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What We Think We Know About the Tutor in Problem-Based Learning

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This purpose of this brief paper is to provide those new to problem-based learning with a summary of the key findings of research conducted into the beliefs and practices of tutors who facilitate this approach to learning. Although findings from the research do differ there are many areas of agreement. There is general consensus that effective problem-based learning tutors know their subject content and are able to communicate their knowledge in ways that students can comprehend; that they are able to judge when and to what extent to intervene in student learning; and enter the learning environment with an intent for students to develop an understanding of knowledge rather than simply acquire it. Findings from research also suggest that to become an effective tutor takes time and requires support in the form of professional development.

Education of health professionals saw the early adoption of Problem-based Learning (PBL), with many medical schools introducing it as a key instructional strategy over 40 years ago.¹ From the beginning the tutor in PBL was regarded as a significant factor when measuring the success of this approach to learning,² as such research on tutors in PBL has been extensive. This paper is aimed at those new to the role of tutor in PBL, to help them understand some of the key evidence-

based findings from this canon. What we think we know about the tutor in PBL can be categorised in the literature as (1) that which is focused primarily on identifying and categorizing the behaviours of PBL tutors and (2) that which is more concerned with the relationship between tutors' behaviours and student outcomes (academic and broader learning outcomes). Studies have used a variety of research methods including data collected via self-reports, surveys of students, third-party observations and interviews. In contrast there is a paucity of research which examines the teaching beliefs of PBL tutors and the development of their beliefs and behaviours over time. This paper attempts to highlight the key findings from the three categories and provide implications for PBL tutor professional development. First however, is a brief summary of what is meant by PBL.

PBL can be implemented into the curriculum in a variety of ways, however there are a number of commonalities that cut across all models.³ Learning always begins with a problem scenario; whereby students actively construct mental models of the problem and its solution. PBL encourages self-direction, with students determining their learning goals, identifying and dealing with obstacles and undertaking research. The learning process requires students to work individually and in small groups, and finally, solutions to the problem are presented to peers and a

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tutor for discussion, feedback and reflection.^{4–7} Such an approach is based on a constructivist theory of learning and requires a model of teaching that is different to the conventional classroom. In traditional classrooms, the teacher is the distributor of knowledge and the students the passive recipients of this wisdom.⁸ In contrast, PBL is based on a philosophy that views learning as a process of knowledge construction with students playing an active role in knowledge acquisition. It requires teachers to facilitate student learning as opposed to providing direct instruction, and for students to be active in their learning; hence in PBL the teacher is generally called a tutor or a facilitator.^{9–11} Given that the tutor in PBL plays a unique role in students' learning process what do we know about this facilitator of learning, their behaviours, their impact on students, and the development of their beliefs and behaviours?

1. Identifying and categorising the behaviours of PBL tutors

Studies that have looked at tutors' behaviours in PBL have offered a number of classification systems in which the tutor can be placed. For example, Wilkie¹² talks about the tutor who is either a, (i) liberating supporter, (ii) directive conventionalist, (iii) nurturing socializer or (iv) pragmatic enabler, whereas Mayo et al.¹³ state that an ideal tutor should be an activator rather than a facilitator; their thinking being that an activator will provoke students into engaging with learning as their approach is more motivational and dynamic than a facilitator. Basing her work in phenomenology Silén¹⁴ provides two labels for tutoring styles; 'present' tutors and 'dys-appearing' tutors. In essence 'present' tutors base what they do on the students, their needs, and how they are functioning in groups to the point that students perceive these types of tutors to be present and supportive in the group rather than focusing on their own teaching. In contrast, 'dys-appearing' tutors are less sure of what to do and hence they are more consciously thinking of themselves and their role as a tutor so that students view them as being distant or non-existent in the student learning groups.

Our understanding of the effective tutor in PBL has been further enhanced by work that has categorised and measured tutor actions. For example Leung, Lue and Lee,¹⁵ used four types of teaching behaviours, (i) assertive, (ii) suggestive, (iii) collaborative and (iv) facilitative, while De Grave et al.¹⁶ have shown that effective tutors are those who score highly on four dimensions: (1) elaboration, (2) directing the learning

process, (3) integration of knowledge, and (4) stimulating interaction and accountability, and are perceived by students as being the most effective tutors. Interestingly the De Grave et al.¹⁶ study suggested that students perceived tutors who stressed content as being less effective than those who focus on the learning process, although the difference was not statistically significant.

What is common in all of these studies on types of tutors is the consensus that a spectrum of teaching behaviours exists.^{15,17} However the effective PBL tutor sits at the end of the spectrum that is represented by a view of teaching that is based on constructivist theory of learning, which is student-centred, concerned with developing students as self-directed, independent learners and where the tutor takes a facilitative role in the classroom – all factors considered essential for PBL.^{3,7,9} A couple of studies have highlighted behaviours that should be in the repertoire of an effective tutor but which can be problematic. Maudsley¹⁸ has examined how tutors try to facilitate rather than teach in PBL classes and found that a key issue in facilitation was a lack of knowing when and how to intervene in student learning. This finding was also raised by Haith-Cooper.¹⁹ In both studies, when tutors decided there was a need to intervene they tended to slip back into the familiar teaching role and start to provide unsolicited information, and direct students' learning. In an earlier study by Maudsley²⁰ some tutors were interpreting the role of a tutor as being 'tutor inactive' whereby they played virtually no role in the classroom or as Neville describes they felt like "wallflowers",²¹ they made little contribution because they thought they could not use their subject expertise to help students. It seems that knowing when, why and how to intervene in PBL classes is an elusive skill. Indeed, in a review of numerous studies of the PBL tutor, Neville²¹ claims the key problem facing teaching staff using this approach is deciding how directive or facilitative they need to be to achieve the balance between students acquiring an understanding of their subject and students being self-directed in their learning. What is unclear from these studies is whether the difficulty related to intervention is based on tutors' lack of knowledge about how to facilitate PBL or a lack of conviction about the appropriateness of this method.

2. The impact of the PBL tutor on students' outcomes

There is a second body of work in the literature on the tutor in PBL that expands upon the research that identifies the behaviours of tutors by looking at how

their actions and their attributes impact on student outcomes. This literature can be divided into two subsections, those studies that look at outcomes in terms of students' academic achievement and those that take a broader view of outcomes to include for example, students' role in groups and their satisfaction with PBL.

Examining first the impact of the tutor on students' academic achievement, a plethora of studies have focused on the subject matter expertise of the tutor. Burrows inflamed the debate into expertise in PBL when he asserted that a good tutor would be able to successfully facilitate in any area.⁹ Much work on the topic followed his claim, with several studies concluding that tutor expertise in a subject is important in students' academic achievement.^{22,23} Yet the review by Dolmans et al.²⁴ cited numerous studies where the evidence was inconclusive. Schmidt²⁵ provides some useful insights as to why there may be inconsistencies in the tutor expertise debate suggesting definitional differences and methodological issues may play a part in the confusion. In addition, he went on to conduct an investigation into the conditions in which subject matter expertise influenced student achievement. His findings showed that subject-matter expertise was important when students' prior knowledge of a subject was lacking and when a curriculum unit was poorly structured. In such cases students performed better when tutored by subject-matter experts.

A study by Chng et al.²⁶ looked at the extent to which three tutors' behaviours influenced learning. The behaviours examined were (1) subject matter expertise, (2) social congruence – their empathic attitude towards students' learning; and (3) cognitive congruence – their ability to communicate complex ideas in ways that students can grasp). The findings suggest these tutor behaviours have a greater impact on average academically performing students than those who are academically stronger or weaker. The authors conclude that average students require tutors to “provide more guidance, generate interest in the subject and deliver the subject in a way that is easily understood”.²⁶

The work on the impact of the tutor on students has been expanded beyond academic outcomes to incorporate students' performance in small groups and their perceptions of, and satisfaction with PBL. An example of this wider interest can be found in a study by Budé et al.²⁷ They examined the impact directive guiding had on students' perceptions of the course, the quality of group discussions and the quality of problems. They also looked at students' achievements in the end of course exam. Their study showed that students who

received directive guidance via a pre-arranged intervention (in the form of a detailed list of specific questions to ask students) performed better on the end of course exam and regarded the course, the group discussions and the quality of the problems more highly than those students who did not experience directive guidance. In their study they imply that individual differences in tutor behaviours can be manipulated and modified through professional development and the use of curriculum support materials.

Overall the studies mentioned above have led to an understanding that an effective tutor is a facilitator of learning; who is knowledgeable about their subject; someone who allows time and space for students to explore problems, who can make appropriate decisions about when to step-in and help students without taking over their thinking and learning process, who encourages knowledge acquisition and the development of sound learning skills and who is reflective of their own practice and encourages students to also reflect on what and how they learnt. Someone who demonstrates these qualities will have an impact on how individuals and groups perform in the PBL learning process and the outcomes they achieve.

Although the studies reviewed have provided a wealth of information about what it is that tutors do and the strategies they adopt, there are two areas where a lack of research remains. We know little about the beliefs and philosophies that underpin and shape tutors' approaches, strategies and styles and we are also equally unclear about the development of tutors; whether their behaviours change and adapt over time. The following sections look at some of the few studies that examine PBL tutors' beliefs about teaching and the development of their beliefs and behaviours over time.

3. Tutors' beliefs about teaching and the development of their beliefs and behaviours over time

Studies in conventional classrooms have shown that the behaviour and practices adopted by teachers are very largely determined by the perceptions they have of teaching and learning, and the contextual factors that either support or modify these perceptions.^{28,29} If this is the case, then tutors' whose views are not aligned to the constructivist theory that underpins PBL may find it hard to conform to teaching practices that provide opportunities for students to co-construct ideas with peers in a collaborative fashion, to be self-directed and to engage in self-reflection. If tutors are not aligned in their beliefs to PBL then it is difficult to be confident

that they are actually practicing PBL as intended, and consequently it makes the measuring of the effectiveness of this method of teaching complex.

Hocking's³⁰ study of beliefs about teaching included a case study of a PBL tutor. He showed that while the tutor made explicit mention of beliefs that could be described as social constructivist and aligned to PBL his teaching behaviours were those of a conventional teacher, transmitting knowledge to his students. The difficulty with this study was that it was based on a single case and therefore difficult to generalise.

A study conducted at a polytechnic in Singapore also looked at PBL tutors' beliefs and behaviours but used a far larger dataset.³¹ The polytechnic in the study had adopted PBL as its single pedagogy across the entire institution – all staff were expected to facilitate PBL in all courses, in all year groups. The study examined the relationship between the academic leadership's view of what an effective PBL tutor looked like and the beliefs and behaviours of the tutors who were implementing PBL. The study found that the academic leadership had a very coherent view of what constituted an effective tutor. However, it also showed there was a misalignment between the beliefs and behaviours of new tutors and the profile of an effective tutor of PBL as determined by this small leadership group. This is not altogether surprising as many of the new tutors had no previous experience with PBL and their initiation into the new pedagogy consisted of just five days training. Nevertheless, even after 18 months few noticeable changes could be identified in the tutors' perspectives on PBL – they were still at odds with the views of the leadership team. Most interestingly it appears that while there were some minor modifications to the tutors' behaviours such that what they were doing in the classroom was more aligned to PBL, their beliefs about teaching and learning were resilient to change.³¹

It is important to know whether staff can eventually adapt to PBL, as there are important human resource issues to be considered. For example, if change is not possible there may be implications for the recruitment process, with the appointment of suitable staff being critical. If however, tutors can be developed so that their beliefs and behaviours gradually show a good fit with the philosophy and practices of PBL then more focus can be placed on staff development than recruitment. Knowing how the development of effective tutors occurs will also be important in ensuring that staff development resources are targeted efficiently.

Another study at the same polytechnic in Singapore³² investigated whether tutors' behaviours are stable across time and context. It looked specifically

at the three distinct tutor qualities mentioned in a study above: (1) subject matter expertise, (2) social congruence and (3) cognitive congruence, as well as overall performance which was an aggregate of the three behaviours. It seems that overall tutor performance is stable although there is some fluctuation in performance when teaching different courses and that this variation is largely accounted for by difference in cognitive congruence and subject matter expertise. Such a finding presents something of a dilemma for a leadership team who has implemented PBL across the polytechnic. While it is good to see that those tutors who are rated highly by students seem to perform well across semesters and courses, it is also true that low rating tutors continue to perform poorly. Change in tutor behaviour is slow, and tutors when they come to PBL often bring with them behaviours that will dominate their classroom practices whether they are appropriate to PBL or not. It is therefore unreasonable to expect all tutors to transition to PBL without a considerable amount of support.

Wilkie¹² has also looked at the development of PBL tutors. In a qualitative study, she followed 18 new PBL tutors were followed over the course of three years to examine whether they experienced a shift in their espoused and actual conceptions of facilitation in PBL. The research found that in the beginning tutors tended to be quite directive in their practices despite having espoused beliefs about the importance of student-centred approaches to learning. After one to three years there was a shift in the tutors' approaches, as they became less directive and more willing to step back and allow the students time and space to explore the problem scenarios. Whilst the study makes available some rich descriptions of the experiences of PBL tutors over a period of time, it is a small study and Wilkie provides little explanation to account for the shift in approaches suggesting only that it may be a result of a sense of dissonance between beliefs and behaviours.

So is it possible to instigate a change in PBL tutors beliefs and behaviours? According to Prosner et al.³³ certain conditions must prevail before successful change will occur. Individuals must not only be dissatisfied with their current beliefs, but they must find the alternatives attractive and useful. In addition, new beliefs must connect in some way to those that are currently held. The adoption of radically different beliefs is unlikely except for a small minority of individuals.

A consistent theme in the literature is the influence that professional development can have on bringing

about change in beliefs and behaviours. It seems that tutors are most open to re-examining their perspectives on teaching and learning when they are about to enter a teacher education programme.³⁴ According to some research, this change is generally brought about via one of two ways; through dissonance³⁴ or through reflection).³⁵ Whilst the change is achieved it is generally agreed that it is a gradual and at times difficult process. Guskey³⁶ stresses that professional development programmes need to recognise that change takes time and therefore they should consider providing ongoing support. Interestingly he looks at the influence that pressure (albeit undefined) can have on encouraging practitioners to persist in their attempts to change practice, especially for those whose motivation for change is not strong.. He acknowledges the role of feedback in providing evidence to teachers that the new practices they have adopted are working. All of these works show that professional development can have an impact on tutors but that it needs to be viewed as a long-term endeavour that provides a mixture of challenge and support and is underpinned by evidence and feedback.

In summary, the research into PBL tutors' beliefs and practices over several decades has coalesced around some clear findings, that effective PBL tutors know their subject and are able to communicate their knowledge in ways that students can comprehend; that they are able to judge when and to what extent to intervene in student learning; and whose intent is for students to develop understanding of knowledge rather than the acquisition of it. However, it seems that teachers new to the role of tutor often demonstrate beliefs and practices that are misaligned to this active learning environment and more akin to conventional classrooms. In addition, it seems that developing and changing from these traditional beliefs and behaviours is difficult, at least in the short to intermediate term. Change takes time. Until tutors, particularly those new to PBL, are provided with professional development opportunities to help them reflect upon and question their beliefs, and understand what it means to facilitate learning rather than transmit knowledge, few changes in behaviour will occur. Institutions, schools and faculties need to view PBL staff development programmes as a long-term investment in student learning. The typical model of professional development that includes short orientation programmes followed by a smorgasbord of workshops which tutors self nominate to attend, may not provide sufficient support to help tutors develop theories of teaching, and educational practices that ensure a smooth and quick transition to PBL. Staff development programmes must provide the

opportunity to engage with colleagues and receive critical feedback from students on teaching practices.

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