Review article **UDC: 371.3:[811.111]276.6:61**
doi:10.5633/amm.2012.0210

PROJECT-BASED LEARNING IN ENGLISH FOR MEDICINE

Zorica Antić[1] and Dragana Spasić[2]

Project-based learning facilitates hands-on learning in student-driven investigations, resulting in high-quality, challenging activities. Students participate actively in projects that revolve around their interests, questions or needs.

PBL also develops the 21st century skills including critical thinking, collaboration and communication. The essence of PBL is problem-solving, a key critical thinking skill. Since problem-solving is an integral part of medicine, projects represent a significant method of instruction in English for Medical Purposes. Depending on their individual interests and abilities, each student contributes to the whole group work and the final outcome.

The approach also requires students to work in teams and to communicate their findings. Using real-life problems to motivate students, challenging them to think deeply about meaningful content, and enabling them to work collaboratively are practices that yield benefits for all students and their future careers. *Acta Medica Medianae 2012; 51(2):50-55.*

Key words: *project-based learning, English for medical purposes, multiple intelligences*

University of Niš, Faculty of Medicine, Niš, Serbia[1]
University of Priština, Faculty of Philosophy, Kosovska Mitrovica, Serbia[2]

Contact: Zorica Antić
University of Niš Faculty of Medicine
Bul. dr Zorana Đinđića br. 81
18000 Niš, Srbija
E-mail: englishformedicine@gmail.com

Introduction

Project-based learning (PBL) is an approach to instruction that emphasizes 'authentic learning tasks grounded in the personal interests of learners' (1). It is 'a systematic teaching method that engages students in learning knowledge and skills through an extended inquiry process structured around complex, authentic questions and carefully designed products and tasks' (2). In language teaching, project work is thought to be an activity which promotes co-operative learning, reflects principles of student-centered teaching, and promotes language learning through using the language for authentic communicative purposes.

However it is defined, PBL presents students with real-world, multidisciplinary problems that demand critical thinking, engagement, and collaboration. Students need both knowledge and skills to succeed. This need is driven not only by workplace demands for high-performance including planning, collaboration and communication, but also the need to help all young people learn civic responsibility and master their new roles as global citizens (2).

Project-based learning is an instructional method centered on the learner. Instead of using a rigid lesson plan that directs a learner down a specific path of learning outcomes or objectives, project-based learning allows in-depth investigation of a topic worth learning more about (3, 4). Learning from doing complex, challenging and authentic projects requires resourcefulness and planning by the student, new forms of knowledge representation, expanded mechanisms for collaboration and communication, and support for reflection and authentic assessment (5).

Features and Phases of PBL Instruction

PBL functions as a bridge between using English in class and using English in real life situations outside the class (6). It does this by placing learners in situations that require authentic use of language in order to communicate (7). When learners work in pairs or teams, they find they need skills to plan, organize, negotiate, make their points and agree on issues such as what tasks to perform, who will be responsible for each task, and how information will be researched and presented. Because of the collaborative nature of project work, development of these skills occurs even among learners at lower levels of language proficiency. Within the group work integral to projects, individuals' strengths and preferred ways of learning (e.g. by reading, writing, listening or speaking) strengthen the work of the teams as a whole (8).

The primary feature (9) of PBL is a driving question that is anchored in a real-world problem and ideally uses multiple content areas. A good

driving question is one of the critical components of PBL (9, 2). The driving question should be authentic and relevant to students. A successful project speaks to the interests of students in a concrete, meaningful way, encouraging students to see the real-world applicability of the concepts they are learning. This kind of question allows students to 'engage in more idiosyncratic investigations, directing their own learning and making decisions about what they are going to do and how they will do it' (10).

Students are given opportunities to make active investigations that enable them to learn concepts, apply information, and represent their knowledge in a variety of ways. Collaboration among students and teachers enables sharing and distribution of knowledge between members of the learning community. The use of cognitive tools in learning environments supports students in the representation of their ideas (audio/visual tools, computers, hypermedia, graphing applications).

With project-based learning, students plan and research, ask questions, make choices within alternatives and apply knowledge gained within their regular classes. A project is an in-depth investigation of a real world topic worthy of attention and effort. It offers opportunities to represent findings in a variety of ways and it introduces a wide range of learning opportunities.

The basic phases found in most projects include selecting a topic, making plans, researching, developing products, and sharing results with others (11).

The first step in project work includes stating the subject and organizing the groups. Students explore the resources and ask questions in order to create a frame for the project. The teacher presents the general subject of the research.

Next, group members make a project plan and choose their roles in the project. They plan what they work on, select the roles and define the contents of these roles. The teacher also helps formulate the projects and find the necessary materials.

In the next phase, application of the project, group members organize and analyze the data and information, and summarize the findings.

During planning of the presentation phase, students define the essential points in their presentation and decide on how to present the project.

The next phase is making the presentation when students present their project and give feedback to their colleagues.

During the evaluation phase students share the project and feedback. The teacher evaluates the project summaries and the students. With the group members, the students reflect what they learnt in the project process and join in the evaluation process of their own project. Students evaluate each other in the group (group assessment), project maker students are also evaluated by their classmates (peer assessment).

PBL and Multiple Intelligences

In addition to strong instructional and organizational skills, PBL requires that teachers facilitate and manage the process of learning. Teachers must create tasks and conditions under which thinking can be revealed – a co-creative process that involves inquiry, dialogue and skill building as the project proceeds (2). Students help choose their own projects and create learning opportunities based upon their individual interests and strengths. Projects assist students in succeeding within the classroom and beyond, because they allow learners to apply multiple intelligences in completing a project they can be proud of. The theory of multiple intelligences is a model of intelligence that differentiates it into various specific modalities, rather than seeing it as dominated by a single general ability. These intelligences include linguistic-verbal, mathematical-logical, spatial, interpersonal-social, personal, kina-esthetic, musical-rhythmic, naturalistic, existential intelligence.

During project work, students use their optimum learning styles, skills and abilities which ensure the best possible conditions and methods for study. In PBL, teachers need to be aware of different learning modes and use teaching methods which accommodate the range as much as possible. Depending on the intelligence modality that is most developed, students participate in group work and make use of their abilities. For example, some students are better at expressing themselves verbally and their linguistic-verbal intelligence will make them good at speaking and holding lectures and presentations. Others will gather materials, organize data, conduct researches which demand mathematical skills for data processing and statistical analyses. Some students will be good at coordinating group members and distributing specific tasks to perform or making presentations and visual aids, taking part in role plays and simulations. On the whole, possibilities are numerous and the final outcome mostly depends on students' motivation to use their abilities and intelligences in the best way possible.

PBL allows the teacher to incorporate numerous teaching and learning strategies into project planning and implementation. Assisting learners in developing all of their intelligences will make learning a part of living.

Project-Based Learning in EMP

When the project is related to the students' interests and subjects of study, it will serve as a realistic vehicle for fully integrated study skills and language practice. Various authors have suggested conducting ESP courses as close to the workplace as possible in order to integrate the language and the 'specific purposes' (12). The workplace context helps keep the focus more on the specific purposes and less on the language (13). Several researchers have emphasized that

the content of ESP courses should be relevant to the field of interest to avoid mismatch between what is learned in class and its usefulness in the workplace (14-16). Students in ESP courses should be prepared for the realities, rather than merely the theories, of the workplace (16) while ESP instructors should be aware of the language demands faced by their students (17). Therefore, in EMP courses, the medical content is put in the context of the English language and students are given opportunities to use their expert medical knowledge during the English language classes.

In English for Medical Purposes students require instruction in medical topics, doctor-patient instructions and dealing with medical literature in English. Considering the fact that English is the lingua franca of medicine, proficiency in English will enable students, future doctors, to establish contact and participate in scientific exchanges with colleagues worldwide, to become equal members of the global medical community which will promote their professional development. In this sense, medical students have specific demands for English. They have a desire to publish medical articles in respected journals, they want to participate in international conferences and practice abroad. Designing a course to meet these specific needs is the starting point of an EMP course. However, since it is a dynamic process, teachers need to negotiate with their students in order to fulfil the goals set before them. Such a situation represents a good environment for the application of project-based learning which aims to engage students in realistic, thought-provoking problems. The core idea of project-based learning is that real-world problems capture students' interests and provoke serious thinking as the students acquire and apply new knowledge in a problem-solving context.

In English for Medical Purposes course conducted at the Faculty of Medicine in Niš the project work was done as a pilot program in order to test its possibilities for increasing student motivation and achieving lifelong learning and student autonomy. In this trial stage, it mainly revolved around parts of the course which refer to doctor-patient communication and writing medical research papers following the IMRAD structure. However, in order to introduce the students to this type of instruction, a kind of small-scale project work was initiated with pre-clinical topics reflected in body systems.

The students were divided into groups and were asked to select one of the body systems they would like to study and explore and then present to their colleagues. On their own the groups selected their mode of work and the way they would conduct the final presentation. Depending on the interests and abilities, each student in the group did a particular job thus contributing to the final outcome as well as to group progress. The students collected and organized data and necessary materials regarding both specialized medical content and the English language elements, planned and presented the work while the other students listened and asked questions and provided feedback.

The students' motivation showed that project work is a successful method for conducting EMP courses. Therefore, the next phase of the course included project work which encompassed the medical interview and was later expanded into writing research papers. Working in groups, the students chose a particular medical area they wanted to explore in their project. They conducted the role plays where one student was a patient with a particular medical problem and the other was a doctor. The roles were played by those students who are more proficient in the English language speaking skill. Those who were more inclined to reading collected the necessary data on the medical problem and its solution from the relevant literature. After the role play, one student gave a short lecture on the simulated medical condition; the lecture was supported by visual aids prepared by a group member. In this way, every group member contributed to the final outcome depending on their abilities, interests, motivations and language proficiency. The idea of multiple intelligences is thereby applied and proved to be a good way of enabling students to use their abilities as well as learn from each other.

The medical interview project was later developed into writing research papers using the IMRAD structure. The IMRAD structure is the form of scientific papers with clearly defined sections (Introduction, Methods and Materials, Results, Discussion/Conclusion). Every project begins with an open-ended 'driving question' that prompts interdisciplinary, student-initiated inquiry. Throughout the project, activities flow naturally from the driving question to the 'culminating event,' a public presentation of the results of the investigation. Since medical students, future doctors, will be faced with conducting researches and publishing articles in specialized journals in their future careers, this part of the course is highly important and requires particular attention. Again, all language skills are used: reading relevant literature for collection of data, writing drafts and final papers, speaking before audience (other students and teachers) and during group discussions and listening to the presentations. Translation is also employed when a relevant piece of information is translated from Serbian into English. Each individual student takes one aspect of the project for detailed study. After the presentation, the students discussed the topic with their colleagues, asked and answered questions referring to their notes taken during the presentation. The final stage included feedback and assessment by the teacher, as well as by other students. The students gave their assessment mostly on the basis of their specialized medical knowledge, whereas the teacher observed the whole process from the linguistic standpoint.

In the context of project-based learning, the teacher plays the role of facilitator, working with students to frame worthwhile questions, structuring meaningful tasks, coaching both knowledge development and social skills, and carefully accessing what student have learned from the experience. Project-based learning helps prepare students for thinking and collaboration skills required in the workplace. Worthwhile projects require challenging questions that can support collaboration, as well methods for measuring the intended learning outcomes. Without carefully designed tasks, skilled teachers, and conditions that support projects, project-based learning can devolve into a string of activities with no clear purpose or outcome.

The project work enables the students to put their medical knowledge into the context of English which is a source of great motivation. The best projects call upon prior knowledge and expertise of each student. They are aware of the purpose and relevance since they are learning something they will need in the future. During great projects students are connected to each other, to experts, multiple subject areas, to powerful ideas. The lessons learned during interpersonal connections that are required by collaborative projects last a lifetime. Collaboration may consist of observing a peer, asking questions, or by working with the same colleagues for the duration of a project. Students access a wide variety of materials available for example through books, expert journals, the Internet. They make something that is shareable with others. This provides a great deal of motivation, relevance, perspective making, reciprocal learning, and an authentic audience for the project.

Conclusion

Project-based learning created opportunities for groups of students to investigate meaningful questions that require them to gather information and think critically. To use project-based learning effectively, teachers must fully understand the concepts embedded in their projects and be able to use model thinking and problem-solving strategies effectively (9).

PBL is also an effective tool for imparting essential non-academic 21st century skills, including collaboration, critical thinking, and communication. PBL has been demonstrated to improve students' ability to reason and argue clearly (18), to answer conceptual problems (19), and to hypothesize accurately (20).

Project-based learning can be put to good use in the area of English for Medical Purposes as it is a great source of motivation to medical students since they are learning meaningful medical content which they put in the context of the English language.

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UČENJE PUTEM PROJEKTA U ENGLESKOM JEZIKU ZA POTREBE MEDICINE

Zorica Antić i Dragana Spasić

Učenje putem projekta je vrsta direktnog učenja u kojem istraživanje vodi student, a što kao rezultat ima izazovne aktivnosti koje se odlikuju visokim kvalitetom. Studenti aktivno učestvuju u projektima koji su zasnovani na njihovim interesovanjima, pitanjima i potrebama.

Ovaj tip nastave takođe pomaže razvoju takozvanih „veština 21. veka" u koje spadaju kritičko razmišljanje, saradnja i komunikacija. Suština ove metode je rešavanje problema, što je ključna veština kritičkog razmišljanja. S obzirom da je rešavanje problema sastavni deo medicine, rad na projektu predstavlja značajnu nastavnu metodu u oblasti engleskog jezika za potrebe medicine. U zavisnosti od svojih skolnosti i interesovanja, svaki pojedinačni student doprinosi celoj grupi i konačnom ishodu.

Od studenata se očekuje da rade u timovima i da svoje nalaze i saznanja saopšte i prenesu svojim kolegama. Primena i istraživanje realnih problema u cilju motivisanja studenata, postavljanje izazova da se o značajnom i svrsishodnom sadržaju duboko razmišlja i omogućavanje međusobne saradnje metode su od kojih studenti imaju najviše koristi u svojoj budućoj lekarskoj praksi. *Acta Medica Medianae 2012;51(2):50-55.*

Ključne reči: *učenje putem projekta, engleski za potrebe medicine, višestruka inteligencija*