SILESIAN UNIVERSITY OF TECHNOLOGY PUBLISHING HOUSE

SCIENTIFIC PAPERS OF SILESIAN UNIVERSITY OF TECHNOLOGY ORGANIZATION AND MANAGEMENT SERIES NO. 217

2025

THE EDUCATION OF ENGINEERS, ENTREPRENEURS, CONSTRUCTION MANAGERS AND ENVIRONMENTAL ENGINEERS AT THE UNIVERSITY OF BIELSKO-BIALA – SURVEY RESEARCH

Józef MYRCZEK^{1*}, Piotr TWOREK²

¹ University of Bielsko-Biala; jmyrczek@gmail.com, ORCID: 0000-0002-9351-1410 ² University of Economics in Katowice; piotr.tworek@ue.katowice.pl, ORCID: 0000-0002-2871-2902 * Correspondence author

Purpose: The paper aims to outline the findings from a questionnaire survey conducted among students of Construction and Environmental Engineering programmes at the University of Bielsko-Biała. In particular, the paper discusses the application of teaching methods in the education of engineers, entrepreneurs, construction managers and environmental engineers. Its purpose is also to highlight the advantages and the drawbacks of the selected teaching methods; its aim is to present the selected methodical aspects of the discussed issues.

Design/methodology/approach: Due to the nature of the publication, it mainly focuses on the results of the survey carried out among students of Construction and Environmental Engineering programmes at the University of Bielsko-Biała, i.e. engineers, entrepreneurs, construction managers and environmental engineers. The research covered students of undergraduate and graduate programmes who, in most cases, had already been in employment and acquired hands-on experience in their fields. The survey used questionnaires as the basic research technique. The questionnaires followed up a review of scholarly literature. The paper uses the fundamentals of deduction and synthesis. At the same time, in the publication the authors drew on their own knowledge and experience gained when educating attendees of technical and business programmes.

Findings: The paper constitutes an empirical verification of the knowledge presented in the scholarly literature. It addresses the selected methodical aspects of the discussed issues.

Research limitations/implications: The presented research concerned the selected teaching methods. It covered a relatively small group of students. The vast majority of the respondents had already been working in organisations, i.e. these were mostly students attending extramural programmes.

Practical implications: The findings of the empirical research, referred to in the publication, may serve as a starting point for any efforts aiming to improve the range of methods used when educating students attending technical programmes but also managerial and business ones. Arguably, the knowledge conveyed to engineers and engineer-entrepreneurs i.e. individuals who are often at the helm of organisations, must be based on practical aspects.

Originality/value: The paper is an attempt to cast light onto the process of educating future engineers as well as managers in charge of organisations (construction, environmental engineering) by a technical university. The research findings should help us to improve the teaching methods used in these areas. This is particularly important as the main issues discussed

in the paper are presented predominantly from students' perspectives. The paper also addresses the advantages and the drawbacks of the teaching methods used at the time when e-learning was the main formula i.e. during the Covid-19 pandemic and the post-pandemic period. **Keywords:** construction, environmental engineering, teaching methods, technical university, management

Category of the paper: research paper.

1. Introduction

Undoubtedly, the education of engineers, as well as future managers of organisations, poses a big challenge. This applies to basically all universities with a variety of educational profiles. In technical universities, in particular, the utilitarian aspect of knowledge is gaining importance. By definition, technical programmes are highly practical fields of study. Therefore, academic teachers face many challenges which, on the one hand, stem from the continuous development of knowledge in the field of education and, on the other hand, result from the emergence of new situations in the organisation's environment (technical universities); an example of such a situation is the Covid-19 pandemic (Tworek, 2023). The Covid-19 pandemic has affected the traditional methodology previously applied by academic teachers not only in Poland, but all around the world (Tworek, 2023). Classes conducted remotely (Garrison, and Vaughan, 2008; Mokwa-Tarnowska, 2015; Picciano, 2017; Pokrzycka, 2019) are a common practice now, and this derives directly from the times of the Covid-19 pandemic (Szczygieł, 2021; Jarosz, et. al., 2021; Garwol, 2022; Wiatr, 2022; Czajka, 2023; Tworek, 2023). It is worth noting here that phenomena such as the Covid-19 pandemic are referred to in the scientific literature as black swans (Kotnis, 2014; Taleb, 2021; Kisielnicki, 2021; Myrczek, et. al., 2021; Myrczek, and Tworek, 2022).

The aim of the publication is to present the issues related to the education of engineers, entrepreneurs, managers of the construction industry and environmental engineers, based on the example of the University of Bielsko-Biała. In particular, the publication draws on the results of the surveys conducted among the students of two fields of study, i.e. construction and environmental engineering. The paper focuses on the case study as a method used when implementing teaching processes. It is one of the methods included in the methodology exploited not only in teaching, but also in the field of scientific research.

The survey was conducted in May 2022, i.e. at the time when not only Polish but also foreign universities adopted a hybrid formula for the delivery of classes. The research was carried out among full-time and part-time (extramural) students attending undergraduate and graduate programmes in Civil and Environmental Engineering at the Faculty of Materials, Civil and Environmental Engineering of the University of Bielsko-Biała. These are technical fields of study. The research covered mainly part-time students, and the proportion of full-time students was negligible. The respondents in the survey were mainly people who had obtained their university degrees before and who, in the vast majority, had already been employed. The research was carried out in a direct way. The research tool was a survey questionnaire. The survey involved 54 respondents who answered 11 questions, supplemented by open-ended answers. Therefore, the research maybe seen as a pilot study.

In the paper, the authors drew on their own knowledge and experience gained during many years of work with students both at the University of Bielsko-Biała and the University of Economics in Katowice. This applies, in particular, to studies with a practical profile. The paper is mainly empirical in its nature, but it should be emphasized here that it is based on a review of scholarly literature. In general, the literature does not contain any studiessimilar to the research outlined in the paper. In particular, this applies to the research conducted among students of technical universities. This, in a way, may be seen as implying that the paper is original in its content.

2. Methods

The Covid-19 pandemic has contributed not only to some revolutionary organisational changes embraced by universities, but it has also affected the way of thinking about work in general (Tworek, 2023). These issues are related, inparticular, to the performance of remote work in management in general (Wolniak, 2022). As stated in the introduction, management can be viewed here more broadly i.e. in the context of educating engineer-entrepreneurs and managers in charge of organisations (in the area of both civil and environmental engineering). With this in mind, it is important to emphasize the role that teaching plays in the life of every student. Regardless of this, however, it should be remembered that the basis for successful and effective education of students is the ability to apply appropriate teaching methods (Kember, 2009). Such a conclusion results from the review of scientific literature, in which, from a theoretical point of view, teaching methods can be broadly divided into expository methods, problem-based methods and practical methods (Turos, 1999; Nalaskowski, 2000; Kawecki, 2000; Kupisiewicz, 2000; Bereźnicki, 2001; Półturzycki, 2002; Pilch, 2003; Perch, 2003; Zawadowska, 2004; Richardson, 2005; Okoń, 2007; Ziółkowski, 2015; Bereźnicki, 2015). As regards the specific implementation of teaching processes at technical universities, a set of practical methods is of particular importance, due to the very nature of such programmes of study. It should be noted that these methods indicate the education of students through practical activities (Nalaskowski, 2000; Michalski, 2001; Bereźnicki, 2001; Półturzycki, 2002; Pilch, 2003; Zawadowska, 2004; Richardson, 2005; Okoń, 2007; Bereźnicki, 2015; Ziółkowski, 2015). The best example here are student internships.

From a theoretical point of view, "(...) the teaching method involves the need to meet at least three conditions, i.e. firstly, precisely define and name the activities that [a student] will have to perform in order to ensure that the objective of the classis achieved; secondly, to create conditions in which the teaching process will be carried out; thirdly, to determine the skill that [the student] should acquire as a result of the specific method" (Traszka, 2005). In general, "(...) in order to choose the appropriate teaching method, [the academic teacher] should determine: firstly, how many [students] will participate in the class; secondly; how well they have acquired the material from previous classes; thirdly, what the potential interest [of students] in the topic is; fourthly, what technical teaching aids are available for use during the class; fifthly, which activating methods to choose - in accordance with the principle of one method per class; sixthly, how [students] canpossibly prepare to the class at home; seventhly, whether it is possible to use any correlation between subjects; eighthly, whether the chosen teaching method is implementable from the organisational point of view; ninthly, whether the chosen teaching method can be applied to the topic in question; tenthly, whether any outsiders [e.g. people from construction companies and environmental engineering organisations] may participate in the class; eleventhly, how to motivate [students] to actively participate in the class; twelfthly, how to builda tool for measuring [a student's] activity during teamwork; thirteenthly, how to create a self-assessment test for [students]; fourteenthly, how to evaluate [students'] work in order to motivate them and to avoid putting them under stress" (Trzaska, 2005).

In the teaching processes carried out, for example, at business universities, the importance of the case-study method can be emphasized (Pizło, 2009; Matejun, 2011; Kożuch, March, 2014; Gaweł, Pietrzykowski, 2014; Mielcarek, 2014; Czakon, 2015). What should be clearly noted here is the fact that its importance is equally valid in technical universities. What is more, in the area of scientific research the case-study method is classified as a qualitative method (Konecki, 2000; Pizło, 2009; Creswell, 2009; Matejun, 2011; Gaweł, Pietrzykowski, 2014; Mielcarek, 2014; Kożuch, March, 2014; Czakon, 2015). Another group of methods are quantitative methods. When looking atthe case-study method through the lens of teaching, however, it is classified as a problem-based method (Trzaska, 2005; Jaques, 2008; Zelek, 2021). It is widely applicable or even versatile, i.e. it may be used in lectures, classes, laboratories, as well as for writing diploma theses and implementing projects. Its main advantages and drawbacks are presented in Table 1.

The benefit that Table 1 offers is the fact that it presents the content (case studies) considered in terms of both advantages and disadvantages, and from the perspectives of academic teachers, on the one hand, and of students, on the other hand. When looking at the features of the case-study analysis, we can see that academic teachers must have adequate knowledge of the strengths and weaknesses of this method in order to be able to use it in a skilful way in the process of educating engineers, entrepreneurs, construction managers and environmental engineers. This remark applies, in principle, to all other methods used in teaching processes at universities, with a particular focus on technical universities.

Table 1.

Advantages and drawbacks of the case-study analysis as a method used for the teaching of students

Item	Teacher	Students
Strengths	Gets to know students and their possibilities It is easy to motivate learners Evaluates solutions given by a group Evaluates involvement It does not physically burden and does not stress Work can be directly monitored It is easy to correct errors Improves methods and tools	Highly motivated to work Actively involved It enhances their creativity It improves their time management skills It allows them to get familiar with business practice It helps them to acquire practical skills It helps the group to integrate It is not stressful
Weaknesses	It is difficult to keep discipline It is time consuming to prepare It requires an updated knowledge from a number of areas	Groups and individuals work at a different pace Some individuals are not active Other groups' solutions can be copied No critical feedback Lack of discipline Noise

Source: Trzaska, 2005.

3. Results

As stated above, the case-study analysis belongs to the most commonly used methods for teaching students. In the empirical research, the respondents – when asked whether they think that academic teachers should support their lectures with numerous examples from business practice (and use the case-study analysis), as many as 94.4% of them answered yes. In addition, almost 100% of the surveyed students answered yes, when asked whether they personally find the case-study method useful (i.e. because it makes it easier for them to gain an understanding of business practice), with only 1 respondent having given a no answer. This proves that engineers, entrepreneurs, construction managers and environmental engineers appreciate the advantages of this method, some of which are listed in Table 1.

What, then, are the benefits of solving specific cases from the point of view of the respondents and what makes the case-study method most interesting? The research posed such aquestion to the respondents, who replied that – as quoted in the same order– the method helps them toconsolidate and acquire the knowledge more easily; the analysis of specific cases allows them to memorize important things faster and more effectively; it helps them to gain a better understanding of issues and to find quicker solutions; it offers them an opportunity to solve problems as a team and exchange views; it teaches them how to solve problems in a team and integrates the group; it provides them with an opportunity to share their views; it is more interesting for participants; solving specific cases allows them to draw conclusions that may be useful in the future; it may help them to avoid mistakes; it provides an opportunity to learn by example; it develops creativity and gives them 'a chance to shine'. The answers given to



the following question are also worth considering: What percentage do you think case studies should represent in relation to the strictly theoretical knowledge provided at the university? The results of the research in this area are shown in Figure 1.

Figure 1. Percentage participation of case studies in relation to the general theoretical knowledge provided to students at a university.

Source: authors' own research.

As can be seen in Figure 1, the vast majority of respondents (63% of the surveyed students) stated that the participation of case studies in relation to theoretical knowledge should depend on the type of subject being taught. There are subjects where it is not possible to use this method or there are significant limitations in its use. In the survey, 22.2% of the respondents indicated the option that this participation should exceed 50%. On the other hand, the other results obtained were: below 50% (5.6% of the respondents); it should be 50/50 (7.4% of the respondents); the subject should be based exclusively on specific practical cases (only 1.8% of the respondents). Therefore, a fundamental conclusion can be drawn here that in general, the knowledge provided to engineers, entrepreneurs, managers of the construction industry and environmental engineers should be largely based on business practice. The empirical research findings may serve as clear evidence for this.

Other interesting research results concerned e-learning, i.e. the form of course delivery which was so widespread during the Covid-19 pandemic and the post-pandemic period. In particular, when asked whether they think that some lectures can be held online only, almost 93% of the respondents answered yes; with the remaining 7% giving a negative answer and no one choosing the 'I don't know' answer. When explaining why they gave negative replies, the respondents indicated the following reasons: students not showing interest in the topics taught; the fact that it often has an adverse impact on student involvement and the fact that online knowledge is easily accessible. On the other hand, when considering the presented issues through the lens of the theoretical aspects, one can refer here to the previously mentioned division of methods, offered in the literature, into expository methods (a lecture, a discussion, working with a textbook), problembased methods (a case study, brainstorming, etc.), as well as practical ones (internships, student workshops) (Turos, 1999; Nalaskowski, 2000; Kawecki, 2000; Kupisiewicz, 2000; Bereźnicki, 2001; Półturzycki, 2002; Pilch, 2003; Perch, 2003; Zawadowska, 2004; Richardson, 2005; Okoń 2007; Ziółkowski, 2015; Bereźnicki, 2015). The results of the surveys in this area are presented in Figure 2.



Figure 2. Usefulness of expository methods, problem-based methods and practical methods in the light of the empirical research findings.

Source: authors' own research.

The research findings (Figure 2) clearly indicate that practical methods are the preferred group of teaching methods (55.6% of the respondents). When justifying their choice, the following arguments were given by the respondents, namely: practice often differs from theory; they clarify theoretical issues; practice makes perfect; smoother acquisition of knowledge; the possibility of combining theory with practice; easier to gain an understanding of one's future profession. It is also worth looking at the lowest figure, i.e. only 1.80% of the respondents chose methods in which knowledge is conveyed (expository methods). As you can see, attending lectures or working with a textbook, for example, are not perceived by engineers, entrepreneurs, construction managers and environmental engineers as interesting forms of acquiring knowled-ge.

As for how classes should be organised and conducted in the ways perceived by the respondents as the most valuable ones, i.e. in response to the question of how classes should be conducted by lecturers in order to ensure that students are provided with knowledge, skills and competences in a comprehensive and effective manner, the following answers were obtained: in a demanding way but without stifling a student's ambition; (a lecturer should) talk more with students and ignite their ambitions; encourage students to participate (actively) in classes; conduct classes with students, not for students; satisfy the curiosity of students; allow students to speak; avoid being boring; provide examples; encourage discussions; conduct classes in an easy-to-understand manner; avoid using slides only, as this is tedious; many examples from construction sites should be given; the changing tone of voice attracts listeners' attention. What is more, lectures, in addition to classes, are the basic form of tuition at universities in general.

Equally interesting results were obtained concerning obligatory student internships, with 72.2% of the respondents claiming that student internships should continue to be an obligatory requirement and 16.6% of the students surveyed holding the opposite view. The remaining respondents said that they did not know. This means that the vast majority of the respondents have a positive attitude towards student internships. These results, to some extent, correspond to the subsequent research findings. In particular, almost 91% of the students, when asked if classes organised by lecturers outside classrooms (e.g. showing a construction site to students) are a good way of supporting the teaching process, gave a yes answer. Only 9% of the surveyed ones expressed a different opinion. In the light of the results obtained, the reasons provided are also important, i.e. the answers stated that: it was possible to get acquainted with one's future job; it is worth seeing how specific work is performed and compare it with the theory; even one visit illustrates the reality of work; some students have never been to a workplace (a construction site), which would allow them to verify their interests; it shows the actual reality of the construction site; it enables the comparison between theory and practice; it will provide an opportunity for some students to see the construction site for the first time. The answers obtained are, therefore, the best evidence for the practical value of the knowledge provided to students in the surveyed faculties.

The other research findings should be viewed in a similar way. In the survey, when asked whether academic teachers should invite business practitioners to their classes or lectures more often, 87% of the respondents answered yes and only 5.5% of the respondents gave a negative answer. The remaining part of the respondents (7.5%) simply did not express any views, i.e. they did not have any opinion on the topic. The reasons provided by engineers, entrepreneurs, managers of the construction industry and environmental engineers included the following ones: it is the best system of education; it increases the attractiveness of classes; it gives the opportunity for personal analysis of the issue; it helps (students) to easier absorb knowledge; it makes the group more interested. On the other hand, when asked whether classes conducted by academic teachers possessing hands-on experience in the fields of construction and business have a positive impact on the education process, as many as 98% of them answered yes, only 2% said no (none of the respondents stated that they had no opinion on this topic). The obtained results reconfirm the applicability of the knowledge taught in an organisation such as a technical university.

4. Conclusion

The discussions contained in this publication can be summarized by stating that the utilitarian aspects of knowledge provided to students of technical universities, which – by definition – offer practical programmes, are an inseparable element of the general knowledge conveyed in course of the teaching process. This is evidenced by the results of the empirical research conducted among the students of Civil and Environmental Engineering at the Faculty of Materials, Civil and Environmental Engineering of the University of Bielsko-Biała.

What is worth emphasizing in the conclusion is that: firstly, academic teachers should support their lectures with examples from business practice (as many as 94.4% of the respondents); secondly, due to the advantages the method demonstrates (Table 1), they should use the method of case-study analysis (based on the case studies surveyed, it facilitates the understanding of practical issues); thirdly, they should prefer practical methods (55.6% of the respondents), i.e. also due to the advantages indicated by the respondents; fourthly, student internships should be obligatory (72.2% of the respondents) and should provide an excellent opportunity for students to acquire practical knowledge in a direct way, for example, on construction sites; fifthly, they should invite business practitioners more often to their classes and lectures (87% of the respondents); sixthly, they should have practical experience (as many as 98% of the respondents stated that it generally adds value to the teaching processes) – engineers, entrepreneurs, construction managers and environmental engineers stated that: experience translates into the knowledge to be conveyed; it helps in gaining experience; lecturers may expand students' knowledge by giving them some non-typical examples; they have work experience and present things in a better way; practitioners are better at conveying professional knowledge; (lecturers may use it) to support theory with practice; practitioners present a true picture of work on a construction site; seventhly; the e-learning formula should be used (almost 93% of the respondents had a positive attitude towards classes conducted remotely). In the context of theoretical knowledge in the field of teaching methodology, however, this result should be considered as a support for the teaching process carried out in a traditional way, i.e. due to the specific character of technical studies. It should be added that not only the points made in this paragraph, but also the general considerations presented in the paper, should be analysed in terms of learning outcomes, divided into the ones related to the acquisition of knowledge, skills and competences.

To sum up, it should be stated that the applicability and the utilitarian dimension of knowledge provided to engineers, entrepreneurs, managers of the construction industry and environmental engineers, slightly prevails over the theory itself, considered, for example, in the context of academic knowledge resulting from scientific research conducted by academic teachers. It is important that the respondents in the research were not only seen as typical engineers, but also as people managing organisations in the areas of civil and environmental engineering. Many of them perform or will perform managerial functions, entering management and supervisory bodies in such organisations – hence the managerial context of the discussions outlined in the paper.

The research presented in the paper addresses the selected methods and ways of teaching and, in addition, it has covered a relatively small group of students. These may be seen as limitations of the conducted study. Undoubtedly, any future research needs to be carried out on a much wider population. The results of the research will shed more light on the knowledge provided to engineers and engineers-entrepreneurs, i.e. the people who tend to manage organisations, as such knowledge must be based on practical aspects. Nevertheless, the results contained in the paper make an interesting input for the improvement of the methodology by academic teachers lecturing at technical universities.

In its theoretical part, based on a review of the literature on the subject, the paper points to the advantages and disadvantages, mainly of the case-study method, which should be treated as adding a cognitive value. The survey material shows that it is particularly valuable for respondents. This is primarily due to the nature of the studies and their technical profile.

The authors of this publication hope that its content will inspire potential readers to conduct more extensive empirical research in this area. Future research may focus slightly more on the managerial aspect of knowledge provided to would-be engineers attending engineering programmes offered by technical universities.

References

- 1. Bereźnicki, F. (2001). Dydaktyka kształcenia ogólnego. Kraków: Impuls.
- 2. Bereźnicki, F. (2015). Dydaktyka szkolna dla kandydatów na nauczycieli. Kraków: Impuls.
- 3. Creswell, W.J. (2009). Research Design Qualitative. *Quantitative and Mixed Methods Approaches.* Thousand Oaks–London–New Delhi: SAGE.
- 4. Czajka, Z. (2023). Zdalne kształcenie akademickie w opinii nauczycieli. *Polityka Społeczna, 10, 15-22.*
- Czakon, W. (2015). Zastosowanie stadium przypadku w nadaniach nauk o zarządzaniu. In: Czakon, W. (Ed.) *Podstawy metodologii badań w naukach o zarządzaniu* (189-208). Warszawa: Wolters Kluwer Business.
- 6. Garrison, D.R., Vaughan, N.D. (2008). Blended Learning. In *Higher Education: Framework*, Principles and Guidelines. San Francisco: Jossey-Bass.
- Garwol, K. (2022). Społeczne aspekty zdalnego nauczania w początkach pandemii Covid-19 w Polsce. *Media i Społeczeństwo, 12, 82-95.*

- 8. Gaweł, A., Pietrzykowski, M. (2014). "Studium przypadku" jako metoda nauczania studentów ekonomii i zarządzania. Zarządzanie Zasobami Ludzkimi, 1(96), 83-94.
- 9. Jarosz, E., Hetmańczyk, H., Gierczyk, Dobosz, A. (2021). *Edukacja zdalna w okresie drugiej pandemii Covid-19. Przypadek gminy Ruda Śląska*. Katowice: Towarzystwo Inicja-tyw Naukowych.
- 10. Jaques, T. (2008). A case study approach to issue and crisis management. Schadenfreude or an opportunity to learn? *Journal of Communication Management*, *3*(*12*), *192-203*.
- 11. Kawecki, I. (2000). Wprowadzenie do wiedzy o szkole i nauczaniu. Kraków: Impuls.
- 12. Kember, D. (2009). Promoting student-centred forms of learning across an entire university. *Higher Education, 58, 1-13.*
- 13. Kisielnicki, J. (2021). Teoria "Czarnego Łabędzia" a przewidywanie kryzysów i katastrof. *Przegląd Organizacji, 4(975), 23-31.*
- 14. Konecki, K. (2000). Studia z metodologii badań jakościowych. Teoria ugruntowana. Warszawa: PWN.
- 15. Kotnis, M. (2014). Modele zarządzania ryzykiem w warunkach niepewności. Zeszyty Naukowe, s. Finanse, Rynki Finansowe, Ubezpieczenia, 65(1), 481-491. Szczecin: Uniwersytet Szczeciński,
- Kożuch, A., Marzec, I. (2014). Studium przypadku jako strategia badawcza w naukach społecznych. Zeszyty Naukowe, 2(172), 32-44. Wrocław: Wyższa Szkoła Oficerska Wojsk Lądowych imienia generała Tadeusza Kościuszki.
- 17. Kupisiewicz, C. (2000). Dydaktyka ogólna. Warszawa: Graf Punkt.
- Matejun, M. (2011). Metoda studium przypadku w pracach badawczych młodych naukowców z zakresu nauk o zarządzaniu. Zeszyty Naukowe, 666, Problemy Zarządzania, Finansów i Marketingu, 203-213. Szczecin: Uniwersytet Szczeciński.
- 19. Michalski, J. (2001). Metody aktywizujące, Nowa Szkoła, 6.
- 20. Mielcarek, P. (2014). Metoda case study w rozwoju teorii naukowych. Organizacja i Kierowanie, 1, 105-117.
- 21. Mokwa-Tarnowska, I. (2015). *E-learning i blended learning w nauczaniu akademickim: zagadnienia metodyczne*. Gdańsk: Wydawnictwo Politechniki Gdańskiej.
- 22. Myrczek, J., Tworek, P. (2022). Managing finance and risk in Polish property development enterprises in the period of SARS-CoV-2 pandemic. *Zeszyty Naukowe, Organizacja i Zarządzanie, 163, 365-380.* Gliwice: Politechnika Śląska.
- 23. Myrczek, J., Tworek, P., Podstawka, Z. (2021). Financial management and risk among Polish developers in the period of Covid-19 pandemic. *Zeszyty Naukowe, Organizacja i Zarządzanie, 154, 191-200.* Gliwice: Politechnika Śląska.
- 24. Nalaskowski, S. (2000). Metody nauczania. Toruń: Wydawnictwo Adam Marszałek.
- 25. Okoń, W. (2007). Nowy słownik pedagogiczny. Warszawa: Żak.
- 26. Picciano, A.G. (2017). Theories and Frameworks for Online Education: Seeking an Integrated Model. *Online Learning*, 21(3), 166-190.

- 27. Pilch, T. (2003). Encyklopedia pedagogiczna XXI wieku. Warszawa: Żak.
- 28. Pizło, W. (2009). Studium przypadku jako metoda badawcza w naukach ekonomicznych. *Stowarzyszenie Ekonomistów Rolnictwa i Agrobiznesu, XI(5), 246-251.*
- 29. Pokrzycka, L. (2019). Efektywność e-nauczania w szkolnictwie wyższym. *Studia przypad*ków. Zarządzanie mediami, 7(1), 15-27.
- 30. Półturzycki, J. (2002). Dydaktyka dla nauczycieli. Płock: Novum.
- 31. Richardson, J.T.E. (2005). Students' Approaches to Learning and Teachers' Approaches to Teaching in Higher Education. *Educational Psychology*, 6(25), 673-680.
- 32. Szczygieł, A. (2021). Status online plusy i minusy nauczania zdalnego podczas pandemii Covid-19. *Kultura i Wychowanie, 2(20), 9-27*.
- 33. Taleb, N.N. (2021). Czarny Łabędź. Jak nieprzewidywalne zdarzenia rządzą naszym życiem. Warszawa: Zysk i S-ka.
- 34. Trzaska, B. (2005). Studium przypadku jako metoda nauczania zarządzania. In: Polok, G. (Ed.) Profesjonalizacja kompetencji dydaktycznych nauczycieli akademickich w nauczaniu przedmiotów ekonomicznych (71-73). Katowice: Akademia Ekonomiczna im. K. Adamieckiego w Katowicach.
- 35. Tworek, P. (2023). How future entrepreneurs and financialists are educated at the University of Economics in Katowice survey research from the time of the Covid-19 pandemic. Zeszyty Naukowe, Organizacja i Zarządzanie, 184, 603-614. Gliwice: Politechnika Śląska.
- 36. Turos, L. (1999). Pedagogika ogólna i subdyscypliny. Warszawa: Żak.
- 37. Wiatr, M. (2022). Przegląd badań nad zdalną edukacją prowadzoną w polskiej szkole podczas pierwszej fali pandemii Covid-19 - O prymacie techniki i technologii nad refleksją pedagogiczną. *Colloquium Pedagogika – Nauki o Polityce i Administracji*, 1(45), 135-165.
- Wolniak, R. (2022). Wpływ pandemii Covid-19 na zarządzanie. Zeszyty Naukowe, 1(18), 21-32. Katowice: Wyższa Szkoła Zarządzania Ochroną Pracy w Katowicach.
- 39. Zawadowska, J. (2004). Wyzwania szkoły XXI wieku. Dyrektor Szkoły, 3.
- 40. Zelek, A. (2021). Case study nieocenione narzędzie dydaktyczne. Około Pedagogiki, 2, 66-79.
- 41. Ziółkowski, P. (2015). *Teoretyczne podstawy kształcenia*. Bydgoszcz: Wyższa Szkoła Gospodarki w Bydgoszczy.