

Learning and Competency Development

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INTRODUCTION

Problem-based learning is an approach to professional education which has been used by a number of educational institutions involved in professional education both here and overseas. The most famous example in Australia is probably the medical course at the University of Newcastle, however an increasing number of professional educators are seeing this approach as being ".....the most significant innovation in education for the professions for many years; some argue that it is the most important development since the move of professional training into educational institutions".

(Boud and Feletti, 1991,

p.13)

Schools of nursing, design, engineering, optometry, architecture, law and business are amongst those developing a problem-based approach to professional education.

This paper argues that this initiative in professional education has within it characteristics which are sympathetic to many of the current moves in Australia to describe, and in some cases redefine, professional work. This process is part of a wider move in Australia to upgrade and improve the skills and abilities of the Australian workforce in the context of economic reform. As part of this analysis there has been a broad recognition that an able workforce requires skills and abilities which transcend those embedded in conceptions of workplace competence as posited in the behaviourist approach to workplace activity.

" The description of work situations should not be reduced to special (technical, economic, sensumotoric etc.) tasks and skills. General social, intellectual and emotional abilities must be included because, e.g. cooperation, communication, making independent decisions, planning and organising work on one's own are important aspects of efficient performance."

(Laur-Ernst, 1990)

In terms of professional work, abilities such as critical analysis, professional judgement, self-direction, problem solving, ethical self-regulation, research and a variety of interpersonal skills have all been highlighted as crucial abilities which are of equal importance to the broad knowledge base that underpins professional work.

Many professions in Australia have already developed, or are in the process of developing, competency standards. The National Office for Overseas Skills Recognition (NOOSR) has encouraged

professions to undertake this process. While a number of methodologies can be used to develop these standards, (Gonczi, Hager and Oliver, 1990), to be valid, they must of course capture the complex nature of professional work which includes those abilities outlined above.

1. NATURE OF PROBLEM-BASED LEARNING

Rationale of problem-based learning

" The principal idea behind problem-based learning is.... that the starting point for learning should be a problem, a query or a puzzle that the learner wishes to solve." (Boud, 1985, p. 13)

The rationale for problem-based learning arises from a view that, historically speaking, human learning has taken precisely this form and that from the advent of classrooms and curricula, human learning has been moving further and further away from this situation. By being centred on professional practice, problem-

based professional education courses avoid many of the difficulties which are often in many traditional discipline-based professional education programs. These difficulties include issues of relevance, learner experience, and the problems associated with the 'front-end' approach of many of these courses, whereby an attempt is made to cover all the knowledge relevant to the profession. Problem-based learning highlights how professional knowledge is never static and can never be totally accommodated in pre-service programs. It therefore views the goals of pre-service education as developing the skills to learn new knowledge quickly, effectively and independently. The problem-based approach is seen as an effective way of developing these crucial skills. Proponents of problem-based learning also argue that professionals need much more than a store of knowledge in the subjects which relate to their profession.

"They will have to adapt to numerous economical, political, scientific and technological changes and, as members of their profession, to participate in advancing, moderating or retarding changes as they affect the whole of the world. Adapting to, and participating in change and self-directed learning are composite competencies. Each will require the development of a number of component competencies, such as the skills of communication, critical reasoning, a logical and analytical approach to problems, reasoned decision making, and self-evaluation."

(Engel in Boud and Feletti (Eds.), 1991,

p. 24)

Proponents of problem-based learning also suggest that it serves two major and distinct purposes. The first concerns the practice and development of a number of crucial generalizable competences. These include (Engel in Boud and Feletti (Eds.), 1991, p. 25):

- * Adapting to and participating in change.

- * Dealing with problems, making reasoned decisions in unfamiliar

situations.

- * Reasoning critically and creatively.
- * Adopting a more universal or holistic approach.
- * Practising empathy, appreciating the other person's point of view.
- * Collaborating productively in groups or teams.
- * Identifying own strengths and weaknesses and undertaking appropriate remediation, e.g. through continuing, self-directed learning.

Secondly, problem-based learning admirably meets the following conditions for effective adult learning (Engel in Boud and Feletti (Eds.), 1991, p. 25):

- * Active learning through posing own questions and seeking the respective answers.
- * Integrated learning, learning in a variety of subjects or disciplines concurrently through learning in the context in which the learning is to be applied in real-life situations.
- * Cumulative learning to achieve growing familiarity through a sequence of learning experiences that are relevant to the student's goals, experiences that become progressively less straightforward but more complex, as well as less non-threatening but progressively more challenging.
- * Learning for understanding, rather than to recall of isolated facts, through appropriate opportunities to reflect on their educational experiences, and through frequent feedback, linked with opportunities to practise the application of what has been learned.

There is no single view of problem-based learning, indeed the conception will vary in practice according to the type of profession, the nature of the overall professional education program, the time available, and the preliminary skills of the group. However there are various common features that characterise problem-based learning. The following set of characteristics is derived from Boud and Feletti (Eds.), 1991, p.

15.

Characteristics of problem-based learning

1. The stimulus material used in problem-based courses to engage participants in a problem is presented, as far as possible, in the same context as they would find it in 'real-life'.
2. Information on how to tackle the problem is not given, although resources are available to assist participants to clarify the 'problem'.
3. Participants work cooperatively in a small group or team with access to a tutor who is often not expert in the field but can facilitate the learning process.
4. Needed areas of learning are identified through addressing the problem and participants study resources, some of which may be provided, others which they have located themselves.

5. This information is then reapplied to the original problem.
6. Learning which has occurred from this process is summarized and integrated into participants existing knowledge and skills. While these features are common to many versions of problem based learning, there are some examples which do not adopt all of them. In particular, there is significant dispute about "whether or not the small-group or team approach is essential." (Boud and Feletti (Eds.), 1991, p. 15)

Another important issue in problem-based learning is 'how are the problems selected?'. For problem-based courses to meet the above characteristics and outcomes, not just any problems will do. In practice there needs to be a relatively small number of problems, since students at any one time can work on only a few problems, yet the work on the problems needs to extend over significant periods of time. So the problems need to be central to the practice of the profession yet at the same time be suitable to producing the educational outcomes described above. Selection of suitable problems remains one of the main challenges for the successful operation of problem-based learning. We found ourselves asking the question 'what sort of competency standards would be most in accord with the rationale of problem-based learning?'. If we wanted to introduce problem-based learning into a teacher education course, what sorts of problems would be most appropriate?

2. Competency-based standards for The Teaching Profession?

It is with a sense of considerable unease that many within the teaching profession are being asked to revisit the notion of competence. The profession, particularly in the USA, was one of the first to develop competency based training for teachers. The failure of this movement known as Competency Based Teacher Education (hereafter CBTE) is well known. It is therefore not surprising that many teachers who are now being asked to embrace the idea of competency standards for the profession are somewhat wary of the idea.

It is beyond the brief of this paper to make a detailed analysis of the failure of CBTE. This has been well documented (see, e.g., Short, 1984 and Simons and Elliot, 1989). However a brief analysis of CBTE reveals that that it viewed the teaching profession from an extreme "Experts Systems" model of professional work. It went about analysing the work of teachers using a systems model approach. The components could be broken down and measured. Rules concerning teaching and learning could be established and the relationship between the variables worked out. Implicit in this view of learning was that learning outcomes were predictable as long as all the components making up the system could be identified and the rules governing the relationship of these components could be formulated.

The CBTE movement went about finding all of the components of the teaching learning system. This reductionist approach to

teaching/learning was an integral part of CBTE. Richard Burns writing about the programs stated that:

" Education can be viewed as a system whose parts can be defined, classified, measured and improved in other words managed systematically. Teaching skills for example are a composite of discrete but interdependent skills there is no reason to believe they are a gestalt of some type" (Houston (Ed.), 1972, p. 57).

Over 1000 components were identified. These "behaviours" were then earmarked as the competencies which would form the basis for professional development.

The search for measuring instruments and the laws and rules governing the system was found to be much more difficult than expected and became a major focus of activity. A committee that was formed to study national program priorities in teacher education recommended the development of approximately 250 school-based criterion measures of teacher performance.

" The Committee cannot emphasise too strongly the needed development of measures of teacher performance in the classroom." (Houston (Ed.), 1972, p. 26)

Patricia Kay discussing the report noted:

"The development of instruments to measure teacher performance under real classroom conditions will no doubt be extremely expensive but it is crucial to the establishment of competency based teacher education." (Houston (Ed.), 1972, p. 272)

While McDonald wrote:

"There is a need to identify those behavioural events that are reliably measurable and to determine the intercorrelations among these events....I was investigating the positive reinforcement given by a teacher for student participation in the class and the adverse stimulation provided by the teacher....Although the number of positive and negative reinforcers were negatively correlated the correlation was far more modest than I had predicted." (Houston (Ed.), 1972, p. 72)

The failure of CBTE was therefore due in part to its acceptance that professional work was open to a mechanistic analysis which if conducted exhaustively could codify performance and produce "correct" or "optimal" solutions to all teaching /learning situations (presumably both current and future ones!). Thus ignoring the fact that the real world of teaching and learning is characterised by unique situations and unpredictable events and that all analysis is coloured by the act of interpretation. CBTE infused with the spirit of "objectivity" also ignored the

emotional and value based characteristics of the professional work of teachers.

The moral of the failure of CBTE is:

Competency standards cannot be developed using an expert systems model of professional practice. Behaviours cannot be analysed and broken down to a myriad of components that adequately represent professional practice. Measuring instruments and rules cannot be developed to codify and produce correct professional practices.

Clearly CBTE is almost totally at odds with the rationale of problem-based learning. If we wanted to introduce problem-based learning into a teacher education course, CBTE would offer no worthwhile guidance on selection of appropriate problems.

3. ALTERNATIVE APPROACHES TO Professional Competency standards
Academic critics of competency standards rightly reject the narrow CBTE approach, preferring instead to focus attention on generic attributes such as problem solving, decision making, critical reasoning. While this approach certainly points to some important deficiencies in the CBTE alternative, it has its own defects. Notoriously the link between a generic attribute, such as analysis, and actual professional performance is doubly vague. Firstly because the claim that graduates develop a capacity for analysis is typically not subjected to detailed scrutiny (see, e.g. Chipman, 1992), and secondly because what analysis typically means in the day to day practice of the profession is not considered. Since these are the kinds of considerations that lead people to turn to problem-based learning, it is evident that the generic attribute approach, by itself, would offer little guidance either in the development of a problem-based learning course, or in the selection of suitable problems.

However the CBTE and generic attributes approaches are not the only alternatives for conceptualising competence, although this does not appear to be a welcome message in many quarters. There is a third approach to conceptualising professional competence, which has been called the 'integrated approach' because it brings together 'key tasks' (or, more accurately, 'key intentional actions') and generic attributes. This approach has provided the rationale for the development of professional competency standards in Australia. (This paper is not the place to describe the processes involved; see Gonczi, Hager and Oliver, 1990; Ash, Gonczi and Hager, 1992; and Heywood, Gonczi and Hager, 1992 for

details.) These professional competency standards are the result of using a suitable combination of applied social science research methods to arrive at a logically structured set of action categories. (The concepts 'key intentional actions' and 'action categories' are outlined and defended in Hager, 1992.) So, on the integrated conception, competence is conceptualised in

terms of knowledge, abilities, skills and attitudes displayed in the context of a carefully chosen set of realistic professional tasks ('intentional actions') which are of an appropriate level of generality. A feature of this integrated approach that it avoids the problem of a myriad of tasks by selecting key tasks ('intentional actions') that are central to the practice of the profession. The main attributes that are required for the competent performance of these key tasks ('intentional actions') are then identified. Experience has shown that when both of these are integrated to produce competency standards, the results do capture the holistic richness of professional practice. Recently it has become evident that there is still a lot of misunderstanding of the professional competency standards that have been developed in Australia under the aegis of NOOSR (e.g. Dall'Alba and Sandberg, 1992), so it is worth pointing to some of their distinctive features. One of the most overused terms in the debate about competency standards has been 'atomistic'. Authors seem to assume that if an approach to conceptualising competence is labelled, usually by themselves, as 'atomistic' then it can be rejected without further argument. In chemistry, where atoms are discrete and independent units, they nevertheless combine to form molecules which have quite different properties to those of their constituent atoms. So here atoms are a highly useful unit of analysis and are consistent with subsequent powerful synthesis. In reference to competency standards, 'atomistic' has no such clearcut meaning, nor does 'holistic'. Both are relative terms when applied to competency standards and their application needs to be justified by further argument. The fragmenting of a profession into a myriad of tasks, as the CBTE approach to competence does, is overly atomistic precisely because actual practice is much richer than sequences of these isolated tasks and the overall approach fails to provide any synthesis of the tasks. In that case we are justified in concluding that the distinctive character of the profession has been destroyed by the analysis. However the opposite mistake is adherence to a rigid, self-defeating monistic holism that rules out all analysis. In practice, some degree of atomism in approaches to competence will be acceptable, provided that it is accompanied by a suitable degree of holism. The professional competency standards produced in Australia by the integrated approach are holistic in several important senses.

1. They are holistic in that competence is a construct that is inferred from performance of relatively complex and demanding intentional actions. The relative complexity of the actions can be gauged from the fact that a typical profession involves no more than 30-40 such key intentional actions.
2. The holistic character of such competency standards is due also to the fact that the tasks (or intentional actions) are not discrete and independent. For example, actual professional practice will often simultaneously involve several of these

intentional actions.

3. A further sense in which these kinds of competency standards are holistic is that the intentional actions involve what Walker (1992a, 1992b) calls "situational understanding", i.e. the competency standards include the idea that the professional performer takes account of the varying contexts in which they are operating. A more general cognitive perspective is called on to frame a skilled intentional action appropriate to the context.

4. Yet another sense in which these kinds of competency standards are holistic is that by integrating key tasks and attributes,

i.e. integrating intentional actions with characteristics or qualities of individuals, competence is constituted by a relation between the professional and their work. (Contrary to Dall'Alba and Sandberg, 1992, this means that Sandberg's (1991) findings actually provide strong support for the integrated approach to professional competency standards that has been used in Australia).

By being holistic in the above senses, these competency standards are the opposite of any significantly atomistic approach, whether the atoms be tasks or attributes (once again, contrary to Dall'Alba and Sandberg, 1992, p. 2). In this way these professional competency standards strike a balance between the misguided extremes of fragmenting the profession to such a degree that its character is destroyed by the analysis or adhering to a rigid, monistic holism that rules out all analysis. That this balance is a reasonable one is indicated by the fact that these professional competency standards allow for professional discretion, i.e. they do not prescribe that all professionals will necessarily act in the same way in a given situation. Nor do they require that all professionals will have identical overall conceptions of their work, i.e. these professional competency standards are quite consistent with one practitioner having, say, a strong commitment to social justice, while another is just as strongly committed to excellence of practice.

The nature of these competency standards will obviously determine how they should best be assessed. Since they are based on the idea that competence is a construct that is not directly observable, but rather is inferred from successful performance, it is clear that performance will be vital for assessment.

Equally vital will be the requirement that sufficient evidence be gathered to justify the inference. While evidence from performance will be central to assessment, it may be supplemented by other kinds of evidence. This follows from the integrated nature of these competency standards in which attributes underpin performance. This means that the attributes often figure in the performance criteria. Thus in some instances evidence about possession of attributes, such as certain kinds of knowledge, might usefully supplement evidence of performance. (For a

detailed treatment of these points see Gonczi, Hager and Athanasou).

It was shown above that both the CBTE and generic attributes approaches to competence were not very helpful in relation to problem-based learning. The opposite is clearly the case for the integrated approach. With its units of analysis being holistic intentional actions that include situational understanding, the integrated approach's representation of professional practice is very much in accord with the aim, rationale and practice of problem-based learning. Competency standards based on the integrated approach could be expected to help answer one of the key questions for problem-based learning, namely 'how are suitable problems to be selected?'. On the other hand, problem-based learning provides an opportunity for the implications of professional competency standards for higher education to be assessed rationally. Unfortunately, the assumption that competency standards must be of the narrow CBTE kind has so far prevented any widespread informed discussion of this important issue. Accordingly, we expect that the advent of professional competency standards will stimulate a growing interest in problem-based learning in higher education.

Problem-based learning and teacher education

While many professional courses around the world, including nursing, design, engineering, optometry, architecture, law and business, are employing a problem-based approach to education, we are aware of no instance where this is occurring in teacher education. Our interest in the integrated approach to conceptualising professional competence has led us to think about

the applicability of problem-based learning to the teacher education programs in our own faculty. Presently there are no competency standards for teaching in Australia although several projects are currently in train to develop such standards for teachers in schools and vocational colleges. In anticipation of these developments, we commenced in August 1992 a pilot program of problem-based learning in the Graduate Diploma in Education (Technical) in the School of Adult Vocational Education at UTS. We will report on this venture at a later date.

CONCLUSION

This paper has argued that, of the three approaches to conceptualising professional competence, only one supports and enriches a problem-based learning curriculum in professional education. This is the integrated approach to conceptualising professional competence. Since this is the approach that has been used in the development of professional competency standards in Australia, it seems that the time is ripe for more attention to be paid to problem-based learning curricula in professional education. We have argued that problem-based learning and

integrated competency standards have a lot to offer one another. Problem-based learning appears to be relatively unknown in teacher education. Perhaps the imminent development of competency standards for teaching will change this situation.

References

- Ash S., Gonczi A. and Hager P. (1992) Combining Research Methodologies to Develop Competency-Based Standards for Dietitians: A Case Study for the Professions. National Office of Overseas Skills Recognition Research Paper No. 6, DEET. Canberra: Australian Government Publishing Service.
- Ashworth P.D. and Saxton J. (1990) "On 'Competence'", Journal of Further and Higher Education, xiv, 3-25.
- Boud D. (1985) "Problem-based Learning in Perspective" in Boud D. (Ed.) Problem-Based Learning in Education for the Professions. Sydney: HERDSA.
- Boud D. and Felletti G. (Eds.) (1991) The Challenge of Problem-Based Learning. London: Kogan Page.
- Burke J. (Ed.) (1989) Competency-Based Education and Training. London: McGraw Hill.
- Butler J. (1990) The Identification and Assessment of Competencies: The Nursing Project and its Implications. National Office of Overseas Skills Recognition Research Paper No. 4, DEET. Canberra : Australian Government Publishing Service.
- Chappell C. S. (1992) "Competency and Professional Education". Paper presented at the 'Competency and Higher Education' Symposium, University of Canberra, 26 September, 1992.
- Chipman L. (1992) "Spooked by Competency Push", Sydney Morning Herald, July 27.
- Dall'Alba G. and Sandberg J. (1992) "A Competency-based Approach to Education and Training: Will it Improve Competence?", Occasional Paper 92.4. Melbourne: ERADU, RMIT.
- Elliott J. (1991) Action Research for Educational Change. Milton Keynes: Open University Press. (Especially Ch. 8 titled 'Competency-based training and the education of the professions: is a happy marriage possible?').
- Eraut M. (1985) "Knowledge Creation and Knowledge Use in Professional Contexts", Studies in Higher Education, 10(2), 117-133.
- Field J. (1991) "Competency and the Pedagogy of Labour", Studies in the Education of Adults, 23(1), 41-52.
- Gonczi A., Hager P. and Oliver L. (1990) Establishing Competency-Based Standards in the Professions. National Office of Overseas Skills Recognition Research Paper No. 1, DEET. Canberra : Australian Government Publishing Service.
- Gonczi A., Hager P. and Athanasou J. A Guide to the Development

of Competency-Based Assessment Strategies for Professions.
(Provisional title) National Office of Overseas Skills

- Recognition Research Paper, DEET. Canberra : Australian Government Publishing Service. (Forthcoming 1992 or 1993).
- Grant G. and Associates (Eds.) (1979) On Competence, A Critical Analysis of Competence-Based Reforms in Higher Education. San Francisco: Jossey Bass.
- Hager P. (1990) 'Vocational Education/General Education- A False Dichotomy?', Studies in Continuing Education, Vol. 12, No. 1, pp. 13 - 23.
- Hager P. (1992) 'Are There Any Cogent Philosophical Arguments Against Competency Standards?', paper presented at the Annual Conference of the Philosophy of Education Society of Australasia, Fremantle, September 1992.
- Hager P. and Gonczi A. (1991) 'Competency-Based Standards: A Boon for Continuing Professional Education?', Studies in Continuing Education, Vol. 13, No. 1, pp. 24-40.
- Heywood L., Gonczi A. and Hager P. (1992) A Guide to Development of Competency Standards for Professions. National Office of Overseas Skills Recognition Research Paper No. 7, DEET. Canberra : Australian Government Publishing Service.
- Houston W. et al (Eds.) (1972) Competency Based Teacher Education. Berkeley, CA: McCutchan
- Laur-Ernst U. (1990) The development of the vocational education system in the Federal Republic of Germany from the perspective of the 1992 European integration. Paper presented to the National Conference 'Assessment and Standards in Vocational Education and Training', TAFE National Centre for Research and Development, Adelaide.
- Masters G. and McCurry D. (1990) Competency-Based Assessment in the Professions. National Office of Overseas Skills Recognition Research Paper No. 2, DEET. Canberra : Australian Government Publishing Service.
- Sandberg J. (1991) "Competence as Intentional Achievement: A Phenomenographic Study", Occasional Paper 91.4. Melbourne: ERADU, RMIT.
- Short E. C. (Ed.) (1984) Competence : Inquiries into its meaning and acquisition in educational settings. Lanham: University Press of America.
- Simons H. & Elliott J. (Eds.) (1989) Rethinking appraisal and assessment. Milton Keynes: Open University Press.
- Walker J. (1992a) "A General Rationale and Conceptual Approach to the Application of Competency Based Standards to Teaching". Paper prepared for the National Project on the Quality of Teaching and Learning. Canberra: University of Canberra.
- Walker J. (1992b) "The Value of Competency Based Education". Paper presented at the 'Effects of Competency Based Education on Universities' Conference, University of Western Australia, 24 June, 1992.

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