THE ISSUE IS

How Should the Effectiveness of Problem-Based Learning in Occupational Therapy Education Be Examined?

The recognition that students require practice-related, contextual learning to effectively integrate and apply knowledge has propelled problem-based learning (PBL) to the forefront of health-related professional education (Brandon & Majumdar, 1997). The need for practice-ready graduates has added further momentum to this trend. Occupational therapy is among the many health professions to embrace PBL. Discussion with colleagues at national and international conference workshops, some of which were given by one of the authors, suggests that many occupational therapy education programs use PBL courses within their broader curriculum. Less common are occupational therapy education programs that are based entirely on PBL, such as those at McMaster University in Canada, Shenandoah University in Virginia, and the University of New Mexico (Royeen & Salvatori, 1997; Watson & West, 1996). The validity and efficacy of PBL to achieve the desired educational outcomes of occupational therapy educational programs has yet to be examined. In this article, we question occupational therapy educators about why and how PBL is used in occupational therapy education programs and advocate research to substantiate its efficacy in achieving educational outcomes.

A Rationale for PBL in Occupational Therapy Education

Intuitively, an observer would conclude that PBL and the philosophical beliefs of occupational therapy concur. In both, the principles of client-centeredness, relevancy of action, learning in context, the value and integrity of all participants, recognition of existing skills, developmental level and readiness to learn, and the fundamental principle of interdependence of all persons are evident (Watson & West, 1996). Thus, we can see why a PBL approach is appealing to occupational therapy educators.

PBL posits that understanding is individual and that context, both physical and social, is critical for learning. The motivation of the learner is central to what is learned (Hein, 1991; Savery & Duffy, 1995). Savery and Duffy (1995) argued that PBL is consistent with instruction arising from constructivism because, in a PBL environment, learners construct their own knowledge in contexts compatible to those in which they will work, live, and play, and they are encouraged to engage in metacognition. Collaboration, personal autonomy, generativity, reflectivity, active engagement, and personal relevance also are valued in constructivism (Lebow, 1993). Thus, PBL seems to be attractive to occupational therapy educators both for its principles and for its contextual learning.

The primary outcome of students' working with PBL is that they learn to synthesize knowledge for the real world. For occupational therapy students, working with PBL means that they would learn to synthesize knowledge for practice within the occupational worlds of their clients in the current health care market. We think that this synthesis process is the essence of clinical reasoning. PBL purportedly provides a learning environment conducive to the development of such a mind-set (Savery & Duffy, 1995).

Clinical reasoning is a complex process that is much more than providing multiple explanations for clinical decision making and possessing the ability to articulate justifications for clinical judgment. Mattingly (1991) described the clinical reasoning of occupational therapists as tacit understanding, imagistic, and phenomenological thinking that is based on habitual knowledge gained through experience. If we concur with this definition, how do we determine that clinical reasoning for occupational therapists is taught through PBL, as VanLeit (1995) had stated?

Several authors have advocated for the inclusion of PBL into occupational therapy education to better prepare future practitioners (Royeen, 1995; Royeen & Salvatori, 1997; VanLeit, 1995). However, claims about the effectiveness of PBL have been based on subjective and anecdotal descriptions. PBL supposedly has been responsible for higher learning, intellectual curiosity,
transitioning from passive to active learning using a “variety” (unspecified) of reasoning skills, improved “quality of living, such as comradeship, fun, and enjoyment” and mutual regard, increased self-confidence, personal responsibility, coping abilities, understanding, and acceptance (Sadlo, 1994, p. 83; VanLeit, 1995).

The few research studies of PBL in occupational therapy have tended to focus on students’ perceptions of PBL, not its educational efficacy. Both Stern (1997) and Sadlo (1994, 1997) reported positive student perceptions. Students in Stern’s study reported that PBL improved their ability to clinically reason and synthesize concerns pertaining to clinical cases, provided parameters for thinking about cases, and increased their recognition of the importance of their personal biases. We have noted similar positive perceptions of the value of PBL in feedback from students, fieldwork educators, and faculty members. Roberts’s cross-sectional study reported that supervisors and recent graduates found PBL motivating and helped them to develop reasoning skills and teamwork (Roberts, as cited in Sadlo, Piper, & Agnew, 1994). The recent qualitative study by Hammel et al. (1999) reaffirmed those positive perceptions; students reported PBL contributed to “clinical reasoning, communication and team-building skills” (p. 199). These studies contribute to our knowledge of PBL but are primarily exploratory and experiential.

Evaluation of PBL Efficacy
In this fiscally accountable educational climate, evidence of the academic benefits of PBL—a resource-costly teaching method—is crucially needed. Because we are faculty members in an occupational therapy education program that has used PBL courses since 1996, we became interested in the problem of how to measure the efficacy of PBL or the educational outcomes of PBL for our program. In our review of the literature on PBL in the health professions, we found that most of the efficacy research focused almost exclusively on PBL in medical education (Barrows, 1986; Birgargar & Lindquist, 1998; Nash, Schwartz, Middleton, Witte, & Young, 1991; Newble & Clarke, 1986; Schmidt, 1983; Schmidt et al., 1995; Sobral, 1995; Vernon, 1995; Walton & Matthews, 1989). Seldom has the distinction been made between curricula that are predominantly PBL and those with individual PBL courses within the structure of a traditional curricular framework (Albanese & Mitchell, 1993; Vernon & Blake, 1993). But these “efficacy” studies examined PBL on numerous academic and behavioral dimensions without contextualizing the setting or idiosyncratic application process, making it difficult to translate the findings beyond the research site (Hayes, 1998; Savin-Baden, 1997a, 1997b; Stern, 1997).

Two meta-analyses concluded that further research is necessary to arrive at a definitive statement regarding the effectiveness of PBL. (Albanese & Mitchell, 1993; Vernon & Blake, 1993). Vernon & Blake (1993) commented that “valued outcome variables were complex, multidimensional and difficult to measure” (p. 660). These meta-analyses found agreement in the studies they examined about PBL’s strengths, such as clinical functioning, ongoing learning, transfer of learning, student satisfaction in clinical rating, and retention of learning. The potential weaknesses of PBL include students having poorer quality of factual information and knowledge of basic sciences. Outcomes of PBL courses, as compared with outcomes of traditional courses, were identified as increased problem-solving abilities, accuracy of learning, and short-term recall of factual data (Berkson, 1993). These potential cognitive benefits are tempered by deficits in forward reasoning and inaccurate diagnoses (Albanese & Mitchell, 1993; Patel, Groen, & Norman, 1991; Schmidt, 1983; Vernon & Blake, 1993).

Do these results of educational outcomes or efficacy of PBL in medical education have any relationship to education in occupational therapy, which desires different educational outcomes? The paradigm in medical education is essentially biomedical, a model that some in our profession have stated is inconsistent with the focus of occupational therapy. Can we use these findings to make curricular changes in occupational therapy education?

Occupational therapy education programs that have incorporated PBL have done so for its potential to develop interpersonal and cognitive skills, above and beyond those garnered in traditional occupational therapy curricula (Bruhn, 1997). The predominant reason for choosing PBL has been to develop clinical reasoning and critical reflection, necessary abilities for graduates in their immediate and long-term practice (Royeen, 1995; VanLeit, 1995; Watson & West, 1996).

The development of clinical reasoning and critical reflection may be the greatest assets of PBL in the education of the occupational therapy student but, at this stage, these educational outcomes are suppositional. In PBL, the educator can dynamically combine theory and knowledge learned in the classroom with the unique contextual factors of each practice scenario to provide invaluable synthesizing experiences that help prepare the student for real-life situations. If clinical reasoning at the procedural level (Slater & Cohen, 1991) is the most frequently used mode of reasoning for recent graduates, then this type of clinical reasoning needs to be intentionally fostered and evaluated. To ascertain the effectiveness of PBL to promote the learning valued by the occupational therapy profession requires studies that measure specific educational outcomes. Accountability for outcomes education must be addressed with the same fastidiousness of measurement as outcomes are given in the health care environment, and the decision regarding curricular design and choice of educational methodologies should be based on the results of educational outcome studies.

Recommendations
The first step in researching PBL is to define PBL as it is used in occupational therapy education. Some programs, like ours at the University of New England (UNE) in Maine, apply PBL in accordance with the protocol of this educational methodology (i.e., problem-focused, small groups, student-centered, five-step inquiry process), whereas other occupational therapy educational programs use a wide variety of teaching approaches loosely structured around clinical cases. A consensual definition will contribute to uniformity in its application and generalizability of future research findings.

A second step is to delineate the component skills enhanced by the PBL
methodology; it is necessary to intentionally promote the skills in the student and to evaluate them as educational outcomes. The components include critical thinking skills, such as meta-cognition (thinking about one’s thinking), and the ability to integrate and synthesize knowledge and to draw interrelationships between bodies of knowledge in clinical practice. Skills also include learning where to find and how to evaluate credible resources and how to make the best use of them in problem solving and decision making. This includes the transfer of learning and generalization of knowledge to a variety of environments. Thirdly, PBL is believed to assist students to learn at the higher levels of Bloom’s (1956) taxonomy of educational objectives: integration, analysis, and synthesis. These cognitive abilities are essential to the complex problem solving, decision making, and judgment currently used in clinical reasoning.

The focus of research on PBL has shied away from measuring these aspects, partly because of the absence of reliable, valid, and utilitarian instruments to measure constructs such as critical thinking and clinical reasoning. Studies that have attempted to use traditional measures have found few robust effects (Hmelo, Gotterer, & Bransford, 1994; Schmidt, Daupinee, & Patel, 1987; Tolnia, 1991).

Our experience in measuring critical thinking in PBL parallels this difficulty. Students reported that the typical attributes of PBL were the ability to research effectively, synthesize information, engage in active learning, and problem solve, but the UNE study, using recognized psychometric measures of critical thinking, yielded nonsignificant results (McLeod, 1997). These findings reflect the methodological difficulties of measuring the construct of critical thinking, especially in a quasi-experimental model and limited time frame.

Summary

Our aim in discussing the issue of educational outcomes of PBL has been to provoke discussion among occupational therapy educators and researchers. Future collaboration and research should involve occupational therapy educational programs that use PBL and those who have yet to access this teaching–learning method. Multisite studies would allow the evaluation of different teaching methods of clinical reasoning and their respective efficacies. Germane instruments that are easy to use and that effectively measure clinical reasoning in occupational therapy must be developed to supplement the qualitative research that is being undertaken. Such research will support and validate the use of resources and constructively contribute to accountability.

PBL may be valuable for promoting adaptive learning in students, which will help them and the profession stay informed and proactive and ensure best practice in a rapidly changing health care environment. This article is a call for educators to collaborate in educational outcome research studies. The traditional methods of evaluation, such as pass rates on national certification examinations, may not demonstrate the multidimensional learning and cognitive growth acquired in PBL; therefore, there is a need to generate validating research about the efficacy of PBL in occupational therapy education. If we are to undertake the challenging task of measuring the development of clinical reasoning, research will require creativity and reflection, hallmarks of the PBL process.

References


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