

# Problem-based Learning in Veterinary Medicine: Advantages and Disadvantages

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## Abstract

The purpose of the research is to see if Problem-based Learning (PBL) can be successfully used in veterinary medicine. Research results show that PBL offers several advantages (it contributes towards the reduction of information overload; it develops generic skills and aptitudes; it facilitates an integrated core curriculum; it facilitates the relevance of curriculum content; it fosters active, deep learning, improved understanding, and retention and development of lifelong learning skills; it is a constructivist approach; it makes the students more responsible for their learning; and it motivates both teachers and students) over traditional teaching methods. However, it also has several well recognised disadvantages (it deprives students' access to a particular inspirational teacher who, in a traditional curriculum, would deliver lectures to a large group; it is difficult and frustrating for the tutors who cannot "teach"; it makes students be unsure about how much self-directed study to do and what information is relevant and useful; it needs more human resources to take part in the tutoring process; it needs more material resources for the students to access simultaneously). The conclusion is that PBL can successfully be used in the teaching of veterinary medicine-related disciplines provided the teachers work on its disadvantages

**Keywords:** advantages, disadvantages, method, problem-based learning, problem-based teaching, veterinary medicine.

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## 1. Introduction

Problem-based Learning (PBL) has been 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 sustained Savery [1].

Endorsed by a wide variety of national and international organisations, as mentioned by Newman [2], PBL offers several advantages over traditional teaching methods. However, it also has several well-recognised disadvantages, as discussed by Jones [3].

Back in 1992, Norman & Schmidt [4] examined several claims about the potential advantages of PBL for students' learning (students in PBL curricula may be better able to integrate basic science knowledge into the solutions of clinical problems, may be better able to learn and recall information, may be better problem solvers and self-directed learners, may be more highly motivated) and concluded PBL appears to enhance self-directed learning skills (and this enhancement may be maintained), PBL curricula may enhance both transfer of concepts to new problems and integration of basic science concepts into clinical problems, PBL enhances intrinsic interest in the subject matter, PBL may initially reduce levels of learning but may foster, over periods up to several years, increased retention of knowledge, there is no evidence that PBL curricula result in any improvement in general, content-free problem-solving skills, as found by Samfira & Fărăgău-

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Dragoş [5]. Newman [2] also believes that the evidentiary basis of the claims for the advantages of PBL is often questionable.

Azer [6] suggested that the advantage arising from lecture-style preparation is short-lived and that the overall learning from PBL participation is better retained. On the other hand, it seems that, as far as traditional vs. problem-based curricula is concerned, there is no significant trend in favour of either method, as approached elsewhere [7, 8].

## 2. Advantages of Problem-based Learning

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.

Literature shows that there are almost as many advantages as disadvantages of PBL.

Most authors seem to agree that there are several major advantages of PBL in the teaching/learning of veterinary medicine-related disciplines. These advantages are as follows:

- *PBL allows students to articulate incorrect knowledge*, providing them with the opportunity to revise their false beliefs when confronted with correct knowledge, as sustained by other authors [9, 10];
- *PBL contributes towards the reduction of information overload that overburdens many of our students* through its identification of core curriculum, as discussed by Davis [11];
- *PBL develops capabilities*: adopting a more universal or holistic approach, awareness (active listening), collaborating productively in groups or teams, coping creatively with conflict, creativity, decision making, defining real problems (goals, mission, vision), group and chairperson skills, interpersonal skills, learning skills (laws, theories, concepts, etc.), look back and extending experience (recognising fundamentals in a given situation), managing change, obtaining criteria, personal learning preference, practicing empathy and appreciating the other person's point of view, problem solving, reasoning critically and creatively, self-

assessment, self-directed (lifetime) learning, strategy (planning), stress management, and time management, as Engel, 1991 and Woods, 1995, as were mentioned in other papers [2, 7, 10];

- *PBL develops generic competencies*, i.e. it allows students to develop generic, personal, transferable skills and attitudes desirable in their future practice (adopting self-directed learning and use of resources, chairing a group, communicating, cooperating, developing presentation skills, evaluating literature critically, listening, problem solving, recording, showing respect for colleague's views, team working, etc.), problems approached by others [10-13];
- *PBL facilitates an integrated core curriculum*, sustained by some authors [11, 13];
- *PBL facilitates the relevance of curriculum content*, i.e. it structures student learning round common clinical problems, approached elsewhere [10, 11];
- *PBL fosters deep learning*, i.e. students interact with learning materials (are considered, in veterinary medicine, learning materials: 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), relate concepts to everyday activities, and improve their understanding (for the discussion of effective PBL scenarios, see the end of this chapter) as discussed elsewhere [10-13];
- *PBL helps distribute the cognitive load among the group members*, taking advantage of the members' distributed expertise by allowing the whole group to tackle problems that would normally be too difficult for each student alone, as sustained by Pea, 1993 & Salomon, 1993, in Hmelo-Silver [9];
- *PBL improves retention and recall of information* (*Problem-Based Learning at HYMS* [12]);
- *PBL is a constructivist approach*, i.e. students activate existing or prior knowledge to identify what they still need to learn and build on existing conceptual knowledge frameworks when generating learning issues, as discussed elsewhere [11, 13-16];

- *PBL is engaging, interesting and stimulating*, as sustained by Lane [10];
- *PBL is motivating*, i.e. it is fun for and rated enjoyable by students and tutors, and the 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), as approaches elsewhere [10-13];
- *PBL is student-centred*, i.e. it fosters active learning, improved understanding, and retention and development of lifelong learning skills as discussed by Wood [13];
- *PBL makes the students learn because they want the knowledge not because they are told to learn, makes the students work, not sit in lectures then forget* as approached by Engel [17];
- *PBL makes the students more responsible for their learning*, as discussed by Davis & Harden [11];
- *PBL prevents dropout from school due to the non-cognitive side-effects of small-group collaboration* as approached by Schmidt, Rotgans & Yew [18];
- *PBL promotes independent learning*, as observed by Lane [10];
- *PBL promotes students' confidence in their problem-solving skills* as evoked in Problem-Based Learning [19];
- *PBL provides students with scenarios that can be considered by students, in many instances, as prototype cases which can be used as a*

*framework for their learning*, as discussed by Davis & Harden, 1998 and Dolmans, Snellen-Balendong & van der Vleuten, 1997, in Wood [13], who stated that teachers should observe seven principles when creating effective PBL scenarios (learning objectives likely to be defined by the students after studying the scenario should be consistent with the faculty learning objectives; problems should be appropriate to the stage of the curriculum and the level of the students' understanding; scenarios should have sufficient intrinsic interest for the students or relevance to future practice; basic science should be presented in the context of a clinical scenario to encourage integration of knowledge; scenarios should contain cues to stimulate discussion and encourage students to seek explanations for the issues presented; the problem should be sufficiently open, so that discussion is not curtailed too early in the process; scenarios should promote participation by the students in seeking information from various learning resources);

- *PBL strives to make students self-directed learners* as evoked in Problem-Based Learning [19] and Samfira & Tulbure [20];
- *PBL suggests a method to promote active and reflective knowledge-building-for-action* as discussed by Hmelo & Guzdial, 1996 citing Hmelo-Silver [9] and by Rață [21].

### **3. The most significant disadvantages of Problem-based Learning**

- *PBL denies staff the fun of sharing their processes of understanding with their students and of getting a buzzout of teaching* as approached by Davis & Harden [11];
- *PBL deprives students' access to a particular inspirational teacher* who, instead of enjoying delivering lectures to a large group and, thus, pass on their own knowledge and understanding (as in a traditional curriculum), serves as a facilitator rather than acting as a role model, as discussed elsewhere [10-13];
- *PBL disadvantages students educated in a lecture-based and competitively graded environment*, as discussed by Neville [8];
- *PBL disadvantages the students educationally*, as mentioned by Ross et al.[22];

- *PBL is difficult and frustrating for the tutors who cannot “teach” as sustained by Wood [13];*
- *PBL is time-consuming for students, particularly if they need to identify educational resources for themselves, as approached elsewhere [6, 11, 12];*
- *PBL makes students be unsure about how much self-directed study to do and what information is relevant and useful, as sustained elsewhere [12, 13];*
- *PBL needs more human resources (more teaching staff) to take part in the tutoring process and needs more material resources (the same library and computer resources) for the students to access simultaneously, as discussed by Wood [13];*
- *PBL overloads students, as evoked in Problem-Based Learning at HYMS [12];*
- *PBL programme implementing is costly, as discussed elsewhere [11, 22];*
- *PBL provides no real way of determining if students learn the right stuff, as sustained by Engel [4];*
- *PBL provides students with knowledge that tends to remain unorganised (in traditional courses, organisation of knowledge comes from students being introduced to a topic by experienced teachers able to distinguish between what is important and what is unimportant for the former), and requires teaching competencies many teachers do not possess as explained by Davis & Harden [3].*

#### 4. Conclusions

Future studies might maintain the findings presented above about the advantages and disadvantages of using PBL in the teaching of veterinary medicine-related disciplines. However, to a greater or lesser extent, the disadvantages of using PBL in veterinary medicine-related disciplines can be overcome if appropriate strategies are adopted when this method is introduced into the curriculum.

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