# Bridging Theory and Practice: Enhancing Business Decision Making Course through Project-Based and Work-Based Learning

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***Abstract****. This paper presents the project-based (PBL) and work-based learning (WBL) implementation within Business Decision Making course over the past four years. The implementation of the activity differed in each year considering the number of organisations included, who selected the organisations and defined the problems in the activity, and the mode of course delivery. Achieved levels of generic skills were self-evaluated by students. Additionally, course grades were also analysed. Analytical thinking involving mathematical skills and the ability to work in a team were the lowest and the highest achieved competencies respecting all four years. Better results in generic competencies skills were achieved when the problems were posed by teachers. Higher self-evaluated levels of skills' achievements are not always followed by higher exams and course overall results. However, higher activity grades were positively correlated with exams and course overall results. Consequently, it can be concluded that some students overrated the achievements of self-evaluated skills. Finally, the paper proposes how to design the WBL/PBL activity in the future.*

**Keywords.** project-based learning, work-based learning, Business Decision Making, learning analytics, ANOVA, correlation, Kruskal-Wallis test

## 1 Introduction

In a world of rapid change, higher education retains its role as a catalyst for a well-educated workforce. One of the prerequisites for quality learning and teaching for future professions is the application of innovative pedagogies. Innovative pedagogies that are becoming increasingly prevalent in teaching include interactive lessons, using virtual reality technology, using AI, blended learning, project-based learning (PBL), problem-based learning, work-based learning (WBL), inquiry-based learning, flipped classroom, and experiential learning (Khamitova, 2023; Tran, 2024).

Successful collaboration with the private sector has enabled the Faculty of Organization and Informatics to actively implement PBL and WBL in the teaching process. The course Business Decision Making (BDM) is implemented in the sixth semester of the Entrepreneurship Economics study program. The course provides a comprehensive understanding of key concepts of business decision-making, decision-making theories that form the basis for decision-making processes, and the application of various decision-making approaches, preparing students for the complex challenges of decision-making in the business world. Students in seminar classes apply theoretical knowledge of methods and techniques. The seminar classes are designed for students to solve real challenges and case studies through discussions, small group work, and individual assignments. In the scope of this course, students participate in a PBL/WBL activity related to analysing different problems. This paper describes how this activity was implemented during the past four academic years (each year differently) and compares the achieved results concerning the acquired competencies and grades. The paper's goal is to evaluate different variants of PBL/WBL applied to the course. The purpose of the evaluation can be observed in the light of learning analytics (LA) because the idea is to conclude the design of PBL/WBL activities that are the most successful in practice. To track the success of those designs, two aspects are covered: (1) development of student generic competencies and (2) achieved grades.

The paper is organised as follows: Section two presents the literature review related to PBL and WBL. Section three presents the research methodology. Section 4 presents the results of the research. Finally, section 5 concludes the paper.

## 2 Literature review on PBL/WBL

Many innovative teaching and learning strategies can be used to increase the quality of the education process. Their choice depends on several factors. These factors include the subject, learning outcomes, characteristics of students, knowledge of educators to implement certain innovative teaching and learning strategies,

practical possibilities to implement certain innovative teaching and learning strategies and others. This section focuses on work-based and project-based learning.

The work-based learning (WBL) includes employers in the education process. WBL is often a very successful approach. It incorporates both theoretical and practical aspects of learning which ensures a high comprehension of the education process. There are many variants of how employers can be included in academic education. Some of them include student internship (the most advanced form), job shadowing, providing real case studies for problem-solving assignments, and participating in the evaluation and assessment phase.

The purpose of the WBL is to increase the effects of studying. The positive effects on students' achievement motivation were identified in research conducted in Indonesia. The authors concluded that WBL can improve the quality of the education process. (Sudjimat & Permadi, 2019). Additionally, WBL can improve students' soft skills. (Dogara et al., 2020)

WBL is also called workplace learning and work-integrated learning. Many scientific papers describe good and bad practices in WBL, analyse students' motivation, how the education process is organised, what the benefits of WBL are, and what are the issues. Listed topics were also the focus of the systematic literature review conducted in 2020. The issues faced by faculties and universities were related to time planning, different expectations from WBL by academia and industry, a large amount of resources needed to implement WBL, and students' skills and well-being. (Murtazin et al., 2020) In the same year, a systematic review of the literature resulted in the identification of WBL features and educational leadership features in the journal articles 2015-2020. Further, the authors analysed the types of connections between WBL and educational leadership. The highest number of articles can be associated with the collaboration as a type of connection between WBL and educational leadership indicating the need for collaboration among students and educators with industry and other relevant stakeholders. (Sudirman & Gemilang, 2020)

More recently, in 2023, another systematic literature review was conducted focusing the conducting the WBL in an online environment. The authors were dealing with the identification of WBL typologies and the effectiveness of WBL. They concluded that in some case studies, the function of technology is supportive, while in others the function of technology is delivering. Additionally, they analysed the case studies in the light of Schuster and Glavas classification. In terms of WBL effectiveness, there is a lack of robust evidence. (Rienties et al., 2023) Analysing WBL in an online environment was also analysed in the literature, especially in the light of Covid-19 pandemic. The author concluded that Covid-19 speeded up the online WBL. However, the theoretical and practical of WBL should be connected better. (Lester & Crawford–Lee, 2023)

There are two study programs types, university (scientific) and professional study programs. Professional study programs are more practice-oriented and consequently, more suitable for intensive WBL application. That was exactly the focus of the research related to the scientific nature of WBL. The authors came up with "five first principles or fundamental conditions of scientific inquiry ". They conclude if the scientific inquiry is defined as narrow, then professional programs can't be considered scientific. But, if the definition is broad, then the conducted research, which included WBL analysis, suggests that professional study programs are scientific. (Fergusson et al., 2020)

Project-based learning (PBL) is related to posing and solving different kinds of problems in different fields. Employers now do not have to be included in the education process, but it is possible to include them and witness the application of both strategies, PBL and WBL. Applying the PBL contributes to the development of both, technical and generic skills that are crucial in social science, for example in the field of marketing (Rohm et al., 2021). Additionally, PBL can enhance students' learning, increase their motivation and success (Maros et al., 2023; Ngereja et al., 2020; Rozal et al., 2021), improve students' self-efficacy (Krsmanovic, 2021) and boost their higher-order thinking skills (Eliyasni et al., 2019).

Similarly to WBL, PBL played an important role during the Covid-19 pandemic. This is presented in the research that analysed the interviews with teachers in the United States. Results show that PBL improved individual learning experiences, tackled students to take responsibility for their learning, upgraded communication and collaboration between students and educators, and promoted technology (Hira & Anderson, 2021). Another research among teachers resulted in a structural equation model that confirmed that PBL improved student engagement by enabling discussions (Almulla, 2020). A student perspective on PBL is also analysed in the literature. One of the common student-related problems in PBL is collaboration among students during the project implementation. (Hussein, 2021).

There are different approaches available for students' knowledge and produced artifact assessment. Assessment is one of three components of constructive alignment. Both PBL and WBL present the polygon for diverse (formative and summative) assessment approach applications. Different authors presented sets of assessment activities implemented with PBL in engineering courses (Cifrian et al., 2020) and business decision making (Kadoic & Slibar, 2020). Further, PBL can be combined with another innovative pedagogy and there is some evidence of its combination with flipped classrooms (Chis et al., 2018; Hossein-Mohand et al., 2021; Shih & Tsai, 2016).

A systematic literature review on PBL research resulted in 76 papers that were focused on cognitive aspects of teaching and learning, affective aspects, behavioural aspects, and artefact performance. The authors also gave recommendations for how future studies in PBL should be designed. Some of them are related to presenting a more comprehensive project evaluation, giving more details on methodologies applied, and enabling more details on reporting and validity of developed instruments. (Guo et al., 2020)

The success of different WBL and PBL variants varies depending on different aspects. Our research evaluates the success of WBL/PBL variants by considering the level of generic competencies students achieve and their grades.

# 3 Methodology

This section describes the application of PBL and WBL in the BDM course, the research questions, and the methods applied to answer the research question.

## 3.1 Application of PBL and WBL in BDM

As a part of the BDM course, a team activity titled "Development of Project Idea" has been applied for over ten years. This paper focuses on analysing the implementation of activities in the last four academic years. The implementation of the activity differed in each of the four years.

In this activity, students practically address the business challenges of public organisations, non-profit organisations, and private companies from their immediate environment. In the first observed year, all assigned challenges were related to an association involving counselling, education, promotion, and improvement related to individuals with various impairments and disabilities. In collaboration with responsible persons from the association, seven topics were prepared for the team members to work on, each being addressed by two teams of students.

The elaboration of the topic involved the prescribed elements of the PrOACT approach (Hammond et al., 1999), including:

1. analysis of the business case problem,
2. identification of criteria for evaluating created alternatives,
3. creation of alternative solutions to the problem,
4. identification of the consequences of individual alternative solutions and selection of the best alternative solution,
5. financial and time plan for the implementation of the chosen alternative solution,
6. analysis of the risks of applying the chosen alternative solution,
7. ethical background of the analysed problem and proposed solution, and
8. marketing aspects of the chosen solution.

**Table 1.** The comparison of the activity implementation over four years

| | Number of organisations | Who selected organisations in PBL/WBL | Who defined topics for projects | Teaching process |
|---|---|---|---|---|
| 2021 | 1 | Teachers | Organisations | Online |
| 2022 | 5 | Teachers | Teachers and organisations | F2f |
| 2023 | 31 | Students | Students | F2f |
| 2024 | 1 | Teachers | Teachers | F2f |

During the practical handling of the assigned topic, students actively communicated with responsible persons from the association. The final solutions were presented online, as epidemiological measures due to COVID-19 were in effect during that period. The project evaluation was done by teachers and carried the highest percentage in the overall grade, followed by evaluations from the person responsible for the association and evaluations from student colleagues. In the second year of the observed topic, challenges included family agricultural business, home crafts, transportation company, private clinic, and cultural arts society, totalling eight topics. For the needs of project activities in the third observed year, students themselves researched and negotiated challenges, so there were no recurring topics. The challenges included organisations from the public and private sectors, totalling 31. In the fourth year, the challenges were related to the needs and projects of the faculty and the banking sector. Solutions were physically presented at the university in the second, third, and fourth years. The mentioned course of project activity was the same during all observed years (FOI, n.d.).

## 3.2 Research questions and methods

After the "Development of Project Idea" activity had been implemented, the students participated in a survey related to self-evaluation on the level at which they achieved ten generic competencies. The competencies are presented in Table 2. The survey consisted of 10 closed questions related to the generic competencies and two open questions related to the positive and negative aspects of the activity implementation. The generic competencies used in this research were previously used in different research by researchers in the Center for Student Support and Career Development (University of Zagreb Faculty of Organization and Informatics), and in (Anicic & Buselic, 2021; Pažur Aničić et al., 2023). The closed questions were quantitatively defined, describing the level at which particular competence was achieved. Five levels (from 0 to 4) describe each competence

achievement. The students participated in the research voluntarily.

The answers to the survey from the past four years, together with the grades, are analysed in this paper to answer the following research questions:

- RQ1: What were the average levels of achievement of each competence per year? Is there a significant difference among the competencies' achievements in different years?
- RQ2: Do those who are defining the project topic influence the improvement of students' generic competencies?
- RQ3: What were the average grades of students per year? Is there a significant difference among the students in different years?
- RQ4: In the years when they improve their generic competencies, do the students notice improvements in their project and exam scores?
- RQ5: Are the project scores and midterm exams scores correlated, and how has the correlation changed through time?

For comparing the improvement of students' generic competencies over time, the Kruskal-Wallis test was performed because the assumptions for the one-way analysis of variance (ANOVA) were not satisfied. If there were a significant difference in the Kruskal-Wallis test, then post hoc tests were done to find where the difference exists. For this purpose, the Dunn test with multiple testing corrections was performed (p-values adjusted with the Holm method). Pearson correlations between project and midterm exam scores were calculated and compared over four years. For comparing students' project and exam scores over four years, ANOVA with post hoc tests (Tukey HSD test with adjusted p-values) were performed because the assumptions for using ANOVA were satisfied.

# 4 Results

The answers to the RQ1 can be found in Table 2.

**Table 2.** Comparison of generic competencies over four years

| Ability to quickly acquire new knowledge (Brzo_OCJ) | | | | |
|---|---|---|---|---|
| | n | $\bar{x}$ | SD | p value |
| 2021 | 81 | 2.88 | 0.98 | 0.4785 |
| 2022 | 21 | 2.90 | 1.04 | |
| 2023 | 38 | 2.61 | 0.95 | |
| 2024 | 50 | 2.80 | 0.99 | |
| Ability to identify and solve problems (IRP_OCJ) | | | | |
| | n | $\bar{x}$ | SD | p value |
| 2021 | 81 | 3.22 | 0.822 | 0.0081* |
| 2022 | 21 | 3.24 | 0.889 | |
| 2023 | 38 | 2.66 | 0.909 | |
| 2024 | 50 | 2.98 | 0.869 | |
| Ability to apply knowledge to practical problems (PRIMJENA_OCJ) | | | | |
| | n | $\bar{x}$ | SD | p value |
| 2021 | 81 | 3.14 | 0.862 | 0.0997 |
| 2022 | 21 | 3.00 | 0.894 | |
| 2023 | 38 | 2.68 | 0.989 | |
| 2024 | 50 | 2.94 | 0.890 | |
| Ability to work in a team (TIM_OCJ) | | | | |
| | n | $\bar{x}$ | SD | p value |
| 2021 | 81 | 3.33 | 0.894 | 0.1688 |
| 2022 | 21 | 3.48 | 0.512 | |
| 2023 | 38 | 2.95 | 1.06 | |
| 2024 | 50 | 3.34 | 0.848 | |
| Analytical thinking involving mathematical skills (AR_OCJ) | | | | |
| | n | $\bar{x}$ | SD | p value |
| 2021 | 81 | 2.73 | 0.949 | 0.0002* |
| 2022 | 21 | 2.62 | 1.02 | |
| 2023 | 38 | 2.21 | 1.02 | |
| 2024 | 50 | 1.9 | 1.22 | |
| Responsibility in work and evaluation of the quality of your own work (OCG_OCJ) | | | | |
| | n | $\bar{x}$ | SD | p value |
| 2021 | 81 | 3.33 | 0.822 | 0.0711 |
| 2022 | 21 | 3.33 | 0.730 | |
| 2023 | 38 | 2.97 | 0.915 | |
| 2024 | 50 | 2.96 | 1.03 | |
| Ability to adapt and act in new situations (PRIL_OCJ) | | | | |
| | n | $\bar{x}$ | SD | p value |
| 2021 | 81 | 3.17 | 0.755 | 0.0026* |
| 2022 | 21 | 3.19 | 0.814 | |
| 2023 | 38 | 2.53 | 1.06 | |
| 2024 | 50 | 2.70 | 1.02 | |
| Capacities for generating new ideas (GEN_OCJ) | | | | |
| | n | $\bar{x}$ | SD | p value |
| 2021 | 81 | 3.19 | 0.823 | 0.0983 |
| 2022 | 21 | 3.14 | 0.910 | |
| 2023 | 38 | 2.68 | 1.07 | |
| 2024 | 50 | 3.08 | 0.877 | |
| Ability to work under pressure (PRIT_OCJ) | | | | |
| | n | $\bar{x}$ | SD | p value |
| 2021 | 81 | 2.79 | 1.01 | 0.0275* |
| 2022 | 21 | 3.05 | 0.92 | |
| 2023 | 38 | 2.29 | 1.14 | |
| 2024 | 50 | 2.48 | 1.11 | |
| Independence in work (SAM_OCJ) | | | | |
| | n | $\bar{x}$ | SD | p value |
| 2021 | 81 | 3.28 | 0.84 | 6.291e-05* |
| 2022 | 21 | 3.05 | 1.12 | |
| 2023 | 38 | 2.58 | 1.13 | |
| 2024 | 50 | 2.40 | 1.20 | |
| Average grade | | | | |
| | n | $\bar{x}$ | SD | p value |
| 2021 | 81 | 3.11 | 0.6 | 0.0008* |
| 2022 | 21 | 3.1 | 0.688 | |
| 2023 | 38 | 2.62 | 0.752 | |
| 2024 | 50 | 2.76 | 0.672 | |

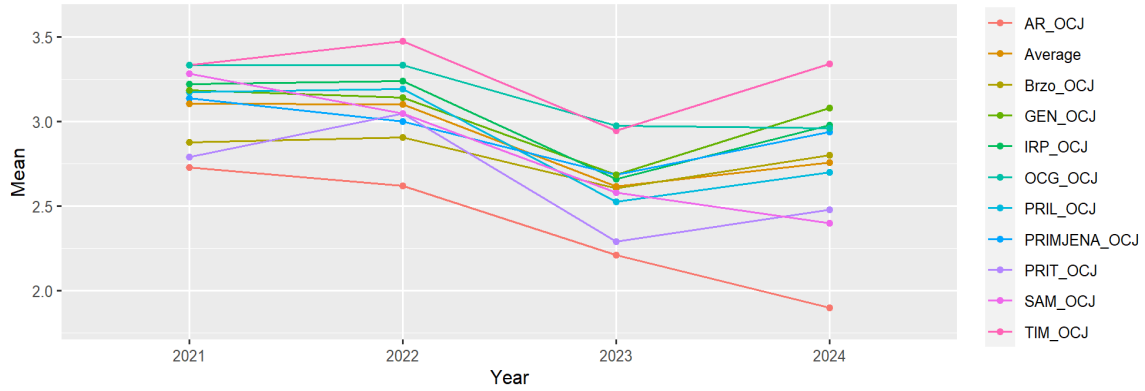


**Figure 1.** Comparison of generic competencies over four years over four years

On average, the levels of competencies' achievements vary among both years and competencies.

The lowest average level of competence achievement was 1.9, which was achieved in 2024 in relation to analytical thinking involving mathematical skills. The highest level of competence achievement was 3.48, which was achieved in 2022, related to the ability to work in a team. Additionally, analytical thinking involving mathematical skills and the ability to work in a team were the lowest and the highest achieved competencies respecting all four years. A detailed analysis of the competencies' achievement per year and each competence is presented in Table 2.

In terms of statistically significant differences among the competencies' achievements in different years, they are identified in several competencies. They are the ability to identify and solve problems (2021-2023 p.adj=0.008, 2022-2023 p.adj=0.070), analytical thinking involving mathematical skills (2021-2023 p.adj= 0.051, 2021-2024 p.adj=0.00019), the ability to adapt and act in new situations (2021-2023 p.adj=0.0102, 2021-2024 p.adj=0.042), the ability to work under pressure (p-value= 0.02745<0.05; 2022-2023 p.adj= 0.074189), and independence in work (2021-2023 p.adj=0.006778, 2021-2024 p.adj= 0.00013). A similar conclusion is for the average improvement after WBL/PBL activity (2021-2023 p.adj= 0.00314982, 2021-2024 p.adj=0.02086040). The average improvement for all generic competencies over four years is represented in Fig. 1.

Now, RQ2 can be answered. From Table 1 and Fig. 1, it is clear that in 2023, when students defined the topics of their projects, the lowest levels of competencies achievements were achieved in the majority of competencies.

To answer the RQ3, Table 3 is prepared. According to it, 84 students enrolled in the course in 2021, 92 in 2022, 83 in 2023, and 56 in 2024. Also, for all categories, students' results statistically significantly changed over time, and students had the best grades in most categories in 2024 (except PROC). Points for assessment (PROC) that students achieved statistically significantly differ for 2023 and 2022 (p.adj= 0.0168424), and on average, students had the best results in 2023 for this grading category. Achieved points for report (RAD) were statistically significantly greater in 2024 than in other years (2024-2021 p.adj=0, 2024-2022 p.adj=0.0000001, 2024-2023 p.adj=0) and also lower in 2021 than in other observed years (2022-2021 p.adj=0.0000076, 2023-2021 p.adj=0.0059596).

**Table 3.** Comparison of grading components

| Points for assessment (PROC) (4) | | | | |
|---|---|---|---|---|
| | n | $\bar{x}$ | SD | p value |
| 2021 | 84 | 2.27 | 0.33 | 0.0156 * |
| 2022 | 92 | 2.24 | 0.376 | |
| 2023 | 83 | 2.40 | 0.427 | |
| 2024 | 56 | 2.25 | 0.294 | |
| Points for report (RAD) (16) | | | | |
| | n | $\bar{x}$ | SD | p value |
| 2021 | 84 | 12.3 | 1.67 | <2e-16 * |
| 2022 | 92 | 13.6 | 1.82 | |
| 2023 | 83 | 13.2 | 1.54 | |
| 2024 | 56 | 15.2 | 1.63 | |
| Midterm exam 1 (K1) (35) | | | | |
| | N | $\bar{x}$ | SD | p value |
| 2021 | 84 | 15.3 | 5.07 | 2.53e-08 * |
| 2022 | 92 | 16.7 | 5.27 | |
| 2023 | 83 | 17.0 | 3.84 | |
| 2024 | 56 | 20.5 | 5.07 | |
| Midterm exam 2 (K2) (35) | | | | |
| | N | $\bar{x}$ | SD | p value |
| 2021 | 84 | 16.9 | 5.29 | 6.82e-12 * |
| 2022 | 92 | 13.5 | 4.28 | |
| 2023 | 83 | 16.4 | 5.36 | |
| 2024 | 56 | 20.4 | 6.54 | |
| K1+K2 (70) | | | | |
| | n | $\bar{x}$ | SD | p value |
| 2021 | 84 | 32.2 | 9.37 | 1.01e-11 * |
| 2022 | 92 | 30.2 | 7.25 | |
| 2023 | 83 | 34.7 | 7.26 | |
| 2024 | 56 | 40.9 | 10.6 | |
| Total number of points (Bodovi) (100) | | | | |
| | n | $\bar{x}$ | SD | p value |
| 2021 | 84 | 59.0 | 10.5 | 3.3e-05 * |
| 2022 | 92 | 59.1 | 10.2 | |
| 2023 | 83 | 54.0 | 8.4 | |
| 2024 | 56 | 62.2 | 11.6 | |

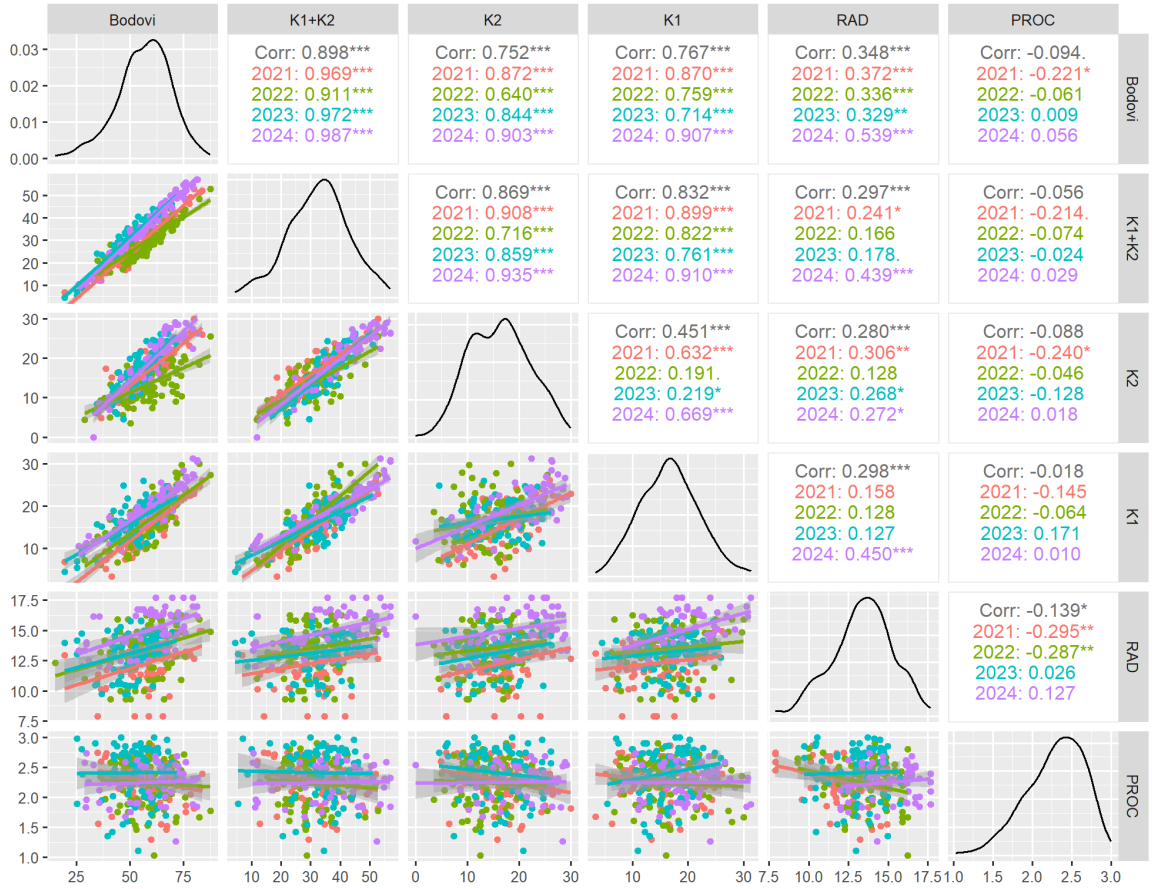


**Figure 2.** Correlations between grading components over four years

Also, the number of points that students achieved on midterm exam 1 (K1) (2024-2021 p.adj=0, 2024-2022 p.adj= 0.0000279, 2024-2023 p.adj=0.0001921), midterm exam 2 (K2) (2024-2021 p.adj=0.0011726, 2024-2022 p.adj=0, 2024-2023 p.adj=0.0001276), and total number of points on midterm exams (K1+ K2) (2024-2021 p.adj=0.0000001, 2024-2022 p.adj=0, 2024-2023 p.adj=0.0001276), were statistically significant greater in 2024 than in other observed years. Achieved points for K2 were statistically significantly lower in 2022 than in other years (2022-2021 p.adj=0.0001277, 2023-2022 p.adj=0.0017179), but the total number of points on midterm exams was higher in 2022 than in 2023 (2023-2022 p.adj=0.0027084). The total number of achieved points (Bodovi) statistically significantly differs for the following years: 2021-2023 p.adj=0.0076733, 2022-2023 p.adj=0.0054387, and 2023-2024 p.adj=0.0000254.

To answer the RQ4, the results from Table 1 and Table 2 have to be combined. In the years when they improve their generic competencies, students notice improvements in their project and exam scores in 2021-2023, but not in 2024.

Correlation analysis was implemented to answer the RQ5. Fig. 2 shows that the total number of points exhibited statistically significant positive Pearson's correlation with all other grading components except points for assessment (PROC) over four years. The total number of points and points for assessment are negatively correlated, especially in 2021. Also, PROC was negatively correlated with the midterm exams results and also exhibited statistically significant negative Pearson's correlation with achieved points for the report (RAD) (especially for 2021 and 2022), but achieved points for the report (RAD) and results of exams are statistically significant positively correlated (RAD and K1 for 2024, RAD and K2 2021,2022, and 2024).

# 5 Conclusion

This paper presents the analysis of the implementation of PBL/WBL activity in the BDM course, considering the grades achieved and the achievements of self-evaluated levels of competencies.

Analytical thinking and mathematical skills were the least developed competencies over all four years, while teamwork skills were the most developed. Students performed better in generic competencies when teachers assigned problems. However, higher self-assessments of skill achievements did not always correlate with better exam and course results. On the other hand, higher activity grades were positively correlated with exam and overall course results. This suggests that some students overestimated their self-assessed skill achievements.

Based on the review of competencies development results by year, it can be concluded that students developed their teamwork skills to a lesser extent in the year when they chose the topics of WBL/PBL activity themselves (2023). One reason could be groupthink and the dominance of the team member whose idea was selected and analysed in the WBL/PBL activity. Additionally, in the same year (2023), their poor selection of decision-making topics for WBL/PBL activity negatively impacted their ability to identify and solve problems, as confirmed by the overall points achieved. One possible reason for the lower development of idea-generation skills in that year (2023) is the subjectivity in problem analysis, as they chose the problems themselves, and teachers evaluated the solutions as less creative. Due to subjectivity and the anchoring trap during that year, their ability to adapt and act in new situations decreased.

When choosing topics independently (2023), students had a less developed ability to work under pressure because they did not have many opportunities for consultations with teachers and organisations—which were not included in the topic definition. On the contrary, students had a more developed ability to work under pressure when teachers and organisations defined topics for WBL/PBL activities because, in those situations, students had the opportunity to consult them and were not left to themselves.

Students were less independent when teachers defined the topics for WBL/PBL activities (2024) because they had more opportunities for consultations with teachers, which they used. During the same year (2024), analytical thinking skills decreased due to the increased use of artificial intelligence tools, reducing their reasoning and problem analysis.

In light of the foregoing LA analysis, revising the WBL/PBL activity considering the previous conclusions is necessary. In the new activity model, students should not choose topics independently; teachers should define the topics in collaboration with organisations. Students should have more frequent consultations with the organisations presenting the problems, and experts from the organisation should be included in the evaluation process of students' projects. WBL/PBL activity needs to be adjusted to the challenges and opportunities offered by artificial intelligence (AI) because AI can be used to create solutions efficiently. Additionally, it is necessary to train students to evaluate AI-generated solutions critically. Finally, the WBL/PBL activity revision should include an evaluation of each team member's contribution. Those are valuable LA conclusions for teachers at the course.

Consequently, considering the above conclusions, it is proposed that the redesigned activity be implemented for the next academic year. Further, it is recommended that a survey related to competencies development and grade analysis be conducted, which will enable evaluation of the impact of the revised WBL/PBL activity (did the proposals for activity revision achieve desired results).

The limitations of this research include the voluntary nature of the survey, meaning that not all students who enrolled on the course participated in the survey. Further, the surveys were anonymous, so matching survey results with individual student performance was not possible. Finally, competency achievements were assessed through self-assessment, a subjective evaluation method.

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