

CHAPTER 2: LITERATURE REVIEW

The literature was reviewed under two sections:

A. Literature informing evaluation

B. Literature on studies in prosthodontics

It focused on literature arguing the adjudications of worth and evaluation approaches. It also relates to prosthodontics and oral health curricula focusing on literature debating the need for curricula innovation in oral health education.

Evaluation Literature

Curriculum evaluation has grown as a formalised field of disciplined inquiry addressing educational reform, characterised by its own set of international journals documenting various studies, aspects and approaches (amongst other issues) to undertaking curriculum evaluation (Worthen and Sanders, 1987; Weiss, 1997; Jacobs, 2000). Primarily, there are two paradigms to curriculum evaluation - quantitative and qualitative – which look at adjudications of worth of curriculum. The former are more concerned with measurement and assumptions underpinning scientific research (agricultural – botany approach) and are often criticised for not bringing in the “human face” to evaluation (Parlett and Hamilton, 1976). This is in contrast to qualitative approaches to evaluation which evaluate programmes in their own terms.

Qualitative evaluation approaches derive from social anthropology, psychiatry and participation observation research in sociology utilising anthropological tools in the data collection and analysis (Parlett and Hamilton, 1976; Wolcott, 1988; Wandersmann, Snell-Johns, Fetterman, Keener, Livet, Imm and Flaspohler, 2005; Fetterman, 2001). They seek through observation to describe and interpret what happens in a social setting in order to add to information to better understand innovations and assist in the decision making process. Evaluators seek to broker multiple views and are usually not authoritative nor the lone voice, but play the honest broker role between multiple voices in the adjudicatory process (SAIDE, 1999; Basson, 1997).

The challenge to the validity of qualitative approaches to evaluation is to investigate the issues in depth and present a detailed penetration or description of issues where the strength of the argument is explicit in the rigor with which the argument is presented and is not dependent on numbers. For example, Basson and Nonyongo (1997) in the DUSSPRO study evaluated, amongst other issues, the reduction of “transactional distance” through the provision of face to face tutorials, where the finding was that the uptake of face to face tutorials did not necessarily reduce “transactional distance” for a whole variety of reasons.

The shift towards qualitative approaches means that the evaluations need not control for all variables and need not be numerically objective, as is required in scientific inquiry, but have to ensure that a variety of techniques in the data collection phase are utilised and that the data has “trustworthiness” by using triangulation of data, interpreting such data based on sound understanding of educational theory, methodology, principles etc. This was evident in the study that evaluated the Scottish Integrate Science (Hamilton, 1975; 1976) where observation of what happened was matched with what was supposed to happen as stipulated in the curriculum documents and several mismatches between the intention and the reality were recorded.

As evaluations are also concerned with utility to impact problems, the utilisation focused approach as described by Patton (1997) ... brings closer together evaluations and their utilisation to impact practical action in sensible and tangible ways... (SAIDE, 1999) This is true in the Boitekong study where the community was able to define for themselves what was important and act upon their findings to effect change resulting in utility (Basson, 1998). “Utility” was brought into the evaluation fray as oftentimes findings from evaluations were never implemented and are said to have tended to gather dust in closets once the evaluation had been completed. Here, findings are thus used to address the need. Utilisation – focused evaluations are thus ... done for and with specific, intended primary users for specific intended uses... (Patton, 1997).

In order to “put back into the driving seat, those who know the programme best”, programme developers act as evaluators of the programmes themselves in empowerment evaluation and this is never a sole person as it is the collective that informs the adjudication (Fetterman, 1996). It could be said that curricula in health education where there is more of a student

centered focus and a more participatory approach in the teaching and learning strategies, has an element of empowerment to it as the students' voices are often solicited and taken cognisance of during the evaluation process.

In as much as evaluation studies report the failures in order to correct them, connoisseurship and criticism as a qualitative evaluation approach focuses on reporting 'good practice' (Eisner, 1985; Barone, 1985) and works off the prior adjudication of good. Connoisseurship evaluation thus seeks to disclose and celebrate good practice. Utilising this evaluative approach necessitates the evaluator to have refined sensibilities about the programme under review in order to effectively ... describe the programme, its organising principles, practitioners, practices, accomplishments, its exceptionalism ... to capture the ineffable qualities of the programme (Eisner, 1985: p140; M^cGreary and Michaels, 1998: p41). Oftentimes, good practice is not celebrated nor recorded for posterity, especially good practice coming out of Africa. An example of such is the Boitekong squatter camp where the community was able to build itself five face – brick schools and a community college without much fanfare and the usual associations of large budget government and NGO intervention (Basson, 1998).

Oral Health Education Literature

There is a worldwide renewed interest in dental curricula and how students become dentists (American Dental Association, 1994; DePaola and Slavkin, 2004; Kersten, Vervoorn, Zijlstra, Snyders Blok and van Eijden, 2007; Aldred, Aldred, Walsh and Dick, 1998) driven primarily by reform in medical education that started decades before that in dental education (Neufeld, Woodward and MacLeod, 1989; Bnurs, Smith, Masterson and Lask, 1995; Love and Russon, 2004). This has led to a strong need to evaluate dental education reform. As it is widely acknowledged, curricula are not made for eternity and therefore there is always a need for change to try and align what is taught with what is needed. In most health communities, there is a real need to rationalise the curricula in light of current disease prevalence and patient demand for treatment. Traditionally content has always driven curricula. However, contemporary education has realised the need for reformed learning and teaching strategies. The movement towards curriculum reform in dental education aims at producing dental

graduates who are not only able to provide comprehensive patient care that is scientifically based and technologically appropriate but also able to appreciate, understand and actively seek solutions to current intellectual, social, behavioural, and philosophical problems in dentistry (DePaola and Slavkin, 2004; Grant and Gale, 1989) and become ‘oral physicians’.

Traditionally, preclinical and clinical dental education did not keep pace with nor was it responsive enough to the shifting patient demographics and patient / population desires and expectations, changing health systems expectations, evolving interdisciplinary expertise, and integration of emerging technologies (Kassebaum, Hendrickson, Taft and Haden, 2004), due maybe in part to the presence of educational silos. The notion of educational silos stems in part from academic fragmentation or compartmentalisation that characterised most dental faculties. This led to students developing tunnel vision, and the inability to make connections between say anatomy and physiology; endodontics and periodontology. The realisation of the above then led a drive towards integration of dental education through utilisation of different vehicles such as problem based learning and case methods, heuristic strategies, reflective paradigm, journals, reflective story - telling, performance based assessment methods etc. (Barrows, 1996; Whipp, Ferguson, Wells and Iacopino, 2000).

Much of the oral health literature has investigated particular aspects of the philosophies underpinning PBL / hybrid - PBL curricula employing (quantitative) classical agricultural – botany methodologies and there is a scarcity of literature looking at these curricula from a straight “evaluation” perspective as described in educational literature. This would involve adjudications of worth regarding the implemented innovations utilising any one of the several approaches in the qualitative paradigm to evaluate educational reform as the conceptual frame informing the study. There is a paucity of qualitative studies investigating curriculum reform in dental education. One study did look at classroom instructional practices in dental education using a (qualitative) formative evaluation methodology utilising the principles of illuminative evaluation (Behar-Horenstein, Mitchell and Dolan, 2005).

Several studies have reported on the broad perceptions of PBL from both students’ and faculty perspectives from a purely quantitative approach (Aldred, Aldred, Walsh and Dick, 1998; Barrows, 1998; Greenwood, Mullins, Townsend, Wetherell and Winning, 1999; Lim and Chen, 1999; Greenwood, Townsend, Joseph and Wetherell, 1999; Farmer, 2004; Dodds, Osmond and Elliott, 2001; Snyman and Kroon, 2005; Haghighparast, Sedhizadeh, Shuler, Ferati

and Christersson, 2007). Additionally, the majority of studies have tended to investigate PBL from a pedagogic and curriculum design perspective using the agricultural – botany approach mainly looking at the ... effectiveness of an innovation by examining whether or not it has reached required standards on pre – specified criteria ... (Parlett and Hamilton, 1976; Dederich, Lloyd, Dixon, Farmer, Geurink, Nadershahi, Robinson and Scannapeico, 2004).

Prosthodontic training and education has not been passed by these challenges that informed the need for educational reform in oral health. There has been a massive shift in prosthodontic education influenced by educators' understanding of learning and the evolution of the profession. The emphasis shifted from prosthodontic curricular emphasising content driven by respected 'expert' opinion towards understanding the learning process and that which it hopes to achieve (Chaytor, 2005; Brunton, Morrow, Hoad-Reddick, McCord and Wilson, 2000). The 'situated learning' theory advanced by Lave and Wenger (1996) perceives learning as a function of the activity, context and culture in which it occurs and oral health education is a prime exemplar of this. Even with this acknowledged change in the way prosthodontics is taught and the adoption of such teaching and learning strategies, there has been minimal evaluation of such reform in the qualitative paradigm.

Teaching and learning activities in prosthodontics present a complex educational phenomenon as they are largely experientially based. Any study looking at 'researching' such a learning milieu would therefore need to investigate qualitatively and not utilise the quantitative research paradigm that relies heavily on large sample sizes; randomised controlled sampling, utilising pre-ordained pre and post tests and working to either refute or validate a preset hypothesis. The research methodology employed in such instances need to provide the necessary information and ...take into account the complexity of the context – dependent situations involved... (van Rensburg, 2007; AERA, 2006). The qualitative paradigm adds to the body of information that seeks to provide an in-depth description and interpretation of what happens in the 'classroom'. This would further provide information needed by the stakeholders and decision makers, in this instance the teachers (Faculty) within the department to enable them to modify and innovate further the programme at hand.

The aim of this study was to evaluate how the prosthodontic programme at the SOHS was working out, in its own terms. This study used an illuminative evaluation approach, which

Parlett and Hamilton (1976) report was developed in order to address the dissatisfaction inherent with the traditional approach to evaluate innovations which primarily focused on “measurement”. Illuminative evaluation also takes account of wider contexts in which educational innovations function. Its primary concern is with description and interpretation rather than measurement and prediction. The aim of illuminative evaluation is to study the innovatory project. It seeks to address and illuminate a complex array of questions.

Challenges inherent with PBL curricula

Curriculum reform is not without its challenges and often barriers are created and encountered during the process. PBL curricula are therefore not exempt from the above and several reactions to it include: doubts about its educational benefits; anxiety that its outcomes may not be tangible; the challenge to faculty to change their teaching strategies and hence come out of their comfort zones and the general fear of anything new (Hung, Bailey and Jonassen, 2003; Azer, 2001; Abrahamson, 1998; Barrows and Tamblyn, 1980). These challenges therefore make it imperative to evaluate curriculum reform.

There are several reported issues implicit in resistance to curricula change or reform. These include amongst a host of factors, but not limited to, personal factors, organisational issues, educational views, individual faculty’s interest in, beliefs and attitudes toward education, approaches to learning and views of teaching, educational and academic background and personal and career ambitions greatly influence ones openness to change (Peirce, 1877; Fullan, 1991 cited in Azer, 2001; Kelly, Shanley, McCartan, Toner and McCreary, 1997). With respect to organisational culture, the nature of the enterprise, the explicit and implicit distribution of power and influence, the degree of political control and influence driving the national imperative and the outlook of the professionals involved all greatly influence the outcome or organisational culture and may interact and limit the styles and types of change that is possible (Livet and Wandersman, 2005). Organisational resistance to the introduction of PBL curricula is widely reported (Ryan and Little, 1991; Ostwald and Chen, 1995; Ostwald, 1994).

Resource and time intensive nature of PBL curricula

Amongst the many challenges that have been reported is the issue of resource and time intensive nature of any PBL based curriculum impacting on the actual ‘cost’ of the innovation. There are many factors to be considered when assessing cost to time commitments of faculty and students, requirements for support personnel, cost of instructional materials, necessary infrastructural support etc. (Azer, 2001; Barrows, 1994; Haug, Brown, Goodacre and Cerimele, 1993). Attention needs to be paid to these issues as they could impede student learning and improved professionalism.

PBL programmes are resource intensive and also require much liaison which is time consuming. An increased number of staff is required when teaching small groups compared to when delivery is to a large student group. This also implies that there is a large investment of staff time with PBL based programmes. Additionally, the sustained attention to teaching required by PBL curricula may create barriers to the delivery of teaching. One question that has to be asked before implementing any new innovation is whether the cost of change and its maintenance is justified in terms of learning effectiveness and efficiency. This is addressed with utilisation – focused evaluation strategies (Patton, 1997). With PBL curricula, it is well established that effective case planning and development is time consuming and planning the detailed content of each semester does occupy an inordinate amount of time (Benbow, Rutishauser, Stoddart, Andrew and Freemont, 1996; Hung, 2009).

Content Integration

Vertical integration in the context of dental curricula can be defined as the integration of basic science knowledge (e.g. biology) in the clinical context. Horizontal integration can be defined as the integration of knowledge and skills between the clinical subjects that relates to comprehensive and holistic patient management.

Critics have raised concerns that the introduction of PBL may detract students from the traditional rigor associated with the basic sciences and hence question the efficacy of PBL formats in facilitating knowledge acquisition. PBL is reported to enhance depth of knowledge and not breadth with an increased number of studies reporting student discomfort regarding the ‘looseness’ of PBL curricula in terms of requiring students to have the ability to identify knowledge deficiencies, search for and learn new knowledge effectively. Students have

reported discomfort associated with the lack of definition of core material as well as clarity of the objectives of PBL (Boshuizen, Van der Vleuten, Schmidt, Machiels – Bongaerts, 1997; personal discussions with SOHS students and faculty – see transcripts of student interviews: Appendix 4.4).

One of the major aims of PBL curricula is integration of knowledge. As reported, and noted during this study, integration is not an easy task. It takes time for behavioural and basic science knowledge integration to be realised and seen to prove its relevance in clinical settings even within PBL curricula. However, several studies are reported to demonstrate a counter view wherein PBL curricula encouraging critical thinking with students demonstrating improved attitudes to learning (Birgegard and Lindquist, 1998). It has also been reported that long term retention of information was no different between PBL students and traditional curricula students, suggesting that the advantages arising from lecture – style preparation are comparative with learning from PBL curricula, with however, reported greater retention of knowledge via the PBL mode of learning (Eisenstaedt, Barry and Glanz, 1990).

Staff expertise

Wilkerson, Hafler and Lin (1991) report that content expert tutors in a PBL setting have a more directive role and suggest that this may endanger one of the most important aspects of small group work: where students are expected to determine their own learning objectives and access appropriate literature resources. Other authors have found the converse. Schwartz, Burgett, Blue, Donnelly and Sloan (1991) have reported that tutoring skills are more important in facilitating student learning than the staff's experience in the content of the problems. The evidence relating to this aspect of PBL is equivocal with certain groups touting tutor expertise as paramount and others proclaiming that a tutor who has good facilitation skills without content knowledge of the cases under review, is required. Maybe the middle of the road view that tutors have to possess both content and small group facilitation skills is the way to go. For small groups to function effectively, the facilitator must be familiar with teaching techniques of facilitating small groups (Barrows and Tamblyn, 1988). Similarly it is also important for tutors to be well informed about a problem and about related learning issues (Eagle, Harasym and Mandin, 1992). Good group guidance by the

facilitator has been correlated with effective group discussion in PBL programmes (Dolmans, Wolfhagen, Schmidt and van der Vlueten, 1994). It is argued that content expert facilitators tend to talk too often and too long and also provide direct answers to student questions and suggested more topics for discussion within the group instead of letting the students derive such concepts for themselves organically.

Importance of group dynamic to the success of PBL

There are essentially three factors responsible for group dynamic and hence the success or failure of a PBL session:

1. Facilitator associated issues
2. Student associated factors and
3. PBL case design

Facilitator associated factors include aspects such as lack of adequate preparation for PBL sessions, tutorial dominance, tutorial bias towards those students who dominate the discussion and inexperienced facilitators or those having lack of proper knowledge regarding the PBL process. All these can lead to a dysfunctional group dynamic which may not bode well for effective teaching and learning and may actually tip students towards disinterest in the PBL session.

With regard to students, if there is a negative attitude towards one another within the group, poor communication skills, lack of appreciation and support for each member of the small group, distraction / stress amongst the students, unresolved personal issues and laxity in getting assigned tasks completed group work will suffer. It is important that there is equitable participation from each group member for effective group dynamic. Another contentious issue is the notion that students from a PBL curricula may become dependent on the group environment and may not be effective in situations requiring them to function independently.

Case development and or selection can also make or break the PBL session. Issues such as inadequate design of PBL problems and lack of information in the student pack (the trigger), the facilitator guide, discrepancy between facilitator and students objectives may all

contribute towards a dysfunctional group or PBL process. Failure to address these challenges appropriately may affect the learning process of the students in the PBL programme.

Conclusion

Illuminative evaluation was used to get beyond using the agricultural – botany paradigm in evaluating the worth of the prosthodontic curriculum within the innovation at the SOHS. It also linked classroom based observations in order to adjudicate if the PBL innovation within the discipline of prosthodontics as intended was operationalised. It looked at the intentions of the PBL philosophy and concepts within the prosthodontic curriculum, i.e., student centered teaching and learning, integration of knowledge, small group work, student - directed learning, amongst others. Essentially, the study evaluated how the prosthodontic department operationalised the intentions of the innovation and was cognisant of any emergent factors. These issues (i.e, the emergent ones) were made available to the department through discussions with faculty within the department and at departmental meetings.