

Metaknowledge in tertiary education

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Abstract: *Participants in western tertiary education are becoming increasingly diverse in origins and backgrounds and this has led to the claim that there is less shared understanding about what constitutes a university education than was the case as little as ten years ago. This increasing diversity is found in the staff and students in New Zealand universities and reflected in the New Zealand Ministry of Education's data, in the literature of second language (L2) learning and teaching and in publicly available information on tertiary education. The well-known Bloom's Taxonomy of Educational Objectives has provided an explicit structure that has informed debates about the nature of educational experiences in secondary schools. This paper is a contribution to debates about the experiences that should form the basis of metaknowledge experiences of tertiary students and academics. An example of a curriculum is offered as a constructivist contribution to discussions about how to address the problems of making explicit metaknowledge that has historically been tacit. While the proposed levels and content are advanced in a New Zealand context it is expected that the issues raised will be relevant in other educational settings.*

Keywords: *metaknowledge, metacognitive knowledge, multicultural education, taxonomy of educational objectives*

Introduction

In the mythical traditional university, students learned about academic culture through day to day exposure to people and processes where the tacit aspects of academic behaviour were taught or caught, by example. The expectations of academics, as educators, were supposedly less multi-faceted than is likely when academic staff are drawn from a variety of cultural backgrounds. Disciplines were the pedagogical context for passing on a cultural heritage. The student body and the academic staff were, historically, more homogeneous as to cultural background and thus tertiary educators expectations were more closely aligned to social expectations. A significant tacit goal was the selection of the most successful students as the generational replacements of incumbent academics.

Problem statement

In the current, and foreseeable future, much that was tacit in tertiary education must be made explicit, in the sense that the taken for granted assumptions about what is important require spelling out for increasing numbers of staff and students. The linguistic and performance experiences and capabilities of staff and students are increasingly diverse, as tertiary education providers in every western country make accommodations for people with diverse disciplinary, social and cultural backgrounds.

The lack of provision for identifying and sharing taken-for-granted cultural behaviours has changed the nature of the tertiary experience for L1 (English first language) and L2 (English additional language) learners. In my professional experience, over a period of more than 30 years in the education sector, increasing numbers of students come with a lack of exposure to the metaphors and supporting cognitive structures required to engage in English language academic discourse. Lack of provision of the full range of metaknowledge experiences has exacerbated this disparity in preparatory learning and is, in part, a consequence of the increased access to tertiary education provided for people from diverse cultures and social backgrounds.

In the context of this paper 'metaknowledge' is naively defined as 'knowledge about knowledge'. Metacognitive knowledge, according to (Pintrich, 2002) writing in the context of a revised taxonomy of educational objectives, refers specifically to 'strategic knowledge, knowledge of cognitive tasks and self knowledge in relation to cognition' (ibidem). A substantial literature, and on-going debate, about the relationship between these terms and their relevance to educators can be expected to continue to grow especially since the (Anderson & Krathwhol, 2001) revision. As a contribution to that debate this paper follows the prior work in Bloom's Taxonomy of Educational Objectives for schools and extends that work into the graduate and post-graduate levels.

Metaknowledge: is knowledge about knowledge in a context. As such metaknowledge implies both a maintenance and constructive aspect. Knowledge is maintained through records and through instruction. Knowledge is constructed through research and through changes in practice. Academics are concerned with both aspects, with the former (records and instruction) roughly from ages 13 to 20 while the latter (research and changed practice) is more prominent in masters and doctoral levels. 'Metaknowledge' includes meta-level knowledge in addition to that specifically related to cognition as is implied in the term metacognitive knowledge. Metacognitive knowledge is acquired in contexts in which the learner can construct and evaluate personally important relationships between what is known and new material. Providing that context has been part of the well understood role of academics in traditional settings. Changes in practice also occur in the settings to which they apply. These two elements of metaknowledge learning are under threat from new technologies. Ethical, cultural (within and between disciplines) organisational and generational knowledge is also included at scales beyond the individual person, group or society. Where individuals share a particular culture, at whatever scale, such issues diminish in importance. But where, as is increasingly the case, societies become pluralistic tending towards a multicultural structure, knowing about, understanding, and acting in complex contexts assumes greater importance. The proliferation of disciplines and flavours within disciplines generates incomprehensible complexity at a surface level. Yet the expectation is that the educated leaders of tomorrow will both understand and be able to work usefully in and with such complexity. This paper explores some contributory aspects of the current tertiary context in New Zealand as an instance of wider trends in an increasingly globalised international community. Evidence for the claim of a globalised community is found in the increasing influence of L2 students in New Zealand tertiary institutions in changing the experience of tertiary education for all people involved.

Supporting evidence

Growth in numbers of L2 learners in New Zealand, for example, is reflected in the statistics reporting full-fee-paying students at all levels of New Zealand's education system. There are no statistics available to indicate how many L2 learners there are among New Zealand residents participating in tertiary education. New Zealand residents (people with permanent residency but who are not yet New Zealand citizens) are not distinguished in reported statistics. Many people in this group have English as a second language. The New Zealand Ministry of Education web site does provide much informative documentation about foreign fee paying students in New Zealand. The statistical information provided below is extracted from the Ministry's web site documents (Anon, 2001, Anon, 2004).

Among the more challenging statistics are those reporting that foreign fee paying students make up 2.6% of the total secondary roll. Of these students more than half (about 3,127) of the people are found in the Auckland region. Particular classes in the most popular business and commerce subjects may have a majority of foreign fee paying students. Over 90% of foreign fee paying students come from Asia with China, Japan, Korea and Taiwan being the most important source countries. Interestingly, the data shows that the large bulge of foreign fee paying student from secondary schools in the year 2000 will be moving on into post-graduate study over the next several years. Behind them is a significantly smaller pool of students that may offer a useful breathing space for academics coping with the large influx over the period from 2001 to 2003. In passing, it is noted that had growth continued as expected then numbers would have risen to between 14,168 and 21,865. This number of extra students would have required an additional 2000 academics, about 500 support staff and growth in the salary budget of over \$120 million not to mention accommodation and other support facilities. In round numbers such growth would require an additional two university campuses. The additional academic staff could not come from within New Zealand so a further influx of overseas academics would be required to provide for the numbers of foreign fee paying students. The staffing situation in existing tertiary education is sketched in the next section.

Indicative survey of tertiary academic staff in New Zealand

There are no available statistics that report on the country or culture of origin of particular university's academics in New Zealand. Gaining some insight into the origins of academic staff without biographical details is difficult and may be seen as intrusive of other peoples' privacy. Tertiary institutions however, provide published, and therefore public, documents that detail staff employed and provide other related information such as department or faculty grouping. Some documents are available 'online' with listings of employees by department, qualification and role. Looking at the first degree reported in department web pages and tertiary 'Calendar' publications as an indicator of first language, in a larger New Zealand university department of some 30 academics, only 8 have a first degree from a New Zealand university. Of the other academics 13 took out a first degree from countries where English is likely to be the language of education but whose cultural ethos is, not unexpectedly, different from New Zealand. Almost one third (9) of the remaining academic staff are L2 speakers whose first degree was taught in a language other than English. Across an available sample of 90 academics at another institution 68 were New Zealand qualified L1 speakers, 18 were L1 speakers qualified in other English speaking cultures and just 4 were L2 speakers.

This diversity of backgrounds presents particular difficulties for both foreign fee paying students, whether L1 or L2 and New Zealand students whether L1 or L2. Not the least of these difficulties is the assumption questioned by Pennington (1998), that students will be able to hear through distinctive accents and pronunciation what is being said in lecture theatres and tutorials. The distinctive syntax that characterises regional and national variants of English also presents an additional communication difficulty. The communication aspects of academic accents, pronunciation and written expression may be addressed through appropriate instruction (Schmitt, McCarthy, & (Eds), 1997). The metaknowledge issues facing L2 speakers and L1 speakers from other nations are not trivial for academics in western universities. There appears to be little or no reported serious attempt to acculturate L2 tertiary academics into local cultural practices in tertiary institutions.

Course materials and course work preparation

Local L1 practitioners recognise that the changes in the composition of staff in tertiary education place increasing demands on academic institutions and the courses prepared and presented for students. Undergraduate courses and programs tend to be team taught so that differences in expectations are

moderated by local knowledge. In preparing materials academic staff are mindful of the increasing use of student course appraisal processes. Course appraisal processes mix feedback on the learning experience with management and control of staff issues. At an individual level, and in order to ensure materials are comprehensible to people with disparate language backgrounds, and what many academics see as inadequate student preparation, academics resort to a reduced vocabulary of instruction with few metaphors or discipline specific linguistic structures other than those found in conventional dictionary sources. Such coping strategies are to be deplored since both L1 and L2 students are disadvantaged as a consequence of the 'internationalised' medium of instructional English. L1 learners because they are denied part of their national cultural heritage and L2 learners because they sought a local English cultural and linguistic experience only to get a watered down internationalised version with none of the richness of the local culture. Classes have tended to become content focussed and wider issues, among which is the development of metaknowledge such as developing an academic voice and the development of academic literacy, are neglected. There is a serious need to follow linguists' advice (McLaughlin, 1992) and dispel the myths and misconceptions about second language learning. McLaughlin citing the research literature argues that it takes '2 to 3 years of formal instruction to acquire oral communications skills' and '4 to 6 years to acquire the proficiency through instruction needed for understanding language in its 'academic uses'.

Seeing and making sense of words

It is still an open question among educators and linguists as to the form of a suitable second language acquisition theory. As Gregg (reported in Johnson, 2001) says, such a theory would be expected to 'accurately describe and explain the process of how an adult learner acquires a second language'. From a semiotic point of view, languages use different gestures, marks and sounds from which hearers and readers create meaning. At a surface level, there will be differences in the ways in which L1 learners create meaning from alphabetically represented languages as distinct from character based languages such as Chinese. Koda (1999) argues that the fundamental distinction between these language forms is derived from whether the meaning is conveyed through sound (phoneme) or the form of the word (morpheme). Koda's (1999) most telling observation is "that when designing materials or curriculum for L2 instruction educators need to take the first language background of their students into account".

E-learning and ways forward

The introduction and continued spread of e-learning exacerbates the separation of academics from students and leads to the expectation that courses can be successful with no shared-air-space face-to-face interaction. If the intention of the e-learning experience is to advance English language acquisition among L2 students then the advice of linguists is clear. Face-to-face feedback is an important aspect of L2 learning (Johnson, 2001; Oliver, 2000), no surprise there. Face-to-face monitoring is an important aspect in how verbs are used, more monitoring brings more correct responses (Salaberry, 2000). Learning that is textbook or screen-based can become contextless, fact based, time-dated and increasingly dissatisfying to all concerned. Microsoft 'University' is perhaps the most visible exemplar of this process. Microsoft's offerings are specific to company products and have a limited usefulness bounded by whether Microsoft continues to support a particular version of a particular product. While there is a role for such learning, metaknowledge aspects of the type discussed below are almost entirely absent from the Microsoft University experience.

Metaknowledge, i.e. knowledge about how knowledge and practice is organised, conveyed, advanced, and legitimated, may be dropped from the disciplinary curriculum because it is difficult under the best of circumstances. The consequences of failing to identify and defend a specific disciplinary cultural ethos in academic life will be the loss of our points of difference in the international setting. It may well be that the point of difference western nations wish to advance does not include a particular perspective on academic

discourse. It may well be that westerners are happy to become McDonald-ised joining the Coca-Cola nations of the world. Until that day comes, steps need to be taken to address the metaknowledge issues in western tertiary institutions either from the point of view of cultural identity or from the point of view of adequately preparing local graduates for contributing to an internationalised disciplinary community.

In this paper I recommend addressing the assertion of a lack of provision for metaknowledge and put forward suggestions for palliative strategies. Some suggestions are made in the next section to address the issues of acculturation into western academic culture. These suggestions take the form of a 'straw man' curriculum described by indicative examples in the next section. These examples have been abstracted from Information Technology curricula in the United Kingdom and the USA as well as New Zealand curriculum statements. No specific examples or details are provided since each discipline will view particular outputs or exemplars in different ways. However, it is contended that it is a specific discipline's responsibility to address the issue of how to meet students' metaknowledge needs. It is strongly advocated that the following topics be presented in shared air-space face-to-face situations and that they be part of every completing student's tertiary experience. The suggested metaknowledge areas dealt with below are intended as exit level performance items that, when met at mastery level, would enable further study at the next level. The levels correspond to entry into tertiary education (Level 4) undergraduate study (Levels 5,6 and 7) postgraduate study (Levels 8 and 9) and doctoral level study (Level 10). These levels include the Knowledge Dimensions listed in the revised Taxonomy (Tables 2, 3, and 4) probably most commonly addressed, if at all, at Level 4.

Level 4 (ages 16-18)

Metaknowledge about using terms and specialist vocabulary

- **A vocabulary** of 2,000 English language word families (Nation & Waring, 1997).
- **A vocabulary** of 500 discipline specific words related to discourse in target disciplines and a vocabulary of 836 academic words (UWL, (Nation & Waring, 1997)).
- **Demonstrated fluency** in using the vocabulary in literary and verbal context such as is required for engaging in simple discourse.

Level 5 (ages 17-19)

Metaknowledge about communication in communities of practice

- **Roles and communities of practice:** Academic as a member of the wider community of practice, stakeholders within the discipline.
- **Intellectual property, academic voice,** the role and importance of the contribution of individuals in academic contexts, mechanisms that promote, recognise and maintain creativity.
- **Academic literacy:** The use of the core means of demonstrating oral and written literacy in the disciplines. For most disciplines the core language will be English, or Maori but for others mathematics may be the language of discourse or one or more programming languages, or one or more natural languages such as Japanese or French.
- **The creation of clear text** using the language of the discipline.
- **Logic,** both first order and modal logics, the structure of defensible argument.
- **Temporal structures:** Exemplars and case studies in the personal organisation of time. Understanding and meeting schedules, planning for deadlines, setting and meeting targets and goals. Managing time (work, leisure and study as an individual and group member).
- **Assessment and evaluation:** Academic processes for deciding who may benefit from further education. What is assessed and the assessment processes. Preparing for assessments and evaluation. Ways of legitimising and demonstrating knowledge, skills, abilities, and affective outcomes.

Level 6 (ages 19-20)

Metaknowledge about academic contexts and activities

- **Academic Interactions**, academic disciplines structures and process. The roles and contributions of academics and associated staff. The advantages and disadvantages of group work in disciplines and in practice. Group dynamics and interactions. Intradisciplinary interactions between people with specific disciplinary interests. Planning and managing learning in groups. Conflict resolution
- **Assessment and evaluation** of group work. Projects and in-depth short term studies. The role of groups in completing projects.
- **Academic literacy** reflected in reports and extended essays demonstrating within discipline use of accurate expression following instruction in the tools and techniques.

Level 7 (ages 20-23)

Metaknowledge about theory and trends

- **Academic theory and methods:** The role of theory in specific disciplines. The role of methods in disciplines. The relationship between theory, methods and practice. The use and role of theory and methods in practice. The illustration of theory and method through practice.
- **Disciplinary issues and trends:** The nature and role of change in disciplines. Historical outline of disciplinary developments, turning points and pressure points.
- **Advanced tools and techniques:** Identification and enumeration of past and current tools and techniques. Illustrative evaluations of past tools and techniques in relation to current tools and techniques. The discipline specific role of computer based technologies. Appropriate and inappropriate uses of technology.

Level 8 (graduate study)

Metaknowledge about philosophies and bases of judgement

- **Academic philosophies:** Discipline specific philosophy. Elucidation of the central philosophy of disciplines, as well as the range of philosophies extant in disciplines. Evaluation of current developments in disciplines, both cognate and reference disciplines with a specific focus on codes of ethics and ethical issues.
- **Academic evaluations** of contemporary trends and issues.
- **Academic evaluations** of contemporary tools and techniques as used in practice.
- **Literatures:** The nature and role of academic literature. Evaluating and reviewing a literature within a tightly scoped discipline specific focus.
- **Academic communication in disciplines.** The nature and role of publications from popular to professional to academic. The preparation of working papers, poster sessions, short and longer conference presentations, journal and textbook preparation. The patterns of academic critique and the role of critique in the advancement of knowledge. Defensible and indefensible argument.

Level 9 (graduate study)

Metaknowledge about knowledge dissemination and dealing with interdisciplinary and interdisciplinary issues

- **Contemporary trends and current issues:** The identification of trends from historical and current professional literature. Preparation of literature-based reports of trends in disciplines. The writing of reviews and papers for publication.

- **Interdisciplinary trends and issues:** Contrasts in Codes of ethics in professions. Points of stress and methods of conflict resolution at disciplinary interstices. Pedagogies for knowledge transmission and choices in academic career paths.

Level 10 (doctoral study)

Metaknowledge about academic communities of practice, praxis and knowledge creation activities.

- **Cultures in the academy:** The advance of disciplinary specific interests. Practical aspects of advancing the interests of a community of practice. The life-cycle of ideas and the growth and development of disciplines. Life-cycle of ideas in practice.
- **Reflexive thinking:** Critique of Praxis. Praxis for whom and for what, who is advantaged/disadvantaged. Knowledge and contributions to knowledge specific to disciplines and across disciplines. Pedagogies for knowledge creation and generational succession.
- **Research and re-search:** The creation and validation of new knowledge and new practice. The range of research types and research communities of practice. Disciplinary specific primary, secondary, tertiary and quaternary research. Research ethics.

Summary

This paper reports work in progress on identifying metaknowledge issues in tertiary education. It follows the prior work in the Revised Bloom's Taxonomy of Educational Objectives (Anderson & Krathwhol, 2001) for schools and attempts to extend that work into the undergraduate, graduate and post-graduate levels. It will be clear that none of the above foci of interest belong in any one specific discipline. I would argue that it is in the nature of metaknowledge that every discipline should be concerned with each of the themes identified in the above suggestions. It would be surprising if there were not omissions in the suggestions I have made. There will be differences in where emphases are placed and perhaps the order of presentation will vary from discipline to discipline. There are many disciplines, some with lengthy histories of scholarly inquiry that do not take aspects of these metaknowledge issues seriously and do not make attempts to ensure their students are adequately prepared for the other than content specific aspects of academic life. It seems reasonable to expect, at the end of a tertiary education experience, that every student's attention should have been focussed on all of the themes identified in discipline and level specific contexts. At stake here is an academic point of difference, the advantage offered to western tertiary students of a comprehensive exposure to the central contextual and communication issues in the tertiary experience. The problem remains for educators to consider where the role, if any, of metaknowledge should be played out in the crowded tertiary curriculum.

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