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THE INSPIRE PROJECT: TEACHER EDUCATION IN THE TIMES OF REVOLUTION 4.0

ABSTRACT: This article outlines the implementation of the INSPIRE project by the University of West Bohemia in Pilsen, with some activities conducted in Poland. The project leverages Fred Korthagen's conception of teacher education to introduce innovative higher education methods. It targeted 20 pedagogy students and 6 active teachers from regional partner institutions and was carried out between 1 July 2020 and 31 December 2022 in Czechia and Poland and in three stages. In the first stage, educational needs were examined and the syllabuses of the subjects taught were modified to address the challenges of the contemporary world so that students could acquire relevant new skills. In the second stage, the participants gained international educational experience. In the final stage of the project, the participants evaluated the activities and exchanged their own observations. The participants' reflections on their experiences from the project activities are presented here as a way of disseminating the new approach to education.

The results of the project are presented qualitatively as the methodological approach followed in the project was that of the action research paradigm. The project contributes a fresh and realistic perspective to the debate on the contemporary university and on what will help to achieve learning outcomes in line with the requirements of the Revolution 4.0. It also shows how to introduce the social competencies required for the education of the future at universities.

KEYWORDS: innovation in higher education, Korthagen's concept of realistic education, teacher skills, teacher education.

Introduction

The INSPIRE[6] project – its name being an acronym that stands for Internationalization, Collaboration, Innovation, Reflection, and Evaluation – was initiated by the Faculty of Pedagogy and Education at the University of West Bohemia (FPE ZČU) in Pilsen. Funded by the university, this two-year endeavour (2020-2022) aimed at enhancing

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the quality of future teachers' education through a detailed exploration of its philosophy, objectives and impact. By integrating modern educational models, the project responded to the OECD's future skills requirements.

The article presents models of education functioning in higher education. It also discusses the INSPIRE project in detail, exploring its philosophy, objectives, structure, and content, as well as its strengths and limitations. Finally, the impact of INSPIRE on the academic community and its potential contribution to the development of higher education in Czechia and other countries are discussed.

Background

The OECD report "The future of education and skills Education 2030" (OECD, 2017) lists the following six skills that can help to face the challenges of the future: interdisciplinary skills, creative and analytical skills, digital and technical skills, entrepreneurial skills, leadership skills, global and civic awareness. Contemporary education needs to answer the question whether it develops these skills in students and whether it knows how to do it. The next group of requirements for contemporary universities is hidden in the consequences of Industry 4.0, especially the reduction of human labour. They are likewise related to demographic factors, migration and the change in people's way of life (Chmielecka, 2019: 13).

At this point, it is worth explaining what Industry 4.0 is. In the literature, we can find the operationalization of the concept by Wojciech Paprocki (2018), who points out that Industry 4.0 is associated with the technical integration of Cyber-Physical Systems (CPS) in production and logistics processes and with the use of the Internet of Things (IoT) and the Internet of services in industrial processes, including the resulting consequences for the development of value chains, changes in business models, as well as service provision processes and work organization. In other words, in the Fourth Industrial Revolution feedback and a circular process of using automation, data processing and exchange, as well as the exchange of manufacturing techniques are characteristic of industry, which causes significant changes in the functioning of societies in terms of work, data collection, the organization of life, and communication.

Consequently, it is expected that the values and importance of education and work will change (Szulczewski, 2018: 31-32). According to the World Economic Forum (WEF, 2016), the development of technologies such as large-scale power systems, blockchain technology, digital twins, three-dimensional printing, optical genetics, metabolic engineering, two-dimensional materials, nanosensors and the Internet of nano things, or organs-on-chips define Industry 4.0. Interestingly, this list of technological novelties is accompanied by the anticipation that each employee, if he/she wants to continue

working, will change jobs many times during their lives. As Ewa Chmielecka (2019: 19) states, citing the United States Bureau of Labor Statistics, in 2018 approximately 30 million Americans were doing jobs that did not exist in 2017.

A good example of changes connected with the opportunities provided by the Fourth Industrial Revolution are those that became apparent during the COVID-19 pandemic crisis, when all education, including higher education, was run online for over a year. This specific effect of acceleration was achieved owing to technological possibilities, but also because of the need to isolate and detach education from the specific physical place, the teacher from the student and from the university. Pandemic education was a test for technology and it changed the way people learned and interacted. Pandemic education crossed the boundaries within which it had been closed before. Thus, the dividing lines between formal and informal education, between local and global education became blurred. Universities and other educational institutions continued to be access points to knowledge, but these access points were taken out of the bricks-and-mortar university buildings and placed on the Internet instead. Apart from locally available resources, everyone could also use global ones. Numerous courses taught by the best professionals in the world became widely available. Teaching also turned out to be the only way to solve difficult issues, including a thorough rethinking of the quality of human life. Our students and lecturers got closer to the education of the future than ever before. What are then the characteristics of the education of the future? According to the European University Association, there are nine principles for modern universities:

1. The higher education learning experience enables the learners to become active and responsible citizens, critical thinkers, problem solvers, equipped for lifelong learning;
2. Learning and teaching is learner-centred;
3. Commitment to learning and teaching is integral to the purpose, mission and strategy of the university;
4. Institutional leadership actively promotes and enables the advancement of learning and teaching;
5. Learning and teaching is a collaborative and collegial process involving collaboration across the university and with the wider community;
6. Learning, teaching and research are interconnected and mutually enriching;
7. Teaching is core to academic practice and is respected as scholarly and professional;
8. The university community actively explores and cherishes a variety of approaches to learning and teaching that respect a diversity of learners, stakeholders, and disciplines;
9. Sustainable resources and structures are required to support and enable learning and teaching enhancement (OECD, 2017).

It can be noticed that in general the principles correspond to attitudes which, together with knowledge and skills, constitute the three basic elements of academic education. According to Chmielecka, meta-competencies are built on knowledge and skills because they are supplemented with an axiological component (values, motivations) (Chmielecka, 2019: 23-24).

Acting on this assumption, creators of higher education systems and solutions should take into consideration the requirements and expectations towards academic education. The idea of creating better conditions for educating future teachers in line with the requirements of Revolution 4.0 was put forward and implemented at FPE ZČU in Pilsen in 2020. The INSPIRE project was focused on interdisciplinary skills, creative and analytical skills as well as global and civic awareness. These skills will be extremely important in managing the challenges posed by Industry 4.0 as cultural awareness, creativity and communication skills will be particularly needed in the world of hybrid education.

In the following, this paper describes the implementation of the project based on the new ideas of education inextricably linked to Industry 4.0 developments. The evaluation and results are presented in line with a qualitative methodology connected with the action research paradigm. (Farnicka, 2019)

The INSPIRE project: aims, objectives, content

In July 2020, the Faculty of Pedagogy and Education (FPE) at the University of West Bohemia in Pilsen (ZČU) started a three-year scheme called INSPIRE – Internacionalizace, spolupráce, inovace, reflexe a evaluace v přípravě budoucích učitelů (INSPIRE – Internationalization, Collaboration, Innovation, Reflection and Evaluation in the preparation of future teachers), focused on the improvement of the quality of future teachers' education.

The aims of the project were to:

- achieve a conceptual transformation of the preparatory education of future teachers at the Faculty of Education at the University of West Bohemia;
- introduce evaluation and self-evaluation strategies into selected courses of all programmes taught at the faculty;
- enhance the sharing and cooperation among academic staff members, students and teachers from partner schools in the region;
- provide an international perspective through the conjoint didactic internships in selected European countries.

Philosophy, content, learning outcomes and assessment of the project

"The quality of teaching is the sum of all the diverse characteristics that an observer can attribute to teaching and which condition its success and value. Teaching is only successful and valuable if it is beneficial to the learners" (Slavík et al., 2020: 90).

In relation to the quality of teaching, emphasis is placed on psychodidactic understanding of teaching situations, on linking practice with theory, on practical experiences which lay the foundations for the learning process and reflection on educational situations. The teacher (future teacher) should develop the ability to critically examine his/her own actions, analyse them, interpret them, evaluate them in relation to the intended goals, consider their consequences, as well as theoretically reflect on practical experience, *i.e.* put it in the context of theory, explain it, argue it. According to Fred Korthagen, a renowned expert in contemporary teaching theory and practice, the teacher is to be a reflective professional who, supported by professional knowledge, creatively thinks and comprehends the elements that influence the effectiveness of his or her teaching. The teacher should also perceive the ability to reflect and self-reflect as a crucial one (Kosiková, 2022). Korthagen expresses his idea thus: "Reflection is a mental process that seeks to structure or restructure an experience, problem, or existing knowledge or insight. This reflection can occur after an act or during an act" (Korthagen, 2011: 80).

Korthagen's concept of the development of the teacher's knowledge could be described as based on three levels: gestalt formation, schematization, and theory building. "In forming gestalts, the focus is (often unconsciously) on how to act in certain situations; in schematizing, the person consciously tries to interpret the gestalts; and in theory building, the aim is to apply logical order on conceptions" (Korthagen, 2011, in Slavík et al., 2012: 368). As one progresses between levels, first there is an increase in the amount of information gained within a particular mode of understanding, then at some stage in this development there is a restructuring of knowledge and a move to a higher level of understanding.

The author of this realistic model, Korthagen, offers a concept of teacher education that differs in many ways from the traditional approaches to education. In the process of educating future teachers, linking theoretical knowledge with practical skills should be prioritized so that no gap exists between theory and practice. Furthermore, some experts (Chmielecka, 2019; OECD, 2017) emphasize the requirement for the teacher to be a reflective professional who Can assess, evaluate, and seek effective ways of dealing with educational challenges.

The traditional model of teacher education expects pedagogy students to learn how to apply in practice the theory of quality teaching which they have learned in their

teacher preparation. Meanwhile, the opposite model leads from practice to theory. And the INSPIRE project is aligned with the concept of preparation for the teaching profession by drawing on practical first-hand experience, which should indeed inspire all the individuals concerned. Precisely that attitude is reflected in the project name – INSPIRE. According to the authors of the realist model, first comes the practical experience, then one focuses on building one's own conceptual schemes. This model assumes that teachers apply scientific, pedagogical, psychological and other theories acquired through formal teacher education to their daily practice in schools. Three principles of the new didactics of teacher education are emphasized:

1. The educator should help the student teacher to become aware of their learning needs;
2. The educator should help the student teacher to find useful experiences;
3. The educator should help the student teacher to reflect on these experiences in detail.

Korthagen's approach builds on constructivist theories of education, which accentuate the role of the student's own professional experience. Further emphasis is placed on basing one's professional knowledge on one's own experimentation with the known reality rather than passing on "ready-made" knowledge (Korthagen, 2011: 188, in Slavík et al., 2012: 382).

INSPIRE – project implementation

The project was carried out from 1 July 2020 to 31 December 2022 in three stages.

1) Stage one: Being aware of teaching needs. Each department of the Faculty of Education (currently 18 departments in total) successively innovated 4 courses of its own choice and incorporated activities into the course syllabuses which will allow students to acquire competences in the following areas:

- evaluation of the future teacher's own work;
- reflection on the learning and teaching process;
- evaluation of the pupils'/student's learning outcomes;
- providing feedback to the pupil/student;
- methods of pupil assessment;
- evaluation of the school's own performance – preschools/primary schools/secondary schools;
- pursuing the school's own vision – preschools/primary schools/secondary schools;
- school climate assessment – preschools/primary schools/secondary schools.

In addition to the modification of the syllabuses, various study materials (in electronic form via LMS Moodle WBU), teaching aids and evaluation tools were developed.

The electronic study materials included texts, images and other multimedia and interactive elements. In addition to the electronic study aids, teaching aids (*e.g.*, evaluation cards, diagrams, *etc.*) and evaluation tools (questionnaires, lists of criteria for evaluation and self-evaluation, creative graphic materials for evaluation and self-evaluation, *etc.*) were devised.

2) Stage two: Internship. The international mobility aspect of the INSPIRE project focuses on professional development of the University of West Bohemia pedagogy students, their university teachers and practitioners from cooperating nursery/primary/secondary schools. This stage was connected with seeking and finding useful experience. The participants of the international internship were given the possibility to visit a selected foreign local school, school facility or university for several days and get inspired by examples of good practices in working with heterogeneous groups of children, pupils and students in other countries.

The schedule of each arranged didactic internship consisted of 36 hours of activities for all 32 participants (20 students, 6 members of academic staff, and 6 practitioners from the University of West Bohemia partner institutions):

The Department of Psychology and the Section of Health Education did their internship in Zielona Góra, Poland in cooperation with the Institute of Psychology of Zielona Góra University. In addition to offering opportunities for discussion with local academic staff, the programme also:

- gave the Czech students a chance to prepare and conduct a seminar on socio-psychological training methods, which they did under expert supervision of the FPE University of West Bohemia teachers and teachers from the university partner schools participating in the programme. The class was conducted in English and the visiting students utilised their knowledge of the cooperative learning approach;
- included a visit to a nursery school and a primary school in Zielona Góra. The Czech students and teachers were provided an opportunity to talk to school administrators and join and observe the ongoing lessons;
- included a visit to the Centre for the Inclusion of the Mentally Disabled into Ordinary Life, the Day Care Centre for Children with Autism Spectrum Disorders and to the Pedagogical-Psychological Counselling Centre.

At the final meeting with the main Polish organizers of the internship, the individual activities and the course of the whole internship were discussed. What is important, all the participants of the project stayed in the same hotel in double or triple rooms. Every day they met in the hotel conference room to discuss their impressions, exchange comments and reflect. They also asked questions that they wanted to find answers to after returning to their universities or work. Interestingly, during the internship, they gave up communicating in English. Instead, during joint activities they communicated

in their native languages, *i.e.*, Polish and Czech, with the help of the Polish-Czech interpreters. English was used only in official contacts.

3) Stage three: Reflection and evaluation by the participants. Evaluation by the participants was the stage of theory making. The final stage of the project was a post-project meeting, during which the students answered the questions posed during the internship on the basis of theory and government data. They also presented their reflections and conclusions based on the Korthagen theory, their experience gathered in Poland, and their own experience from practice elsewhere.

Outcomes of the project and feedback from the participants

The comments and feedback received from the participants were analysed and suggestions from the participants were collected. In their conclusions, the students emphasized the importance of exchange at various levels, *i.e.* between practitioners and students and between practitioners and academic staff. In their final reflections, they pointed to the observed intercultural differences and diverse solutions to similar problems. They analysed the consequences of different solutions that are in place in Poland and Czechia, for example, with regard to compulsory school attendance in both countries.

In Poland, schooling is compulsory until the age of 18 and Polish teachers complained about the mental laziness, reluctance, and lack of aspirations of students who are uninterested in their education. By contrast, in Czechia education is compulsory only until the age of 16. This means that students who do not want to attend school do not do so. As a result, there are more students who are committed and ambitious, especially in secondary schools. Czech teachers, however, pointed out that there is a high number of students who drop out of the education system, which is not a positive developmental phenomenon. In addition, it may pose a threat to the further individual development of these students. Such experiences of comparing various practices and their implications are undoubtedly useful for developing lifelong learning (LLL) skills, which are crucial for the education of the future.

And how did the students and teachers comment on the internship? (The answers were chosen by the competent judge N = 3 as different from others and showing different aspects of the evaluation). In general, the participants expressed views about the extent to which the project had influenced them. They explained how they had discovered new learning opportunities and experiences. The topics that emerged from the evaluation forms fell into three broad categories: internationalisation, methods, development of competencies.

1. The international

"I greatly benefited from the internship. Thanks to it I can now compare our way of teaching with that from another European country. In my opinion, the single most valuable opportunity for every teacher is to be able to observe how a lesson is taught by a colleague from a parallel class, a colleague from another subject commission, a colleague with a different class team, a colleague from another school and, what is even more interesting, colleagues from another country, from Poland in this case." (Participant – Student 1)

"I am a student at the Faculty of Education, at the beginning of my pedagogical career. I wouldn't want to miss the opportunity to go to a Polish school. A peek under the lid of the educational reality in other countries would be quite beneficial. To get to know the school curriculum, school rules, rules for pupil assessment, internal regulations, the keeping of class books, the approach to implementing further education for educational staff and much more." (Participant – Student 7)

"Developing contacts not only in academia, but also among teachers and students – networking on an international level." (Participant – Student 10)

"In the future, it will bring the possibility of creating a database of potential partners for short-term internships such as this one, and the reduction of administrative burdens." (Participant – University staff 6)

2. Differences between pupils result from differences in methods

"I had the opportunity to compare pupils in terms of their activity in class, work in a team, the use of chosen teaching methods, forms given by teachers, the decoration of classrooms, corridors, school regime, teaching materials, textbooks and much more." (Participant 5)

3. Improvement and development of professional competencies

"Every day spent on this foreign internship was a professional advancement." (Participant – Teacher 3)

"A great opportunity to help students to find more courage to do a longer internship abroad, e.g., under an Erasmus project." (Participant – University staff 1)

"It connects students, academics and practitioners for mutual enrichment, transfer of experience and knowledge." (Participant – Teacher 2)

Implemented in several stages, the project focused initially on identifying and addressing teaching needs through curriculum innovation. Subsequent phases included international internships offering participants first-hand educational experiences abroad, culminating in reflective evaluations aligned with Korthagen's theory. Feedback from the participants highlighted the value of cross-cultural exchanges and the development of lifelong learning skills, underscoring the project's impact on professional competencies and educational methods. Thanks to this project, in 2022, the University

of West Bohemia in Pilsen planned to introduce new evaluation methods and increase mobility among students.

Limitations of the INSPIRE project

The project facilitated the development of important and interesting educational processes. However, it also had a number of limitations and encountered quite a few obstacles. Something that has not been settled yet is the post-project student work. Since the project ended relatively recently, it is obviously still difficult to assess the effects of its implementation in the long term.

Another limitation was the quantity and quality of the data collected to support the effectiveness of the project. The participants' statements were very useful tools in relation to the resources available for this project. However, much stronger arguments regarding effectiveness could be made, for example, through the use of instruments such as semi-structured individual interviews developed in the Advisory Department specifically to assess the experience of the participants.

Summary of the implementation

The INSPIRE project is an example that proves the synergistic effect of theoretical assumptions and intercultural exchange. During the exchange, the participants were left free; thus they learned and experienced the Polish reality in complete autonomy. The only collective moments, apart from shared experiences, were meetings to comment on the day's events prepared by mentors (academic staff). It was also a time to ask questions and express doubts.

The outcomes of the project are listed below:

- seeing the education system as an inspiration for reflection and improvements;
- new syllabuses and new courses developed;
- recognition of differences and similarities in the functioning of the home and foreign systems;
- recognition of differences and similarities in the functioning of social life (shops, access to infrastructure, railways, *etc.*);
- observation of reactions to otherness in controlled situations – in educational and social institutions, and in uncontrolled situations – on the street, in the shop, in personal interactions;
- checking the credibility of the declarative educational values of a given place from the perspective of another place;
- reflections on the new phenomena observed and experienced;

– learning intercultural skills, especially dealing with uncertainty, checking and experiencing unfamiliar behaviours;
– going beyond stereotypes, creativity, communication skills, observation, listening and analysis skills.

Lifelong learning is becoming the basic educational guideline in our times and it cannot be achieved only through formal education. Therefore, there is a growing need for universities to create opportunities to validate learning outcomes obtained in this way, and to open up to the possibility of integrating various forms of learning.

"Occupational Preparation" seems to be tricky even in relation to well-established jobs of social importance such as the professions of doctor, teacher or lawyer, when new professions and new branches of industry are likely to appear in the future. One solution is to shape the competencies of the future. This requires different approaches, which are built on different assumptions, different teaching methods and a different teaching culture. In this model of fostering future-proof competencies, in addition to the specific knowledge and skills required in a certain field, soft competencies are developed as a kind of accompanying effect regardless of the discipline. They include the ability to work in a group and communicate effectively, also in foreign languages, peer learning, creative problem-solving skills *etc*.

While the INSPIRE project facilitated valuable educational advancements, it faced limitations in long-term impact assessment and data collection. Nonetheless, it exemplified the effective integration of theoretical principles with practical experiences, promoting intercultural skills and reflective teaching practices. Projects like INSPIRE could play a crucial role in preparing future educators to meet the challenges and opportunities of the Fourth Industrial Revolution. Interdisciplinary skills, creative and analytical skills, as well as cultural and civic awareness are worth emphasizing (Serrat, 2011).

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