# INTEGRATION OF GENERIC SKILLS WITHIN EDUCATION FOR THE PROFESSIONS

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## ABSTRACT

Academics in professional disciplines are reviewing content and professional and generic skills to align courses with principles of lifelong learning. Problem Based Learning develops generic and professional skills while students perform complex, higher-order tasks that are aligned with community demands for better work and life skills in graduates.

## THE PROFESSIONS AND DEMANDS FOR GENERIC SKILLS

Academics in professional disciplines are questioning the relationship between content and discipline-specific skills, and generic or core skills. Graduates expect to be equipped to join professional teams as productive employees. Employers demand that tertiary institutions blend professional and interpersonal skills – including abilities in communication and technology-related skills – into courses. Professions demand development of lifelong learning skills in undergraduates to combat increasing knowledge obsolescence. As evidenced by the recent virtual BHP closure in Newcastle, lifetime jobs are increasingly rare. High school leavers may need to change careers during their working lives – even into careers that do not exist today.

The terms 'core skills' and 'generic skills' are now used to represent the development of lifelong learning skills; communication skills; interpersonal, group, team and leadership skills; critical and reflective thinking; the ability to work autonomously; appreciation of cultural diversity and the environment; and similar non-discipline specific abilities. The term 'generic skills' is used in this paper to refer to such attributes. The University of Newcastle has developed a set of generic skills for integration into all courses. All faculties will be required to show how their courses provide these skills when reviewed by the university's Curriculum Review Committee in the next few years.

Problem Based Learning (PBL) emphasises the integration of knowledge, skills, and attitudes while concentrating on a specific discipline, by developing proposals for action to realistic problems and scenarios (Woods, 1994). Generic skills are developed with PBL emphasising collaborative and independent learning: learning how to learn (Boud, 1985), and enabling graduates to continue learning after formal education. This is essential for professionals to avoid knowledge obsolescence (Stretton, 1985; Cowdroy & Kingsland, 1990; Maitland, 1991) – especially in technical and technology areas.

The faculty of Architecture at the University of Newcastle reviewed the curriculum extensively in 1984, converting to Integrated Problem Based Learning (IPBL) to integrate and cross-coordinate all subjects using complex architectural problems and scenarios (Donaldson, 1989; Maitland 1991). Generic skills are embedded into subjects, enabling students to

- integrate material from diverse sub-disciplines and related professions,
- communicate ideas, design philosophies and architectural proposals,
- work in teams when appropriate and to share ideas and resource material,
- develop professional and interpersonal skills.

It is timely to revisit the original views regarding generic skills from the last 15 years and to compare them with current expectations of the university, the architectural profession, and the general community.

The five year, Newcastle Architecture course provides one integrated, full-time subject per year, i.e. Architecture 1, 2, 3, etc. Students work through a number of Phases: integrated modules of work sequenced in increasing complexity, presenting architectural 'problems' requiring identification of current understanding to determine what additional learning is needed. Knowledge and skills development is serviced by 'Study Areas' and design tutorials. Students undertake learning activities in each Study Area appropriate to the current Phase problem, culminating in an integrated submission. Study Area coordinators sequence

learning for progressive development of appropriate attitudes and knowledge and skill frameworks.

A longitudinal study of the perceptions and preferences of Newcastle architectural students determined that many of the positives were generic skills. This supports the position that IPBL can readily accommodate generic skills integrated with discipline-specific subject matter if dealt with holisticly (Kingsland & Chen, 1993).

## GENERIC SKILLS FOR THE UNIVERSITY OF NEWCASTLE

Newcastle University has expectations of the outcomes of a university education. These are derived from its understanding of the nature of a university. The university decided that all undergraduates need to develop non-discipline specific generic skills, and commissioned a working party to investigate these expectations and determine common, core or generic skills. Working Party members represented most faculties and the university's Information and Educational Services Division. This promoted discussion in faculties of work-in-progress; providing feedback for refining core skills definitions.

The document 'Core Skills for Graduates' sets out the generic skills, and suggests how these generic skills might be developed within subjects and courses, and how students could demonstrate acquisition of these skills (The University of Newcastle, 1999). A primary consideration was that generic skills should be readily demonstrated by graduating students, and that there should be practical ways of developing these skills. Table 1 sets out the generic skills that the University of Newcastle expects graduates will have demonstrated before completing their undergraduate studies.

A number of items suggested were either very difficult to demonstrate and assess reliably, or would be difficult to implement. Members believed that graduates should have developed aesthetic sensitivity and responsiveness. Discussion raised the issue that if all graduates would be expected to develop aesthetic abilities then should they not also be required to develop equivalent skills in technology and science? For all courses to develop these dual, high-order skills, there would need to be considerable and radical redesign of most courses without further resources and without compromising the level of detail and coverage required by accreditation bodies. In order to achieve a useable list of generic skills, it has been recommended that consideration of aesthetic sensitivity and science and technology skills development be examined separately.

Graduates of the University of Newcastle will have demonstrated that they are able to:

- operate effectively with comprehensive and well-founded knowledge, skills and ethical standards appropriate to their fields of study;
- acquire, organise and present information;
- reflect on and continue to develop their knowledge, skills and attitudes;
- think logically, laterally, critically and creatively; analyse and synthesise;
- act effectively in decision-making and problem-solving;
- carry out research activities;
- communicate effectively as members of their communities;
- work autonomously and collaboratively;
- seek improvement in organisational, social, and cultural contexts in an ethical manner;
- recognise social, cultural, physical, and intellectual diversity, including the history and diversity of indigenous peoples;
- recognise and respond appropriately to globalisation and other changes of context;
- recognise human impact on the environment, and implications for sustainability.

*Table 1: Core skills for graduates from the University of Newcastle*

The wide variation in teaching philosophies and methods between and within faculties and departments is a result of each subject coordinator taking responsibility for designing appropriate learning activities and assessment tasks. The working party suggested that each faculty conduct workshops to coordinate generic skills implementation and that the Curriculum Review Committee was the appropriate body to monitor implementation via course and subject proposals and reviews.

The discussions mirrored those within the Faculty of Architecture from 1984 when it redesigned its undergraduate curriculum to concentrate on higher-order skills. The Department considered a number of abstract, higher-order qualities as very important, yet there was no convenient way of assessing these qualities. Examples included the development of creative and inspirational abilities, and the ability to innovate. Some others are now assessed, e.g. sensitivity to cultural diversity and sensitivity to the impact of architectural works on the aesthetic quality of neighbourhoods.

It is time that these issues were revisited, as discussions across the higher education community internationally may help to unearth examples where

these skills are considered within subjects and assessed in ways readily translated for the context of architectural studies. Also the increase in published research regarding ways of embedding within subjects reflection-in-action and reflection about practice (Schön, 1983) may help address some of these issues if tailored appropriately.

## PROFESSIONAL CONTENT KNOWLEDGE AND GENERIC SKILLS

There are increasing demands to cover more material. Generic skills to be added to existing content include critical thinking skills; group work and assistance with team building and group dynamics; communication skills and particularly interpersonal communication: discussion, debate, verbal presentation in support of proposals or specific positions; and development of self-directed learning. Two additional pressures impinging on education for the professions are an exponential increase in the amount of information being created, and the decreasing useful life of information – otherwise known as 'knowledge obsolescence'. Academics in professional disciplines cannot cover all material required for graduates' future professional practice – changing the learning philosophy to just-in-time learning – as, and when, needed.

In developing or refining curricula, it should be recognised that not all knowledge needs to be studied to the same depth. The various levels range from awareness (in areas indirectly related to their discipline), through understanding (in areas supporting their discipline), to ability to perform (in areas central to their own discipline) (Gonczi et al, 1990; Cowdroy & Kingsland, 1990). Accreditation bodies recognise these levels and use similar nomenclature for their professional registration procedures.

Some material needs to be so deeply embedded that it is, in effect, intuitive. This includes information and processes applied instinctively in life-or-death situations. Architects are not normally exposed to such circumstances, however, any architecture graduate must be able to apply basic and often-used information such as maximum slope and length of ramps for disabled access; maximum travel path to a fire exit; standard configurations for weather-proofing windows, doors, roofs, etc; and many other, similar, applications. A practitioner could refer to texts for this type of knowledge, but their work would become very inefficient and point to incompetence.

Some knowledge or processes, though critical, are used only occasionally, so practitioners use references to check their understanding. Architects use references such as building codes, Australian standards, structural span tables, etc. when appropriate. Accreditation bodies need to be sure that graduates know where to find this type of information and how to derive appropriate solutions from these databases.

Knowledge obsolescence refers to information that is no longer relevant or correct (Stretton, 1985; Cowdroy & Kingsland, 1990; Maitland 1991). This is becoming a major issue, especially for technical information. The 'half-life of knowledge' refers to the time before new information becomes obsolete. The half-life for some engineering disciplines is five years or less, with similar times for some architectural knowledge. In the computer, information technology and Internet fields, the half-life is often two years or less. Material studied in the first undergraduate year may be incorrect or irrelevant within the first few years of graduation. Knowledge and processes that are less time-critical still hold true for many years, although it may be necessary to re-interpret and update this material periodically.

If graduates have learnt how to learn, and experienced a variety of learning methods for different types of material, then they should be adequately prepared for new information. It will be necessary for undergraduates to experience a wide variety of knowledge types and learning processes; for example:

- understanding scientific data such as heat transfer coefficients for new building materials used to determine energy efficiency of a proposed design,
- understanding new theoretical approaches to design when accommodating a specific client or a specific class of client,
- understanding sociological data for future planning with government authorities,
- understanding complex ecosystems when designing in sensitive environments,
- understanding how computer programs work when learning new application programs, and so on.

## AUTONOMOUS AND COLLABORATIVE LEARNING ACTIVITIES

Small group participation, as in IPBL, in a supportive learning environment, allows expression and testing of understanding and ideas, and feedback from the tutor or facilitator and other

students. Teamwork adds the requirements that work is shared actively and constructively by all: all have responsibility to help others understand the material being studied, and to organise learning activities to achieve goals; and to support team members experiencing difficulties (Woods, 1994). Collaboration promotes deeper learning with greater achievement, by reducing the total time spent on low-level processing; and it also promotes interpersonal skill development (Woods, 1994). Candy (1991) promotes the concept of self-determination as being at a higher level than self-management (under someone else's direction), requiring abilities in areas of communication, goal setting, self-organisation and management.

Small group tutorials are used in Architecture at Newcastle for briefing and debriefing students, checking progress, and suggesting avenues for further discovery and detailed development. Students develop confidence as they progress through the course by contributing to discussions and interacting with other group members. However, more could be done to help students enhance their self-evaluation skills.

For 2000, the final Phase in Architecture 1, 2 and 3 will integrate students vertically with projects emphasising theoretical material, integration of theory with design agendas, and personal development of theoretical architectural views. Tutors will concentrate on generic skills development including teamwork, critical thinking and written and other communication skills, and will explore the frontiers of research in the discipline.

Authentic assessment, used in IPBL, concentrates on higher levels of thinking and practice, rather than on low-levels such as recall and recognition, and simple processes (Boud 1985). Authentic assessment uses tasks developed from realistic activities in the professional world (Nightingale et al, 1996; Herrington & Herrington 1998). Nightingale et al, (1996) define authentic assessment tasks as "complex simulations, case studies, ... or multi-faceted projects ... assessing a range of knowledge, skills and attitudes in the one assessment task" (p 3).

Herrington and Herrington (1998) note that the complex nature of authentic assessment requires higher-order thinking. Dall'Alba & Sandberg (1993) further state that higher order competencies require performance in order to demonstrate the integration of attitudes such as ethical and professional behaviour with appropriate knowledge and skills in complex situations. This is observed from the choices and actions students use to determine priorities, recognise conflicts, and, propose compromises, and in their response to moral and ethical questions and wider societal demands.

Newcastle architecture students undertake modified versions of real projects using authentic assessment processes that produce outputs identical to those in professional practice. Assessment is multi-faceted, with consultants in each sub-discipline assessing the submission for aspects specific to their knowledge domain. The whole submission is also assessed by a design panel viewing the integrated presentation. Assessment processes mirror those of professional practice where individual clients, committees, consultants and practice partners judge schemes presented for approval. Also, design competitions for major building work use design juries.

Assessment of complex, multiple, higher-order competencies presents difficulties in quantification of outcomes, because assessment of the resolution of complex issues is more than an assemblage of parts. Each part may be able to be assessed on an objective scale but the integration into a holistic product can be assessed only through subjective judgement by an expert. The difficulties of subjective assessment may be overcome by use of a panel of qualified and informed assessors (Cowdroy & Kingsland, 1990) and providing feedback using a profile aligned to the assessment criteria (Wilson, 1996).

The connection between authentic assessment and the issue of generic skills, is that the holistic nature of the processes and subject matter being assessed makes it natural to incorporate generic skills within the learning and assessment processes. In the Newcastle Architecture courses using IPBL, integrating all subjects and sub-disciplines, it is natural to use processes experienced in professional practice. Many of the generic skills identified by the Core Skills Working Party match those used in the IPBL process.

Authentic assessment uses a framework of defined competencies to organise and implement relevant curriculum and provide clear descriptions of assessment objectives and procedures (Bowden & Masters, 1993). Higher order competencies are complex, synergistic combinations of lower order (specific) competencies – more than just the aggregate of knowledge and skills required for the successful performance of the component attributes. In practice, specific competencies require professional judgement to understand when and why these combinations of attributes are called for (Gonczi et al, 1990). This demonstrates the attendant intellectual processes – creative problem analysis, critical reasoning, conceptualisation, innovative thinking, synthesis, and the ability to transfer skills and knowledge to new tasks and situations.

## PROFILE ASSESSMENT

Profiles overcome objections to arriving at single marks for holistic or integrated assessment tasks. Single marks hide both excellent performance in some components and inadequate performance in other parts. Profiles convey more formative information about summative assessment tasks; ideal for professions involved in designing, creating and/or performing. Profiles demonstrate the accountability of the assessors.

Nightingale & Magin (1996) define profiling as "complex, detailed reports, often with narrative elements, in which the assessor comments on the attainment of particular goals of the ... program of study" (p 196). Profiles help achieve desired learning outcomes by providing comment on a student's strengths and weaknesses. A checklist ticked by the assessor is the simplest form of profile. More extensive and comprehensive use of profiling as a method of assessment includes indicating how well an assessment criterion has been met, including providing written or verbal comments.

In Architecture at Newcastle, detailed reporting on learning objectives and assessment criteria, listed in project briefing documents, provide each student with a performance profile. Staff provide further verbal or written feedback to the whole class and to individual students needing specific assistance. Where a student needs more information to understand how to improve their performance, even after the profile feedback has been provided, they are encouraged to seek out the staff member individually.

Wilson (1996) reports that each student within integrated subjects encompassing diverse areas of knowledge and multiple sub-disciplines, presents a complex "profile of motivation, awareness, understanding, visual literacy and technical skill" (p 198). A matrix profile evolved providing a detailed list of assessment criteria with each assessed at one of three levels of achievement, i.e. as excellent, satisfactory, or unsatisfactory.

## CONCLUSION

Society demands more from tertiary education institutions in the overall development of graduates as individuals contributing to society. Graduates must have a thorough grounding in their discipline, but also have developed generic skills that complements detailed subject matter knowledge. Universities across Australia are developing generic skills guides for all courses. The University of Newcastle has developed a set of generic skills to apply across the university with a primary consideration being that these generic skills should be able to be demonstrated by graduating students, and that there should be practical ways of developing these skills.

The Faculty of Architecture redesigned its curriculum to use IPBL. It reviewed the professional and generic skills to be integrated into the course. Many skills match the university's generic skills, e.g. recognition of cultural, physical and intellectual diversity; of the impact of human and building activity on natural environments and of environmental sustainability. Other skills, such as creativity, inspiration, intuition, and development of sensitivity to others, were difficult to demonstrate and assess reliably, or were difficult to implement. They were not formally incorporated, other than by creating a learning environment that helped to engender such attitudes and skills.

Integrated Problem Based Learning provides an ideal educational setting for integrating generic skills in a realistic manner. Surveys support the view that students readily appreciate these skills as essential parts of their university education, and as preparation for an effective and valuable working life. Many of these skills promote contributions to the well-being of society in general. The nature of generic skills is that they require the development of higher-order thinking. Further research should investigate whether graduates using higher-order thinking for work activities, also transfer these thinking processes to other aspects of their life, and how to promote this goal.

## REFERENCES

Boud, D. (1985). Problem-based learning in perspective. In D. Boud; (Ed.), Problem-Based Learning in Education for the Professionals. Sydney: Higher Education Research and Development Society of Australasia (HERDSA) (pp 13-18).

Bowden, J.A., & Masters G.N. (1993). Implications for Higher Education of a Competency-Based Approach to Education and Training. Canberra: Australian Government Printing Service.

Candy, P.C. (1991). Self-Direction for Life-long Learning. San Francisco: Jossey Bass.

Cowdroy, R.M., & Kingsland, A.J. (1990). Assessment of Complex Multiple Criteria: Focus on Professional Development. In R. Ross, (Ed.) Research and Development in Higher Education 13, 150-156.

Dall'Alba, G., & Sandberg, J. (1993). A Competency-based Approach to Education and Training: Will it Improve Competence. HERDSA News. 15 (1) 2-5.

Donaldson, R.J. (1989). A Good Start in Architecture. In B. Wallis, (Ed.) Problem-Based Learning: The Newcastle Workshop. Newcastle: Faculty of Medicine, The University of Newcastle (pp 41-53).

Gonczi, A., Hager, P., & Oliver, L. (1990). Competency-based approaches to education. Paper presented at the Annual Conference of the Australian Association for Research in Education, University of Sydney

Herrington, J., & Herrington, A.J. (1998). Authentic Assessment and Multimedia: How University Students Respond to a Model of Authentic Assessment. Higher Education Research and Development. 17 (3), 305-322.

Kingsland, A.J., & Chen S.E. (1993). Defining, Developing and Assessing Higher Order Competencies: Focus on Learning Outcomes in Higher Education. In After Competence: The Future of Post-Compulsory Education and Training 1. Brisbane: CSFRD (pp 193-200).

Nightingale, P. & Magin, D. (1996). Designing, Creating, Performing. In Nightingale, I. Te Wiata, S. Toohey, G. Ryan, C. Hughes, and D. Magin, (Eds), Assessing Learning in Universities. Sydney: The University of New South Wales Press (pp 163-201).

Nightingale, P., Te Wiata, I., Toohey, S., Ryan, G., Hughes, C., & Magin, D. (1996). Assessing Learning in Universities. Sydney: UNSW Press.

Maitland, B.S. (1991) Problem-Based Learning for an Architecture Degree. In D. Boud, & G. Feletti, (Eds), The Challenge of Problem-Based Learning. London: Kogan Page. 203-210.

Schön, D. (1983). The Reflective Practitioner: How Professionals Think in Action. New York: Basic Books, Inc.

Stretton, A. (1985). Problem-based learning and the academic-practitioner gap. In D. Boud, (Ed.), Problem-Based Learning in Education for the Professionals. Sydney: HERDSA (pp 59-66).

The University of Newcastle (1999). Core Skills for Graduates. (Draft document). Core Skills Working Party, Teaching and Learning Committee.

Wilson, J. (1996). Case Study 50: Profiling Achievement. In P. Nightingale, I. Te Wiata, S. Toohey, G. Ryan, C. Hughes, and D. Magin, (Eds) Assessing Learning in Universities. Sydney: The University of New South Wales Press (pp 197-200).

Woods, D.R. (1994). Problem-based Learning: How to Gain the Most from PBL. Hamilton: McMaster University.