A Problem-Based Learning Implementation to a Psychology Course in Higher Education

Isabel Cuadrado, Andreea A. Constantin

Department of Psychology, University of Almería, Spain.

Abstract

The present work describes a Problem-Based Learning (PBL) activity implemented in an undergraduate course of Psychology of Groups. Additionally, considering the findings on the effects of PBL on cognitive and motivational components, we also explored the effect of the PBL activity on students' information processing strategies and intrinsic motivation using a pre-post design. Only 28 students (25% men) completed the measures at both point times (pre and post-activity). Although no significant pre-post differences was found for any of the measured variables, the observed trend of change revealed mixed results. While for some cognitive strategies (e.g., critical thinking, information management, information transference) a trend towards improvement could be observed between the pre-post phases, for strategies of information elaboration and information acquisition the trend was reversed. Despite the non significant results, the present work contributes to the field of research on PBL in higher education by describing and testing the effects of a PBL activity implemented in a social discipline, a field in which PBL implementation is rather scarce.

Keywords: *Problem-based learning; higher educaction; psychology of groups; information processing.*

1. Introduction

To respond to the needs of a society characterized by globalization, high technological development and low employability, the Bolonia Plan (1999) raised as one of its key elements the modification and adaptation of the traditional teaching style and the promotion of student-centered learning. However, recent reports (EURYDICE, 2015) reveal that the change in the teaching paradigm is relatively difficult. In this sense, it might be helpful to promote the use of new teaching methodologies in the classroom such as active methodologies focused on learning (e.g., problem or project-based learning). Following a constructionist perspective, this type of methodologies conceptualizes learning as a process in which the student is the main protagonist and actively builds knowledge. Accordingly, in the present work, we examine the effect of the implementation of a problem-based learning (PBL) activity on students' cognitive strategies related to information processing in an undergraduate course of Psychology of Groups.

1.1. PBL studies

PBL is a teaching-learning strategy in which the student actively manages their learning under the supervision of the professor/instructor. In general terms, it seeks to stimulate the motivation of the students and their sense of responsibility regarding the learning process (Boronat, 2008). Working individually or in small groups, students identify and search for the information necessary to respond to a real-life problem or situation previously raised by the professor. The situation or problem is designed so that, specific knowledge objectives are achieved through its solution. PBL was found to be effective for both content knowledge acquisition and the achievement of a series of skills, attitudes and values necessary both in the professional field and in other life fields (Bradley-Levine & Mossier, 2014; Guo *et al*., 2020; Kokotsaki *et al*., 2016). For example, it has been found that PBL increased students' intrinsic motivation to learn (Lima, 2021; Ocak & Uluyol, 2010), improved students cognitive skills such as critical thinking, synthesizing, evaluating, predicting, reflecting and engaging in scientific exploratory tasks (e.g., Boubouka & Papanikolaou, 2013; ChanLin, 2008; Horan *et al*., 1996; Stefanou *et al*., 2013). The impact of PBL has been tested across educational levels, from elementary school to higher education. However, a recent review of the studies developed in higher education (Gou *et al*., 2021) emphasized that few studies (e.g., de Lima, 2021) have applied PBL in humanities and social sciences discipline. In this sense, our work contributes to the field of research on PBL in higher education by describing a PBL activity implemented in an undergraduate course of Psychology of Groups. Additionally, considering the findings on the effects of PBL on cognitive and motivational components, we will also explore the effect of the implemented PBL activity on student's strategies of information processing and intrinsic motivation.

1.2. Context and description of the implemented PBL activity

During a previous academic course, several difficulties were detected among students when it came to understanding the different stages of the research process. A large part of the students struggled with basic aspects such as the search and selection of bibliographic material, or the lecture, the analysis and the synthesis of the information provided in the research literature. To help students to overcome this type of difficulties and facilitate the acquisition and development of basic and transversal skills in both the academic field and in the general context, a learning activity was designed following the PBL premises. The activity was carried out with the six practice groups of the course Introduction to Psychology of Groups studied in the 2nd year of the degree in Psychology. Each group had approximatively 25 students, thus each practice groups was divided into 4 or 5 small working groups. The proposed practical activity asks students to participate in a fictitious competitive call for research projects of the Education Ministry. Students had to propose and develop a research project on a subject of free choice related to the theoretical contents contemplated in the first four units of the course. The activity was divided into three phases in which the students had to carry out different group and/or individual tasks to facilitate the achievement of the proposed objectives.

Phase 1. Reading and understanding of scientific literature

In this phase, three short activities were carried out oriented towards the detection of learning needs, and towards the reading, the analysis and the understanding of scientific literature (e.g., research articles, book chapters) related to the content of the course. Each activity had associated an evaluable virtual task. In the first session, the students were presented with a PBL activity and methodology. Subsequently, in groups of a maximum of 5 people, the students applied different group decision-making techniques (Brainstorming or Phillips 66), previously explained by the professors, to detect their learning needs. Specifically, they had to answer the question: *What do we need to know and know how to do to prepare a research report*? (e.g., perform database searches). At the end of the session, the needs detected by each group were shared. The virtual task consisted of creating an entry in the WIKI (online portfolio) of the group in which the students described how they carried out the group technique, the detected learning needs of their group, and the conclusions reached after the joint group discussion in class. The learning needs detected by the students and agreed upon in the joint discussion are summarized in the following 6 points: to choose a topic for your research, how to search and where to find information, how to read and understand the information found, how to organize the information found, how to write (vocabulary, style, format, etc.), how to work in a group. In the second session, the activity carried out aimed at facilitating the reading and understanding of scientific literature. Using a research article and a series of guide questions developed by the professors of the course, the students were explained how to detect the relevant information in a research article. To carry out the virtual

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task linked to this activity, each group chose a research topic and searched for a research article on that topic. Subsequently, each group created a new entry in their WIKI and analyzed the article conjointly, answering the guide questions. In the third session, each group shared the analyzed article. Specifically, each group presented to the other groups the chosen topic and a summary of the analyzed article. Furthermore, the difficulties encountered during the search and analysis process were shared, and an exchange of ideas between the groups took place to guide and provide possible solutions to the difficulties encountered. The virtual task consisted of the analysis performed by each group member of a research article related to the group's research topic following the guide questions.

Phase 2. Preparation and writing of the introduction of a research report

This phase included learning how to build, to structure and to write the introduction of a research report. In the fourth session, the students were explained different techniques for preparing a theoretical introduction, as well as the basic rules of the APA style. In the fifth session, the articles analyzed by each group were shared, briefly explaining how they planned to structure the information considering the criterion of theoretical coherence, as well as expressing the difficulties encountered in the process. Each group received feedback from both the professor and the members of the other groups. Both sessions were associated with a single virtual task that consisted of preparing and delivering a draft of the introduction.

Phase 3. Defense of the research project

The activity associated with this phase consisted of the public presentation of the research project in a free choice format (slides, poster, video, story-telling, role-play, etc.). The professors reminded students that the financing of their project depended in equal measure on the theoretical content as on their public defense thus, the presentation should be convincing, creative and original. The defense of the projects was carried out in two sessions (sessions 6 and 7). In each session, 2 to 4 groups presented their projects. The viewer groups evaluated the presenting groups and pose at least one question to each of the exhibiting groups. The questions asked by the classmates and the teacher constitute the feedback about those parts of the work that need improvement. The evaluation criteria for the presentations have been developed and provided to the students by the teachers. After the defense of the projects, the groups had a period of 10 days to prepare the final deliverable of the research project proposal (theoretical review on the chosen topic and objectives and research hypotheses from the reviewed literature).

2. Method

2.1. Participants

Only 23 students (25% men) completed the questionnaire at both time points (pre and post activity).

2.2. Measures

Students' intrinsic motivation, knowledge about search and bibliographic resources, strategies of selection, elaboration, acquisition, organization, management and transference of information and critical thinking were assessed. All measures used a seven-points response scale ranging from 1 (*totally disagree*) to 7 (*totally agree*) and were extracted from the CEVEAPEU questionnaire (Gargallo *et al.*, 2009).

3. Results

The results of paired sample *t* test revealed no significant differences between the pre-post measurements of the assessed variables (Table 1).

Table 1. Pre-post differences for the measured variables.

		Mean	SD	t	df	Sig (bilateral)
Intrinsic motivation	Pre	5.99	0.92	0.216	22	0.831
	Post	5.96	0.79			
Knowledge of search resources and bibliographic resources	Pre	5.00	1.06	-1.453	22	0.16
	Post	5.26	1.12			
Information selection	Pre	4.89	1.01	-0.355	22	0.726
	Post	4.93	1.03			
Information elaboration	Pre	5.88	0.78	1.686	22	0.106
	Post	5.63	0.93			
Information acquisition	Pre	4.94	0.97	1.786	22	0.088
	Post	4.57	1.13			
Information organization	Pre	4.90	1.51	0.047	22	0.963
	Post	4.89	1.56			
Critical thinking	Pre	5.30	0.99	-0.891	22	0.383
	Post	5.45	1.13			
Effective management of information	Pre	5.02	1.27	-0.689	22	0.498
	Post	5.17	1.02			
Transference of information	Pre	5.84	0.72	-0.877	22	0.39
	Post	5.94	0.86			

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4. Discussion

The aim of this study was to describe a PBL activity implemented in an undergraduate course of Psychology of Groups and to examine its effects on student's strategies of information processing and intrinsic motivation. The activity was implemented to help students to overcome the difficulties encountered when they are confronted with distinct phases of the research process. Specifically, we focused on the improvement of students' strategies of information search, selection and processing. The results indicated that the PBL activity did not affect significantly the measured variables. Interestingly, while for some cognitive strategies (e.g., critical thinking, information management, information transference) a trend towards improvement could be observed between the pre-post phases, for strategies of information elaboration and information acquisition the trend was reversed. It seems that the PBL activity impacted negatively on students' self-perception regarding their ability to acquire and elaborate information. Indeed Boubouka & Papanikolaou (2013) informed of mixed effects of PBL; the effect was not significant on student achievement, but significant and positive on self-perceived learning performance. Likewise, Schaffer et al. (2012) found that although the PBL increased students' self-efficacy, for others the PBL decreased it. The lack of significance of the results could be due to the small size of the sample. Likewise, it should be mentioned that the participation of the students has been voluntary and no type of reward has been provided (e.g., obtain an extra score). Furthermore, a closer look at the scores of intrinsic motivation suggests that our participants might have been the students with a higher interest and motivation in carrying out academic activities. Their interest and motivation could be associated with a constant level of dedication to academic tasks, which could explain the lack of variation in our results.

Finally, some aspects that need be improved have been detected, based on the feedback of the students and the observations of the professor. First, the students were allowed to freely decide the topic to investigate as long as it was related to the content of one of the first four units of the course. The election of the research topic was the first challenge for the students because, at that specific time, the students did not know the content of all the units. On the other hand, the wide range of topics to be investigated has also made this election difficult, even when counting with the teacher's guidance. Future modifications to the PBL activity should contemplate providing the students with more concrete information and fewer election options during this initial phase to facilitate the election of the research topic.

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