time, in-person education at KGNU is highly unlikely until hostilities cease but a hybrid model (a combination of online and offline classes) is possible in the nearest future.

KGNU offers a wide range of programs in science, humanities, social sciences, medicine, and engineering across multiple faculties. In terms of Geography teacher training, this is provided by the *School of Geology, Geography, Recreation, and Tourism*. The School has a rich history, dating back to 1804, when the Department of Statistics and Geography was first established at Karazin University. Today, the School consists of three departments:

- Department of Physical Geography and Cartography;
- K. Niemets Department of Human Geography and Regional Studies;
- Department of Fundamental and Applied Geology.

Currently, these departments offer Bachelor's and Master's programs in the following specialties: Geography and Regional Studies, Earth Sciences, and Secondary Education (Geography). The latter is designed for students who wish to become geography teachers.

The purpose of the article is to explore the current experience of geography teacher training in Czechia and Ukraine based on the experience of the University of West Bohemia and V.N. Karazin Kharkiv National University. It compares educational approaches for enhancing the quality of geography teacher preparation considering the current situation in Ukraine.

Geography teacher training at the University of West Bohemia. At the Department of Geosciences of the UWB students can obtain a teaching qualification in Geography at a Master's level (in combination with other subjects e.g. with languages, history, biology, physical activity etc.). General features of all of the study programs are comprehensive education (a diverse range of subjects that include theoretical foundations from various areas of geographical disciplines with an emphasis on understanding basic terminology and conceptual system thinking), internship in schools, individual support and access to modern research in the field of education.

The Bachelor's degree program in Geography for Education is designed as an academic program. The graduates are primarily prepared to continue their studies in a follow-up program in the field of geography with a pedagogical focus. They demonstrate knowledge and understanding of the fundamental trends in the development of geographical thinking.

The program lasts for 3 years (180 credits) and includes around 55 compulsory components (20 in geography, 20 in the second subject and 15 in pedagogical-psychological basis) and some elective components (languages, or courses for deepening the subject skills). By completing pedagogical-psychological

and general didactic courses, the graduates acquire the foundations necessary for developing competencies required for teacher qualification, thereby creating the prerequisites for entering follow-up study programs leading to full teaching qualification.

Regarding the distribution of disciplines by years of study, first-year students mostly learn general physical geography disciplines (Fundamentals of Geology, Geosciences) as well as subjects focused on scientific research in geography (Geographical Research, Basic Geography for Science Study, Introduction to GIS). In the second year of study, students continue to study Physical Geography, complemented by Economic Geography. As for the compulsory courses in the third year, they include cartographic disciplines (Cartographic Methods of Geodata, Geographical Cartography), Geography of Europe, and Basics of Landscape Ecology. The only pedagogical discipline in the compulsory part of the study program is Propaedeutics of Geography Education.

As for the elective part of the curriculum, it may include long-term international internships or courses focused on travel and game-based learning. Students can also apply for the short-term Field Course in Geosciences, held in the Western Bohemia region, or opt for a long-term field course, which often takes place abroad. Both types of field courses are practically oriented and provide students with hands-on experience. During the short-term Field Course, students often visit the Barrandien region, known for one of the largest karst complexes in Czechia, or explore spa areas with evidence of post-volcanic activity. The long-term Field Course typically involves a study tour with stops at geographically significant sites – for example, students once had the opportunity to sail along the Croatian coast on a yacht. At the end of their studies, students are required to publicly defend a research-based Bachelor's thesis. They can choose to conduct research either in geography as an academic discipline or in geography education, and must complete the full research process: selecting a topic and research questions, establishing a theoretical framework, describing the methodology, visualizing and analyzing results, and discussing the findings. Finally, students must take the State Final Bachelor Examination, which consists of three components: i) physical geography, ii) human geography, iii) GIS and cartography.

The following Master's degree program in *Upper Secondary School Teacher Training in Geography* runs for a standard length of 2 years (120 credits). To meet the program requirements students are expected to write and defend their Master's thesis and pass the final state examination.

Most of the program focuses on geography teaching methods which is reflected in the presence of such compulsory courses in the curriculum as Methodology of Teaching Geography, Modern Methods in Teaching Regional Geography. Interestingly, unlike the Bachelor's

program, the compulsory part of the Master's program, which includes 8 disciplines with a total of 34 credits, is more regionally oriented. There are such disciplines as Physical Geography of the Czech Republic and Human and Regional Geography of the Czech Republic.

In a rapidly changing world of technology, future geography teachers must stay aligned with current trends and be prepared to adapt through continuous professional development [8]. Within the courses that focus on teaching, students can train their teaching skills in a specific virtual reality-based simulator (Fig. 1). This simulator (called Virtual Classroom) was developed at the University of West Bohemia and represents a unique opportunity for students [3]. Future teachers put on the head display and find themselves in an immersive classroom environment where they can teach the avatars who are operated by a didactician.

During the following Master's degree program, students also undertake pedagogical practices, which consist of 3 courses. The first one is based only on observing and reflecting on real teaching. To pass the second course, students have to teach 10 hours (in each of the two subjects they study) at schools, and to pass the third one, students teach 20 hours at schools (in each of the two subjects they study). During each of these three courses, the teaching is evaluated using transdisciplinary didactics with 3A methodology [6].

Final state examination at the Master's level is quite unique in Czechia, because students resemble actual teaching. They essentially teach the examiners in two topics (10 minutes on each) – one topic from general geography and one topic from regional geography. This approach allows for an assessment not only of subject-

specific knowledge but also of the students' proficiency in teaching methodology.

Geography teacher training at V.N. Karazin Kharkiv National University.

At the School of Geology, Geography, Recreation and Tourism students can obtain a teaching qualification in Geography at both the Bachelor's and Master's levels on the corresponding study programs [10]. These programs are provided jointly by the Department of Physical Geography and Cartography and K. Niemets Department of Human Geography and Regional Studies.

The Bachelor's degree program in Geography, Nature Study, Economics and Tourism-Related Activities is aimed at forming a specialist with a modern worldview and thinking, who is able to carry out competent teaching in general secondary schools and specialized educational institutions, master modern information and communication technologies, and apply means and technologies of interaction between participants of the educational process.

The program lasts for 4 years (240 credits) and includes 39 compulsory components (179 credits in total) and 16 elective components (61 credits in total). It needs to be said that after obtaining such a degree graduates can teach Geography, Nature Study and Economics in general schools in Ukraine, there is no choice of additional subjects for them.

As for the the distribution of disciplines by years of study, first-year students learn general subjects (History of Ukraine, Advanced Mathematics, Foreign Language) and general physical geography disciplines (Scientific and Natural Picture of the World, General Earth Science, Fundamentals of Human Geography etc.). Starting from



Fig. 1. Future geography teacher training in the VR classroom: A – the virtual classroom environment from the user's point of view; B – the virtual classroom environment from the operator's point of view; C – users presenting their own presentations; D – real-time recording of the user's actions in the real world

the second year, students have pedagogical subjects in their curriculum (including Age-Related Physiology and Child Health, General and Age Psychology, Pedagogy and others). There are also some subjects aimed at mastering economic knowledge and teaching Economics (Basics of Economics and Financial Literacy, Methods of Teaching Economic Subjects at School). Also, the compulsory part of the program includes two disciplines related to geography of Ukraine: Physical Geography of Ukraine and Economic and Social Geography of Ukraine.

Regarding the elective part of this program, it includes four interfaculty disciplines (selected by students from the general catalog of disciplines formed by all structural units of KGNU), an elective practical training in the sixth semester (regional studies, regional-tourism, pedagogical or sports-tourism training), and faculty-specific elective disciplines covering various areas of geography, tourism, and pedagogy. Thus, the compulsory part of the curriculum emphasizes the study of geographical disciplines while pedagogical disciplines are mostly offered in the elective part.

Amid renewed approaches to geography education and efforts to foster national-patriotic consciousness, there is a growing need to modernize the training of future geography teachers in local lore and tourism [4]. Particular attention should be paid to fieldwork and practical experience (31 credits in total). Such comprehensive and extensive practical training is traditional for all natural science schools of KGNU, particularly for the School of Geology, Geography, Recreation, and Tourism. It is undertaken by both students enrolled in purely geographical educational programs and those who prepare to be future geography teachers. Practical training sessions are separate components of the students' curriculum. Most of the practical sessions take place in June, following the completion of the students' summer session exams, and last for 4–5 weeks.

First-year students undergo educational nature scientific training while second-year students undertake educational professional-oriented training. Before the war, these types of fieldwork took place on a field station (Gaidary village) in the Kharkiv region and in the Ukrainian Carpathians respectively but now all the field learning is delivered remotely with the help of different online resources such as Google Earth, Sentinel Earth Observation (EO) Browser and Planet Explorer [5]. Third- and fourth-year students undergo two pedagogical practices which usually take place in secondary schools under the supervision of Geography teachers. As many Ukrainian schools work online during the wartime, these practices mostly take place in remote format now with some exceptions when students can practice in schools that work offline currently.

To obtain the degree students must publicly defend their Bachelor's thesis in the end of the fourth year of study. In the qualification paper the student must demonstrate the skills and abilities acquired during

the years of study. As a rule, this research includes a pedagogical experiment conducted by the student, the results of which are analyzed.

As for the Master's degree programs for future geography teachers, there are two of them provided by the School of Geology, Geography, Recreation and Tourism. *The Master's degree program in Geography, Man and Nature and Tourism Work* is provided by the Department of Physical Geography and Cartography and *The Master's degree program in Geography, Economics, Local Studies and Tourism Work* is offered by K. Niemets Department of Human Geography and Regional Studies.

The programs are quite similar; however, the first one is more focused on natural sciences, while the second has an economic orientation. The majority of compulsory courses consist of psychology and pedagogy, as well as various types of teaching practicum. By choosing elective courses, students can deepen their knowledge in different areas of geography, cartography, and GIS (Geography, Man and Nature, and Tourism Work) or in economic geography, tourism, and local studies (Geography, Economics, Local Studies, and Tourism Work). To obtain the degree, students must publicly defend their Master's thesis at the end of the third semester, which is usually a continuation of their Bachelor's research.

Comparative analysis of the study programs. So, we can say that the geography teacher training systems in the UWB and KGNU share significant similarities in their structure and objectives, but there are notable differences in their approaches and challenges:

- *Educational content:* Overall, the curricula for training geography teachers at the analyzed Czech and Ukrainian universities are quite similar: Bachelor's programs are primarily focused on studying physical and socio-economic geography, while Master's programs are mostly centered on pedagogy and teaching methodology for geography and related subjects. A key difference is that Czech students have the opportunity to choose additional subjects not directly related to geography (such as languages, history, biology, physical activity, etc.) that they wish to be qualified to teach. This is due to the fact that the training is conducted at the Faculty of Education rather than a Faculty of Geography, which facilitates the implementation of interdisciplinary programs. In Ukrainian curricula, courses related to the geography of the native country are included at the Bachelor's level, whereas in the Czech curricula, they appear at the Master's level.

- *Pedagogical training:* Both universities emphasize the integration of pedagogy with geography content and place great emphasis on pedagogical practices in schools during undergraduate and postgraduate studies. However, Czech study programs tend to provide more opportunities for interdisciplinary learning and research, whereas Ukrainian ones emphasize only geography and related subjects. It is also interesting that in the Czech model, Master's students, upon completing

their studies, must take final exams in which they are required to actually teach the examiners, demonstrating both their knowledge of specialized subjects and their pedagogical skills.

- *Fieldwork and practical experience:* Practical experience is an integral component of geography education at both universities. However, the Czech system places greater emphasis on international internships, offering students valuable global exposure – for example, through an optional long-term Field Course often held abroad. In contrast, the Ukrainian model includes a larger number of compulsory long-term field training sessions. Prior to the war, these activities were conducted at the field station in the village of Gaidary (Kharkiv region) and in the Ukrainian Carpathians. Currently, however, all field-based learning is delivered remotely.

- *Technological integration:* Czechia is more advanced in integrating technologies such as virtual reality into

the curriculum, while Ukraine faces challenges related to limited resources and the necessity of distance learning due to the war. Nevertheless, V.N. Karazin Kharkiv National University is actively progressing in the adoption of digital tools and modern teaching methodologies.

Conclusions. The analysis of geography teacher training in Czechia (University of West Bohemia) and Ukraine (V.N. Karazin Kharkiv National University) demonstrates both the progress that has been made and the challenges that remain. Both countries have established strong foundations for preparing future geography teachers, with a focus on integrating pedagogy and content knowledge, practical experience, and fieldwork. Looking ahead, further modernization of curricula, increased use of VR technology, and international cooperation will be key to ensuring that geography teachers are well-prepared to meet the demands of 21st-century education.

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ПІДГОТОВКА МАЙБУТНІХ УЧИТЕЛІВ ГЕОГРАФІЇ В ЧЕХІЇ ТА УКРАЇНІ: ПОРІВНЯЛЬНИЙ АНАЛІЗ ДВОХ УНІВЕРСИТЕТІВ

Метою цієї статті є дослідити сучасний досвід підготовки вчителів географії в Чехії та Україні на прикладі Університету Західної Богемії та Харківського національного університету імені В.Н. Каразіна.

Основний матеріал. У чеській освітній системі здобуття кваліфікації вчителя зазвичай передбачає проходження трирічної бакалаврської програми (180 кредитів) та дворічної магістерської програми (120 кредитів), тоді як в Україні бакалаврат триває чотири роки (240 кредитів), а магістратура – півтора року (90 кредитів) або два роки (120 кредитів).

Підготовка вчителів географії на кафедрі геонаук Університету Західної Богемії здійснюється на магістерському рівні (після підготовчої бакалаврської програми) і передбачає можливість поєднання з іншими навчальними дисциплінами. Бакалаврська програма з географії для освітян акцентує увагу на академічній підготовці в галузі географії та педагогіки, готуючи студентів до подальшого навчання. Вона включає польові дослідження, дипломну роботу дослідницького характеру та державний іспит. Наступна магістерська програма орієнтована на методику викладання географії й охоплює регіональні дисципліни, три етапи педагогічної практики та інноваційне навчання із використанням VR-симулятора класної кімнати. Фінальний державний іспит має унікальний формат імітації реального викладання, під час якого студенти повинні продемонструвати як географічні знання, так і педагогічні компетентності.

Підготовка вчителів географії на факультеті геології, географії, рекреації і туризму Харківського національного університету імені В.Н. Каразіна здійснюється як на бакалаврському, так і на магістерському рівнях через спеціалізовані програми, що поєднують географічні, педагогічні та практичні компоненти. Бакалаврат готує студентів до викладання географії, природознавства та економіки, приділяючи увагу фундаментальним знанням, педагогіці та значному обсягу польових практик. Магістерські програми мають дві спеціалізації – природничо-наукову та економічну – що дає змогу студентам поглибити свої знання та викладацькі навички. Обидва рівні включають педагогічні практики та завершуються публічним захистом кваліфікаційної роботи.

Висновки. Аналіз системи підготовки вчителів географії в Чехії (Університет Західної Богемії) та України (Харківський національний університет імені В.Н. Каразіна) демонструє як досягнення, так і наявні виклики. Обидві країни створили міцну основу для підготовки майбутніх учителів географії, приділяючи увагу поєднанню педагогічної та предметної підготовки, практичному досвіду й польовим дослідженням. У перспективі важливими напрямками залишаються подальша модернізація навчальних програм, активніше впровадження VR-технологій та розширення міжнародного співробітництва, що забезпечить належну підготовку вчителів географії до освітніх викликів XXI століття.

Ключові слова: підготовка вчителів географії, майбутні педагоги, порівняльна освіта, професійний розвиток, педагогічні компетентності, Чехія, Україна.

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