

PROJECT-BASED LEARNING IN DISTANCE LEARNING: AN APPROACH TO ORGANIZE EVENTS AND DEVELOP COMPETENCIES

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Abstract

Today the world is facing a great challenge that has a strong impact on the Mundial Educational System, the COVID-19 pandemic. The Covid-19 pandemic has changed the learning process and required that all students have to learn through online platforms which imply a distance learning process between teachers and students. In order to minimize this impact of COVID-19 on the students' learning, the educational system has been forced to change, and new pedagogical activities have emerged, everything was adjusted to the digital learning environment. Teachers during the year 2020 were forced to adapt their pedagogical activities as well as learn a new one to become attractive and motivating for students to actively participate in the distance learning process.

The objective of this article is to present an application of the Project-Based Learning (PBL) and understand the perception of students about the development of their transversal competencies acquired during this collaborative work. The project involved students from the second curricular year of a Higher Professional Training Course (HPTC) of Management Applied to the Development of Touristic Products (MADTP) at University of Aveiro, Portugal, during the fall/winter of 2020. Teachers shared the PBL methodology to join two disciplines for the same students: "Animation, and Itineraries and Tourist Events" and "Tourism Quality Management". It was purposed as a practical activity that students should organize four webinars with different themes. The aim of this project is to explore how collaborative work within PBL methodology can motivate students and engage them in distance learning using several digital tools to support the learning process, team coordination, and interpersonal communication.

The methodology used was initiated with exploratory research as a case study. One questionnaire was applied to better understand the perception of students to their competencies developed with this project. Implementing this methodology, teachers have a deeper knowledge about the transversal competencies that can be developed under this particular context.

The study shows some evidence of the students' perceptions about their competencies developed during a real-life learning context, such as communication, problem-solving, critical thinking, creativity, time management, collaboration, leadership, responsibility, self-direction, and work ethic. The results aggregate organizational and behavioural competencies.

Keywords: Project-Based Learning, Distance Learning, Collaborative work, Event Management, Transversal Competencies, COVID-19.

1 INTRODUCTION [ARIAL, 12-POINT, BOLD, UPPER CASE AND LEFT ALIG.]

In recent years there has been a constant concern about the quality of higher education and the practice of innovative pedagogical activities [1][2]. Today the world is facing a great challenge that has a strong impact on the Mundial Educational System, the COVID-19 pandemic [3]. Governments from different countries imposed online teaching, and virtual education replacing face-to-face classes aiming to stop the coronavirus spread [3]. In order to minimize the impact of COVID-19 on the students' learning process, new pedagogical activities are necessary to be implemented within the online teaching and virtual education environment. These new learning pedagogical activities must be active with opportunities to practice, to apply new knowledge and to solve real-world complex problems throughout group work collaboration and aiming to develop importantly competencies [2].

In the context of Covid-19 pandemic environment and in the particularly in the case of students from Higher Professional Training Course (HPTC), a course from Higher Education-based in acquiring competencies during a real-life learning context, PBL methodology was applied. Even though previous studies call out to the importance of PBL methodology [4], [2], [5] there are few studies that applied this methodology within the digital learning environment [6]. The online learning system can be a challenge and an opportunity at the same time to develop new learning pedagogical methodologies.

Project-Based Learning (PBL) is defined as a method that tries to understand a specific problem through practical solutions adopting and conducting a research process [7]. PBL is also defined as an approach of learning that involves students in order to create a solution to solve a problem or a challenge [8]. Finding out a solution, or creating a product, involves a process that the student, or a group of students, need to be proactive and take initiative [9]. They must organize their research, learning by themselves, creating their strategies to execute their project. Independence, responsibility, discipline in learning, organizing, and driving activities to launch the product, are some of the skills developed by this approach [8].

Students also learn through PBL methodology to solve real problems and tasks [7]. Teachers help students' autonomy, aiming to work as a group and develop critical thinking in order to achieve the best results. Intended to achieve these goals, teachers supervise every step of the process, providing feedback to guide their work whenever it is necessary. In its turn, the students reflect on their work to make a decision about the best solution [10].

We might say that PBL promotes a good environment to learn by doing, as an independent process of learning through collaborative work. And these factors motivate students to achieve the best results. Thus, PBL methodology can be considered to be a student-centered learning process [11] [12] that promotes critical thinking, problem-solutions, independence, autonomy, and collaborative work.

Nowadays, using technology associated with the PBL method can promote engagement and motivation [13]. Some authors also highlight the importance of the digital learning environment as a factor that facilitates the implementation of the method [14][15][16].

In PBL, the students need to develop cognitive skills to manage the complexity of the learning process, and they also need metacognitive knowledge to deal with ambiguous and complex real situations [10]. Besides, students acquire new competencies when they build metacognitive abilities, and it is reflected in new concepts that would be incorporated into their knowledge, skills, and abilities. Several studies suggested that PBL is a means to achieve the development of new competencies and integrates knowledge, skills, and values at the same time [17], [18].

Aiming to understand the perception of students about the development of their transversal competencies, this research adopted the concept of competence that includes cognitive elements, functional aspects, interpersonal characteristics and individual values[19] [18].

Some studies show that competencies can be developed in adulthood and it has an impact on job outcomes [20] [21], and it was considered as valid reason to adopt PBL methodology.

Finally, it should be pointed out that this study was focused on the development of transversal competencies such as communication, problem-solving, critical thinking, time management, creativity, collaboration, leadership, responsibility, self-direction, and ethics [17], [21]–[23].

The aim of this paper is to answer the following research question: “How can collaborative group work through the PBL methodology contribute to the development of students' transversal competencies, or motivate students and engage them in distance learning in order to support the learning process? We will describe the results of the PBL methodology implemented in the Higher Professional Training

Course (CTeSP) of Management Applied to the Development of Touristic Products (MADTP) at University of Aveiro, Portugal, during the fall/winter of 2020. Results will be demonstrated, we will conclude by assessing some limitations and some suggestions for future research.

2 METHODOLOGY

The present research employed the quantitative and qualitative methodology to the case study approach. In order to have complete information, we used different sources of that collection including online questionnaires and teacher observations. The online questionnaires were administered to students to measure their perception of the skills acquired during the project development.

The project involved twenty students from the second year of a Higher Professional Training Course (HPTC) in Management Applied to the Development of Touristic Products (MADTP) at University of Aveiro, Portugal, during the fall/winter of 2020. The project was implemented through two disciplines from the second curricular year, more specifically: Animation, Itineraries, and Tourist Events and Quality Management.

During the last three years the HPTC in MADPT has been organizing an annual event called TalkinTur, which is a seminar about tourism. The principal goal of this annual seminar is to allow students to learn how to organize an event. The secondary goals are that students can learn the subjects how to organize an event, how to communicate these events, how can this be a sustainable event, how can be evaluated the quality of the event and what can they learn with their mistakes and good practices adopted. In doing this, it is expected that some transversal competencies will be developed.

This year, because of the COVID 19 pandemic momentum that Portugal is facing, the students were challenged to organize a digital TalkinTur event. Because a digital event should have a time limit, it was consensual by the students and teachers involved that it could be organized into our short digital events, on four different days. The four principal groups were randomly formed.

It was planned four events and each event had a working group responsible for its organization. The four principal groups were randomly formed. Each group was constituted by five or six members. The students were instructed to choose a particular theme by group using a brainstorming activity within an on-line classroom. Once defined the topic of each webinar, the group's members worked collaboratively between groups and individuals within a group in the organization of each webinar.

It was decided that the principal group should be supported by three different groups that worked within different strategic communication tools, such as Facebook, Instagram and Virtual Posters. The communication strategy should be planned, integrated, and implemented after the principal group agreed.

This project implied the execution of five steps: planning, development, cooperating, execution, and evaluation. This approach encouraged students to be proactive, creative, work collaboratively in their team and other teams, independently developing several competencies. Students were responsible for important decisions along with the webinars 'organization, such as the subjects of each the event, to choose and to invite different speakers, to decide the division of different tasks (e.g. the participants' invitation, how to communicate the event).

Based on a literature review, the questionnaire was created with 28 items with a five-point Likert scale (from 1-very bad to 5- very good). The transversal competencies were supported by the items: Communication (1; 2;3), Problem solving (4; 5; 8; 9), Time management (10; 11), Creativity (7; 28), Collaboration (18; 19; 20), Leadership (14; 15; 16; 17), Responsibility (25), Self- direction (6; 21; 22; 23; 24), Work ethic (26; 27), Critical thinking (12; 13).

The students answer an online anonymous questionnaire on the last day of the semester, January 2021, in forms.ua.pt. The questionnaires ask the student to mark the level to which the competence was developed, in a Likert scale level of 1 to 5. This survey provides the student perceptions of the competencies developed, according to an intensity scale, in the collaborative work doing during the four events. The competencies are developed throughout the semester along with the project.

The survey data were analyzed to find the mean that indicates central tendency. Variability was analyzed by the standard deviation. This information determines the skills students identified as that they acquired during the work developed along with this project and the skills identified by students that are not so consensual.

3 RESULTS

The objective of this study is to acquire a better knowledge of students' perception of their competencies. And the methodology applied was PBL.

Heighten students respond to the questionnaire (9 female, 9 male) in the final of the semester. That represents 90% of the universe of the class. The age of students was between nineteen and twenty-three years old.

Results show that the PBL approach helps students to improve their competencies. All items have a mean higher than three (3 = reasonable).



Figure 1. Transversal competencies acquisitions (Mean). (Source: Authors)

The competencies related to teamwork obtained the highest values such: collaboration ($M^1= 4.24$, $SD^2=0.83$), responsibility ($M=4.17$, $SD=0.74$) and leadership ($M=4.03$, $SD=0.77$). Although the students identified collaboration as the competence they most developed, the standard deviation value was higher. These disagreements were aggravated as a result of the poor ability to manage conflict, particularly remotely. The lack of physical contact between students led to reduced socializing, missing an opportunity to get to know themselves a little better. Socializing is necessary to create affinity among peers [24].

On the other hand, the leadership of the teams emerged naturally throughout the work and proved to be essential when they were close to the deadline for completing tasks and carrying out the event. The leadership promoted the dynamism of the teams, coordinated the work, and alerted to the responsibility of each member [25].

Moreover, working on the webinars organization, an ethical attitude was crucial to be assumed by the students ($M=4.06$, $SD=0.55$). All the activities were planned and executed thinking in the best quality of the event. It was based on honesty, good relationships with the guest speakers, and well interaction were promoted by all members of the group because the goal achieved by each member depends on the work of the others as a team. It appears that the competence of responsibility ($SD=0.74$) presented smaller values of standard deviation, indicating that it was consensual among students that their individual work was important for the team to be successful in organizing the event.

The students were aware of their competencies accomplished in improved communication ($M=3.93$, $SD=0.88$). The written and oral communication was developed when they invited the speakers, sponsors and hosted the event [16]. They also invited potential participants, like teachers and other students.

¹ M – Mean value

² SD – Standard Deviation

Students also developed communication competencies to promote the event in social networks, creating Facebook and Instagram's pages and sending information to school newspaper and respective social networks.

The items that was focused on problem-solving ($M= 3.97$, $SD=0.69$) showed that students faced a number of real problems that must be solved using creativity and critical analysis [23] [26]. The event organization allowed the "learning by doing" from the real context and extracted knowledge students face complex problems in reality and they must resolve.

The competencies of critical thinking ($M=3.83$, $SD=0.68$) and creativity ($M= 3.81$, $SD=0.68$) had a lower score. These competencies are usually connected with problem-solving. Sometimes when problems come, students discussed their ideas with their peers, showing different points of view, question others, looking for a solution. The organizing thinking and critical analysis to seek new solutions to solve the problem [2].

Students' perception of the effects of PBL for their abilities' in self-direction ($M=3.88$, $SD=0.62$) showed the commitment, determination, and persistence of them to be successful in the organization of the event [15].

Time management ($M= 3.78$, $SD=0.72$) was the competence hardest to achieve. It became more difficult with social distance and distance learning. It took longer the communication in the digital world. It took time to manage the messages received by email, WhatsApp, and Skype. On the other hand, the answers they needed did not always come on time. It was not easy to combine work schedules when everyone was within remote working. The results of teamwork took longer to emerge and sometimes it was necessary some teachers' interventions in order to finish the tasks on time.

The results were relevant to show that using PBL methodology was important to student's motivation to learn and to work together. To achieve the best results, 78% of students answered that developing the project had contributed to achieving these competencies. Before the pandemic crisis of COVID-19, several authors find out the connection between PBL and transversal competencies [14] [13], [17], [21], [23], [24] [22] [25], and other recent studies confirmed the relevance of these methodologies regarding engagement and development of their competencies in distance learning [15], [16], [26], [27].

4 CONCLUSIONS

Despite the importance of PBL methodology, there are few studies that applied this methodology in the digital learning environment. Nowadays, digital technologies change the students' perceptions of real-world problems. Thus, they need to understand what they have to learn and how they need to apply it.

The purpose of this article was to present an application of the PBL and understand the perception of students about the development of their transversal competencies acquired during this collaborative work, organizing these events. In this sense, it is considered very important to bring to the online classes real-world problems. Besides, it helps to work as a collaborative group to find the best solution.

The results evidence that all students have the perceptions that they learn different competencies that were very important for their future as a professional. At the same time, all the behavioural competencies developed were considered complimentary training. And the research emphasized the importance of collaboration, responsibility, and leadership to be able to face the dynamics of the market, especially in times of global crisis. In conclusion, in a crisis situation, as we are facing now, we need to think differently to create innovative strategies.

The study has some limitations that can be future lines of research. The study was done during one moment of time, cross-sectional, so we cannot compare the evolution of the students' competencies with the project. It will be interesting to collect data before the implementation of the PBL and compare it with data collected in the end. The specific characteristics of the project do not allow it to be compared with other learning methodologies.

On the other hand, it may be of interest to study the participation of the teachers throughout the process. At distance learning, participation in orientation is more demanding, especial in the first stage of the implementation.

The implementation of PBL in distance learning, in a collaborative and active learning context allows students to share knowledge, be more reflective and develop transversal competencies that are so important to be successful, responsible, and socially engaged professionals.

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REFERENCES

- [1] A. Azevedo, G. Apfelthaler, and D. Hurst, "Competency development in business graduates: An industry-driven approach for examining the alignment of undergraduate business education with industry requirements," *Int. J. Manag. Educ.*, vol. 10, no. 1, pp. 12–28, 2012, doi: 10.1016/j.ijme.2012.02.002.
- [2] C. L. Scott, "The Futures of Learning 3: what kind of pedagogies for the 21st century?," *Educ. Res. Foresight*, pp. 1–21, 2015.
- [3] S. J. Daniel, "Education and the COVID-19 pandemic," *Prospects*, vol. 49, no. 1–2, pp. 91–96, 2020, doi: 10.1007/s11125-020-09464-3.
- [4] L. C. Chang and G. C. Lee, "A team-teaching model for practicing project-based learning in high school: Collaboration between computer and subject teachers," *Comput. Educ.*, vol. 55, no. 3, pp. 961–969, Nov. 2010, doi: 10.1016/j.compedu.2010.04.007.
- [5] B. L. Gerber, A. M. L. Cavallo, and E. A. Marek, "Relationships among informal learning environments, teaching procedures and scientific reasoning ability," *Int. J. Sci. Educ.*, vol. 23, no. 5, pp. 535–549, 2001, doi: 10.1080/09500690116971.
- [6] K. Zhang, S. W. Peng, and J. L. Hung, "Online collaborative learning in a project-based learning environment in Taiwan: A case study on undergraduate students' perspectives," *EMI. Educ. Media Int.*, vol. 46, no. 2, pp. 123–135, 2009, doi: 10.1080/09523980902933425.
- [7] J. R. Savery, "Overview of Problem-based Learning: Definitions and Distinctions," *Interdiscip. J. Probl. Learn.*, vol. 1, no. 1, pp. 9–20, 2006, doi: 10.7771/1541-5015.1002.
- [8] S. Bell, "Project-Based Learning for the 21st Century: Skills for the Future," *Clear. House A J. Educ. Strateg. Issues Ideas*, vol. 83, no. 2, pp. 39–43, 2010, doi: 10.1080/00098650903505415.
- [9] L. Helle, P. Tynjälä, and E. Olkinuora, "Project-based learning in post-secondary education - Theory, practice and rubber sling shots," *High. Educ.*, vol. 51, no. 2, pp. 287–314, 2006, doi: 10.1007/s10734-004-6386-5.
- [10] P. C. Blumenfeld, E. Soloway, R. W. Marx, J. S. Krajcik, M. Guzdial, and A. Palincsar, "Motivating Project-Based Learning: Sustaining the Doing, Supporting the Learning," *Educational Psychologist*, vol. 26, no. 3–4, pp. 369–398, 1991, doi: 10.1080/00461520.1991.9653139.
- [11] J. L. Shih, C. W. Chuang, and G. J. Hwang, "An inquiry-based mobile learning approach to enhancing social science learning effectiveness," *Educ. Technol. Soc.*, vol. 13, no. 4, pp. 50–62, 2010.
- [12] D. Kokotsaki, V. Menzies, and Andy Wiggins, "Project-based learning : a review of the literature," *Improv. Sch.*, vol. 19, no. 3, pp. 267–277, 2016, doi: doi.org/10.1177/1365480216659733.
- [13] C.-M. Hung, G. Hwang, and I. Huang, "A Project-based Digital Storytelling Approach for Improving Students' Learning Motivation, Problem-Solving Competence and Learning," *Educ. Technol. Soc.*, vol. 15, no. 4, pp. 368–379, 2012.
- [14] K. Anwar, S. Asari, R. Husniah, and C. H. Asmara, "Students' Perceptions of Collaborative Team Teaching and Student Achievement Motivation," *Int. J. Instr.*, vol. 14, no. 1, pp. 325–344, 2021, doi: 10.29333/IJI.2021.14119A.
- [15] T. Ningsih, S. Rahayu, and H. Kurniawan, "Lif skill education development through project-based learning in distance learning at MI Al-Falah UM," *Ilkog. Online - Elem. Educ. Online*, vol. 20, no. 2, pp. 117–122, 2021, doi: 10.17051/ilkonline.2021.02.10.

- [16] M. A. Baihaqi, S. Sarwi, and E. Ellianawati, "The Implementation of Project-Based Learning With Integrated Stem in Distance Learning to Improve Students' Communication Skills," *Educ. Manag.*, vol. 9, no. 10, pp. 227–233, 2020.
- [17] I. De Los Ríos-Carmenado, F. R. López, and C. P. García, "Promoting professional project management skills in engineering higher education: Project-based learning (PBL) strategy," *Int. J. Eng. Educ.*, vol. 31, no. 1, pp. 184–198, 2015.
- [18] R. E. Boyatzis, "Competencies in the 21st century," *J. Manag. Dev.*, vol. 27, no. 1, pp. 5–12, 2008, doi: 10.1108/02621710810840730.
- [19] K. Ananiadou and M. Claro, "21st century skills and competences for new millennium learners in OECD countries," *OECD Educ. Work. Pap.*, no. 41, p. 33, 2009, [Online]. Available: <http://dx.doi.org/10.1787/218525261154>.
- [20] R. E. Boyatzis, "Competencies as a behavioral approach to emotional intelligence," *J. Manag. Dev.*, vol. 28, no. 9, pp. 749–770, 2009, doi: 10.1108/02621710910987647.
- [21] S. Handayani and V. A. Kristianto, "Increasing Competency on Timber engineering using project-based learning," *J. engeneering thechnology*, vol. 2, pp. 56–65, 2018.
- [22] M. A. de la Puente Pacheco, D. Guerra, C. M. de Oro Aguado, C. Alexander McGarry, and L. Tinoca, "Undergraduate students' perceptions of Project-Based Learning (PBL) effectiveness: A case report in the Colombian Caribbean," *Cogent Educ.*, vol. 6, no. 1, 2019, doi: 10.1080/2331186X.2019.1616364.
- [23] M. D. C. Granado-Alcón, D. Gómez-Baya, E. Herrera-Gutiérrez, M. Vélez-Toral, P. Alonso-Martín, and M. T. Martínez-Frutos, "Project-based learning and the acquisition of competencies and knowledge transfer in higher education," *Sustain.*, vol. 12, no. 23, pp. 1–18, 2020, doi: 10.3390/su122310062.
- [24] D. Lee, Y. Huh, and C. M. Reigeluth, "Collaboration, intragroup conflict, and social skills in project-based learning," *Instr. Sci.*, vol. 43, no. 5, pp. 561–590, 2015, doi: 10.1007/s11251-015-9348-7.
- [25] J. S. Vogler, P. Thompson, D. W. Davis, B. E. Mayfield, P. M. Finley, and D. Yasseri, "The hard work of soft skills: augmenting the project-based learning experience with interdisciplinary teamwork," *Instr. Sci.*, vol. 46, no. 3, pp. 457–488, Jun. 2018, doi: 10.1007/s11251-017-9438-9
- [26] R. Yilmaz, F. G. K. Yilmaz, and H. Keser, "Vertical versus shared e-leadership approach in online project-based learning: a comparison of self-regulated learning skills, motivation and group collaboration processes," *J. Comput. High. Educ.*, vol. 32, pp. 628–654, 2020, doi: 10.1007/s12528-020-09250-2.
- [27] V. Ardhyantama and S. Widodo, "Creativity Skill Proses in Project Based Learning: A Case Study of Distance Learning in Pacitan," *Randwick Int. Educ. Linguist. Sci. J.*, vol. 1, no. 2, pp. 152–158, 2020, doi: 10.47175/rielsj.v1i2.82.