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Advantages and disadvantages of using the problem-based learning method- PBL for upper level students in business areas

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Abstract

Problem-based learning (PBL) is a teaching method that encourages the student´s proactivity to reason, in order to seek solutions to the problem in question. This article aims to evaluate the advantages and disadvantages of using the PBL method for top level students in business areas. In order to meet the objective, a questionnaire was prepared from the literature studied and sent to 375 students, with a return rate of 19%. The main results show that 74% of the respondents consider that the practical classes contribute to the memorization of the content, 93% of the respondents consider it an opportunity for personal and social formation, besides promoting the sharing of knowledge and improvement in decision-making. It also found that 83% feel more protagonists in the PBL method and more than 81% feel more engaged in their own learning. As a result, it was possible to identify a favorable perception of the learning method that leads and engages the student. This research also allows us to conclude that the PBL is, in fact, perceived as a more current and innovative method by students.

Keyword: Methods. Undergraduate. Problem-based learning. Evaluation. University.

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ABSTRACT

Problem-based learning (PBL) is a teaching method that encourages the student´s proactivity to reason, in order to seek solutions to the problem in question. This article aims to evaluate the advantages and disadvantages of using the PBL method for top level students in business areas. In order to meet the objective, a questionnaire was prepared from the literature studied and sent to 375 students, with a return rate of 19%. The main results show that 74% of the respondents consider that the practical classes contribute to the memorization of the content, 93% of the respondents consider it an opportunity for personal and social formation, besides promoting the sharing of knowledge and improvement in decision-making. It also found that 83% feel more protagonists in the PBL method and more than 81% feel more engaged in their own learning. As a result, it was possible to identify a favorable perception of the learning method that leads and engages the student. This research also allows us to conclude that the PBL is, in fact, perceived as a more current and innovative method by students.

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1 INTRODUCTION

One of the main objectives of education is the training of critical and fully participating citizens, motivating the constant improvement of teaching-learning techniques to accompany the changes observed in society. The evolution of the labor market also generates pressure on the forms of teaching and learning, and contemporary methodologies are directed primarily towards the training of independent professionals capable of solving diffuse problems (DE MASI, 1999). Undergraduate programs are currently presented as the main testing arena for the formation of a new generation - known as Y - that matured amidst the new information technologies and the global network; a generation characterized by entrepreneurship, independence, restlessness, agitation, anxiety and impatience (LEMOS, 2011; MUNRO, 2009; SOARES, 2008).

The profile of this new generation points to the need for teaching techniques that value autonomy and practical experiences, addressing real-world issues to establish relationships between objects and concepts in the search for solutions, simultaneously stimulating the conceptual, procedural and attitudinal development of students (BOROCHOVICIUS; CRISTINA; TORTELLA, 2014). Considering this context, Problem-Based Learning (PBL) - is presented as a pedagogical resource to meet the learning demands found in these students. Starting from practical problems, the PBL stimulates the search for solutions in

small groups, using systematic processes of analysis, search and exchange of information and critical self-evaluation in the cycle of resolution of the issues presented (FREITAS, 2012; KAROLINE, 2010).

In order to verify the efficiency of this pedagogical method, this article presents a preliminary evaluation of the application of the PBL in the training of bachelors in Administration, Foreign Trade, Economics and Accounting of a private educational institution in Paraná. Using a questionnaire, the students' perception of Problem-Based Learning was evaluated, highlighting the advantages and disadvantages that the PBL presents in relation to traditional teaching methods, highlighting among them the expository method.

2 CONCEPTUAL/THEORETICAL FRAMEWORKS

The emergence and application of the problem-based teaching method in universities, according to Gomes, Brito and Varela (2016), began in medical courses in Canada, more precisely in the 1960s. The method was structured in four axes, which go through the integrated curriculum, with the fusion of scientific disciplines in thematic axes; the study based on problems based on reality, involving research and discussion in small groups for the resolution, understanding and acquisition of knowledge; insertion of students in public health and education services and evaluation in differentiated methodology, leading to the appropriation of metacognitive knowledge (GOMES; BRITO; VARELA, 2016; MENEZES-RODRIGUES et al., 2019).

During the subsequent years of its implementation, the PBL began to be disseminated to the Netherlands, Australia and the United States (BRANDA, 2009; COELHO, 2016). In Brazil, it began at the School of Public Health of Ceará in 1993; at the Faculty of Medicine of Marilia in 1997; and at the Medical Sciences course of the State University of Londrina in 1998 (BRANDA, 2009). The idea began at the medical schools and it was later recommended for other areas besides medicine such as economics, law and engineering in several places around the world (RIBEIRO, 2005).

Barrows (1986) described the basic cycle that make up this path of problem-based learning, as the organization of working groups where students receive the problem in order to examine it, discuss it and define a search for solutions. Then, the aspects of the problem are identified; the questions that were not understood are ordered and, from there, information and new knowledge are shared, closing cycles with self-evaluation as individuals and collective (BARROWS, 1986).

Innovative teaching practices are necessary for learning - considering that, according to Velloso (2014), the rapid transformations that society has experienced with the information technologies developed from the network connections and accessibility through mobile devices, such as smartphones, has influenced the formation of a new student profile: more dynamic, more technological and less patient to sit paying attention to content merely passed by the teacher. These students seek information through the Internet and are involved in this context, therefore, there is a need for a methodology that follows this reality, since the traditional methods of teaching learning, whether in basic education or undergraduate education are not sufficient to achieve a higher cognitive learning (GIL, 2015), in short, the most recent projections for the future of education indicate that the school, as it is today, has little chance of survival in the coming decades (BARBOSA; MOURA, 2013).

The PBL connects classroom activities with problems in the student's daily life, gives them more responsibility and ability to solve issues that will arise in their daily lives and thus have systematic arguments to make the resolution effective. In this way, innovation in education is promoted, with a new curriculum suited to this method and where learning is not only the acquisition of much information, but also transform this information into knowledge that will be useful to manage the life of the student in school, in primary education, in high school, in undergraduate and postgraduate education (BARBOSA; MOURA, 2013; GOMES; BRITO; VARELA, 2016).

In this way, a collaborative and solidary space between the various entities of the group is spontaneously created. This climate favors the construction of an enriching environment that only collaborative work can provide, and in this sense the teacher who traditionally transmitted knowledge as a protagonist, becomes mentor and tutor in this transformation of the learning teaching process (LAMBROS, 2004; SOARES, 2008).

The process of teaching learning is a challenge for teachers, principals and all those who make up the school, in an attempt to make the student have a high intellectual and cognitive capacity. Building conceptual learning, lacks current and a well developed methodologies (BEERS, 2005; CEZAR et al., 2010; MENEZES-RODRIGUES et al., 2019).

However, in the PBL, student commitment is fundamental to the success of the teaching and learning process; cooperative learning requires individuals to be in line with the group's objectives. It happens that the teacher in the classroom needs to have skills to develop interpersonal relationships in students through a change of posture, since education is a dynamic process of learning, in this sense the teacher also has the responsibility to be in permanent update of interdisciplinary knowledge, considering that the PBL requires a close relationship between teacher, student and content for the objectives of learning are achieved effectively (BOROCHOVICIUS; CRISTINA; TORTELLA, 2014; GOMES; BRITO; VARELA, 2016; MENEZES-RODRIGUES et al., 2019a).

The tutor-teacher has several specific functions in the PBL, such as encouraging students to make their own decisions; contributing to students seeking reliable references through research; identifying students with difficulties in this process, so that it is possible to lead them to learning; promoting the integration of working groups; and stimulating the exploration of knowledge already existing in the student to be added to the new (DELISLE; OLIVEIRA, 2000; LAMBROS, 2004)..

That said, it is necessary to reflect on how this teaching strategy takes place in practice, what the PBL cycle is and how the teacher behaves who intends to work in a more innovative way in his methodology. Thus, Freitas (2012) points out that, in the PBL, the curriculum has a difference in the organization of traditional education being organized by modules or axes and this implies a more robust and complex structure for the operationalization.

By observing the teaching practice in universities, through the regulations and criteria adopted by the regulatory body (MEC, 2019) still resembles the traditional one, in which the teacher transmits the content; discusses with students; performs the activities; and, the student answers the questions; and moves on to the next content after the memorizations. That is, a methodological strategy that is still perceived in most schools. However, different strategies have been developed by teachers who believe that they can teach in a different way and, thus, will be more effective in the content and learning of students. These are

innovative practices, with the aim of making the student stop being just a listener and begin to actively participate in learning, that is, as a protagonist of their own knowledge (SOUZA; GOLDEN, 2015).

In this educational context, all those who make up the school should be encouraged to seek new forms of teaching that would be more appropriate to the student and the needs of society, with methodologies that innovate the way of teaching, in which learning is more effective (BOROCHOVICIUS; CRISTINA; TORTELLA, 2014; GIL, 2015).

The PBL in educational practice is a curricular challenge, since it needs systematic structural changes, as well as an integrated teaching staff and trained to work the content in an interdisciplinary way. However, it offers a development of new skills, such as: autonomous learning; teamwork; and adaptability to change (KAROLINE, 2010; RIBEIRO, 2005).

The PBL methodology is usually applied through working groups, in which students receive the problem; discuss; diagnose; elaborate the questions that have answers; for the unanswered questions, research the solutions and finish with collective evaluation and self-assessment. It seems a simple strategy, however, the responsibility and qualification of the teacher increases considerably (GIL, 2015; MENEZES-RODRIGUES et al., 2019b).

The construction of knowledge by the PBL is a method of interdisciplinary and transdisciplinary learning, i.e., all school entities may be involved in this process, unlike the traditional alternatives where the teacher of the subject is the only protagonist of teaching. Moreover, when the teacher ceases to be the protagonist so that the apprentice can manage his own knowledge relying on the guidance of the teacher, who at this time becomes a mentor, a new reality of reconnection of knowledge is created where it seeks to develop new knowledge and skills of students (BARROWS, 1986; DELISLE; OLIVEIRA, 2000; GIL, 2015).

The development of guided and non-impulsive thinking makes it possible to face complex problems and situations. The use of the PBL in undergraduate education allows students to develop conceptual and procedural skills (KAROLINE, 2010). In other words, they are built in an active and not passive way, leading to autonomous learning; the application of memorized knowledge in other contexts; the use of knowledge acquired in the analysis of new problems; and situates the student since the beginning of the course in his professional area (GOMES; BRITO; VARELA, 2016).

As mentioned by Mamede and Penaforte (2001), the construction of knowledge in an active way reinforces the idea that the PBL cannot be applied in isolation, although the student has the capacity to seek their own solutions, the discussion and sharing of information is fundamental for the strategy to work effectively. Understanding the content in a complete way requires an effort not only from the student, but also from the teacher when accompanying the groups as a guide and motivator, in this sense the presence of the teacher is essential for the objectives to be achieved.

For Vygotski (2015), the child's development takes place first at the social level and only then at the individual level. In other words, between people and after by himself, this application also takes place in the memory and formation of concept and also emphasizes that the superior functions originate from the real relationships between people. From this approach of the thinker, it is observed that the group study provided by the PBL method has numerous advantages, since it promotes and still encourages social interactions not only of the child, but also of the adult already at the level of undergraduate education.

When communication is established, there is an active participation in the production of knowledge and also provides the individual with the interaction that makes him/her feel a sense of belonging. Thus, the individual is an element in this construction and cultural and social development.

Morin (2015) points out that group work is an opportunity for personal and social formation and offers learning that provides a planetary citizenship. As one of the main characteristics of the PBL, the student has the opportunity to share knowledge and learning through collaboration in solving problem situations.

At PBL, group work stands out as a form of activity in which there is an appreciation of the student's coexistence in the learning process, in which all are protagonists and collaborate with mutual learning and in an integral manner (BARRETT; MOORE, 2011). In this approach of the authors, collaborative learning is essential to the formation of independent subjects. In this process of seeking the solution of the problems presented, the student faces different ideas, divergent points of view, has to make analysis and interpretation of the facts and will necessarily have to learn to respect divergences in order to find solutions to proposed issues.

Finally, in the PBL, the teacher ceases to be the protagonist and starts to stimulate the student to be independent and reason with autonomy. According to Borochovicius et. al (2014), this methodology does not only meet the needs of students, but also of teachers. In other words, the method has the function of allowing students to solve problems related to the future profession and thus will be able to learn, be critical and make the decisions they will need in life as professionals. With regard to teachers, the method encourages them to research more and seek interdisciplinarity, in order to make connections in teaching with the needs of professionals who will be their students in the future.

The professor who uses the PBL, besides being prepared with interdisciplinary knowledge, certainly needs to have other important qualities for this new learning reality, such as respect for the opinion of students, leadership and constant feedback (MARTINS; NETO; SILVA, 2018).

Thus, the PBL offers paths for pedagogical problems related to teaching activities, such as deficiencies in the integration between theory and professional practice and difficulty in promoting knowledge beyond the technical-scientific curriculum (COELHO, 2016). As indicated by the author it is pertinent to evaluate and consider that the professor is fundamental in this process, the opportunity to make the student more active by making him have transformative actions in a multidisciplinary context is necessary for the development and quality in learning. Ribeiro, (2005) also emphasizes that working with real life problems is fundamental for the development of concepts and thinking skills.

The educational context of the PBL is rich in possibilities, however, the experiences need to be accessible to students and teachers, who need structures and training in order to glimpse an effective teaching methodology (MAMEDE; PENAFORTE, 2001). Realities below the imagination or the solutions proposed by the teacher can have negative results for learning, so many teachers seek methodological alternatives that are compatible with their realities, exploring the possibilities and mobilizing the interdisciplinary processes so that they effectively have positive results (SOARES, 2008).

However, there are questions about the PBL that should be the object of reflection, such as the practice being more forceful than the theory. The PBL has a much greater relationship with practical studies than with the theory commonly used in the classroom, since the student is in a real situation of experience

with a real problem to be solved and obviously being encouraged to think to solve it. In this sense, one can imagine that, without theoretical knowledge, the mentee will not have subsidies to develop strategy and seek the solution to the problem in question, enriching the concepts and making learning complete (FREITAS, 2012).

The implementation of the PBL, may encounter resistance in schools that are accustomed to traditional methods, since allied to the lack of updates and improvements of teachers, there are misunderstandings and apprehensions on the part of the teaching staff that resist the new reality. That is, they feel threatened in their conservative and traditional posts by the new model, in which they no longer have the domain of learning so that the student is more independent (BEERS, 2005; GIL, 2015).

3 METHODOLOGY

The research conducted is characterized as descriptive as to its objectives and quantitative as to its approach, with results based on the application of a questionnaire type survey. It was chosen the descriptive research with the objective of clarifying the phenomena and consistent facts of a reality or context of interest to the researchers, in this case, the reception of students to the PBL as didactic method. The quantitative orientation was selected by the need for a rapid range of responses, with a lower focus on the interpretation of the object, objectively measuring the perceptions of students about the classes held (BOGDAN; BIKLEN, 1994; GERHARDT; SILVEIRA, 2009).

The research population consisted of 375 second and third year students from the Administration, Foreign Trade, Accounting and Economics courses of a private university in Paraná. In this universe, the sample was established in a non-probabilistic way, with intentional training or by judgment, according to the concepts presented by Oliveira (2001). According to the author, in the intentional sample the researcher uses his or her own judgment in the definition and choice of the research participants, who were selected according to their availability and conformation as good sources of information for the objectives defined in the investigation.

It was decided to use the questionnaire in data collection because it presents the following advantages for the research: obtaining a large number of data; saving time; obtaining faster and more accurate answers; maintaining anonymity; focusing on a specific group simultaneously, in addition to obtaining the opinion and experiences of respondents in relation to a particular phenomenon, theory or experience (LAKATOS and MARKONI, 2011).

The questionnaire was constructed based on a critical review of the literature. Between July and August of 2019, texts, books and scientific journals from the SciELO, Scopus and Web of Science databases were consulted, which discuss constructivism in education, with a focus on Problem-Based Learning. The Scopus and Web of Science databases were chosen because they are considered the main international databases, both with millions of peer-reviewed articles (CHICKSAND et al., 2012; FAHIMNIA et al., 2015; MISCHIATTI; MOLETA; CATAPAN, 2017). The SciELO database was chosen because it is one of the main Brazilian scientific databases (MISCHIATTI; MOLETA CATAPAN, 2017).

Based on the critical review of the articles consulted it was possible to arrive at the basic structure of the questionnaire that would be applied, for which questions were prepared focusing on two specific

topics: 1) differences between traditional classes and classes with the PBL method and 2) survey of the main characteristics of the PBL and how they were perceived by students. Most of the questions had the objective of contrasting the theoretical and practical classes, showing whether or not there were perceived differences between the two methods.

A pre-test was performed, and after the adjustments and corrections, the instrument had ten questions. For the topic of differences between methods, questions such as "Have you ever participated in a class in which, after theory, students meet in groups to solve a problem?", and for the topic of perception of the characteristics of the PBL were asked questions such as, "which class do you consider more 'traditional': theoretical or practical?". Among the ten questions, eight presented closed answers with two alternatives from which the respondent should select only one. The two remaining questions also used closed answers, but with three alternatives that represented the level of agreement or disagreement of the respondent in relation to an assertive with the theme "group work".

The basic (free) version of the surveymonkey software was used for the application (SURVEYMONKEY, 2019). This tool was chosen due to the fact that it presents simple completion and automatic tabulation of responses, maximizing the number of respondents and generating accurate and reliable data at the end of the survey. The questionnaire was transferred in its final version to the digital platform, generating a link that was sent to the 375 students who made up the survey population. The participants accessed the platform between 22 and 26 August 2019, a period in which 72 responses were obtained, corresponding to a participation rate of 19.2%.

Even considering that the sample is not probabilistic, the number of participants reached within the population configures the survey as statistically valid for a 90% confidence level (COMENTTO, 2019). The population was considered as more homogeneous (80/20), due to the fact that all participants were students of a specific level from a private institution, sharing demographic characteristics, such as age, and of a similar sociocultural level, which was also considered in the intentional selection of the sample by the researchers.

4 ANALYSIS AND DISCUSSION

The results of the survey were grouped in relation to the contractive character between theoretical classes (expository/traditional) and practical classes (in working groups/PBL). In the first place, it was observed that 75% of the respondents declared to have already participated in classes similar to the PBL method, with initial theoretical exposure followed by group meeting for practical approach of a problem or question (in contrast to the classes only expository and without practice or consequent group work). The expository theoretical classes are also perceived as the most "traditional" type of class by 91.67% of respondents, which allows us to conclude that the PBL is, in fact, perceived as a more current or different method by students.

When asked about the deepening of the content, more than half of the respondents (54.17%) indicated that the traditional expository classes retain advantage over the practical classes. However, for all the other questions, the practical classes were indicated as superior to the expository classes, in the

perception of the participants. Chart 1 summarizes the answers to the respondents' perception of the practical classes.

Chart 1 – Synthesis of the opinions in relation to the practical classes (in groups)

There is more learning	72,22%
They are more innovative	91,67%
Feels like a protagonist	83,33%
Feels more engaged	81,94%
Memorize the content better	73,61%

Fonte: the authors (2019)

As Chart 01 shows, the results also indicate that 72.22% of respondents consider that this type of classroom conduction provides greater learning than the use of the lecture alone. 83.3% also feel more protagonists of the class and 81.94% more engaged in their own learning when they participate in practical group activities, with better memorization of the content for 73.61%. Finally, 91.67% consider that this type of class is more innovative, corroborating the contrast perceived in relation to the expository class as the most "traditional" method.

With the data it is possible to assume that there is a perception of benefit and advantages when the method used involves practice, student groups and problem solving. The answers show that protagonist and engagement are characteristics which more than 80% of respondents agree. These answers corroborate the ideas of Barret and Moore (2011), who consider both teachers and students protagonists of learning in the classroom.

The collected results emphasize that the activities carried out in groups, favor an independent learning, in which the apprentice becomes a protagonist of his or her own knowledge (BEERS, 2005; RIBEIRO, 2005; BARRETT; MOORE, 2011; GIL, 2015; COELHO, 2016). According to Barrows (1986), this happens because this method goes through the following stages: the identification of the problem, the exploration of different approach strategies, the assessment of the solution and the consolidation of the learned contents. It should be noted that, in addition to the benefits perceived by students in this research, Borochovicius et al. (2014) report that this method also brings advantages for teachers, although it requires greater dedication and effort for the assembly and supervision, when compared to other methods, on the other hand, it allows dividing the time for research and laboratory activities, often prevented by routine disciplinary activities.

When asked which of the methods is more traditional, 91.67% agree that they are the theoretical expository classes, pointing out that it is an almost integral perception of the respondent students. This teaching technique arrived in Brazil recently, in the 1990s, and is increasingly being used in several courses in Brazilian universities for its benefits and for being considered innovative (BRANDA, 2009).

In relation to the deepening of the subject, there was a proximity of the answers, 54% stated that the theoretical classes (expository) bring greater depth of content, against 46%, who stated that there is greater deepness in practical classes (groups).

It is observed that, in the sense of "greater volume of content", the students considered that it is the expository classes that meet this requirement. This perception is contrary to the thought of the authors

Ribeiro, 2005; Soares, 2008; Freitas, 2012; Borochovicius et al., 2014; Gil, 2015; Coelho, 2016, who consider that there is greater depth of concepts and learning in the PBL, which would result in a higher cognitive learning for students. This perception of students can be explained, according to Mamede and Penaforte, (2001), for the reason that schools often do not provide adequate structures and training for teachers to use the methodology effectively.

The two statements were tested and, for the first, 38% fully agree that "group work is an opportunity for personal and social training and offers learning that promotes citizenship", and, they did not have "totally disagree". For the second, 47% fully agree that "group activity, based on a problem, gives the student the opportunity to share knowledge and make decisions. The answers are in line with the authors Ribeiro, 2005; Soares, 2008; Freitas, 2012; Borochovicius et al., 2014; Gil, 2015; Coelho, 2016; Martins; Neto; Silva, 2018, who argue that this approach brings more involvement of students with the problems of society and helps in decision-making.

Finally, it was observed, by the perception of the students surveyed, that there is a tendency that the classes in participatory groups tend to be better used than the expositive ones. This is in line with the concepts researched and exposed in the theoretical framework.

5 CONCLUSIONS

This article aimed to analyze Problem-Based Learning through a survey questionnaire for business students from a private university in Paraná who are in their second and third years of education.

It was verified that the PBL is a form of learning with a high potential of reasoning for a society that needs to learn autonomously, generating a transformational learning, engaging the student and leading him to the search for own and contextualized solutions to different problems and issues.

As presented in the discussion of the results, the most evidenced positive characteristics were related to learning, innovation, protagonist, engagement and memorization. Thus, this methodology is considered an innovative and effective proposal, but in its application, must be present concomitantly with a theoretical framework that enables the student to seek solutions to the issues in an integral manner with quality methodological theoretical subsidies.

It is also noteworthy the practical application of this research, which proposed to analyze the advantages and disadvantages of the PBL by the vision of business school students. This analysis compared the answers to the questionnaires with the main authors of the area verifying a compatibility of ideas and positive perceptions in this teaching model.

It is still necessary to reflect that there are really positive points of wide coverage in the strategy of teaching by problems. However, if not applied in a responsible and integrative manner, there is a serious risk of not effectively achieving the improvement in the quality of teaching that is sought with new methodologies.

With the application of this research it was verified that the relevance and positive perception in relation to the use of this teaching methodology. However, it is important to note that this article was restricted to a quantitative research, focusing on the application of a structured questionnaire to a limited sample in a single private university in the State of Paraná.

As a suggestion for future research, it is recommended that a qualitative research be carried out with different universities in Brazil, to validate the main results obtained, with different data collection techniques, such as an application of individual interviews and focus group.

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