

PBL- as a useful way for development in cooperation: a case of DTMU

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Abstract

There are three attitudes that medical teachers consider to be essential for graduates in their future professional life. These attitudes are: *autonomy*, *personal responsibility* and *cooperation*. In the framework of the EU granted Erasmus+ project “e-PBL-net”, Davit Tvildiani Medical University in Tbilisi, Georgia (DTMU) developed a new track in Basic and Medical Science stage of undergraduate education called PBL. The aim of the tract was to let students internalize positive attitudes towards what they are learning and at the same time towards the learning process itself. Therefore, this study seeks to investigate the entire process of how the PBL was applied by the DTMU and find out to what extent this new track has helped students to progress in the context cooperation. Methodologically, the authors of this research use a case study by comparing and therefore analyzing students’ assessment grades following their PBL weeks. Criteria of assessment are: student’s *preparation* for PBL, *contribution* and *attitude* during their PBL sessions. The observation including interviews was done in 2017. Precisely, estimation was performed at three time points. The points are: 3rd semester student and 5th semester students during the first PBL week and the last PBL week. Mean score PBL group in three time points for each category were compared as well as student’s individual progress in each assessment category was estimated. One way of fostering cooperation versus competition can be a design of curriculum and learning environment, which we see as a PBL method.

1 Introduction

The problem based learning was widely spread in the 1920s and 1930s. It is based on the theoretical principles of D. Dewey, who founded in 1894 in Chicago an experimental school in which the curriculum was replaced by playing and working. Reading, counting and writing classes were conducted only in connection with the needs - the instincts that spontaneously developed in children, as they developed - physiological maturation. For learning, Dewey (1938) singled out four important needs-instinct: social, construction, artistic expression, research. To satisfy these instincts, the child of preschool age was provided with the word (books, stories),

works of art (pictures), and technical devices (toys) as sources of knowledge, children were involved in the game. At a younger age, the child was offered puzzles, tasks and were involved in practical activities.

Subsequently, psychological and pedagogical research in the field of creativity, creative thinking and problematic teaching allowed the development of a common technology of problem-based learning (PBL). Today, the method is understood as the organization of the educational process, which involves creating in the minds of students under the guidance of the teacher of problem situations and organizing active independent activity of students in their resolution, as a result of which creative mastery of knowledge, skills and skills takes place and development of thinking abilities. The essence of PBL is that the teacher does not communicate knowledge in a ready-made form, but confronts the students with problematic tasks, prompting them to look for ways and means to solve them.

The method was further developed by Howard Barrows in 1980. Barrows, a professor at the McMasters University Medical School in Canada, acknowledged that Dewey's theory can be applied to his medical students. The professor (Barrows 1980) developed a set of problems that went beyond ordinary research: he demanded that students conduct sociological studies, disclose related questions directly and find their own answers. Barrows (1980) gave a definition in terms of the specific attributes inherent in this method. They include PBL's characteristics such as personal orientation, the organization of the learning process around the problem and the focus on working in small groups, where the instructor acts as an intermediary. Gijsselaers (1996) identifies PBL based on the principles of theoretical learning, as a gradual building of knowledge, meta-learning and contextual learning. Savin-Baden defines five types of PBL based on the main attributes of this training method, including the perception of knowledge and learning, the presence of a problem, the role of the teacher, students and evaluation. Savin-Baden (2000) systematizes the PBL models as PBL for knowledge achievement, PBL for professional activities, PBL for cross-disciplinary understanding and reflection, PBL for cross-sectoral training and PBL for critical competencies. The benefits of this method are:

- PBL method encourages students to work independently. As a rule, students have to work out much more material to solve the problem than with the usual preparation for practical classes;

- The process is built on the principle: the task is the tools for solving (theories, definitions, laws, etc.) - finding solutions - solutions. The student understands why certain theories, concepts and rules are important and perceives them in a different way;
- PBL method encourages students to think nontrivially. Correctly organized statement of the problem stimulates students to search for non-standard solutions. The ability to think creatively and out of the box is one of the most important qualities for most professions. This is often the quality that employers are looking for when recruiting new professionals;
- The PBL method fuels students' interest in science. It is important that the educational process is interesting and exciting. And the more active a student participates in it, the more interesting it is to learn;
- The PBL method prepares students for "real life". This method makes it possible to apply the theory to practice, thus the student understands the practical aspects of his future profession.

The main psychological and pedagogical goals of problem training are:

- Development of thinking and abilities of students, development of creative skills;
- mastering students' knowledge, skills, obtained in the course of active search and self-solving problems, as a result of which this knowledge, skills are more durable than with traditional training;
- Education of the active creative personality of the student, who can see, set and solve non-standard problems.

An important stage of problem training is the creation of a problematic situation, which is a sensation of mental difficulty. The educational problem, which is introduced at the time of the emergence of a problem situation, should be quite difficult, but feasible for students. Its introduction and awareness completes the first stage. Improving the quality of training general practitioners, their importance is great in maintaining health, lengthening the active creative period of life and increasing the working capacity of the population. Therefore, there was an urgent need to form future doctors with a form of professional thinking that enables students to independently update their knowledge, skills, raise their professional level, think critically and find effective ways to solve clinical problems and problems.

Collaboration represents an important aspect in the context of PBL. For instance, it increases the student's motivation, as the learner acquires to gain new knowledge, and it develops

such skills as a team- work and cooperation, and can have an impact on student's self-esteem, responsibility and interdependence.

This short paper aims to illustrate the way the PBL was applied by the DTMU and find out to what extent this new method has helped students to progress in the context of cooperation.

2 Methodology

In this paper, a case study is used as a method. This implies a comparison and analysis of students' assessment grades following their PBL weeks at the DTMU. The criteria of assessment are: student's *preparation* for PBL, *contribution* and *attitude* during their PBL sessions. The interviews with three PBL tutors was done in 2017. Two time points were used: initial (first PBL week), short-term (after 8 weeks) and mid-term (16th week, end of semester).

3 David Tvildiani Medical University

David Tvildiani Medical University (formally called as AIETI Medical School) and started its functioning in 1992. The main goal of the institution has always been an ability to offer a scientifically- oriented medical education by relying on international experiences. Therefore, the university's aspirations towards international standards caused significant changes in the DTMU teaching methods.

In 2014, after the consistent use of a traditional teaching method that is being used since 1992, the university implemented e-PBL method in the MD undergraduate program's basic science stage (currently called Basic Medical and Clinical Sciences stage). The implementation was done in the framework of EU-funded TEMPUS project "Establishment of the Supra-Regional Network of the National Centers in Medical Education, Focused on PBL and Virtual Patient (ePBLnet)".

In the context of DTMU, the "problem" implies a specially structured scenario of the patient's case:

- The student deals with the questions related to the case (problem) of medical and clinical sciences by studying and solving a pre-determined problems;
- E-PBL (electronic problem based learning) is an online environment for PBL that it is used as an electronic format (access to online information).

It also includes the use of a so-called “virtual patient” as an interactive computer simulation of the patient's case, which has been increasingly used in the field of medical education in recent years. The use of a virtual patient within the program implies independent clinical decisions at different stages of the patient's "management" (diagnosis, selection, examination, etc.) by the student. In this case, students of DTMU have the right to "verify" their decision by: finding out how correct their choices and decisions were, including the consequences (which we consider as an important and significant factor for learning).

All in all, the e-PBL method that is used by DTMU is based on modern international approaches in medical education and uses British experiences and standards for the use of problems-based learning and virtual patient cases.

DTMU MD educational program is six-year program and includes 376 credits. The academic year includes 40 working weeks (240 working days) and consists of two semesters - autumn semester (20 weeks) and spring semester (20 weeks). The e-PBL sessions involve the use of a virtual patient in the 3rd, 4th, 5th and 6th semester. Each virtual patient's case is reviewed twice a week and each meeting is provided for 2 hours.

4 Analysis of the topic

PBL ensures the implementation of the tasks of optimizing social interaction in the "teacher-student" and "student-other student" systems on the basis of team-work and cooperation, as well as the successful adaptation of the student to the forthcoming learning.

In the process of developing and implementing this methodology, DTMY relied on the ideas of the Dewey since he believed that the child assimilates the material, not just by listening or perceiving the senses, but satisfying his needs for knowledge by being an active subject of his training. Thus, in DTMU's understanding, PBL involves the creation under the guidance of the educator of problem situations and the active independent activity of students in their resolution. It is important to note that knowledge and methods of activity in PBL material is not given, but is given as an object of search and the whole point of learning is precisely based on the stimulation of the student's research activities.

The technology of PBL, assuming the student's cooperation with the teacher and other students in the process of resolving the problem situation, ensures the realization of the personality-oriented approach in teaching. In order for children's activity to remain independent,

the teacher organizes the process in such a way that the student solves the problems that arise with them, carries out a joint search that relies on the distribution of successive steps in solving the problem situation between them and acquires the character of shared-distributed activity. Specificity of goals and methods of PBL significantly changes the teacher's role in the teaching process and causes the emergence of new requirements for the teacher as a source of knowledge, and becomes an assistant or leader in the search for this knowledge. The teacher simultaneously acts as a coordinator or partner (during each stage of training).

Going beyond the framework of the classical teaching and the goals and tasks that are usual for it, for teacher at DTMU, the development of student's understanding of themselves, and also their ability for self-discovery and self-analysis, becomes a priority. It also includes keeping students of their own dignity, formation of its adequate self-esteem and the formation of a positive life-affirming attitude and confidence in the future. The interconnection of the students of the group among themselves along with the personal responsibility of each member of the group for their successes and the successes of their classmates. Moreover, in DTMU special attention is paid to the social aspects of learning. For instance, to the ways of communication between members of the group. This aspect is specially trained, it is discussed at the level of the group and the entire class.

The overall assessment of the group's work consists of evaluating the form of communication between learners in the group along with the academic results of the work. After joint work, special time is allocated for discussing the question of "how" the students worked, helped each other, described their own behavior, what have they managed and outline the ways to improve their cooperation. Each of these aspects is necessary for the fruitful work of the group.

The main thing is that the activities of students at DTMU should be structured in such a way that they are involved in active joint activities with personal responsibility for the actions of each and their own actions.

The aspect of cooperation using PBL at the university creates maximum success conditions for each child in the classroom, as a differentiated approach is applied here. By working in cooperation, the final result will be collective. In the learning process everyone makes mistakes, therefore the mistakes of the students indicate to the teacher, first of all, the need for additional practice, so that it becomes possible to master the necessary knowledge and skills, that is, the errors show whether the student needs help or not.

According to my interview with PBL teacher at DTMU Lela Nadashvili (2017), the PBL way of teaching is not only concentrated on student's individual development. The teacher claims "this method does not only have an impact on the individual development of the student, but also in the fact allows the student to strengthen its skills of cooperation and unity due to the work in the group on the same topic". Moreover, the professor argues that "if the student is comparatively passive or weak, the members of the group are obliged to support their classmate". Thus, the students study the case together, discuss the condition of the patient and come to a common conclusions.

Another PBL teacher Salome Chkhaidze (S. Chkhaidze, personal communication, July 19, 2017) argues that "yes, it definitely has a positive impact on learning process among the children in regards to mutual respect and ability to listen to others opinions". One of the main requirements of the BPL is the assignation of the roles, as long as it is the effective method of acquiring of the team-working culture and coordinated activism. Listing of the various hypotheses teaches the culture of respecting others opinions, as long as each and every hypothesis is included. She further argues that, "this type of formation of the groups enables and at some point even creates the mandatory situations for the children to have a direct and active communication with others, thus, there is a higher chance for the establishment of friendly atmosphere and ease of the task-solution process, I had a case last year when one student was much closed and it took several months for him to open up. We discovered a completely different person. I can't say if this was PBL outcome or something else. Probably several factors at the same time" (S. Chkhaidze 2017).

DTMU carried out a study based on a survey on DTMU student's self-and mutual assessment in PBL: Comparative analysis of the concordance of teacher's and student's assessment.

The study included data from MD ePBL 5 group (32 students): 2 groups – 3rd Semester, 1 Group-4th Semester, 2 Groups – 5th Semester. The survey included three Assessment Categories, such as *preparation for PBL*, *Contribution to PBL*, *Attitude towards peers and tutor – Quality of Interaction*.

The questionnaire consisted of three Sources` of Assessment: tutor`s Assessment – tutor assesses each student; self-Assessment – each student assesses self; peers` Assessment – each student assesses each peer-student. Items of the questionarre were based on three questions:

contribution of expertise to the team goals, quality of interaction and flexibility in adaptation to the team and how would the team succeeded if this person (you or your team member) had NOT been a member. In case of teachers, the assessment grades were *A, B, C*. In contrast, the student's assessment was done through three assessment grades, which the university presented as *High/Poorer, Average/ Similarly, Low / Poorer*.

The questionnaires were filled-in by students at the end of PBL week (case) during the semester and results compared with Tutor's assessment data for the same PBL week/case. The questionnaires were filled-in by students at the end of each delivered PBL week (case). Comparison of Assessment was performed at 2 time points: (1) *Beginning of the Semester* and (2) *End of Semester*, accordingly for: *Tutor Assessment vs Self-Assessment, Tutor Assessment vs Peers Assessment and Self- Assessment vs Peers Assessment*.

The results for the 3rd semester students demonstrated that self-criticism increases in the contribution category, awareness of the qualitative interaction commitment in the group increases, Self-criticism increases in the PBL session in the category of preparation for PBL.

When it comes to tutor's and peers assessment of 3rd semester students, the student understands the importance of its contribution to PBL and sometimes is more critical than the teacher. Moreover, the results showed that each member of the group is having a high expectations for a high quality interaction with other classmates. Peer critique for PBL in the preparation of groups is high.

In context of self and Peers assessment, the student's self-criticism (self-commitment) is higher than peer's criticism. Furthermore, the student's self-critique is increasing in interaction and adaptation in the student group than peer. Students' self-esteem for PBL is more willing than peer estimates.

The survey of 3rd semester students and their teachers revealed, that in context of contribution, its importance and self-commitment in this category is higher than the equal and tutorials and is increasing in PBL group. Additionally, the aspect of student's integration and adaptation to the group and classmates increases the level of one participant as well as group level, at the same time, the student's commitment is higher than the "equal".

Self-criticism and peer-critique have been observed during the observation period: students believe that they should be more prepared "self" and "group" as well as "self-consider" themselves in the PBL rather than group members. In all categories peer and tutor, self and peer,

the average of the convergence in comparison with the values is approximately $\approx 73, 3\%$ (36% and 93%).

When it comes to the 5th semester students, in case of the teachers and self-assessment, self-criticism is increasing in all three categories: contribution, preparation, and quality of interaction. Moreover, in regard to teachers and peers assessment, the groups demand from others is increasing in all three categories.

Finally, in context of self and peers assessment, until this equality is calculated, the number of students who believe that they contribute to the work of the group more than others is high. At the same time, students' self-criticism (in relation to equality) increases in context of preparations and quality of interaction.

The survey of 5th semester students revealed that self-critique increases as well as the demand and expectation of other members of the group to contribute to the student's PBL. Moreover, Self-criticism increases as well as the demand and expectation of the other members of the group in the PBL for quality discussion and adaptation. Increasing self-criticism increases the demand for the student's PBL session. In all categories self and peer, peer and teachers, the average of convergence in self and peer estimates is quite low (from 0 to 71) 25, 3%. Group feature (possibly major) is that criticism towards students' equality in all categories of tutor and equality, as well as self-equality (in different %) is higher than "self-critique".

Another group (group B) of 5th semester students revealed similar results. In contexts of Contribution, preparation for PBL and Quality of integration and adaptation in the group "self-critique" is reduced.

5 Conclusion

Practice in "Self-Evaluation" and "Peer review" - is an additional "benefit" for the student in PBL format. As long as it gives the possibility of such assessments (the questionnaire is quite "short", "understandable", "safe" - does not have a final impact on the evaluation).

According to our data, the convergence between assessment of Tutor and PBL participants (self-and equality assessment) has no impact on self-criticism (self-commitment) and criticism ("a member of the group is responsible") for equality. The student's self-liability (even when they consider to be "better prepared" for PBL) is higher than their "demand" from group

members - the group and / or the characteristic of the group (in contribution and quality discussions in the group).

Self-Criticism has been reduced in the background of the increase in "equal critics" - the character of the group and / or members in the lower grades (self-and peer, peer and tutor, average and self-peer assessment) in all categories of assessments.

In sum, working in this format, (also possible learning in other format) student's experience (duration of student's inclusion in PBL) does not have an impact on contribution to PBL by students, adaptation in group and qualitative discussion, understanding of preparation for PBL.

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