sustainability

MDPI

Editorial

Special Issue: Technology-Enabled Interdisciplinary Learning in Economic/Business Studies

Samo Bobek [1], Jarmila Zimmermannová [2] and Simona Sternad Zabukovšek [1,*]

[1] Faculty of Economics and Business, University of Maribor, 2000 Maribor, Slovenia
[2] Department of Sustainable Development, Moravian Business College Olomouc, 77900 Olomouc, Czech Republic
* Correspondence: simona.sternad@um.si; Tel.: +386-2-22-248

Recent developments are transforming teaching paradigms in the area of business and economic studies. Changes are visible in two major areas. Teaching is turning out to be ever more technology-enabled, not just through the use of established e-learning platforms and solutions but also with the use of improved tools and solutions which can be utilised to increase real-life experiences in education courses. On the other hand, technology supported and enhanced teaching in economic and business studies is becoming more and more linked with interdisciplinarity, which has emerged in both economic and business studies. Both changes are also strongly connected with sustainability which appears in economic and business studies as the idea of teaching in a sustainable way, linking the economic and business field with sustainability problems to accomplish interdisciplinarity.

The word interdisciplinary is defined in Merriam-Webster's dictionary as: "Involving two or more academic, scientific, or artistic disciplines" [1]. The keyword discipline has been described as the idea of a topic/subject and the rigour applied, which influences an individual's specific way of observing the world and behaving in it. Academic disciplines are 'constructs' by themselves, which means that they have been developed by scientists researching a distinct field and offer a particular knowledge, i.e., economic and business studies. When interdisciplinary learning (and teaching) is considered, academics are focusing across and beyond the boundaries of knowledge of distinct disciplines, instead having in mind the aim of creating knowledge from various sources.

Regarding the discipline of education, Bridges states that: "Discipline meant that enquiry was conducted in accordance with some established rules and procedures which provided the basis for among other things distinguishing truth from falsity, warranted from unwarranted belief. The requirement for disciplined enquiry became translated into the 'disciplines' which embodied such enquiry" [2]. The context of using the word discipline is relevant to academic organisations and companies. In higher education organisations, the term academic discipline is related to certain knowledge which includes several building blocks, i.e., epistemology, phenomena, concepts, assumptions, methods, and theories, which are in many aspects different from knowledge in other disciplines [3]. According to this, disciplines emerge and are formed at a certain time and conditions of phenomena are studied, using selected methods and theories [4].

Chettiparamb argues that disciplines and their boundaries are too narrowly formed, which therefore restricts innovation and creativity and, on the other hand, limits reflexivity and engagement with the real world and other disciplines [5]. The appearance of interdisciplinarity in science and education can be understood as a reaction to the perceived limitations of single disciplines [4–6]. Economic and business disciplines must go beyond the current situation and apply innovative research and teaching methods by integrating them with other disciplines in the areas of social sciences, technology and sustainability.

Holley identifies three variants of knowledge production that develop across disciplinary borders: (1) cross-disciplinarity, (2) multidisciplinarity and (3) transdisciplinarity [7]. Cross–disciplinarity implies that related disciplines are connected to address a problem

Citation: Bobek, S.; Zimmermannová, J.; Sternad Zabukovšek, S. Special Issue: Technology-Enabled Interdisciplinary Learning in Economic/Business Studies. *Sustainability* **2023**, *15*, 1976. https://doi.org/10.3390/su15031976

Received: 11 January 2023
Accepted: 17 January 2023
Published: 20 January 2023

which goes beyond study from a single epistemic perspective. Multidisciplinarity implies that two or more disciplines are connected for a particular purpose to solve a specific problem, i.e., several scientists collaborate to generate certain results. Holley also links the idea of transdisciplinarity to Gibbons et al. [8], who describe the concept of knowledge as promoting collaborative interaction among researchers and specialists [7]. These three variants of knowledge production can be interpreted as variants of interdisciplinarity. We can recognise interdisciplinary research in situations when scholars are persuaded to incorporate and evaluate the knowledge, insights, approaches and methods of two or more fields within a study program.

Additionally, the Organization for Economic Cooperation and Development (OECD) defines two other approaches alongside interdisciplinarity—multidisciplinarity and transdisciplinarity [9]. To differentiate between interdisciplinarity and multidisciplinarity, the OECD explains that multidisciplinarity implies recognising knowledge from several fields side-by-side [10] and, on the other hand, allying skills from numerous fields [11]. When academic disciplines are aligned, they are both in a sequencing mode, or on the other hand, in a coordinating mode [12]. This means that multidisciplinarity differs from interdisciplinarity in the way that the relations and connections between fields or within fields are lower, interactions with specific individual disciplines are weaker, and less engagement with certain disciplines is presented [3,10,12]. Lattuca, on the other hand, separates transdisciplinarity from interdisciplinarity in that transdisciplinarity means the use of theories, concepts, or methods across fields with the intent of developing an overarching synthesis [13]. Strathern defined transdisciplinarity as an extension of interdisciplinarity that includes fields in contexts where new approaches emerge from the interaction between them, but to a greater extent [11].

An interdisciplinary approach is, therefore, crucial for exploring the important issues facing today's global and digitalised world [3,14]. In general, interdisciplinarity in economic and business studies, and also in social sciences, has been studied by many researchers [4,10,13–18]. As Strathern expressed, interdisciplinarity refers to real life, and it was created to deal with real-world situations within academic research and education [19] (p. 69). Interdisciplinarity in economic and business studies allows the student to learn by connecting knowledge, concepts and ideas across several disciplines. Students learning in this way will be able to use the knowledge learned in one discipline in the area of another discipline, and in such a way, they will be able to deepen their learning experience. Because of its advantages, the use of interdisciplinarity has been encouraged and applied in a variety of economic and business studies situations, including problem solving, the integration of knowledge and synthesis of ideas [3,6,10,11,15,16,20], motivating learners to be self-directed, expressive and creative [17,18].

Interdisciplinarity is empowered and fostered by the use of information technologies and digitalisation. Information technologies and software related to them are very important to achieve interdisciplinary knowledge and competencies in economic and business studies graduates. As employees, they will have to adapt more and more quickly to changes, new realities and new work tasks. Multidisciplinary education includes a wide range of content from different disciplines, enabling and facilitating independent learning from multidisciplinary content to achieve work goals. Technology has also changed the approach to teaching and studying. For example, the field of technology and business studies have a common intersection that would offer the potential for the development interdisciplinary concepts. The advantage of technologies, e.g., in change management and organisational behaviour, lays the foundation for later advances in the use of technology in the social sciences, such as in sociology, psychology and business studies [21]. Technology and communication integration with business studies is a recent example of an integration process that enhances interdisciplinarity in economic and business studies. On other hand, the pressures of globalisation make the interest in interdisciplinary research in business studies even more urgent. This cannot happen just by teaching people with an interdisciplinary book or by understanding the advantages and disadvantages of such alternatives.

Interdisciplinary business research and education need to enhance their performance by removing narrow-minded mentalities and creating conditions for innovation.

In addition to these issues where technology emerges as »content« of economic and business studies, another area of interest is how technologies are used in teaching economic and business studies programs.

Various alternative words are used in research to speak about information technologies used in higher education (e.g., educational technology, computer-assisted instruction, e-learning, distributed learning, educational computing, etc.) [22]. Goodyear and Retalis [23] used the phrase technology-enhanced learning and explained that the phrase includes all technologies that make learning more efficient, effective and enjoyable. If we use this phrase, the catalogue of relevant technologies becomes quite long. It includes technologies specifically developed for learning, such as educational videos, mobile learning apps, game-based learning programs, etc. In addition, the catalogue also includes software tools with the help of which information can be presented via the web, e-mail and/or mobile phones. Such presentation of information can also help in learning; therefore, they are included in the group of technologies used for technology-enhanced learning [24]. Thus, technology-enhanced learning is used today in various situations, where technology is used as a medium to access and study learning materials, request information, learn through communication and collaboration, learn through construction, assess students and improve digital and multimedia literacy [23]. Technology-enhanced learning methods are popular in higher education today, and the number of approaches used is still growing. Many researchers claim that recent generations of students, so-called digital natives [25], require technical assistance in their different learning situations as they are using that technology on a daily basis [22,26,27].

In this Special Issue, nine interesting articles are included. Although they are very diverse regarding the topic they are addressing and the methodology they are using, they are linked because they are related to technology-enabled interdisciplinary learning in economic and/or business studies. The articles could be divided into two groups according to their focus.

Four articles address technology enablement of teaching. In their article, the authors Peterková, Repaská and Prachařová argue that digital business simulation games are among the educational approaches which can respond to the requirements for students to have real-life experiences, while enhancing interdisciplinarity in economic and business studies. Business simulation games prove to be a useful approach to experiential learning. Their findings show that the majority of students perceive simulation games as a helpful and interesting way to understand the dependencies between economic variables, and that simulation games strengthen analytical skills (Contribution 1). Sternad Zabukovšek, Deželak, Parusheva and Bobek have researched e-learning platforms, which are becoming more complex. They argue that the functionality of e-learning platforms is expanding with collaborative platforms, which allow better communication, group collaboration, and face-to-face lectures. Their findings show that improved usability and attractiveness turn out to be essential in successful e-learning platforms, particularly due to the more intensive interactivity expected from students. Their research studied the user experience of students who have used the e-learning platforms Microsoft Teams, Moodle, and/or Google Meet (Contribution 2). Student learning engagement and effectiveness through team cohesion, project-based learning, and flipped learning were analysed in e-learning environments by Umar and Ko. Their analysis found that project-based learning and team cohesion positively impacted the effectiveness of student learning and their engagement. On the other hand, flipped learning showed increased positive direct effects on student learning effectiveness and negative effects on engagement. They also argue that engagement had a positive direct effect on student learning effectiveness (Contribution 3). Beranič and Heričko researched the impact of ERP business simulations on economic and business education. They argue that in higher education, the economics and business curricula should be improved with innovative teaching approaches, including actual topics linked to

real-life scenarios, such as, for example, the ERPsim business simulation. Their research aimed to apply an ERPsim business simulation as part of the presentation of a course. The simulation was applied to ease the introduction of ERP solutions and IT models to economic and business students (Contribution 4).

Five articles address interdisciplinary issues in the areas which the EU defines as priorities—well-being and digital transformation (which are important aspects of sustainability)—related to economic and business studies. Pawliczek, Kurowska-Pysz and Smilnak researched the relationship between global attitudes and quality of life. Their article employs common methods for researching factors of correlation to assess the influence of geographical location on quality of life and happiness. Their research is based on the procedures described by the World Happiness Score (WHS) and the Human Development Index (HDI). Their research shows a relationship between their reported life quality measures and the global attitude toward one's living. The main finding of the research is that the quality of life measured by the WHS and the HDI is distributed asymmetrically across the world with respect to latitude (Contribution 5). Moos, Juergens, and Radecker investigated spatial relationships concerning the availability of urban green spaces, the total annual vitality of nearby vegetation, and other indicators such as noise and air pollution in city regions. Their analysis uses socio-economic data sets derived from a sophisticated disaggregation approach. Their research offers a sophisticated methodology that improves the evaluation of the quantity, quality and characteristics of a particular spatial allocation of environmental justice in urban areas (small- to large-scale areas) (Contribution 6). V. Lazovic, Rondovic, D. Lazovic and Djurickovic discuss economic theories used in textbooks and their applicability to the digital economy. Investigating 90 university textbooks, they analysed the specifics of the digital economy from the viewpoint of the applicability of the traditional economic theory. Based on the research, the authors determined that the digital economy has specific characteristics, and it is necessary to include these as compulsory lessons in university textbooks (Contribution 7). Zimmermannova, Redecker, Mensik and Juergens address the economic evaluation of companies and geospatial data analysis for sustainable business development. They argue that a combination of both geospatial data analysis along with a conventional economic evaluation of companies is advantageous. They present findings from the Erasmus+ SPATIONOMY project ("Spatial exploration of economic data—methods of interdisciplinary analytics") in which an interdisciplinary team of teachers educated an interdisciplinary assembled group of international students (Contribution 8). In their article, Juergens, Meyer-Heß, Goebel and Schmidt also address interdisciplinarity concerning geoscience and economics. They argue that economic forecasts are an important instrument to judge the nationwide economic situation, that such forecasts are mainly based on data from statistical offices, and that there is a gap between the end of the reporting period and the announcement of the statistical data that results from, for example, the time required to gather and process the data. To enhance the projections by lowering the lag, finding alternative data sources that provide information on economic activity without significant delays is of interest. Their findings show how satellite images are thought to assist and accelerate the potential of using earth observation imagery for short-term economic forecasts (Contribution 9).

List of Contributions

1. Peterková, J.; Repaská, Z.; Prachařová, L. Best Practice of Using Digital Business Simulation Games in Business Education. *Sustainability* **2022**, 14, 8987.
2. Sternad Zabukovšek, S.; Deželak, Z.; Parusheva, S.; Bobek, S. Attractiveness of Collaborative Platforms for Sustainable E-Learning in Business Studies. *Sustainability* **2022**, *14*, 8257.
3. Umar, M.; Ko, I. E-Learning: Direct Effect of Student Learning Effectiveness and Engagement through Project-Based Learning, Team Cohesion, and Flipped Learning during the COVID-19 Pandemic. *Sustainability* **2022**, *14*, 1724.

4. Beranič, T.; Heričko, M. The Impact of Serious Games in Economic and Business Education: A Case of ERP Business Simulation. *Sustainability* **2022**, *14*, 683.
5. Pawliczek, A.; Kurowska-Pysz, J.; Smilnak, R. Relation between Globe Latitude and the Quality of Life: Insights for Public Policy Management. *Sustainability* **2022**, *14*, 1461.
6. Moos, N.; Juergens, C.; Redecker, A.P. Combined Small- and Large-Scale Geo-Spatial Analysis of the Ruhr Area for an Environmental Justice Assessment. *Sustainability* **2022**, *14*, 3447.
7. Lazovic, V.; Rondovic, B.; Lazovic, D.; Djurickovic, T. Is Economic Theory, Presented in Basic Academic Textbooks, Applicable to the Digital Economy? *Sustainability* **2021**, *13*, 12705.
8. Zimmermannova, J.; Redecker, A.P.; Mensik, M.; Juergens, C. Geospatial Data Analysis and Economic Evaluation of Companies for Sustainable Business Development—An Interdisciplinary Teaching Approach. *Sustainability* **2021**, *13*, 11245.
9. Juergens, C.; Meyer-Heß, F.M.; Goebel, M.; Schmidt, T. Remote Sensing for Short-Term Economic Forecasts. *Sustainability* **2021**, *13*, 9593.

Author Contributions: Conceptualisation, S.B., J.Z. and S.S.Z.; methodology, S.B.; writing—original draft preparation, S.B.; writing—review and editing, J.Z. and S.S.Z. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by Slovenian Research Agency grant number No. P5–0023.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Merriam-Webster Dictionary. Available online: https://www.merriam-webster.com/dictionary/interdisciplinary (accessed on 29 December 2022).
2. Bridges, D. The disciplines and discipline of educational research. In Proceedings of the British Educational Research Association Annual Conference, Manchester Metropolitan University, Manchester, UK, 18 September 2004.
3. Repko, A.F. Disciplining Interdisciplinarity: The Case for Textbooks. *Issues Integr. Stud.* **2006**, *24*, 112–142.
4. Razmak, J.; Bélanger, C.H. Interdisciplinary Approach: A Lever to Business Innovation. *Int. J. High. Educ.* **2016**, *5*, 173–182. [CrossRef]
5. Chettiparamb, A. *Interdisciplinarity: A Literature Review*; The Interdisciplinary Teaching and Learning Group, Subject Centre for Languages, Linguistics and Area Studies, School of Humanities, University of Southampton: Southampton, UK, 2007. Available online: https://oakland.edu/Assets/upload/docs/AIS/interdisciplinarity_literature_review.pdf (accessed on 20 December 2022).
6. Klein, J.T. A platform for a shared discourse of interdisciplinary education. *JSSE-J. Soc. Sci. Educ.* **2006**, *5*, 10–18.
7. Holley, K. *Understanding Interdisciplinary Challenges and Opportunities in HigherEducation*; Wiley Subscription Services: San Francisco, CA, USA, 2009.
8. Gibbons, M.; Limoges, C.; Nowotny, H.; Schwartzman, S.; Scott, P.; Trow, M. *The New Production of Knowledge*; The Dynamics of Science and Research in Contemporary Societies: London, UK, 1994.
9. OECD. *Addressing Societal Challenges Using Transdisciplinary Research*; OECD Science, Technology and Industry Policy Papers; OECD Publishing: Paris, France, 2020. [CrossRef]
10. Repko, A.F. Transforming an Experimental Innovation into a Sustainable Academic Program at the University of Texas–Arlington. In *The Politics of Interdisciplinary Studies: Essays on Transformations in American Undergraduate Programs*; Augsburg, T., Henry, S., Eds.; McFarland: Jefferson, NC, USA, 2009.
11. Klein, J.T. A taxonomy of interdisciplinarity. In *The Oxford Handbook of Interdisciplinarity*; Frodeman, R., Klein, J.T., Mitcham, C., Holbrook, B., Eds.; Oxford University Press: New York, NY, USA, 2010; pp. 15–30.
12. Knight, D.B.; Lattuca, L.R.; Kimball, E.W.; Reason, R.D. Understanding interdisciplinarity: Curricular and organisational features of undergraduate interdisciplinary programs. *Innov. High. Educ.* **2013**, *38*, 143–158. [CrossRef]
13. Aboelela, S.W.; Larson, E.; Bakken, S.; Carrasquillo, O.; Formicola, A.; Glied, S.A.; Haas, J.; Gebbie, K.M. Defining interdisciplinary research: Conclusions from a critical review of the literature. *Health Res.* **2007**, *42*, 329–343. [CrossRef] [PubMed]
14. Bromme, R. Beyond one's own perspective: The psychology of cognitive interdisciplinarity. In *Practicing Interdisciplinarity*; Stehr, N., Weingart, P., Eds.; University of Toronto Press: Toronto, ON, Canada, 2000; pp. 115–133.

15. Klein, J.T. *Humanities, Culture, and Interdisciplinarity: The Changing American Academy*; Suny Press: New York, NY, USA, 2005.
16. Newell, W.H. Interdisciplinarity in undergraduate general education. In *The Oxford Handbook of Interdisciplinarity*; Frodeman, R., Thompson Klein, J., Mitcham, C., Holbrook, B., Eds.; Oxford University Press: New York, NY, USA, 2009; pp. 360–371.
17. Tominc, P.; Bobek, S.; Sternad Zabukovšek, S. Impact of student involvement in an interdisciplinary project team on their attitude towards interdisciplinary knowledge. *Ekon. Manag. Inovace* **2019**, *11*, 22–33.
18. Sternad Zabukovšek, S.; Tominc, P.; Bobek, S.; Štrukelj, T. Spatial exploration of economic data-insight into attitudes of students towards interdisciplinary knowledge. *ISPRS Int. J. Geo-Inf.* **2020**, *9*, 421. [CrossRef]
19. Strathern, M. *Commons and Borderlands: Working Papers on Interdisciplinarity, Accountability and the Flow of Knowledge*; Sean Kingston Publishing: Oxon, UK, 2004.
20. Repko, A.F.; Szostak, R. *Interdisciplinary Research; Process and Theory*, 4th ed.; Sage Publishing: Thousand Oaks, CA, USA, 2020.
21. Jasanoff, S. A field of its own: The emergence of science and technology studies. In *The Oxford Handbook of Interdisciplinarity*; Frodeman, R., Thompson Klein, J., Mitcham, C., Holbrook, B., Eds.; Oxford University Press: New York, NY, USA, 2017; pp. 191–205.
22. Schweighofer, P.; Weitlaner, D.; Ebner, M.; Rothe, H. Influential factors for technology-enhanced learning: Professionals' views. *J. Res. Innov. Teach. Learn.* **2019**, *12*, 268–294. [CrossRef]
23. Goodyear, P.; Retalis, S. Learning, technology and design. In *Design Patterns and Pattern Languages, Technology-Enhanced Learning*; Goodyear, P., Retalis, S., Eds.; Sense Publishers: Rotterdam, The Netherlands; Boston, MA, USA; Taipei, Taiwan, 2010; pp. 1–27.
24. Dror, I.E. Technology enhanced learning: The good, the bad, and the ugly. *Pragmat. Cogn.* **2008**, *16*, 215–223.
25. Prensky, M. Digital natives, digital immigrants part 1. *On the Horizon* **2001**, *9*, 1–6. [CrossRef]
26. Noguera Fructuoso, I. How millennials are changing the way we learn: The state of the art of ICT integration in education. *Rev. Iboeroamericana De Educ. A Distancia* **2015**, *18*, 45–65. [CrossRef]
27. Schweighofer, P.; Ebner, M. Aspects to be considered when implementing technologyenhanced learning approaches: A literature review. *Future Internet* **2015**, *7*, 26–49. [CrossRef]