

Authentic Learning in a B2B Context: Cases involving Undergraduate Students from the University of Aveiro

Irina Saur-Amaral¹ & Sandra Filipe²

¹ ISCA-UA, Universidade de Aveiro & NECE-UBI, isaur@ua.pt

² GOVCOPP and ISCA-UA, Universidade de Aveiro, sandrafilipe@ua.pt

Abstract

This paper presents the results of an authentic learning project for undergraduate students, in a business to business (B2B) context, more specifically the case of the Information Technology (IT) cluster in Aveiro. The project was implemented between October 2021 and January 2022 with 93 undergraduate students from second and third year of the Bachelor in Marketing and Bachelor in Finance at University of Aveiro, which developed strategic plans and marketing plans for 18 companies belonging to the IT cluster in Aveiro. Results show that benefits overseeded the barriers.

Keywords: authentic learning, problem and project-based learning, pedagogical education, learning by doing

1. INTRODUCTION

In recent years, key elements in the teaching-learning process have emerged in many Higher Education Institutions (HEI) based on an oriented holistic educational approach and, also, on an attempt to effectively improve the profile of students, namely with the acquisition of the skills required by the labor market as future professionals. To help substantiate this holistic approach to higher education, innovative teaching methodologies have been implemented and experienced in several undergraduate and graduate courses.

Authentic learning experiences put students in a problem-solving environment which is close to the future professional context where they will be working in the future (Chiu et al., 2018). Incorporating this type of learning in curriculum design in higher education allows students to develop the complex knowledge structures related to an uncertain environment in a progressive way, with the support of their academic or professional tutors (Meyers & Nulty, 2009). Notwithstanding the difficulties and barriers in its implementation, if properly managed and assessed along the way, it may lead to positive experiences for students and teachers (Stein, Isaacs, & Andrews, 2004).

As authentic learning experiences are used in HEI courses, the question that arises is: Which are the benefits and barriers to the implementation of this type of projects?

To answer this question, a group of teachers implemented an authentic learning project in two undergraduate courses (Finance and Marketing) in the University of Aveiro, Portugal, and assessed the results from the perspective of the students and the teachers involved. The current paper presents the results of this project, focused on a business to business (B2B) context, more specifically on the case of the Information Technology (IT) cluster in Aveiro.

After this introduction, the paper follows with a theoretical background. Next, it describes the methodology developed in the implementation of the project and presents the results obtained with these authentic learning experiences. Finally, it ends with a brief discussion and conclusion.

2. THEORETICAL BACKGROUND

Academic literature advocates a change in HEI courses, encouraging innovation in teaching learning methods in order to prepare students to face the contemporary global challenges (Luna Scott, 2015). In fact, this meets the current demands of the job market, which requires professionals with a set of skills that include responsibility, autonomy, critical thinking skills, self-confidence, social and communication skills, flexibility, team-spiritedness, good work attitude, digital skills, self-motivation and self-management, among others (Bhagra & Sharma, 2018; Chiu, Pu, Kao, Wu, & Huang, 2018; Di Gregorio, Maggioni, Mauri, & Mazzucchelli, 2019; Fajaryati & Akhyar, 2020; Sarfraz, Rajendran, Hewege, & Mohan, 2018; Van Laar, Van Deursen, Van Dijk, & De Haan, 2017).

Innovative learning methodologies have been recommended by several authors, namely project-based learning (PBL), problem-based learning, challenged-project learning (CBL), inquiry project learning (IPL), interdisciplinary project-based learning (IPBL), authentic learning, among others (Bell, 2010; Lombardi & Oblinger, 2007; Musa, Mufti, Latiff, & Amin, 2012; Panasan & Nuangchalerm, 2010; Stozhko, Bortnik, Mironova, Tchernysheva, & Podshivalova, 2015).

Looking more closely into Project-Based Learning (PBL), according to Bell (2010, p. 30), this methodology “is a student-driven, teacher-facilitated approach to learning” and “a key strategy for creating independent thinkers and learners”.

Krajcik (2006) highlighted the four learning sciences fundamentals behind PBL: active construction, situated learning, social interactions and cognitive tools. PBL is deeply related with problem-based learning, since both promote student engagement to achieve a shared learning goal through collaboration (Kokotsaki, Menzies, & Wiggins, 2016).

Several benefits of PBL usage in HEI courses have been identified by the scholars. Anazifa (2017) showed the effect of PBL and problem-based learning on creativity and critical thinking of students of mathematics and natural sciences. Mioduser (2008) presented the contribution of PBL for serving the students' knowledge acquisition and problem-solving process, while Fernandes (2014) identified a set of benefits of PBL, such as teamwork skills, increased student motivation, articulation between theory and practice, problem solving, amongst others.

In several scientific areas in higher education, projects and problems are usually used by teachers for a more active and effective learning. When projects and problems are real, i.e., authentic, they have been proven to achieve better results.

Lombardi and Oblinger (2007, p. 2) stated that an authentic learning activity "is designed to draw on the existing talents and experiences of students, building their confidence through participation and helping them see the connection between personal aptitude and professional practice". Nab, Pilot, Brinkkemper and Ten Berge (2010, p. 3) also concluded that "by working on real-life problems, students construct knowledge themselves instead of reproducing knowledge. They are part of a community of practice, where knowledge and meaning are constructed together with others, expressing and discussing their ideas. Also, students learn to recognize resources and use them in an effective way. And students acquire tacit knowledge that can only be obtained in practical situations."

Authentic learning experiences put students in a problem-solving environment which is close to the future professional context where they will be working in the future (Chiu et al., 2018). Incorporating this type of learning in curriculum design in higher education allows students to develop the complex knowledge structures related to an uncertain environment in a progressive way, with the support of their academic or professional tutors (Meyers & Nulty, 2009). Notwithstanding the difficulties and barriers in its implementation, if properly managed and assessed along the way, it may lead to positive experiences for students and teachers (Stein, Isaacs, & Andrews, 2004).

3. METHODOLOGY

The authentic learning project was implemented between October 2021 and January 2022 with 93 undergraduate students from second and third year of the Bachelor in Marketing and Bachelor in Finance at University of Aveiro, which developed strategic plans and marketing plans for 18 companies belonging to the IT cluster in Aveiro. Four different teachers were involved in the project and six different classes from two curricular units: Strategic Management and Marketing & Business Planning. The group of four teachers involved in the two curricular units met frequently to plan and implement the pedagogical project.

Table 1 presents a description of the companies, which have been anonymized due to confidentiality concerns, and the 27 student groups that were created.

Table 1. Companies and composition of the groups of students.

Company	Groups of Strategic Management	Groups of Business and Marketing Planning
BV, 3D printing		3 students
ED, copy machinery		3 students
EX, personalized sensors and electronics	4 students	
GL, electronics and telecom	4 students	3 students
HF, electronics and telecom	4 students	
LIT, lightening	4 students	

Company	Groups of Strategic Management	Groups of Business and Marketing Planning
MET, software development	4 students	4 students
MIC, electronics and software	3 students	4 students
OUT, software development	3 students	
PICA, optics and electronics	4 students	3 students
PICT, software development	4 students	3 students
QI, electronics	3 students	4 students
RH, software development		2 students
VI, software development (energy)	3 students	3 students
WAT, sensors	2 students	3 students
WAV, telecom	4 students	3 students
WIN, software development and IT consultancy		2 students
WIS, electronics and robotics	3 students	

In November 2021, students had an initial presentation of the IT cluster by a director of the IT association Inovaria and then they interacted with firm representatives and made visits to some of the firms. We used a Padlet to organize all the information about the IT cluster, the presentation of the director of the IT association, and data sources about the IT cluster (see Figure 1).

The Padlet was shared with all students and teachers and complemented in-class interactions. Additionally, in Microsoft Teams Software, collaboration spaces were also created for the groups of students from 2nd and 3rd year that worked on the same company.

From November till January 2022, they developed their work with tutorial support from the four teachers involved in the project. End of January, they presented their works to the representatives of Inovaria and companies they studied. The project continued in the second semester with the 1st year students of the Master in Marketing (out of the scope of this research) and undergraduate students prepared videos for the postgraduate students to continue the work.

At the end of the semester, two surveys were applied by the two responsible teachers to collect students' opinions about the experience and, independently, the curricular unit quality system assessments were run by the university staff. The two other involved teachers shared their experience, as well.

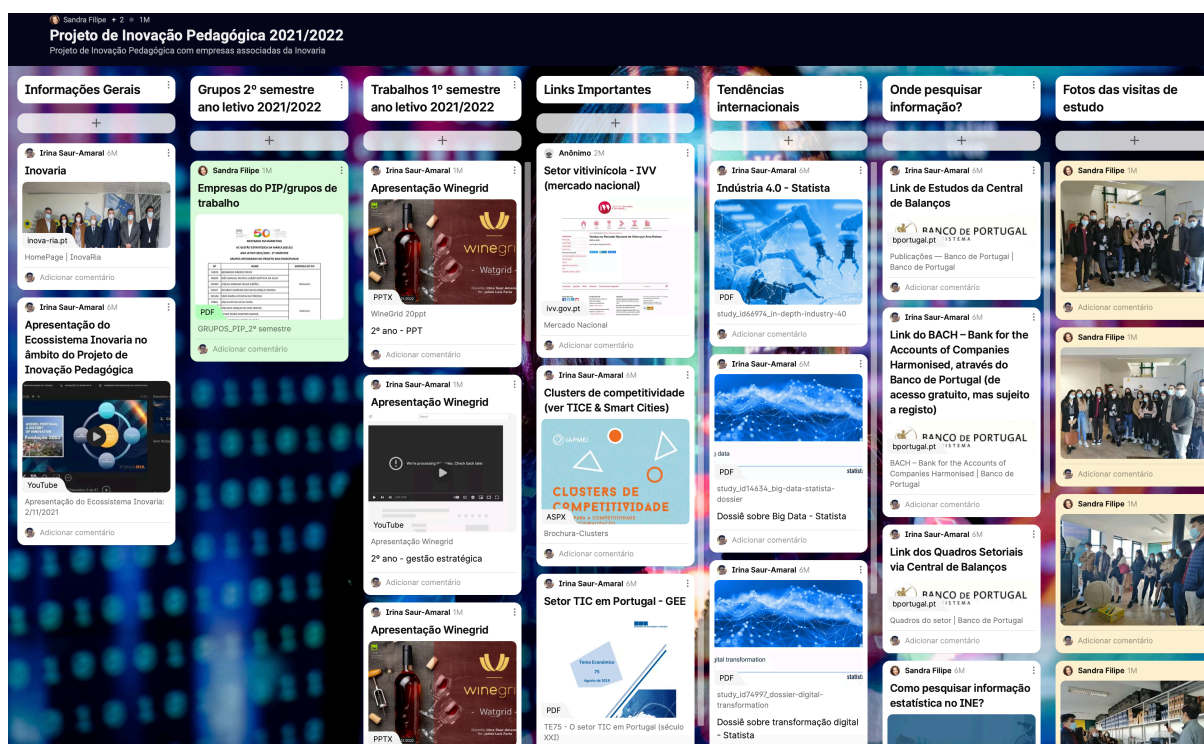


Figure 1 – Padlet used to aggregate all relevant information about the project

4. RESULTS

4.1. STRATEGIC MANAGEMENT CURRICULAR UNIT

In Strategic Management (2nd year of bachelors in Finance and Marketing), 20 students completed the questionnaire. On average, they evaluated as good or very good the tutorial support from the teachers during the development of the authentic assessment (average of 4,20 on a scale 1 to 5, where 1 - totally disagree and 5 - totally agree) but they assessed as nor good, nor very good the feedback they received from the companies in the final presentation (average of 3 on a scale 1 to 5) – something explained by the fact that not all companies' representatives could assist to the session. On the overall, they were satisfied to very satisfied with their learning during the development of the authentic assessment (average of 4,15 on a scale 1 to 5).

Surprisingly, half of the students that completed the questionnaire did not attend the presentation session performed by the director of the IT organization, nor did they see the video afterwards. However, 30% of the students participated in the study visit to the companies and 60% used the Padlet to search for relevant information. Half of the students indicated that the company they studied was very open to answer their questions.

Finally, only half of the students who had a group from the 3rd year that studied the same company assisted to the final presentation of their counterparts.

The quality system assessment indicated an excellent evaluation of the course (8,52 on a scale of 1 to 9), the tutorial support of the teachers (8,30 on the same scale), promotion of students' autonomy (8,42). Students felt very motivated to participate in the class (8,38) and the relationship teacher – student was excellent (8,58). The assessment methods were considered very adequate (8,14) and assessment activities were very adequate and adjusted to the course's goals, as well (8,38). In terms of learning and understanding of the content, students were very happy with the outputs of the course (8,13).

In terms of qualitative comments, students considered more interesting:

- *“the contact with a real company” and “with company representatives”*

- *“the assessment used all the content lectured along the semester and had a very practical application – a very complete work!”*
- *“being able to learn in a more practical way the theoretical concepts”*
- *“the contact with a small company linked with the IT cluster”*
- *“the search for information, the interaction with the company”*
- *“having worked together with the colleagues from the 3rd year of study and shared knowledge about the company we all studied”*
- *“the tutorial support from the teacher”*
- *“a very challenging work as it is a complete work on a almost unknown area of study!”*

They also indicated the elements they considered more difficult:

- *“not getting feedback from the company – we stood there waiting for the feedback”*
- *“have to do a work based on suppositions as the company wouldn’t provide all the needed information”*
- *“low quantity of information about the company”*
- *“doing a strategic plan on a company that was not chosen by the students”*
- *“time management was difficult as we had to conciliate this work with four other courses”*
- *“working as a team, in the beginning, and starting to obtain the needed information for the work”*
- *“communication with the company did not work as expected”*
- *“information needed was not provided due to confidentiality concerns”*

Suggestions for next experiences included:

- *“adapt the work to study bigger companies”*
- *“allow students to choose the company”*
- *“have a tutor from the company that could follow up the work with the students at least once a month”*
- *“students should receive more information about what they should give more emphasis”*
- *“just the same way that we had a study visit, we should have programmed another session to exchange ideas with somebody from the company”*

In the conversation with the teachers following up the bachelor in Finance, the colleagues mentioned some difficulties in students to focus on the work and delays in collecting the information in class, something that was also registered by the responsible teacher. The moments of tutorial support in class were highly valued, yet not always students took due advantage of the two hours of work and support in class.

4.2. BUSINESS AND MARKETING PLANNING CURRICULAR UNIT

In Business and Marketing Planning curricular unit (3rd year of bachelor in Marketing), 33 students completed the questionnaire.

A significant number of students attended the presentation session performed by the director of the IT organization and/or they saw the video afterwards (59% of the students that completed the questionnaire) and 58% used the Padlet to search for relevant information. However, only 32% of the students participated in the study visit to the companies and few students interacted in Microsoft teams with elements of the groups of students of the other curricular unit who studied the same company. More than half of the students indicated that the company they studied was very open to answer their questions.

Finally, most students who had a group from the 2nd year that studied the same company assisted to the final presentation of their counterparts.

In terms of qualitative comments, students highlighted a long list of benefits and some barriers of this innovative project.

They considered more interesting:

- *"It helped to improve and understand how to make a marketing plan correctly, when working with real companies"*
- *"It allowed me to be more involved in the company, in a business world"*
- *"interaction with real companies"*
- *"in my opinion, creating a marketing plan for a real company is very more enriching for us students than for a fictitious company"*
- *"I really enjoyed getting to understand a little more about Inovaria, a project that I didn't know about before"*
- *"study of B2B companies that is not usual throughout the degree"*
- *"studying an area that I would not have chosen under other circumstances (software development)"*
- *"possibility to meet great professionals and acquire know-how"*
- *"gain skills for the elaboration of a marketing plan"*
- *"the tutorial support from the teacher"*
- *"exchange of information with the Strategic Management group of the 2nd year"*
- *"I consider a project something complex and challenging, both positive points"*
- *"I thought it was an extremely interesting initiative. Since during my 3 years of graduation I had not yet witnessed anything that was innovative, different from the traditional model of classes that we have"*

They also indicated the elements they considered more difficult:

- *"Lack of availability or slow response from the company to emails sent asking for information"*
- *"Little information about the company and difficult contact with managers"*
- *"Companies sometimes without a department or marketing function, making our work difficult"*
- *"Little cooperation from companies and lack of knowledge of the same about the work to be "developed"*
- *Schedule compatibility with group colleagues"*
- *"It is not possible to choose another workspace, as the companies were predefined and indicated to carry out this project"*
- *"Some groups were left with worse companies, where marketing doesn't apply as well, nor is it as "easy" to create and think about content. For product and B2C companies it is much easier"*

Suggestions for next experiences included:

- *"partnership with other companies"*
- *"companies from different industries should be included to allow more industries to be addressed in the development of the work"*
- *"more contact and interaction with companies, because a project of this kind requires some level of continuous interaction with the company to be carried out well, even if it's via email"*
- *"let the students choose the companies that will do the group work"*
- *"contact only companies with a Marketing department that are really interested and available to join this project and collaborate with students"*
- *"the curricular unit should be taught in a block of 4 hours per week on the same day instead of 2 classes per week of 2 hours"*
- *"considering that it is a curricular unit that complements Strategic Management curricular unit, a weekly class could be taught together"*
- *"possibility of a compatible timetable for the two curricular units"*

Students expressed their agreement on a set of ten affirmations focused on soft skills, on a scale of 1 to 5 (1 - totally disagree and 5 - totally agree), and regarding students' perception about their skill improvement as a result of participating in this pedagogical activity, some stimulating findings were uncovered.:

- *"allowed to gain more autonomy" (4,33)*
 - *"became more self-confident and with a positive attitude" (4,15)*
-

- *“became more responsible and mature” (4,30)*
- *“allowed to be motivated and focused to achieve success” (4,27)*
- *“allowed to gain teamwork skills” (4,61)*
- *“allowed to gain time management skills” (4,42)*
- *“allowed to gain skills in planning and organizing tasks” (4,61)*
- *“allowed to obtain more capacity to make decisions” (4,27)*
- *“allowed to gain leadership skills” (4,03)*
- *“allowed to gain communication skills (4,33)*

Moreover, two questions focused on knowledge/hard skills were asked using the same scale and the results were very positive:

- *“gained more knowledge of marketing and business planning” (4,85)*
- *“allowed to consolidate and articulate the knowledge acquired during the bachelor” (4,82)*

From a different perspective, the quality system assessment indicated an excellent evaluation of the course as a whole (7,82 on a scale of 1 to 9), the tutorial support of the teacher (8,43 on the same scale), promotion of students' autonomy (8,14). Students positively highlighted the creation of a favourable climate for learning and the active participation of students (8,19) and the great relationship between teacher and student (8,29). The assessment methods were considered very adequate (8,43) and assessment activities were very adequate and adjusted to the course's goals, as well (8,00). In terms of learning and understanding of the content, students were very happy with the outputs of the course (7,95).

Regarding the perception of the professor of the Business Planning and Marketing curricular unit (3rd year of the degree in Marketing) about this project, it is totally in agreement with the perception of the colleagues of the Strategic Management curricular unit (2nd year of the degree in Finance and Marketing) which was already presented in the previous section.

5. DISCUSSION AND CONCLUSIONS

Based on the results obtained from this study, it is possible to acknowledge the relevance of authentic learning initiatives as a tool to improve the teaching learning process for undergraduate students, both in the 2nd year and 3rd year of undergraduate studies.

From the perception gathered from students and teachers, there is numerous evidence that the implementation of this authentic learning project was frankly advantageous.

Most students very positively valued the benefits of this project for their academic and professional path, identifying a set of skills that they leveraged. Some students consider that it was a unique experience throughout their degree course and that it should be replicated in other curricular units. The following transcript is one of the examples of this type of reflection:

“I believe that the teaching process in this UC was one of the best, because it led students to learn from examples, to see and hear true stories, to visit companies. In my opinion, it has to be like this, just reading content from slides is not, in any case, the teaching process and teachers (in general) should seek to innovate.”

Some spontaneous written statements by some students expressed in the questionnaire clearly encourage teachers to continue to develop new authentic learning project in the future. For example: *“Thanks for the experience”* and *“Thanks for the idea and I hope you continue doing it next year”*.

The benefits obtained with the pedagogical teaching project clearly superseded the barriers. The authentic learning project promoted a positive learning environment in both courses where it was implemented, as expected by Stein et al. (2004). It also allowed PBL benefits like team work, student motivation and articulation between theory and practice, in line with what was identified by Fernandes (2014).

However, some students would have preferred working with firms they could choose themselves and others could have preferred more clarity and certainty in the work to be developed, or a more regular follow up with representatives from the firms to get more data and ensure they were on the right track.

It was also noted that most 2nd year students ignored the presentation performed by the Director of the IT cluster, something that was sought important by the responsible teachers to create more awareness about the context where the companies under study operated.

Furthermore, the connection between the groups of students from 2nd and 3rd years of study was not notoriously strong, as 2nd year students mostly did not attend the presentations of one another. Reasons behind this distinct behaviour of 2nd year students remain to be understood. It may be due to the teacher motivation and insistence to attend the presentations, the available time (other assessments in the same week) or student maturity.

To conclude, our results point that drawback may arise in this type of projects, for instance when companies involved do not follow up students' questions in a timely manner or when students do not perform the tasks required by the teachers (e.g., seeing the presentation of the director of the IT cluster about the context). Responsible teachers should account for counter measuring strategies to ensure that drawbacks do not have a negative impact on the overall learning process and follow up closely the development of the authentic learning project.

ACKNOWLEDGEMENTS

This work was financially supported by the research unit on Governance, Competitiveness and Public Policy (UIDB/04058/2020) + (UIDP/04058/2020), funded by national funds through FCT - Fundação para a Ciência e a Tecnologia, and by NECE-UBI, Research Centre for Business Sciences, funded by FCT – Fundação para a Ciência e a Tecnologia, IP, project UIDB/04630/2020.

BIBLIOGRAPHICAL REFERENCES

- Anazifa, R. D., & Djukri, D. (2017). Project-based learning and problem-based learning: Are they effective to improve student's thinking skills? *Jurnal Pendidikan IPA Indonesia*, 6(2), 346-355.
- Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The clearing house*, 83(2), 39-43.
- Bhagra, A., & Sharma, D. K. (2018). Changing paradigm of employability skills in the global business world: A review. *IUP Journal of Soft Skills*, 12(2), 7-24.
- Chiu, P. S., Pu, Y. H., Kao, C. C., Wu, T. T., & Huang, Y. M. (2018). An authentic learning based evaluation method for mobile learning in Higher Education. *Innovations in Education and Teaching International*, 55(3), 336-347. <Go to ISI>://CCC:000437195300011
- Di Gregorio, A., Maggioni, I., Mauri, C., & Mazzucchelli, A. (2019). Employability skills for future marketing professionals. *European management journal*, 37(3), 251-258.
- Fajaryati, N., & Akhyar, M. (2020). The employability skills needed to face the demands of work in the future: Systematic literature reviews. *Open Engineering*, 10(1), 595-603.
- Fernandes, S. R. G. (2014). Preparing graduates for professional practice: findings from a case study of Project-based Learning (PBL). *Procedia-Social and Behavioral Sciences*, 139, 219-226.
- Kokotsaki, D., Menzies, V., & Wiggins, A. (2016). Project-based learning: A review of the literature. *Improving Schools*, 19(3), 267-277. <https://doi.org/10.1177/1365480216659733>
- Krajcik, J. S., & Blumenfeld, P. C. (2006). *Project-based learning*. na.
- Lombardi, M. M., & Oblinger, D. (2007). Approaches that work: How authentic learning is transforming higher education. *EDUCAUSE Learning Initiative (ELI) Paper*, 5.
- Luna Scott, C. (2015). *The Futures of Learning 3: What kind of pedagogies for the 21st century?* (ERF Working Papers Series, Issue).
- Meyers, N. M., & Nulty, D. D. (2009). How to use (five) curriculum design principles to align authentic learning environments, assessment, students' approaches to thinking and learning outcomes. *Assessment & Evaluation in Higher Education*, 34(5), 565-577. <https://doi.org/10.1080/02602930802226502>
- Mioduser, D., & Betzer, N. (2008). The contribution of Project-based-learning to high-achievers' acquisition of technological knowledge and skills. *International Journal of technology and design education*, 18(1), 59-77.

- Musa, F., Mufti, N., Latiff, R. A., & Amin, M. M. (2012). Project-based learning (PjBL): Inculcating soft skills in 21st century workplace. *Procedia-Social and Behavioral Sciences*, 59, 565-573.
- Nab, J., Pilot, A., Brinkkemper, S., & Ten Berge, H. (2010). Authentic competence-based learning in university education in entrepreneurship. *International Journal of Entrepreneurship and Small Business*, 9(1), 20-35.
- Panasan, M., & Nuangchalerm, P. (2010). Learning outcomes of project-based and inquiry-based learning activities. *Online Submission*, 6(2), 252-255.
- Sarfraz, I., Rajendran, D., Hewege, C., & Mohan, M. D. (2018). An exploration of global employability skills: a systematic research review. *International Journal of Work Organisation and Emotion*, 9(1), 63-88.
- Stein, S. J., Isaacs, G., & Andrews, T. (2004). Incorporating authentic learning experiences within a university course. *Studies in Higher Education*, 29(2), 239-258. <https://doi.org/10.1080/0307507042000190813>
- Stozhko, N., Bortnik, B., Mironova, L., Tchernysheva, A., & Podshivalova, E. (2015). Interdisciplinary project-based learning: technology for improving student cognition. *Research in Learning Technology*, 23.
- Van Laar, E., Van Deursen, A. J., Van Dijk, J. A., & De Haan, J. (2017). The relation between 21st-century skills and digital skills: A systematic literature review. *Computers in human behavior*, 72, 577-588.
-