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Difficulties in teaching geography: a survey of relevant literature

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ABSTRACT: Teaching geography places a premium on scientific inquiry and student instruction that anticipates and adapts to the challenges posed by societal and technological changes. Key competencies are those that every individual needs to thrive in today's society; they're also the ones that define adult success and are essential for things like self-actualization, personal growth, social integration, and adaptability. Having these abilities well-developed helps in making sense of social and economic occurrences and processes. This article's goal is to showcase and talk about the research and teaching efforts of the Department of Geography Didactics and Ecological Education at the Adam Mickiewicz University in Poznań's Faculty of Geographical and Geological Sciences. These efforts are aimed at helping students apply different educational concepts and develop the skills they'll need for their future careers. Employers have been paying close attention to "soft skills" in recent years; students may work on developing these and other related abilities, such as confidence, self-esteem, communication, and group responsibility. Thus, certain educational principles must be used in order to adequately prepare the pupil. Bilingual education, curriculum based on language and literacy (CLIL), inquiry based scientific education (IBSE), project method, fieldwork, geographical educational trails, participation, and the use of GIS and ICT are among the most essential.

KEY WORDS: didactics of geography, key competences, project method, geographical trails, fieldwork

Introduction

Professor Stanisław Pawłowski (1882–1940), a pupil of Professor Eugeniusz Romer, and Professor Maria Czekańska (1902–1991) laid the groundwork for the development of geography didactics at Poznań University. Geography, methodology, and popular science were all areas of interest for their respective academic and scientific pursuits. They understood the significance devoted considerable time in classroom instruction, doing thorough scientific research, and penning instructional materials and pedagogical recommendations for the field of geography (Piotrowska 1997, Kostrzewski, Piotrowska 2011, Piotrowska 2012a, b, 2018a). Academic progress, studies, and research that followed, along with internal organizational changes (the Department of Geography Methodology was established, and subsequently the Department of Regional Geography and As a result of Geography Didactics, geography classes are now considered more important in college curricula. The Department of Geography Didactics and Ecological Education (DGDEE), which was established in 1999, is currently involved in these endeavors. Its mission is to continue the long-standing educational traditions of the Faculty of Geographical and Geological Sciences and to educate individuals who will become teachers (Piotrowska 2012a, b, Piotrowska, Cichoń 2015a). One may identify the following works and research directions in the scientific activity of DGDEE staff (Table 1, Piotrowska, Cichoń). in 2015 (a): - about the role of geomorphological processes in geoecosystems, changes in land use, the impact of humans on coastal areas, the services provided by lake ecosystems, cultural and landscape heritage, and the present status of these areas - geographical instruction, sharing geographical information with educators and the general public. Beczkiewicz, Piotrowska (2015) and Kaczmarek et al. (2012) note that the Department is active in developing core curriculum, preparing textbooks and methodological guidelines, and engaging in actual educational activities. the geography curriculum in the classroom (Piotrowska et al. 2017, Szkurłat et al. 2017a, b, c). By working together with other departments at Adam Mickiewicz University in Poznań, the DGDEE staff have been able to develop and test new didactic solutions and educational concepts through educational projects funded by the European Union's European Social Fund. With the direction of Prof., the Śniadecki College project created

a new curriculum for teaching natural sciences and developed the methodological assumptions of the Anticipative Education Strategy. S. Dylak (Adam Mickiewicz University's Faculty of Educational Studies), which relied on students' active participation, placed a focus on self-study techniques for class preparation, and made use of ICTs. The project's outputs included instructional videos, a plethora of pedagogical resources for educators, and lesson plans. The eSchool - My Greater Poland initiative used the project method to build a concept of outdoor education, as well as to organize teacher training, hold extensive substantive and methodological consultations, and more. We at the Academy of Natural Sciences want to achieve

Table 1. Research pursued by the Department of Geography Didactics and Ecological Education.

Subject	Publications
the process of teaching geography and nature	Piotrowska 1999, 2000, 2010a, 2012d, h, 2014a, 2016, Cichoń 2007, Cichoń, Piotrowska 2010a, b, 2015, 2016, Cichoń, Rosik 2008, Piotrowska, Szkurłat 2016
inclusion of strategies, methods and techniques of teaching geography and nature	Piotrowska 2005a, 2008b, c, 2012c, Cichoń, Piotrowska 2010b, Piotrowska 2014b, 2015a, b, c, Piotrowska, Cichoń 2015b, Sypniewski 2015a, b, 2017a, b
application of modern information technologies	Piotrowska 2010b, 2011b, c, Cichoń, Piotrowska 2017
application of technologies geoinformation	Piotrowska 2018b
application of the Geographic Information System in the teaching of geography and nature	Piotrowska 1996, Piotrowska 2018b, Szkurłat, Piotrowska 2018
design and use of geographical educational trails	Cichoń 2006, 2008d, 2009, Piotrowska, Cichoń 2012, Piotrowska, Cichoń 2016b, Abramowicz 2018a, b
regional and ecological education	Cichoń 2008a, b, c, Cichoń, Dybska-Jakóbkiewicz 2008, Abramowicz 2018b
field classes and evaluation of the suitability of the land for school fieldwork	Cichoń 2005, 2007, 2009, Cichoń, Piotrowska 2010a, b
research in the field of developing key competences	Cichoń, Piotrowska 2012, 2018, Piotrowska 2011a, Piotrowska, Cichoń 2015b
evaluation and assessment of the effectiveness of the educational process	Piotrowska 2003
formative assessment	Cichoń, Piotrowska 2017
geographical bilingual education	Piotrowska 2007, 2008a, b, 2009, 2011d, e, 2012e, f, g, h, 2013

The goal of the Talents program, which was jointly run by the Polish Academy of Sciences in Poznań and the Institute for Agricultural and Forest Environment (IAFE), was to enhance the teaching of science and environmental awareness in upper secondary schools through the Landscape Ecology course, and to propose and implement a curriculum for ecological education utilizing project-based learning and information and communication technology. As an additional endeavor, the Internet-based educational system is bolstering current practices in multilingual student preparation for teaching. pupils were better equipped to educate primary school pupils about nature via the use of new methods made possible by nature in the classroom. The scientific research-based education challenges in Poznań metropolitan schools were tackled by the Metropolitan Academy - local and regional education in the Poznań metropolitan initiative, which was administered in collaboration with the Centre for Metropolitan Research of the Adam Mickiewicz University. The result of the Future ICT School Laboratory project, which was carried out in collaboration with the Poznań Supercomputing and Networking Centre, was the development of theoretical frameworks for incorporating ICT tools into natural education throughout the various phases of schooling, making use of next-generation network services.

Modern approaches to the didactics of geography are multidisciplinary in nature, drawing on the most recent findings in the fields of neurodidactics, psychology, pedagogy, and general and applied dynamics. This method led to several scholarly articles and elevated geography education, transforming it into a multidisciplinary theoretical-practical discipline that incorporates numerous practical considerations (Piotrowska, Cichoń 2015a). Preparing students for the teaching profession in a world that is always changing also makes geography education particularly important. This implies that students need to have a solid grasp of geographical science as well as a diverse set of fundamental abilities together referred to as essential competencies. In their 22 May 2018

Recommendation on core competencies for lifelong learning, the European Parliament and the Council highlighted the following as essential skills for an individual to have: - the ability to communicate effectively in their native language, communicating in languages other than one's own, proficiency in mathematics as well as fundamental scientific and technological abilities, digital literacy, - developing the ability to study, - being socially and civically competent, - having an entrepreneurial spirit and taking the initiative, and - being culturally aware and expressive. The purpose of this article is to present and discuss the research and teaching offered by the DGDEE with the objective of helping students employ diverse educational ideas and the important skills that come from them in their future job, considering the premises stated above.

Learning two languages

The incorporation of bilingual education into school curricula was an inevitable next step in preparing the representatives of the world's most multilingual societies for effective communication. According to Piotrowska (2008a, 2009, 2012g, Tab. 1), one example of innovation and educational challenge in Poland was the introduction of multilingual instruction in the 1991–1992 school year, beginning in classrooms with French. Bilingual geographers aim to help their students master two languages at the same level, develop their critical thinking skills so they can describe and understand the world around them, and become fluent enough in a foreign language to be able to communicate effectively in both their own and other cultures (Iluk 2000, Piotrowska 2008a, 2009, 2012g). The practice of using one's mother tongue and a foreign language simultaneously, although to varying degrees, is known as bilingualism. According to Dzięgielewska (2008), school bilingualism, a kind of subordinate bilingualism that emerged from formal schooling and occurs outside of contexts where a foreign language is spoken, is prevalent in Polish circumstances. This led to the development of a distinct substan-tive and linguistic approach necessary for the work of bilingual section non-language teachers. An increasing number of bilingual education models, with an emphasis on integration—that is, the integration of subject matter instruction with language acquisition—became popular in the early 1990s throughout the European Union. The most common approach to teaching a specific field in a foreign language is known as Content and Language Integrated Learning (CLIL) (Mentz 2008, Papaja 2008,

(Piotrowska 2012f). Rather than teaching non-language topics in a foreign language, the goal of integrated content and language learning is to teach non-language subjects alongside and via a foreign language. This suggests that there needs to be a shift toward a more holistic strategy for education. It should be noted, nonetheless, that the problem of bilingualism, and perhaps even multilingualism, is becoming critically significant in educational systems, particularly in light of the wide movement possibilities that exist when many individuals take up employment and settle in other countries. In many cases when tensions and conflicts emerge directly from ethnic and cultural differences, an educational system designed for this purpose might be useful (Piotrowska 2009). The most common responses from students and teachers of Polish-French bilingual classes in Poland between 2008 and 2011 (Piotrowska 2008a, 2009, 2012f, g) revealed that students enrolled in these classes for a variety of reasons, including: expanding their linguistic and cultural horizons, learning French, improving their chances of passing the International Baccalaureate geography exam, exploring French culture, participating in school exchange programs, and studying abroad. The capacity to analyze geographical phenomena, to build explanations and definitions of phenomena in a foreign language, to use French geographical vocabulary in practice, to memorize concepts faster by repeating them in two languages, to search for geographical information, e.g. on the Internet, and to use concepts in two languages were among the basic skills taught in this type of education. Thus, another didactic problem is the process of preparing students to teach multilingual classrooms. When education is done well, students get better language and subject skills, have more opportunities to engage in programs like Erasmus, and learn to appreciate the cultural and geographical diversity within a language region.

Research-Based Science Instruction (RBSI)

Probably the only instinctive way to discover the world is to look for answers to questions that come from cognitive curiosity about commonplace experiences. An issue that often occurs Polish formal education has the challenge of pupils not having enough time to ask questions during class, and when they do, the instructor finds the answers instead of the students, who should be the ones to devise the questions. Indeed, according to Okoń (1987), a student who expresses interest by asking questions is more inclined to seek answers or engage in related activities than one who does not. For a long time, the same problems have been present in the debate over how the school operates. The progressive school's pedagogical tenets gradually replaced the extensive criticism of the so-called conventional school that had begun in the nineteenth century. During this time, thinkers like Piaget, Dewey, Vygotsky, and Freire laid the groundwork for what would later become known as the philosophy of inquiry-based learning (Trna, Tranová 2012). Their constructivist theories, which support the premise that students actively create their own knowledge and provide meaning to their own experiences, are known as Inquiry Based Science Education (IBSE) in this context. Notable among these ideas is "learning by discovery" (Kupisiewicz 1977), a term coined by psychologist J. S. Bruner. This method places an emphasis on both the autonomy of the learner and the ability to see patterns and correlations outside of the material that is now accessible. Despite the theories' more than a century-long history, modern educationalists continue to find them intriguing (Dylak 2013, Klus-Stańska 2010, and Spitzer 2011). Their findings demonstrate that our brains were not designed to receive information from the outside world, but rather to digest it and derive rules from observable occurrences in our own environment (Hüther 2010, following Żylińska 2013). The goal of teaching inquiry is to help students develop what the American National Science Education Standards call "scientific literacy." This competency encompasses not only an understanding of the subject and the nature of science (particularly as it pertains to physical life and the earth sciences), but also an appreciation for the significance of science in one's own life and in the world at large. Research from the National Research Council (1996) verifies that individuals with high levels of scientific literacy are better able to apply scientific concepts and methods to their own choices and to take part in debates on societally relevant scientific matters. The ability to think critically, creatively solve issues, work effectively in teams, use technology, and value lifelong learning are just a few of the many transferable talents that benefit from a solid scientific foundation. The European Commission's report emphasizes the importance of science education in developing competences in areas such as critical thinking, everyday decision making, and science literacy, as well as in instilling a positive attitude towards science in all citizens (Rocard report 2007). Instead of providing solutions, good teachers ask students to think critically and come up with their own ideas. Teaching is not about dictating what students should and should not do, but rather about helping them solve problems (Nix 2016).

Finding solutions to the research questions is at the heart of the IBSE-based teaching approach. This method yields data that may be used as a foundation for drawing broader conclusions about accuracy and definitions. This method of teaching is based on the way scientists really do their work. As long as students do their own analyses and make their own findings, teaching according to the inquiry technique may take place, even when students are given research topics and data from other sources (Bell et al. 2005). Introduction, exploration, investigation design, investigation execution, conclusion, presentation/communication, and deepening/broadening are the seven stages of inquiry (Fig. 1). The authors of the Polish paper titled Basics of the IBSE methodology (Bernard et al. 2015) claim that while the IBSE technique is now used in chemistry and biology classes. Students have very little say over the research process when it comes to

Fig. 1. The phases of inquiry-based learning (Van Uum et al. 2017).

their own, from the moment the research prob- lem is defined, in a Polish public school, e.g. dur- ing regular chemistry lessons. Another approach is presented by researchers who introduce open inquiry teaching as early as the primary school (Van Uum et al. 2017). In their opinion, the basic element of introducing the strategy is the knowl- edge of the IBSE by the teacher, who may decide to carry out inquiry education, or its elements, in a chosen and purposeful way during the classes he conducts.

IBSE can be implemented on one of four levels based on the activity of the student and teacher. The main criterion for the division is the amount of information provided by the teacher, which is presented in Table 2. The X mark indicates the information that students receive from the teach- er at each level of inquiry (from confirmation to open inquiry).

Tasks stimulating the student's curiosity and making it possible to satisfy them increase the motivation to perform them (Błasiak 2011). A student's genuine curiosity can only be satis- fied if the student has an influence on the con- tent and forms of work, which in this case is a tool for searching for answers to questions that interest them. Teachers themselves, who work using elements of the IBSE, notice a number of benefits, including the effects of teaching in the form of knowledge and skills of students, achiev- ing results, combining learning with fun, and finally transferring responsibility for the task to the student (Sypniewski 2015a). Despite this, the strategy is not popular among teachers of science subjects in schools in the Poznań agglomeration (including teachers of geography), which is con- firmed by the fact that more than half of those participating in the survey have never heard of it (Sypniewski 2015a).

The DGDEE has for years made efforts to popularise teaching strategies through scientific inquiry in geographical education (Sypniewski 2015a, b, Sypniewski 2017a, b, Sypniewski 2018).

Table 2. Levels of inquiry (Bell et al. 2005).

Level of inquiry	Information given to students		
	question	methods	solution
1. confirmation	×	×	×
2. structured inquiry	×	×	
3. guided inquiry	×		
4. open inquiry			

The most recent educational activity implement- ed at the Adam Mickiewicz University in Poznań is the project *Kolaboratorium – a training programme for the region's inhabitants*, within the framework of which, in 2019–2021, a series of workshops for teachers about the IBSE strategy *Teaching through scientific inquiry for teachers of nature and geography – how to apply the IBSE strategy during lessons at school* authored by MA Jakub Sypniewski will be conducted.

Project method

Students work in groups on projects with the goal of completing a predetermined set of tasks (Regulation..., 2010). Following the principle that no one should be coerced into doing anything they don't want to, the project-based learning approach relies on students working independently and putting their interests at the center of what they do. The learner's subjectivity, the teacher's progressive role, comprehensiveness, and a break from conventional evaluation constitute the second premise of the project approach. The project's stage approach is the third and equally crucial problem. According to Cichoń (2015a), the project is divided into the following stages: planning, implementation, assessment, consultation, and presentation/evaluation of findings. The project approach has recently seen a renaissance in educational practice across all grade levels. Everything about the project, from its assumptions to its phases of labor, and its features, has remained constant throughout the last century, regardless of the wide range of methodological solutions and issues. Findings from a survey given to geography majors at Adam Mickiewicz University's Faculty of Geographical and Geological Sciences highlight the significance of having a teacher who can both substantively and methodologically support their work are invaluable. Conditions for working on the project are poorer when the instructor meets with the students less often. Students anticipate and place a high value on assistance, despite the fact that it is intended to be an autonomous job. While it's important for teachers to foster a sense of independence in their students, they must also ensure that this freedom is fruitful. The stages of synthesis and preparation for the final product are the most challenging to complete in a project. At this point, however,

you need to pay close attention since the circumstances in the manner in which it is executed will dictate the growth of the most crucial competencies, including reasoning, assessment, problem-solving, and technological proficiency.

Fieldwork

It is important for every educator to deliberate on their approach to skill development. Field courses are highly valued because of their great efficacy, as stated by several writers (e.g., Nowacki 1994, Wojtkowicz 1999, Cichoń 2009). According to Cichoń (2007), field courses are one of the methodological suggestions that help instructors improve their abilities in relation to the subject matter they are teaching. Additionally, they foster an attitude of research in students, which increases their interest and ensures that the information they receive lasts longer. An educational experiment conducted by Cichoń (2004, 2011b) verified this. Students showed the highest level of interest in assignments pertaining to the energy-dynamic sphere of surface waters (Cichoń 2006). The topography, soil, and vegetation all have a role in determining the pupils' field activities. Nevertheless, the allure of a certain location is determined by the presence and uniqueness of both natural and man-made factors, which in turn are impacted by distinct landscape components (Cichoń 2007). Hence, in regions with a high level of geodiversity, a successful perceptual process is feasible (Cichoń 2007, 2008). According to Chichoń (2009), geography education in neglected regions might be especially relevant to the experiment. This idea also states that man-made features, including drainage ditches or excavations, might serve as examples (Cichoń 2010). Going on a school trip to a city could be a fascinating experience. These days, young people's lives revolve on cities, and malls in particular. Cichoń (2011c) posits that young people have a good impression of shopping malls because they provide an environment where each person's requirements are fully satisfied. For instance, in the Warta river valley, there are revitalized manufacturing factories that are now part of the cultural heritage (Cichoń 2014) or that serve as recreational and educational facilities (Cichoń,

Piotrowska (2015) and Piotrowska and Cichoń (2016)b) are also really intriguing. Public facilities or lapidaria may showcase how humans have shaped the natural landscape, including rocks (Cichoń, Piotrowska 2010). During field reconnaissance, which is a perceptual process that involves paying attention to the landscape's structure, stimuli, and distinguishing characteristics, the location for field activities is chosen. According to Cichoń (2009), the placement of a site in a certain location involves more than just knowledge about that location; it mostly involves a specific perception that influences the right style of thinking or the amount and quality of input stimuli. Being able to influence pro-ecological attitudes in a specific field location is equally crucial (Cichoń 2010). The potential for pupils to work together freely and safely is another important consideration for any imaginative educator. According to Piotrowska and Cichoń (2016a), field stations that are adequately prepared should be given extra care. At the stage of analyzing and drawing cause-and-effect conclusions from quantitative and qualitative data gathered in the field, field stations allow for the implementation of a systemic and holistic approach to the geographical environment through the use of experiments, observations, and measurements (Piotrowska, Cichoń 2016a). According to Chichoń (2015b), employing mobile apps during field lessons is also beneficial.

Geographical educational pathways in group projects

A long-standing concern in the field of geography education and a focus of study at the DGDEE is regional education, with the goal of encouraging students to actively observe and comprehend the processes and phenomena taking place in their immediate residential area. According to Ciszewska (1990), Szleper (2002), Cichoń (2004), López de Haro, Segura Serrano (2013), and Abramowicz (2018b), educational trails are highly beneficial when used in field classes. Their main goal is to instill in young people a respect for the natural environment, expand their knowledge, skills, and value system. Also, educational trails in geography classes let students apply what they've learned in the classroom to real-world situations by bringing together concepts from other disciplines .

phenomena that take place in the natural world (Kozak 2013). According to Angiel (2016), educational trails allow for the integration of diverse methods that center on variances in participants' perception and emotional response to their surroundings. These approaches may be complex, problematic, analytical, synthetic, subjective, and geographical-humanistic.
No universally accepted definition of "geographic trail" has emerged as a result of the complexities

inherent in the concept. According to several sources (Ciszewska 1990, de la Vega 2004, Angiel 2006, Cichoń 2008, 2009, Piotrowska, Cichoń 2012, Piotrowska, Cichoń 2016b), it is crucial that they consistently revolve around intriguing artifacts, ecosystems, or compelling vistas that include both cultural and natural components. According to Angel (2006) and Sławiński (2006), they are typically 2 to 6 kilometers long and are marked out in open areas.
There are typically two types when considering their shape. Krzywańska (1999) states that educational trails might resemble a field trip when students follow the teacher's instructions to solve a particular problem. According to Adamczewska (2008), there is a lot of reusability in student-made products and appropriate methodological instructions. Kądziołka (1997) states that an educational trail is a predetermined path with designated stops that have information boards whose material is carefully chosen for instructional purposes. An intriguing effort at a geographical definition of the educational trail was put forth by De la Vega (2004). According to de la Vega, the educational trail serves as a motivating tool for students to gain knowledge (it presents and solidifies the teaching contents) and influences their attitudes and behaviors toward the landscape (it generates their attitudes and behaviors).
It is a recent development that many citizen groups, such as students, instructors, neighbors, and representatives of local authorities, are working together to create educational trails (López Fernández et al. 2017, Abramowicz 2018a). One school in Córdoba, Spain, was involved in these endeavors; the courses were small and met in both the classroom and the field; and the students' primary goal was to plan a citywide geographical education trail. Students and faculty from the school (López) were the primary participants in the design process.

“The Fernández Group” (2017). An analogous instance occurred in Poznań during 2015-2017, when a project was launched under the DGDEE with the objective of establishing a geographical educational trail involving primary school students, teachers, and community representatives (Abramowicz 2018a, b). With the installation of information boards, the project was finished in 2017. The primary purpose of the project was to design the content of the boards and their deployment in the field. All of the things mentioned above are instances of public involvement, particularly in the form of co-creation (or co-production) of educational services (Porter 2013, ORE 2014, Abramowicz 2018b). It should be mentioned that educational pathways are seen by local people as the most desirable way to expand green spaces in the city, according to Stępniewska and Abramowicz (2016).
It is worthwhile to use the assumptions of social involvement in school geographical education as well, even if they are increasingly employed in the development of geographical space (Jankowski et al. 2018, Wójcicki 2018). Consequently, including school communities in the design and creation of geographical trails may have a multiplicative effect: students' knowledge and skills may increase, but they may also develop an attitude of responsibility for the local space, exhibit entrepreneurial behaviors, and be stimulated to become more involved in local matters through the encouragement of creativity.
Technologies related to geoinformation, geographic information systems, and information and communication technol Operational skills and other competences are impacted by the rapid development of technology, as well as the unfettered access of society to digital devices and vast information resources, as well as the possibility of using and creating new ones (Tapscott 2009, Piotrowska 2011a). Zwoliński (2009a, b) claims that new ways of seeing the world and performing multidimensional analyses have been made possible by the rise of digital technologies and Geographic Information technologies (GIS). It is crucial to adequately prepare the youth for such a circumstance. This getting ready is the job of the educational system, which has to keep an eye on how society is changing and adjust accordingly. Hence, sometimes time for a change, since today's youth are more receptive to new technology than their predecessors were, and as members of the digital generation, they are defined by their advanced technical abilities (Piotrowska 2011b, c, Piotrowska 2018b). To that end, it is anticipated that they will get an education and training in a range of critical competencies that will equip them to contribute to the future of society in an effective and efficient manner. Students of the future, who will need to be able to understand and describe the processes occurring in the natural world, will benefit from a geography education that incorporates information technology (Piotrowska 2018b). According to Zwoliński (2010), a geoscientist who makes use of geoinformation acquires, processes, transmits, analyzes, and interprets data related to physical locations. At the elementary school level, students may learn these abilities, and as they get more independence to utilize digital devices as they choose, they can expand their geographical knowledge. So, to provide education that is suitable for the technical and social advancements of the 21st century, it is necessary to include geographic information systems (GIS) and concerns linked to GIS into the basic geography curriculum at the school level. By incorporating digital competences into geographical education, opportunities to form and strengthen these skills become apparent via the use

of digital technology. As a result, computational thinking in problem-solving is advanced. Simultaneously, a chance for geographical education in a digital setting arises; this, of course, shouldn't supplant hands-on experience in the field. Learning about faraway places is now a breeze with the help of geo-information technology. However, when it comes to the attractiveness of teaching geography, the capacity to generate 3D representations enhances the visual approach, efficacy, and efficiency. According to Piotrowska (2018) and Szkurłat and Piotrowska (2018), using digital technology into geography classes might enhance the subject's educational potential and boost students' perception of its practical use in real life. Certainly, modern geography educators do not find the use of multimedia or other forms of information and communication technology to be a difficult task. According to Piotrowska and Cichoń, one essential and often used method in geography teaching is the incorporation of film or animation.

2015 (b). An successful education may not be guaranteed by a skilled teacher using conventional techniques plus ICT, as stated by Cichoń (2015). The core curriculum makes it very obvious that GIS is necessary for teaching students of the so-called Z generation, who need instructors who can effectively use widely accessible, current, and intuitive technology, software, and the Internet. Technology should be a part of kids' education and growth as it is always with us and has shown to be valuable. More realistic teaching is the goal here, not a total upheaval. Nevertheless, as stated by Głowacz (2015), the mindset of geography instructors must be transformed in order for any program solutions to provide positive results. Instead of trying to compel teachers to utilize complicated technologies, Polak (2014) argues that they should be encouraged to use basic tools, learn from students, and spend time preparing digital resources.

The application of essential skills to upcoming projects

According to Cichoń and Piotrowska (2017), graduates of geography programs tend to have a better reputation in the job market compared to graduates of other majors. This is because the broad nature of geography education fosters not only the ability to think logically, but also flexibility, adaptation, and understanding of how our natural and socioeconomic environments are changing. A graduate's view of the economy is global and international in scope. Regardless of their area of expertise, all professional geographers have a knack for spatial reasoning and mastery of field methodologies. Geography graduates have a leg up in the job market because to their education in environmental science, sustainable development, and geographic information systems (GIS). Additionally, Cichoń and Piotrowska (2017) highlight the outcomes that students achieve when studying regular academic subjects and inside the Educational Module. Students aiming to become teachers have a superior degree of competency. It has been determined via interviews and observations with both students and employers that students who complete the Educational Module have a better chance of finding work after graduation. They are in charge of projects more frequently than graduates who did not get any kind of didactic training.

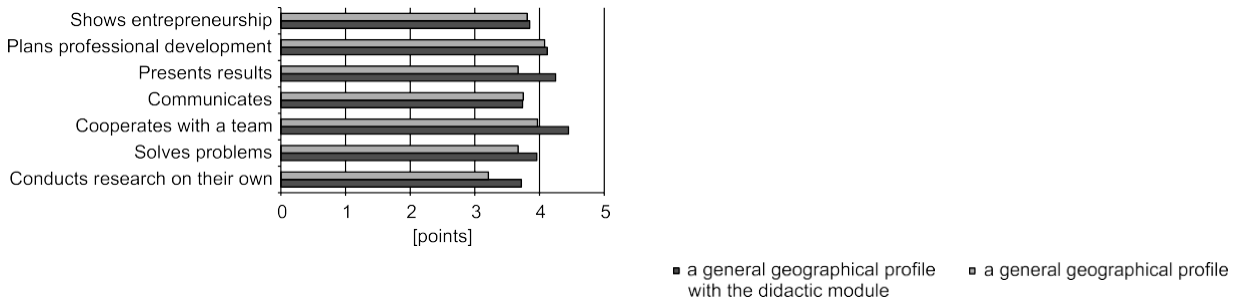

Fig. 2. Assessment of the level of didactic competencies of students of the last year of master's studies of a study conducted by Cichoń and Piotrowska (2018).

and small teams, as confirmed by earlier studies conducted by Piróg, Piróg (2007) and Gierańczyk and Duży (2012). Cichoń and Piotrowska (2012) conducted a study among students of the Faculty of Geographical and Geological Sciences of the Adam Mickiewicz University and found that the combination of the project method, geographical essay and review is an effective strategy for devel- oping key competences.

Competences developed through methods of self-acquisition of knowledge should be comple- mented by methods of knowledge assimilation and valuation. Combining different teaching methods increases the probability of developing different competences at a higher level (Fig. 2).

Conclusion

The Adam Mickiewicz University in Poznań's Department of Geography Didactics and Ecological Education has conducted several research, which contribute to their scientific accomplishments. The roots of the Poznań center's research interests in physical geography, socioeconomic geography, and geography didactics are evident. Educators from different universities in Poland work together in the subject of geography didactics, with the DGDEE hosting yearly conferences and contributing to the Polish Geographical Society's Geographical Education Commission's efforts.
The DGDEE has maintained its research program for the last two decades, with a focus on education methods, regional education, and field courses. The team addresses topics related to geographical education-al trails, project technique, IBSE strategy, and public engagement by drawing on their own scientific research. Additionally, they have problems that are regarded as important in literature around the globe. Neurodidactics, eye-tracking, geographic information systems, and content-language integrated learning are all examples of such topics. The professionals at the DGDEE are able to better prepare students for careers as geography teachers because to the research they do there. Students also improve their employability by acquiring marketable skills. Students have numerous opportunities to put their geographical knowledge and skills to use through the many projects and initiatives in which the Department's staff is involved. These collaborations include, but are not limited to, the Ministry of Education, the Board of Education, publishers, and associations. Educational institutions, local government entities, and the community are all immediately impacted by scientific research and educational activities, which include not only the academic environment but also them. Since its inception, the DGDEE has been actively involved in several public scientific events, where it promotes and disseminates the findings from its more than 300 published articles. On the other side, we may keep our own ideas and pedagogical experiments alive while representing the community of geography educators at international conferences and introducing innovative methods of instruction on a continuous basis. Concurrently, the role of Poznań didactics in shaping geography education in Poland should be acknowledged. Although some of the study topics mentioned in the introduction are well-established in Poznań, others are still in the early stages of development.

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