Determining the sustainability of a model of PBL:
A Conceptual framework

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ABSTRACT

Objectives: To explore processes of implementation that result from attempts at curriculum renewal reliant on principles of PBL in a delivery model.

Methods: An evaluation design using case study was chosen to appraise the worth of curricula reliant on PBL philosophy and methodology. The method involved actual stories or narratives depicting situations and experiences of curriculum implementation.

Results: The use of narratives illuminated daily challenges of students, staff members and other stakeholders and posed solutions to issues raised in a collaborative way.

Conclusions: An evaluation process reliant on a collection of stories of the experiences of those involved shed some light on the perspectives of a range of stakeholders and tested the feasibility and practicality of curriculum design and implementation. There were three major areas on which academic colleagues needed to focus:

Resources- PBL is no different from other approaches to curriculum development; implementation strategies need to comply with the existing institutional policies and work within existing resources and budget allocations.

Processes- PBL strategies can be used in conjunction with flexible/ e-learning delivery modes that increase the potential use of a range of support materials to enhance cases as learning stimuli. Facilitator guides ensure consistency across groups.

Results- Data on the effectiveness of the learning experience is regularly and routinely collected and fed back into continuous quality improvement.

Keywords: Problem−based learning, Curriculum renewal, Evaluation, Educational innovation

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INTRODUCTION

Many people conceive of Problem-based Learning (PBL) as a single methodology and refer to the early models of PBL used by medical schools and cited in the medical education literature. Today PBL has moved a long way from that early model which was resource intensive and developed specifically for the discipline of medicine. PBL remains 'practice-based' but has been adapted in the contemporary environment for use in many disciplines and in widely diverse teaching and learning contexts using a range of media for program delivery. However, the contemporary PBL approach does have a set of common characteristics or principles that include:

- the use of actual 'problems' as the stimulus and context for student learning
- a focus on higher order thinking skills through processes of enquiry
- integration of knowledge skills and behaviours that are discipline specific but informed by other relevant disciplines
- learning in small groups that might be sub-sets of larger groups and
- self-directed learning that demonstrates greater student autonomy.

BACKGROUND

As with all educational approaches there is often a gap between the desirable implementation of the principles and the actual practice. However, when engaging curriculum renewal involving PBL the authors as facilitators of the change processes aimed to develop rigorous and sustainable models of that philosophy and methodology which maintained the integrity of the PBL principles in its implementation.

PURPOSE OF THE PROJECT

PBL team members within particular disciplines undertaking curriculum renewal aimed to explore the processes of implementation that resulted from their attempts to develop an approach that employed the principles of PBL in a delivery model that

- engages and motivates students, enhances students' capacity to apply and use knowledge and skills acquired to the effective management of practice situations;
- is self-sustaining and independent of staff changes;
- is compliant with University teaching and learning structures and policies; and
- is sustainable within resource constraints similar to conventional programs.

METHODOLOGY

Case study design using narratives

An evaluation design reliant on the use of narratives was chosen to appraise the worth of one case of the use of PBL philosophy and methodology because it was believed that one can use actual stories or narratives depicting situations and experiences of curriculum implementation. In this way one can illuminate the daily challenges of students, staff members and other stakeholders and pose solutions to the issues raised in a collaborative way. A collection of stories of the experiences of those involved can shed some light on their perspectives and test the feasibility and practicality of any curriculum design and implementation. The methodology reliant on the use of narratives has been referred to as an "under-explored and under-traversed bridge across traditional knowledge paradigms" (Thorne, 2012, p. 281).

The approach can thus be used for curriculum evaluation and renewal. The cases in this situation were reliant on the phenomenon of storytelling about experience with PBL; each story is a case for cross case analysis and conclusions (Yin, 2004). Stake's reference to the case study as an "opportunity to learn" (2005, p. 451) and the use of narratives is relevant to appraisal of the value of an educational approach. Using a similar approach to that underpinning PBL, exploration of the feedback from the stakeholders leads to understanding of the purpose behind the philosophy and a level of interpretation of the experiences of those involved in what is predominantly a change process.

The Approach

The project aimed to provide a sustainable PBL model through the following strategies:

1. The curriculum model integrates the knowledge and skills encountered in existing subjects through the investigation of selected cases. The PBL methodology provides an integrating mechanism based on a conceptual framework derived from an analysis of actual practice yet conforms to conventional course structures and credit points of the University in which it offered. The development of matrices that map the subject content against the PBL cases ensures that essential content is addressed in the context of practice-based situations.

2. The uses of PBL cases developed are complemented by comprehensive student learning guides based on actual cases thereby providing authentic practice situations as the context for learning. The case development processes are reliant on a sophisticated template and quality assurance process involving practitioners, subject and PBL curriculum experts to ensure consistency, accuracy and quality. This

enhances the reliability of the learning experience across teams (small groups) and classes. The 'cases' should be evaluated by students, staff members and external moderators if possible. The cases are presented in flexibly delivered formats suitable for on-campus and distance education delivery.

3. The use of multiple small groups (4 groups of 5 students; or 3 groups of 7 students) to one facilitator provides the opportunity for small group learning, a key principle of PBL, but removes the resource intensive strategy of facilitator led small groups. In addition to the model conforming to existing student: staff ratios in the discipline. This approach enhances the autonomy of the self-directed learning groups and reduces the reliance on the facilitator. The role of the facilitator is still significant as they guide the sharing of propositions and ideas, and the validation of learning outcomes across all of the teams (small groups). This in turn enhances the reliability of the self-directed learning by the students as they address and test their understanding of the specified learning outcomes in both their own team and with other teams in the group.

4. The development of a comprehensive student guide to being a student in the PBL component of the course provides explicit instruction about their roles and responsibilities as self-directed students and team members, the PBL tutorial process and the chosen approach to case investigating and situation analysis relevant to practice. This, together with the development of a comprehensive guide to being a facilitator in the PBL component of the course, ensures clarity of roles, expectations and consistency of processes.

5. The development and publication of explicit models

of case investigation; situation analysis and case management relevant to the discipline practice facilitates the development and critical review by students of higher-order thinking processes and provides the necessary scaffolding for learning.

OUTCOMES

Reflecting on the introduction of PBL into a Curriculum

In order to evaluate the sustainability of the chosen PBL methodology, the authors demonstrated that one can use the same kind of stimulus material to cause each of the stakeholders to offer their experience of and perspective on the philosophy and methodology. However, just as is the case with good design of learning events, this approach to 'evaluation' or determining the worth of the chosen approach, also relies on a framework of questions to guide the participants and their inquiry process and provide examples of feedback to each of the questions posed to the stakeholder groups. This approach mirrors the mode of interaction between the facilitator and the group with whom they are interacting, that is, the stakeholder at the centre of any process oriented activity like PBL. There should also be agreed benchmarks (for the student learning outcomes, the School resources and the regulatory and institutional requirements) against which one can measure progress towards a curriculum goal in a particular context.

The following narratives depicted scenarios that represented the experiences of a number of stakeholders, the student, the staff member, the institution and others such the professional organizations, associations and regulatory bodies. Any planned introduction of a curriculum change or phase of renewal requires consideration of the impact on all the stakeholders.

Of critical importance is the need to recognize that all curricula need a framework to guide staff members and students. This in turn enables appropriate mapping of concepts, content and processes.

Student Perspective: The scenario as stimulus material

You are in your office listening to some of your new first year students talking in the corridor about their first week of PBL tutorials, and you hear one person say,

"I am not sure I will be able to do this PBL. I liked doing the scenario, but I am worried about how to do the learning issues. They just say go and find out but don't tell you how much to do. I am used to just learning my notes from the lectures."

A second student adds, *"Yeah, well I don't see how the scenarios will cover all that we have got to learn."*

Another responds, *"My friend in second year says that, when you get used to it, it is really good because you can really see why you have to learn all this stuff."*

The first student replies, *"Well, I sure hope they know what they are doing because I want to pass my exams and know that I can do the job when I graduate."*

As you leave your office, the students ask you, can they talk to you about their concerns.

Questions eliciting appraisal of sustainability from the perspective of students include;

1. Does the curriculum design (program, course, module) provide a comprehensive and relevant framework for learning?
2. Do the PBL packages provide a guide, context and boundary for my learning?
3. Are there opportunities for me to apply/ practise my

learning?

4. Is there sufficient feedback on my performance to direct my learning?

5. Is the assessment of my performance fair, equitable and relevant to stated graduate outcomes?

6. How do I know I have achieved the stated graduate outcomes (Knowledge, demonstration of competencies, attributes/abilities)?

Staff Perspective: The scenario as stimulus material

After speaking with the students and reassuring them, you meet some colleagues in the staff room. You report your conversation with the students to the staff and say, *"I don't blame the students. It is pretty scary when you first start."*

A colleague says, *"Well, I have been doing PBL for a while now and I am not so sure we have got it right yet. I still think we need to do more to help the students meet our expectations."*

Another staff member interrupts, *"You can do what you like, but I am not spending any more time on this PBL. I have promised myself, I will get on with my own studies. I want to get promotion this year."*

A third colleague adds, *" I agree, we all have other demands on us, but I would like to review what we are doing, because I think we could make it easier on ourselves without compromising the program for students. I am enjoying the challenge though."*

The second staff member retorts, *"to-day its PBL, tomorrow E-learning, I wish they would just let us get on with our teaching."*

Questions eliciting appraisal of sustainability from perspectives of staff members include;

1. Do all students have a fair and equal opportunity to achieve the stated outcomes of the PBL Initiative?

2. Is there efficiency of delivery in terms of resources (staff, time, facilities) without compromising the PBL principles?

3. Are there sufficient practice opportunities (high cost) considering our resource limited environment?

4. Do we maximise learning opportunities to ensure the most effective use of the mode? eg face to face, on-line, laboratory, off campus?

5. Is the PBL Initiative integrated into the curriculum and not dependent on individual staff?

6. Are staff members encouraged to contribute in different roles to PBL? eg package writer, facilitator, resource person?

7. Do staff in the PBL initiative have fair and equitable teaching loads that allow for other academic responsibilities?

Institutional perspective: The scenario as stimulus material

You and some of your colleagues decide that you will organise a workshop to review some of the implementation issues with the PBL program. You go to the Head of Department to ask for approval and for some support. She listens and then says, "Look, is this really a priority right now? Things seem to be going OK. I have not had too many student complaints."

You suggest that perhaps it might also be an opportunity to begin to collect and document some data about your experiences. She replies, "Well I hope it will be positive because they are watching us like hawks".

You invite colleagues and students in the discussion realise that in the rush of the new academic year and another cohort, some new staff had missed out on the usual induction. You are impressed by the constructive

feedback from all and the suggestion by a group of staff and students to do a collaborative paper for a forthcoming conference.

Questions eliciting appraisal of sustainability from the perspective of the University include:

1. Does the implementation of the PBL initiative fit within the standard resource allocations?
2. Does the PBL initiative meet the quality assurance standards for teaching and learning?
3. Has the PBL Initiative been dissemination within and outside of the University and has transfer of the PBL technology to other areas occurred?
4. Is there a plan /strategy in place to ensure the ongoing maintenance of the innovation?
5. Is there evidence of the success of the innovation?

Besides the students, the staff members and the institution there are other stakeholders interested in the program design, development and outcomes: Regulatory and industry bodies, professional associations

Questions eliciting appraisal of sustainability from the perspective of other Stakeholders include:

1. Does the PBL Initiative meet the accreditation standards of the profession?
2. Do prospective employers understand the intent / benefits of the 'work-integrated' approach to learning?
3. Is there an evidence base to the PBL Initiative?
4. Are there opportunities for the consumers and members of the community or profession to contribute to the design and implementation of the initiative?

DISCUSSION

Strategies for Sustainable PBL Initiatives

For the staff members

- As a group plan 'HOW' the students will learn as well as 'WHAT' students will learn
- Define and agree as a group, the processes of the discipline or profession and the core competencies for graduates and make explicit and public to students.
- Use the graduate outcomes as a framework for the assessment of student performance
- Use the PBL curriculum to make explicit the shared beliefs, philosophies and values of the staff and make public to students
- Select a model of implementation that is sustainable within a resource constrained environment.
- Invest in the development of the PBL packages as the core of the PBL curriculum
- Develop guides to support students and staff in their roles in PBL
- Recognise the different skills and abilities of your colleagues and find ways to capitalise on strengths
- Use quality assurance processes to ensure consistency in the program
- Conduct regular program evaluation including all stakeholders
- Conduct research about your teaching to collect data on effectiveness of practice
- Engage in peer review of your teaching
- Share your successes with your colleagues

For the Institution

- Have a strategic plan and staff dedicated to implementing the plan
- Support the early adopters and develop one or two "champions"

- Provide resources for ongoing staff development
- Ensure PBL is linked to other strategic initiatives such as flexible and online learning
- Collect feedback data such as
  - student satisfaction surveys,
  - staff satisfaction surveys,
  - employer satisfaction surveys
- Establish Quality Assurance frameworks to ensure response to feedback
- Celebrate and reward success

Critical Success factors

A shared understanding of PBL

Teamwork

Supportive leadership

Recognition and reward

Patience

Commitment to empowerment through the philosophy of PBL

CONCLUSION

Reflection on the experience of using a range of practice based learning approaches has enhanced our personal experience of the range of options available to those interested in quality outcomes for student learning. On numerous occasions we have been called upon to work with faculty members from a range of disciplines as they are caused to reflect on their experiences with curriculum design and renewal. Our experience shows that there are three major areas on which our colleagues need to focus.

1. Resources - Programs reliant on PBL as a philosophy and methodology are no different from other approaches to curriculum development; implementation strategies need to comply with the existing institutional policies and work within existing resources and budget allocations.

They should not require any additional funding for their ongoing implementation. For example:

- Staff-student ratios will be the same as for programs that use conventional teaching methods. i.e. one facilitator to multiple learning groups
- Physical facilities should be flexible in design and allow multi – purpose use.
- Learning resources will be available through normal University facilities.

2. Processes - The curriculum, although it may be reliant on greater levels of concept and content integration, should conform to the required program/course structures that is, it should still conform to the usual credit point allocation. In other words, rather than one large integrated subject, use 4 smaller integrated subjects that can run in sequence or in parallel).

PBL strategies can be used in conjunction with flexible/e-learning. eg Web-based systems can be used in PBL for course management, for communication within and between groups and for delivery of stimulus material (problems, stimulus materials), package resources such as radiographs, learning resources. The use of the electronic medium increases the potential to use a range of support materials to enhance the case at the centre of learning stimuli. Other modes of teaching can also be incorporated into the PBL instructional strategy for example resource classes such as lectures, laboratories that relate to the focus of the learning activities within the package.

The PBL packages direct the student learning and the facilitator guides direct the facilitators to ensure consistency across groups. The use of templates and other quality assurance processes ensures the effectiveness of the packages.

Results

Student learning outcomes are central to any curriculum design. These are monitored through a rigorous assessment process congruent with PBL that uses the graduate profile (outcomes) as the framework.

Data on the effectiveness of the learning experience is regularly and routinely collected and fed back into continuous quality improvement.

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