

## **Emerging Perspectives of Work: Implications for University Teaching and Learning**

In Education for Future Practice (ed) Joy Higgs – 6000 words

### **Abstract**

Given that higher education is increasingly focused on the preparation for and continuing development within occupations, it is necessary to understand the nature of this work in order to inform educational purposes and processes. This chapter discusses the emerging requirements for occupations and how educational purposes and processes need to be shaped in order to address these emerging needs. In all, it is proposed that the development of occupational specific conceptual, procedural and dispositional knowledge needs to include: i) a consideration of both the canonical and the situational renderings of this knowledge, ii) the broader sets of capacities that underpin employability, and iii) the development of agentic capacity within learners. In all, it is proposed that, whilst very important canonical occupational knowledge alone will be insufficient. Hence, more than providing experiences within educational settings, there is a need to provide experiences that provide access to situational requirements for performance, mechanisms for understanding variations in these requirements, a broader range of capacities such as interactions with others and developing higher education students as agentic learners.

### **Implications for higher education from emerging perspectives of work**

Higher education is increasingly focused on the preparation for and continuing development within occupations. Therefore, it is helpful at this time to understand the nature of this work in order to inform educational purposes and processes. This chapter discusses the emerging requirements for occupations and how educational purposes and processes need to be shaped in order to address these emerging needs. In all, it is proposed that the development of occupational specific conceptual, procedural and dispositional knowledge needs to include: i) a consideration of both the canonical and the situational renderings of this knowledge, ii) the broader sets of capacities that underpin employability, and iii) the development of agentic capacity within learners. In all, it is proposed that, whilst very important canonical occupational knowledge alone will be insufficient. Hence, more than providing experiences within educational settings, there is a need to provide experiences that provide access to situational requirements for performance, mechanisms for understanding variations in these requirements, a broader range of capacities such as interactions with others and developing higher education students as agentic learners. In the following sections, it is proposed that the knowledge required to be learnt through higher education courses to perform effectively in the occupations roles requires a consideration of those practices as having a diverse situational forms as well as canonical requirements. Moreover, learning for those practices include accounting for not only the kind of activities (i.e. tasks) that constitute the occupation, but also those interactions that shape its enactment. Hence, rather than being uniform, these practices are shaped by situational factors that shape the kinds of activities and interactions required for those particular situations. Further, both sets of requirements are not fixed, but subject to constant change. It is these kinds of considerations which need to be accounted for when selecting the educational purposes and processes for the provision of higher education. To elaborate this, the subsequent section identifies the kinds of knowledge that is required to be learnt for effective practice. Then, given these, some observations about curriculum, pedagogy and students epistemologies are discussed. In all, it is argued that there is a need to identify both the canonical knowledge of the occupation and something of the variations of the occupational practice and provide experiences for students that will engender not only the canonical occupational knowledge but insights about the diversity of the occupational practice and how the requirements for performance are shaped by distinct and situated demands.

### **Diverse and transforming nature of work**

The nature and character of paid work is constantly transforming as brought about by changes in human need, technologies, places while work is undertaken and how work is organized. Characteristics of these constantly transforming requirements include: new products and technologies; short production cycles; changing production concepts, such as a high discretion workforce, and strategies of rationalisation (e.g.

(Darrah, 1996; Ellstrom, 1998). Bailey (Bailey, 1993), for instance, refers to accelerated production cycles, a proliferation of products, heightened levels of uncertainty, and changing work practices. All of these changes have significant implications for the educational projects associated with developing the capacities for effective occupational practice and then sustaining the currency of those capacities across working life. That is, they are central to the purposes of education for occupations and how those purposes should be realized through curriculum, pedagogy and learners engagement. Given that higher education is increasingly focused on the preparation for and continuing development within occupations, it is necessary to understand the nature of this work to inform educational purposes and processes. For instance, effective curriculum processes require an understanding of the kinds of learning that is intended to arise from them. Therefore, it is important to understand the kinds of knowledge that are required for contemporary and emerging work in order that the learning of these kinds of knowledge are central to the purposes that guide the development of the intended curriculum (i.e. aims, goals and objectives). Without a clear understanding of what has to be learnt, it is difficult to know what kind of experiences should be provided to assist students learn the kinds of knowledge that they need to engage in effective occupational practice. Moreover, without the capacity to understand these requirements, and the knowledge that needs to be learnt both for the occupation generally, and how the requirements for the effective enactment of that occupational knowledge is shaped by the particular circumstances of its practice, it is difficult to identify the kinds of pedagogic practices and sequencing of experiences that will most likely generate the kinds of knowledge required for effective practice. Moreover, an understanding of this knowledge is central to how students are guided in their processes of learning. These processes of learning will need to be self monitored and self directed to a high degree as effective workers will require these capacities to satisfactorily respond to the changing and situated requirements for work that they will encounter across their working lives. In this way, the development of purposeful educational intents, curriculum processes and pedagogic practices need to be informed by an understanding of the requirements for work.

It follows that, it is important to understand something of the changing nature and character of paid employment in order to inform these educational projects. From a review of literature, proposed and reported in journals, books and from data sources within government agencies internationally, it was concluded that there were four significant elements in the dynamic nature of paid employment. These comprised changes and diversity in the: i) available work, ii) organization of work, iii) requirements for paid work and iv) composition of paid work forces (Billett 2006). It is worth briefly referring to these four elements and their implications for education.

Firstly, occupations arise, decline, or are sustained through history by changing cultural needs (Billett, 2006). For instance, with mechanisation and, more recently, automisation many jobs have been rendered unnecessary or reduced significantly in that percentage of the overall workforce. In most advanced industrial economies, that instance, the decline in manual work has been quite significant. Hence, there is less of this kind of work available. What has increased, however, is service work on the one hand and technical, paraprofessional and professional work on the other. These increases are often seen as indicating a polarisation of contemporary workforces into low skill non-discretionary work and high skilled discretionary work. The latter is particularly the domain of higher education and as these forms of employment increase in the percentage of the overall workforce so will the demands for students to engage in courses preparing for these occupations. Hence, the massification of higher education provisions arises through such growth in demand. Hence, universities are expected to prepare increasing numbers of graduates for these kinds of occupational fields. Yet, with the massification of educational provisions comes the problems of how to provide effective educational experiences for large numbers of students particularly when the requirements for the kind of experiences that need to be provided, are not those realisable through the direct teaching of students such as in large lecture theatres. Instead, there is a need for particular sets of experiences usually outside of university settings and classrooms. Moreover, the kinds of knowledge that are required for effective occupational practice in technical, paraprofessional and professional work is often not easy to learn, and has particular application requirements in the circumstances in which it is enacted. For instance, what a nurse, doctor or physiotherapist does in a large metropolitan hospital may be quite different than what they would do in a small rural community.

Secondly, the organisation of work is constantly changing. That is, the way in which work is organised and, therefore, occupational knowledge is applied is quite dynamic, and in many ways different from earlier times. Some of the driving forces behind these changes are attempts to reorganise work. These changes include those intended to increase the outputs of paid labour and reduce cost. The strict work hierarchy, closely supervised by those in higher level positions is likely to be less the case now than before, particularly for technical, paraprofessional and professional work working more autonomously, or as part of

a team requires a range of attributes that go beyond the technical knowledge of preoccupations and extends into being more self-directed and self-monitoring in the first instance, and having the capacity to work collaboratively through effective engagement, interactions and shared processes in the latter. With the former, this could include working increasingly from home and outside of direct (i.e. face-to-face) contact with other workers, clients or managers. With the latter, the ability to work as part of a team likely requires particular dispositions, skills and process capacities. Hence, these kinds of capacities need to be developed as part of the initial preparation for the occupation and is an element of ongoing development across working life.

Thirdly, the actual requirements for the effective performance of work tasks are changing and, some argue increasing. The shift to service industries, changes to the character of employment, down-sized workplaces, and non-standard forms of employment all serve to transform and make dynamic (and, therefore, more demanding) the requirements for performing work (Noon & Blyton, 1997). These kinds of changes make particular demands upon educational provisions that are aiming to develop these capacities in the first place, and then sustain them across working life. Indeed, the technology pervading many forms of contemporary and emerging work often requires symbolic knowledge that makes work tasks more demanding (e.g., (Martin & Scribner, 1991; Zuboff, 1988) because workers across a range of occupational classifications are required to represent the structures and processes of their machines symbolically (Berryman, 1993). For instance, Martin and Scribner (1991) note that the requirements for operating a computer numerically controlled (CNC) lathe are now closer to the skill requirements of a computer operator than a manual lathe operator, thereby challenging existing (and unhelpful) distinctions between manual and mental labour.

Fourthly, the compositions of those who work changes and the need to engage with other workers whose gender, ethnic background, age and first language is different than the one used in the workplace. In the last two decades or so, the key change in workplace participants across most advanced industrial economies has been the increase in the percentage of women who are working. Most of these countries have immigration policies which mean that the number of workers whose cultural heritage and language competence is based in countries other than those in which they work likely to increase. Moreover, it seems likely that workers will have longer working lives and many countries workplaces will be dominated in the next two decades by workers who are aged over 45 (i.e. 'older workers'). Hence, the need for ongoing development of workers' skills through educational provisions may need to include understandings about other workers which will make multi-age and multicultural workplaces effective.

Moreover, there are also a set of dynamics which transcend the four above elements (Billett, 2009). These include the situational requirements for practice, and the need to accommodate the constant change which is required to maintain competent practice in contemporary and emerging work. The specific requirements for work are often quite situationally-dependent, rather than being uniform across a particular occupation. Bernhardt (Bernhardt, 1999) found that more expensive retail work or selling products requiring the provision of expert advice, led to retail work that is highly demanding and complex. This work requires building relationships with customers in order to sustain their business. This is quite different than what is required in other kinds of retail settings. For instance, the longer warranties provided when purchasing a new vehicle have transformed relationships between dealerships and their clients. Now, rather than a once off sale, the concern is to secure a purchaser as a lifelong customer of vehicles from that dealership (Billett). Rather than being uniform across occupations, the requirements for competence are quite diverse across workplaces (Billett, 2001a). Although there are occupationally common concepts, values, and practices – the canonical knowledge of the occupation – across workplaces, their application likely differs quite widely. This is because there are quite distinct performance requirements in specific work situations. Consequently, understanding what constitutes workplace competence cannot rely on occupational-level analyses. Instead, national, cultural, local, and enterprise-level factors all shape workplace performance requirements: the 'objective' account of workplace requirements. Therefore, it is helpful to understand something of the range of factors that make particular workplace requirements distinct.

These requirements for workplace competence can be found in the need to accommodate constant change, and the intellectual demands for work in terms of its conceptual (symbolic) requirements and procedural bases. Indeed, the need to accommodate for constant change can render work practice to be inherently non-routine and demanding. Because of this constant transformation, changes to work include relinquishing past practices and the displacement of existing competence and confidence. In these ways, the requirements for competence are increasing in many forms of work. In sum, these changes are making the requirements for work more complex in their formation and more demanding in their enactment. Yet, the

scope and form of these changing requirements are not uniform; they are shaped by societal and situational factors.

The analysis above, and as detailed elsewhere (e.g. (Billett, 2009), emphasises that the requirements for performance at work, expertise if you like, are founded on a platform of robust canonical occupational knowledge, yet that is responsive to workplace requirements that are highly situated. However, these requirements are also dynamic and fleeting. This is because the circumstances that constitute the requirements for performance in particular workplace settings are subject to constant transformation, as technologies, work practices and work requirements change. Yet, although there are many variations in work requirements, even in the same industry sector or occupational practice, there are also variations in these requirements that are more or less common. These are the canonical knowledge of the occupation and trends in the changing character of work requirements that need to be understood and addressed in curriculum and pedagogic arrangements for higher education provisions.

### **Knowledge required for work**

Securing the forms and kinds of knowledge required for a smooth transition into and effective performance in the kinds of occupations that universities prepare for and develop further are important goals for higher education programs. This is now particularly the case given that occupationally specific programs are the higher education sectors' key educational purpose. The forms of knowledge required to be learnt for effective occupational practice have three interdependent dimensions: i) propositional, ii) procedural and iii) dispositional. As foreshadowed, these forms of knowledge are held to exist in a least two levels of domains. The first domain is the canonical knowledge required for the particular occupation. That is, the kinds of knowledge which anybody practising that occupation would be expected to know and be able to practice. These are the forms of knowledge which are usually codified within professional practice standards (i.e. the competencies that individuals wishing to practice of particular patient have to demonstrate). Beyond these, are the domains that constitute the requirements for performance in a particular setting. That is, the application of canonical occupational knowledge, albeit in its conceptual, procedural and dispositional forms is not uniform in meeting the requirements of the places and circumstances in which it is enacted. Instead, these are shaped by the particular circumstances of the practice. The physiotherapist working with elite athletes will be engaged in very different practice and have very different requirements than her counterpart in an aged care facility. However, Cross boasts the canonical and situational imperatives for practice are the need for the development of the interrelated dimensions of conceptual, procedural and dispositional knowledge.

The identification of these forms of knowledge arose through three decades of focused research on what constitutes expert performance, largely within cognitive psychology, but not restricted to it, which has led to an understanding of the kinds of knowledge required for effective occupational practice: expertise (Chi, Feltovich, & Glaser, 1981; Chi, Glaser, & Farr, 1982; Ericsson & Lehmann, 1996; Glaser, 1989; Larkin, McDermott, Simon, & Simon, 1980). This field of research sought to capture the kinds of qualities that distinguished experts from novices, in order to understand what were the particular attributes of people who perform well in that domain of activity, and how and what novices needed to learn to progress through to become experts. This body of research identified that effective occupational performance relies upon three kinds of knowledge. These are:

Domain-specific conceptual knowledge – ‘knowing that’ (Ryle, 1949) (i.e. concepts, facts, propositions – surface to deep) (e.g. (Glaser, 1989)

Domain-specific procedural knowledge – ‘knowing how’ (Ryle 1949) (i.e.– specific to strategic procedures) (e.g. (Anderson, 1993)

Dispositional knowledge - ‘knowing for’ (i.e. - values, attitudes) related to both canonical and instances of practice (e.g. (Perkins, Jay, & Tishman, 1993), includes criticality (e.g. (Mezirow, 1981)

Individuals' capacity to be effective in their professional practice pertains to their performance in a particular domain of activity (e.g. an occupation). The evidence suggests that, rather than generalisable capacities, expert performance is largely specific to a domain of activity, in which individuals have participated over time and developed these forms of knowledge in an interrelated and robust way and learnt through experiences of the domain of activities over time. These kinds of domain-specific knowledge have their own qualities (e.g. specific and strategic procedures, factual to complex conceptual premises). The learning of these likely arises through opportunities to engage in and construct personal domains of the occupational knowledge in setting such as educational institutions, but probably more importantly, in the places in which

these activities are enacted and learners can participate. As noted, there seems to be two levels of these forms of domain-specific knowledge. There is the canonical knowledge of the occupation that comprises the knowledge that constitutes what all of those practising this occupation would be expected to know. Then, there is the manifestation of the occupational requirements where the occupation is practiced. To become effective as a practitioner there is a need to develop the domain-specific procedural, conceptual (Glaser, 1984) and dispositional (Perkins et al., 1993) capacities required for the occupational practice. That is, procedures, concepts and values required to be a doctor, nurse or physiotherapist. In addition, That is, the particular set of concepts, procedures and dispositions that are required for effective practice: that is the requirements of the particular circumstances in which the medical nursing or physiotherapy work is enacted (Billett, 2001a).

Conceptual or declarative knowledge comprises concepts, facts, propositions and the richly interlinked associations among them. This form of knowledge can be spoken about and written down, hence is sometimes termed 'declarative', i.e. it can be declared (Anderson, 1982; Glaser, 1984). Therefore, much of this knowledge can be represented in books, texts and other forms of media or artefacts, in ways that is not possible for much of procedural knowledge. The progression of the complexity for conceptual development tends to move from understanding basic factual knowledge through to propositions and associations between conceptual knowledge. Hence, Deep conceptual knowledge is usually associated with understanding the relations between sets of concepts and propositions, of this kind (Groen & Patel, 1988). One of the key qualities of professional work is the massiveness of the knowledge that is required to deal with tasks in a way which permits a range of variables and factors to be considered. This is the key claim for distinguishing this kind of work from other forms of work (e.g. trades work). Consequently, the development of the range of conceptual knowledge and its associations with other forms of knowledge within its domain is a key focus for the development of educational experiences. Importantly, it seems that the important links and associations are learned richly through associations with practice circumstances that require drawing upon, a development of and reinforcement of particular associations amongst the conceptual knowledge individuals possess. Hence, causal or compounding factors or symptoms need to be identifiable and their potential contribution to, a patient's health, for instance need to be understood.

Procedural knowledge is the knowledge that we use to do things and achieve goals (Anderson, 1982; Shuell, 1990). This form of knowledge is required to be engaged with and practised in order for its development to occur. In general, the progression from specific procedures (e.g. typing a word) through to strategic knowledge (e.g. constructing and argued case within a document) is seen as a process of rehearsing specific procedures in ways that remove the need for conscious memory to be enacted in their deployment, permitting that conscious memory to focus on more strategic issues (Anderson, 1982). This development, at all levels, likely arises from the opportunity to participate in a range of activities and interludes associated with the particular domain of activity for which the procedures are being developed. At one level, it is the rehearsal of specific procedures that permit them to be undertaken without conscious thought. At another level, the repertoire of experiences which individuals can access and understand, leads to rich associations.

Although much of the considerations of expert performance within cognitive psychology focused on the development of conceptual and procedural knowledge, along the way there was a realisation that values and attitudes were central to processes of human cognition, including engaging in activities such as work and learning. It followed that later work identified the key role of dispositional knowledge comprising interests and beliefs, which not only energise the use and development of concepts and procedures (Perkins et al., 1993), they also shape the direction, intensity and degree of their enactment (Billett, 2008). Dispositions are likely developed through individuals beliefs and are negotiated through their encounter with particular experiences across their life course. These are likely to be shaped as much through everyday experience as intentional processes to promote their development.

The importance here is of finding ways in higher education provisions can secure or the development of the kinds of conceptual, procedural and dispositional knowledge required for their selected occupation. These three forms of knowledge are richly interconnected and interdependent. However, the effectiveness of this interdependence usually arises through episodes of practice in which these forms of knowledge are deployed and developed together when enacting work activities (Billett, 2001b). These episodes provide bases for understanding the particular set of circumstances for goal is to be achieved and procedures advanced. For instance, it is most likely that through experiences in practice and practice settings that certainty about performance is developed, procedures automated and dispositions tested. Importantly, however, each occupation requires particular kinds of concepts, propositions, norms and procedures, sets of values and organising ideas that constitute its canonical knowledge. This is the kind of knowledge that is often attempted to be stated as occupational standards and captured as statements for performance and

curriculum content and outcomes. However, and importantly, this occupational knowledge is more than *techne* - technical capacity; it is far broader and more encompassing than that. Even when taking a narrow view of vocational expertise, "there is also the need to: generate and evaluate skilled performance as technical tasks become complex and as situations and processes change, reason and solve technical problems, be strategic, innovate and adapt (Stevenson, 1994), :9). Moreover, beyond all of this, professionals also need critical insights and to be reflexive in how they apply what they know, as requirements change and they have to decide amongst possible options. Running through the considerations here is that students will need to develop factual and interlinked concepts and propositions, specific and strategic procedures and the kinds of dispositions that will, on one level, energise their engagement in learning for and participation in professional practice, and at the same time the required to monitor and regulate their learning and nascent practice.

It follows, therefore, that a key challenge to higher education is to provide the kinds of experiences students need to for them to develop these capacities. Yet, as well as developing the occupationally specific knowledge and seeking to develop an appreciation and knowledge of how the occupational practice has different requirements across the circumstances of its enactment, there is a need for students to develop capacities for thinking strategically and critically about their selected occupation and its practices. Certainly, discussions above suggest that there is a need for the higher education experience to explicitly promote critical and strategic insights and prepare students to use these insights. But, beyond what educators intend and enact, learners will necessarily be engaged in adaptive and critical thinking as they as apply what they have learned through participation in educational programmes into practices and settings which are quite distinct from those in which they have learnt them. Therefore, developing and guiding the exercise of personal epistemologies, becomes an important educational priority as other have long argued, albeit in different forms (Brookfield, 1997; Marsick, 1988; Mezirow, 1985; Simon R I, Dippo D, & Schenke A, 1991) Therefore, a key role for higher education and those who teach in universities to guide this criticality so that it is directed in a productive ways rather than leading to disillusionment from confronting or uneasy experiences in work places, for instance.

Having briefly considered the changing requirements for work and the kinds of knowledge that is required for effective work performance and made some initial links to how these considerations shape educational purposes and processes, it is now appropriate to discuss those purposes and processes more fully.

### **Educational purposes for future practice**

Any provision of education needs to be guided and supported by clear and intentional purposes: i.e. what is aimed to be realized through its enactment. These purposes are central to the effective organization of students' experiences to assist them learn what is intended, the valid and reliable assessment of that learning and the monitoring and evaluation of educational programs. Although educators themselves often enjoy some autonomy in establishing the purposes and direction of the programs, perhaps nowhere more so than in higher education, quite frequently educational purposes served by courses in higher education and their specific forms and focuses are shaped by others than those who teach in them. There is nothing particularly unusual about this. There are few examples of where educators have established educational institutions for purposes that arise from their own educational beliefs and values. Instead, the majority of educators are employed by institutions that are established for and whose funding is dependent upon achieving particular educational purposes. So, although educational institutions can be shaped by particular value systems and approaches to education, there are accountabilities to the communities and nations in which they exist that are quite compelling. For higher education, these accountabilities appear to be growing as programs funded by public sources and privately by students increasingly reflect demands from society. This is no more explicit than in the growing incidence of higher education programs that aim to prepare graduates for specific occupational outcomes, which has led to jibe that universities are now largely engaged in 'higher vocational education'. But then, perhaps they always have been.

However, the important point here is that it is not unusual for educational purposes to be developed outside of educational institutions, as this has usually been the case and is increasingly so for higher education. The vocational and schooling sectors know all about the pre-specifications of learning outcomes, determined by others and often quite remotely from the circumstances in which the educational provision is enacted, and the constant changes to these educational purposes as external agencies (e.g. government, industry bodies, professional associations) seek to shape what is taught, how it is taught and assessed and how what is learnt is reported. This growing emphasis in the provision of external advice about purposes and processes within higher education is not to suggest that these institutions and those who teach within should

not and do not have any autonomy or discretion in the provision of goals for learning and experiences for achieving that learning. Indeed, it has been long recognized that even the most prescriptive of externally derived educational purposes, will not be effective unless the institutions in which these purposes are enacted and the teachers that enact them are sympathetic to at least some degree with what is proposed. Fidelity in enacting and securing what others intend, is not realised through prescriptive standards or documentation. Rather, given the relative autonomy and even privacy in how teaching progresses, how teachers organise, pace, select and sequence what they teach and how they teach, there is unlikely to be any effective method of regularising higher education teaching. Indeed, the old adage that you can give a thousand teachers the same lesson plan and a thousand different teaching experiences will follow probably stands true.

Nevertheless, in contemporary higher education, there are now probably greater demands for external control over educational purposes than ever before. This external control is probably because of the significant public and, increasingly, private investment in mass higher education and growing expectations that higher education institutions will contribute directly towards important social and economic goals. Therefore, there is a growing expectation that those teaching in these programs will return that investment in ways their sponsors request rather than solely the professional concerns and interests of those who teach. Moreover, as programs within higher education become more occupationally specific, there is a greater requirement for these programs to meet the needs of those occupations and those agencies that represent those occupations, and for graduates who are increasingly sponsoring their own education to move smoothly into effective practice.

Yet, because of all of these demands and imperatives, there has probably never been a time at which those working in higher education need be more aware of the kinds of educational purposes that will generate the knowledge required for effective practice in the kind of occupations that are preparing their students for within universities. This is because, as the influences of external bodies grow, that perspectives and influence will become more powerful. However, previous experience indicates that such bodies have little understanding of the complexity of the knowledge required to be generated for effective practice within occupations, or the best ways for this knowledge to be learnt and assessed. Unfortunately, sometimes the educational leadership granted to such agencies is not enacted in ways that are commensurate with or reflect sound educational practices. Instead, lacking understandings, and with a strong interest in managing and ordering the provision of education, that the mandates from these external bodies often focus more on measurable and accountable outcomes and unimportant educational purposes. Hence, it is against this backdrop of changing times in higher education and the growing influence of external agencies that it is important to understand the key educational purposes for developing effective occupational practice and how these chief the provision of teaching and learning in higher education.

### **Implications for teaching and learning in higher education**

From the discussion above about the changing character of work, the kinds of knowledge that are required for effective practice in the workplace and the consideration of educational purposes above, the implications for teaching and learning in higher education briefly foreshadowed here.

#### *The ordering of curriculum*

The ordering of students' experiences across their course curriculum needs to be developed and enacted in ways that assist students to effectively learn the concepts, procedures and dispositions associated with their selected occupation, as well as the kinds of agentic capacities required to be effective learners and professional practitioners. One of the initial concerns is to provide access for students to authentic instances of their selected occupation. For many higher education students, their selection of an occupation has been based on an ideal or a preference that is uninformed by actual practice. Certainly, this is not true for all students, but those who have not had access to authentic instances of practice needs to be provided with such experiences in order for them to understand the nature and requirements of that work. Such groundings are likely to be most robust when students have the capacity to, firstly, share their experiences with other students to compare perceptions and critically appraise their experiences, and, secondly, for the sharing and critical appraisal to be organized and integrated into the overall curriculum. It is evident that dispositional, conceptual and procedural knowledge arises through experiences in both the academic and the practice settling, and likely in different ways depended on the kind of experience is that students have invoked these settings. Hence, in ordering and organizing the curriculum consideration needs to be given to the kinds of knowledge that are most likely be learnt through both the activities in and interactions provided by the University and those by practice settings. This understanding then needs extending into what can best be

learnt in both kinds of sightings and how students experience in both settings can be organized to maximize that learning. So, for instance, the development and practicing of some procedural skills (e.g. and urging, taking poles, temperature, etc) might best be realized in the educational setting before the student comes to apply these in authentic work instances. In all, consideration needs to be given to the positioning of the loan within these arrangements. For instance, if the curriculum is seen as being something which is purely generated by external sources and enacted by teaching staff, then the experiencing of that curriculum by learners may not be fully accounted. If on the other hand, the curriculum process commences with the consideration of what the students know, and then consider what they need to know, In all, the key concept of guiding the organization of curriculum is to consider it as a pathway that will lead to the development of the kinds of capacity is required for a smooth transition into occupational practice.

### *Pedagogic issues*

Through a consideration of the knowledge to be learnt for effective occupational practice, it is likely that the development of specific kinds of capacities will be identified. A consideration for pedagogy is how best these can be learnt and about learning supported by appropriate teaching. So, for instance, consideration might be given to the kinds of pedagogic practices that are required to develop specific procedures. That is what kinds of instructional strategies need to be enacted so that nursing students can learn effectively and with understanding about how tasks such as taking of temperatures, pulse or bandaging can be learnt. In these instances, likely processes such as modeling, demonstration, practice and coaching will likely the most effective. However, the other kinds of learning outcomes, such as challenging individuals' implicit biases might be undertaken through small group activities or experiences in settings all with groups of individuals are unfamiliar with. Similarly, the development of strategic capacities such as being able to observe, monitor and make judgements about particular performance likely needs to be organized through engaging in activities which permit the students to consider array of variables. Hence, in the health care occupations which have featured in the examples used above, it might be important to use case studies and discussions about those case studies in assisting students understand the range of processes and factors that are required to be considered in making judgements about a patient's health and decisions about the kinds of treatments that are most appropriate for them.

### *The importance of epistemology*

Beyond considerations of curriculum and pedagogy, it is important to also develop students' personal epistemologies. As has been advanced above, beyond the experiences that are provided for students and the assistance rendered to them through pedagogic means, it is essential that students engage in an active and agentic process of learning. It is this very quality which will be central to their capacities to direct and monitor their own professional practice and its development within and across their working lives. However, while individuals will need to be active learners, it is likely that the development of agentic personal epistemology will need to be engendered in many students. Again, this draws upon curriculum and pedagogic considerations. In particular, the positioning of learners (i.e. students) in the concept of curriculum that is selected and also the kinds of pedagogic practices which are enacted. For instance, the consideration of the engagement in and sharing of learners experience across the curriculum might be useful in focusing the developmental process on the learners, and also explicitly engage them in a process of sharing and discussing and critiquing the kinds of experiences they are having in both the academic and practice settings. In this way, placing them centrally in the curriculum process gives them an active role and makes them partially responsible for they are learning. Similarly, the use of pedagogic practices which engage the learners as active decision makers and partners in the learning process may well achieve similar outcomes. For instance, the importance of engaging students before, during and after practice placements is seen to be central to developing their understandings about their roles and responsibilities and those of others in those practice experiences, placing them in the role active learners joined those placements and then drawing upon that collective experiences as being rich sources of knowledge and advice all stand to not only engage the students but position them as active learners who have responsibilities for directing and monitoring their learning, and indeed, their professional practice.

### **Work and learning in higher education**

- Anderson, J. R. (1982). Acquisition of cognitive skill. *Psychological Review*, 89(4), 369-406.
- Anderson, J. R. (1993). Problem solving and learning. *American Psychologist*, 48(1), 35-44.
- Bailey, T. (1993). Organizational Innovation in the Apparel Industry. *Industrial Relations*, 32(1), 30-48.
- Bernhardt, A. (1999). The future of low-wage jobs: Case Studies in the retail industry. *Institute on Education and the Economy Working Paper*, 10(March 1999).
- Berryman, S. (1993). Learning for the workplace. *Review of Research in Education*, 19, 343-401.
- Billett, S. (2001a). Knowing in practice: Re-conceptualising vocational expertise. *Learning and Instruction*, 11(6), 431-452.
- Billett, S. (2001b). *Learning in the workplace: Strategies for effective practice*. Sydney: Allen and Unwin.
- Billett, S. (2006). *Work, Change and Workers*. Dordrecht: Springer.
- Billett, S. (2008). Subjectivity, learning and work: Sources and legacies. *Vocations and Learning: Studies in vocational and professional education*, 1(2), 149-171.
- Billett, S. (2009). Workplace Competence In C. Velde (Ed.), *Competence in the Workplace: Implications for Research, Policy and Practice* (pp. 33-54). Dordrecht, The Netherlands: Springer Academic Publication.
- Brookfield, S. (1997). Assessing Critical Thinking. In A. D. Rose & M. A. Leahy (Eds.), *Assessing Adult Learning Settings: Current Issues and Approaches* (pp. 17-30). San Francisco: Jossey-Bass.
- Chi, M. T. H., Feltovich, P. J., & Glaser, R. (1981). Categorisation and representation of physics problems by experts and novices. *Cognitive Science*, 5, 121-152.
- Chi, M. T. H., Glaser, R., & Farr, M. J. (1982). *The nature of expertise*. Hillsdale, NJ: Erlbaum.
- Darrah, C. N. (1996). *Learning and Work: An Exploration in Industrial Ethnography*. New York: Garland Publishing.
- Ellstrom, P. E. (1998). The meaning of occupational competence and qualification. In W. J. Nijhof & J. N. Streumer (Eds.), *Key qualifications in Work and Education*. Dordrecht: Kluwer Academic Publishers.
- Ericsson, K. A., & Lehmann, A. C. (1996). Expert and exceptional performance: Evidence of maximal adaptation to task constraints. *Annual Review of Psychology*, 47, 273-305.
- Giddens, A. (1991). *Modernity and self-identity: Self and society in the late modern age*. Stanford: Stanford University Press.
- Glaser, R. (1984). Education and thinking - the role of knowledge. *American Psychologist*, 39(2), 93-104.
- Glaser, R. (1989). Expertise and learning: How do we think about instructional processes now that we have discovered knowledge structures? In D. Klahr & K. Kotovsky (Eds.), *Complex information processing: The impact of Herbert A. Simon*. Hillsdale, NJ: Erlbaum & Associates.
- Groen, G. J., & Patel, P. (1988). The relationship between comprehension and reasoning in medical expertise. In M. T. H. Chi, R. Glaser & R. Farr (Eds.), *The Nature of Expertise*. New York: Erlbaum.
- Knights, D., & Willmott, H. (1989). Power and Subjectivity at Work: From degradation to subjugation in social relations. *Sociology*, 23(4), 535-558.
- Lakes R D. (1994). Critical Education for Work. In R. D. Lakes (Ed.), *Critical Education for Work: Multidisciplinary approaches* (pp. 1-16). Norwood, New Jersey: Ablex Publishing.
- Larkin, J., McDermott, J., Simon, D. P., & Simon, H. A. (1980). Expert and novice performance in solving physics problems. *Science*(208), 1335-1342.
- Leontyev, A. N. (1981). *Problems of the development of the mind*. Moscow: Progress Publishers.
- Marsick, V. J. (1988). Learning in the workplace: The case for reflectivity and critical reflectivity. *Adult Education Quarterly*, 38(4), 187-198.
- Martin, L. M. W., & Scribner, S. (1991). Laboratory for cognitive studies of work: A case study of the intellectual implications of a new technology. *Teachers College Record*, 92(4), 582-602.
- Mezirow, J. (1981). A critical theory of adult learning and education. *Adult Education* 32 (1), 3-24.
- Mezirow, J. (1985). A critical theory of self-directed learning. In S. Brookfield (Ed.), *Self-Directed Learning: From theory to practice* (pp. 17-30). San Francisco: Jossey Bass
- Noon, M., & Blyton, P. (1997). *The realities of work*. Basingstoke, Hants: Macmillan.
- Perkins, D., Jay, E., & Tishman, S. (1993). Beyond abilities: A dispositional theory of thinking. *Merrill-Palmer Quarterly*, 39(1), 1-21.
- Ryle, G. (1949). *The concept of mind*. London: Hutchinson University Library.
- Shuell, T. J. (1990). Phases of meaningful learning. *Review of Educational Research*, 60(4), 531-547.
- Simon R I, Dippo D, & Schenke A. (1991). *Learning work: a critical pedagogic of work education*. Toronto: The Ontario Institute for Studies in Education.
- Stevenson, J. (1994). Vocational expertise. In J. Stevenson (Ed.), *Cognition at work* (pp. 7-34). Adelaide: National Centre for Vocational Education Research.

Zuboff, S. (1988). *In the age of the smart machine: The future of work and power*. New York: Basic Books.