

Problem-based Learning in Veterinary Medicine: The Tutorial Process

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Abstract

The purpose is to show that Problem-based Learning (PBL) in the teaching of veterinary medicine-related disciplines needs specific tutorial processes and roles. Motivation is a key element in PBL – the tutorial process requires all students to be engaged in the learning process: chair (encourages all the members to participate, ensures that the group keeps to task in hand, ensures the scribe can keep up and make an accurate record, keeps to time, leads the group through the process, maintains group dynamics), group member (asks open questions, follows the steps of the process in sequence, listens to and respects the contributions of others, participates in the discussion, researches all the learning objectives, shares information with others), scribe (helps the group order their thoughts, participates in the discussion, records points made by group, records the resources used by the group), and tutor (assesses the performance, assists the chair with group dynamics and keeping the time, checks if the scribe keeps an accurate record, checks understanding, encourages all the group members to participate, ensures that the group achieves appropriate learning objectives, prevents side-tracking). The major conclusion of the paper is that tutorial processes need the use of a wider range of scenarios to be successful.

Keywords: chair, group member, problem-based learning, scribe, tutor, tutorial process.

1. Introduction

Defined as “an instructional (and curricular) learner-centered approach that empowers learners to conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable solution to a defined problem” as Savery [1] sustain. Problem-based Learning (PBL) has been endorsed by a wide variety of national and international organisations as discussed by Newman [2], offering both advantages and disadvantages over traditional teaching methods, as discussed by others [3, 4].

PBL in the teaching of veterinary medicine-related disciplines needs specific tutorial processes and roles to be successful. This paper analyses these tutorial processes and roles as seen by different

authors that have focussed on this teaching/learning method over the last decades

This is a review paper, a scientific text relying on previously published literature or data in the field of Problem-based Learning. There are no new data from the authors' experiments because the goal was to identify patterns and trends in the literature dedicated to this teaching/learning method in general, in medicine and in veterinary medicine, in particular.

2. Problem-based Learning Features

We present, below, the main issues related to the use of PBL tutorial process in veterinary medicine, tackling the features of PBL, the roles in a PBL tutorial process, the steps of a PBL tutorial process and the design of a proper PBL scenario.

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The taxonomy of PBL applicable in the teaching/learning of veterinary medicine-related subjects covers two educational methods that resemble each other in that they are both teacher and student directed, as discussed elsewhere [1, 4]:

- **Case-based discussions**, where a complete organised case is given to the students for study prior to class discussions, which is facilitated by a tutor and is a combination of student and teacher directed learning (in this case, the tutor is only a facilitator of learning, not a provider of information);
- **Problem or inquiry based**, where students are presented with a new patient problem and are allowed free inquiry in a tutor-led group (in this case, the tutor is both a facilitator of learning and a provider of information).

According to Chilkoti [4], PBL has eleven key features:

- **Problems**, i.e. key units for learning;
- **Resources** (such as instruction, Internet, library, peers, etc.) that, if adequate, allow self-directed learning;
- **Learning objectives** planned by teachers and that may have trainee input;
- **Behaviour that evolves progressively** with increasing knowledge;
- **Learning**, which is active, learner-centered, and self-directed;
- **Examples** used to facilitate high-order cognitive skills;
- **Motivation** through PBL design;
- **Self-directed learning and self-assessment** undertaken by the trainees with the help of tools or resources;
- **Small group (5-10 members) discussion** to achieve the desired learning outcome;
- **Learning-driving evaluation methods** such as multiple-choice questions, multiple-essay questions, triple-jump exercise test (a patient problem-based structured oral examination, a time limited study assignment in relation to the problem, and a repeat oral examination to assess the quality of self-directed learning during the study period);
- **Facilitation skills and knowledge of the facilitator/moderator/tutor.**

3. Problem-based Learning Roles

The tutorial process when using PBL as a teaching/learning method requires all students to be engaged in the learning process. They play the roles of *chair*, *group member*, *scribe*, and *tutor*, as approached by others [5-7].

A **chair** agrees the process for the group, encourages all the members to participate, elaborates or reformulates the discussion, ensures that the group keeps to task in hand, ensures the scribe can keep up and make an accurate record, introduces the case for discussion, invites participation and ensures that everyone is contributing equally and that no one is too quiet or too dominant, keeps to time, leads the group through the process, maintains group dynamics, monitors and passes observations on the process, oversees the timekeeping and moves discussion on where necessary, proposes evaluative comments on the group's performance and his/hers own as chair for general discussion, stimulates, structures the session by bringing it and the stages that comprise it to a conclusion, and summarizes as discussed elsewhere [6, 7]. The chair should be different from session to session as mentioned by Newman [2].

A **group member** asks open questions, avoids being shy to contribute ideas, follows the steps of the process in sequence, listens to and respects the contributions of others, participates in the discussion, researches all the learning objectives, respects the roles of the chair and the scribe and assists them in their roles, shares information with others, and shares ownership of the group as sustained by others [6, 7]. Small-group work has three main features that may turn into issues in PBL, as sustain Azer [8]:

- The levels of participation may vary among the group members;
- Unclear objectives can cause frustration for the tutor as well as the group members;
- Group members need experience and reflection to modify their behaviour accordingly.

A **scribe** checks the accuracy of the notes with other group members, continues to contribute to the group, helps the group order their thoughts, listens carefully, notes down ideas and concept even if apparently trivial, organizes the notes by categorizing concepts, participates in the discussion, posts the learning objectives the group

has decided upon on blackboard after the session, records points made by group, and records the resources used by the group, as sustained elsewhere [6, 7]. The scribe should be different from session to session, as discussed by Newman [2].

A *tutor*, also called a *cognitive coach*, a *facilitator*, a *guide*, an *instructor* in *Problem-Based Learning* [9], a *metacognitive coach* by Savery [1], a *moderator*, a *supporter*, activates student learning, aids in resolving intra-group conflict, assesses the performance, assists the chair with group dynamics and keeping the time, checks if the scribe keeps an accurate record, checks understanding, encourages all the group members to participate, ensures that all students are involved in the process, ensures that the group achieves appropriate learning objectives, facilitates discussion, facilitates student learning, guides the group learning, helps students identify inaccuracies and inconsistencies in their knowledge, helps students identify learning resources, intervenes when necessary, keeps the discussion on track, keeps the learning process going, models behaviour that the student will adopt, modulates the challenge of the problem, monitors attendance, monitors the progress of each student in the group, monitors the quality of learning, motivates the students to learn, prevents side-tracking, probes the students' knowledge deeply, promotes student interaction as a group, provides a framework that students can use to construct knowledge on their own, provides feedback to management/planning group, provides insight and background when necessary to keep the discussion going on, provides support and a first point of contact for academic or welfare problems, and scaffolds student learning, stimulates elaboration, stimulates integration of knowledge, and stimulates interaction between students successfully *provided they have a clearly defined task* as discussed by others [6, 7, 10, 11]. According to Newman [2], a tutor is also a *challenger* (when he/she asks involving questions), a *creator* (when he/she probes questions such as *What do you mean? What does that mean? Why?*), a *designer* (when he/she decreases challenge where there are signs of boredom or over challenge), a *director* (when he/she reflects questions such as *How does this idea help you?*), a *facilitator/supporter* (when he/she helps students address issues with

interpersonal dynamics), a *learner* (when he/she has to stay silent), a *modeler* (when he/she stimulates interest), a *negotiator* (when he/she asks educational diagnosis questions such as *How do you feel about the way you formulated your ideas?*), and an *evaluator* (when he/she positions physically in the group such as *Who else has ideas on this?*). Identifying appropriate tutors is difficult since they need to, as approached by others [8, 10, 12, 13]:

- Be familiar with teaching techniques of facilitating small groups;
- Be less directive;
- Be less passive;
- Be well informed about a problem and about related learning issues (however, content expert tutors with a more directive role may endanger the development of students' skill in active and self-directed learning);
- Have the overall educational program;
- Provide structured feedback which facilitates student learning, enhancing analogous transfer;
- Understand the curriculum.

4. Problem-based Learning Tutorial Process

A **PBL tutorial process** consists of seven steps where each of the actors mentioned above, plays his/her role as discussed elsewhere [6, 7]:

- **Step 1** consists in *identifying and clarifying unfamiliar terms presented in the scenario*: the *scribe* lists those terms that remain unexplained after discussion;
- **Step 2** consists in *defining the problem(s) to be discussed*: the *group members* (the students) may have different views on the issues, but all should be considered; therefore, the *scribe* records a list of agreed problems;
- **Step 3** consists in *a brainstorming session to discuss the problem(s) and suggest possible explanations on basis of prior knowledge*; the *group members* draw on each other's knowledge and identify areas of incomplete knowledge and the *scribe* records all discussion;
- **Step 4** consists in *reviewing steps 2 and 3 and arranging explanations into tentative solutions*; the *scribe* organizes the explanations and restructures them if necessary;

- **Step 5** consists in *formulating learning objectives*; the *group members* reach consensus on the learning objectives and the *tutor* ensures learning objectives are focused, achievable, comprehensive, and appropriate;
- **Step 6** consists in *private study* (all the *group members* gather information related to each learning objective);
- **Step 7** consists in the *group members sharing results of private study* (students identify their learning resources and share their results) and the *tutor* checking learning (he may assess the group).

However, there may be group dysfunction because of the following problems associated with some key elements of the tutorial process as discussed by Azer [8]:

- *Tutor-associated problems*, such as lack of adequate preparation for tutorials, lack of proper knowledge regarding the PBL approach, tutorial bias towards students who dominate the discussion, and tutorial domination;
- *Student-associated problems*, such as distraction/stress in the group, lack of appreciation and support of each other, laxity in getting the tasks completed in time, negative attitude towards each other, poor communication skills, and unresolved personal conflict;
- *PBL-problem design-associated problems*, such as discrepancy between faculty and students' objectives, and inadequate design of PBL problems and lack of information in the Trigger, the Tutors' Guide or Patient Data Sheet. Are also problems in PBL the formulation of objectives, the selection of cases, the scheduling of time, and the development and maintenance of resources. There should be three group sessions in PBL as discussed by Engel [14]: a *first small group session* (where a new problem is introduced: no *chair*, just a *scribe*), an *individual study session*, and a *second* or *follow-up session* (group members share what they have learned individually).

5. Problem-based Learning Scenario

In order to create **effective PBL scenarios**, PBL designers should take into account the following,

as approached by Dolmans et al., 1997, in Wood [7]:

- The basic science should be presented in the context of a clinical scenario to encourage integration of knowledge;
- The learning objectives likely to be defined by the students after studying the scenario should be consistent with the faculty learning objectives;
- The problem should be appropriate to the stage of the curriculum and the students' level of understanding;
- The problem should be sufficiently open so that discussion is not curtailed too early in the process;
- The scenario should contain cues to stimulate discussion and encourage students to seek explanations for the issues presented;
- The scenario should have sufficient intrinsic interest for the students or relevance to future practice;

The scenario should promote participation by the students in seeking information from various learning resources.

6. Conclusions

According to Ertmer & Simons, 2006, in Savery [1], in adopting a PBL approach, curriculum designers are challenged to make the transition from *teacher as knowledge provider* to *tutor as manager and facilitator of learning*. Savery [1] has sustained that teachers are more likely to be *instructors and coaches rather than tutors*.

No matter the perspective, a successful PBL approach should always:

- rely on such roles as a coach, group members, a scribe and a tutor: tutors seem to have the largest number of responsibilities in a tutorial process, followed by chairs, scribes and group members;
- observe the seven steps of the tutorial process;
- design the proper PBL scenario.

Besides all this, a tutorial process also needs the use of a wider range of scenarios (a family tree showing an inherited disorder, a real or simulated patient, all or part of an article from a scientific journal, experimental or clinical laboratory data, newspaper articles, paper-based clinical scenarios, photographs, video clips, etc.) to be successful as mentioned by Wood [7].

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