Non-technical Skills in Undergraduate Degrees in Business: Development and Transfer

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The development of discipline-specific skills and knowledge is no longer considered sufficient in graduates of Bachelor level degrees in Business. Higher education providers are becoming increasingly responsible for the development of a generic skill set deemed essential in undergraduates. This required skill set comprises a broad range of non-technical skills encompassing analytical/reasoning skills and 'soft skills', widely considered to be transferable across a range of scenarios including the classroom and the workplace. Yet graduate skill gaps persist in Australia; questioning the extent to which this required skill set is truly generic and thus transferable from higher education to the workplace. The process of, and ensuing problems with, transfer from the classroom to workplace contexts is discussed and future research needs identified.

Introduction

The focus of Bachelor degree level programs in Business[1] is gradually extending beyond traditional, discipline-specific content to encompass the development of non-technical skills. This expansion of curricula content has been driven by global acknowledgment of the importance of developing non-technical skills, commonly referred to as generic, core or professional skills, in undergraduates from all disciplines. Acknowledgement of the need to foster non-technical skills essentially arose from industry calls for job-ready entry-level graduates who have both the technical expertise and soft skills necessary to add immediate value in the workplace. There has been a phenomenal push by governments and Higher Education providers across developed economies over the past 20 years to identify the non-technical

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[1] The nomenclature *Bachelor of Commerce* is also common in Australia.

undergraduate skill set most required by industry. Stemming from this, considerable effort and resources have been placed on the successful development and assessment of these skills; catalysing a growing trend towards the more competency-based and outcomes-focused learning programs traditionally associated with the vocational education sector.

Background: Developing A Non-Technical Skill Set For Business Undergraduates

A review of the development of a non-technical skill set in Australian Bachelor level degree graduates in Business requires consideration of a number of areas. First, why is this skill set so desired, what does it comprise, how is it best developed and how should it be assessed and measured? Second, an assessment of the extent to which it is generic to help us understand whether developed frameworks and pedagogical processes are replicable across different disciplines and, in addition, if the skill set is transferable to work contexts. Finally, an appraisal of the extent to which the non-technical skill set is being developed in graduates from Australian Bachelor degrees in business, and possible explanations for any deficiencies. For the purposes of this paper, the term 'graduate' refers to those who have completed a Bachelor degree program.

Why non-technical skills?

There is a broad consensus amongst employers and educational practitioners that first-degree business graduates must enter the workforce equipped not only with disciplinary knowledge but a skill set that enables them to use and apply the disciplinary knowledge in a work setting. The ability to apply disciplinary knowledge using the skill set significantly influences the extent to which a graduate is employable; that being their ability to effectively practice / implement their technical capabilities and successfully achieve prescribed outcomes in the workplace. The skill set is commonly perceived to be generic, its' required composition the same across different disciplines and workplace contexts.

The increased demand from employers for non-technical skills in business undergraduates can largely be attributed to three factors. First, changing attitudes of the perceived role of higher education; second, changes in business practices and, third, changes in job roles (Howieson, 2003). In consideration of changing attitudes, there has been a gradual shift in expected undergraduate outcomes. The overarching goal of undergraduate business education has traditionally been considered to rigorously develop the ability to analyse, reason and evaluate relevant disciplinary information/data to enhance both the student's critical thinking skills and knowledge of the relevant business discipline. The development of non-technical skills is not without challenge as some perceive it detracts from the fundamental and unique goal of undergraduate business education; reducing its worth and likening it to business management vocational education programs (see Jackson, 2009a).

There has been a gradual shift towards the commercialisation of business degrees whereby higher education providers are increasingly expected to develop both cognitive and non-cognitive capabilities and mould undergraduate curricula to industry requirements. A number of reports show that relevant professional associations (Birrell, 2006) and employers (Australian Chamber of Commerce & Industry [ACCI], 2002; Business Council of Australia [BCA], 2006; Business Industry and Higher Education Collaboration Council [BIHECC], 2007) are dissatisfied with the level of non-technical skills of many business graduates.

A recent paper on *Transforming Australia's Higher Education System* (Australian Government, 2009) identifies a number of significant reforms for the sector including the development of competency-based learning outcomes for universities for all degree awards in Australia. All business degrees will be required to develop threshold learning outcomes as required by the revamped Australian Qualifications Framework (AQF) regime. The AQF descriptors for Bachelor and Master (other) degrees require graduates to develop relevant knowledge and various cognitive or non-technical skills to be able to apply the

knowledge. The development of non-technical skills are now considered to be part and parcel of the business degree, employers recognising that gaps in non-technical skills affect work performance, output and efficiency (Otter, 1997; Financial Services Skills Council [FSSC], 2007) and some argue are better addressed in higher education prior to entering the workforce (BATEC, 2007) although this view is not shared by all (Hancock, Howieson, Kavanagh, Kent, Tempone & Segal, 2009). Indeed, certain elements of university funding are now partly conditional on developing non-technical skills (Green, Hammer & Star, 2009) and accreditation to certain relevant professional bodies will inevitably be linked with undergraduate program learning outcomes such as for Teaching, Law and Nursing. The universities themselves also recognise the need to address employability to remain competitive in the undergraduate degree market (Jackson & Chapman, submitted a; Gerdes, 2005).

There are a number of factors in relation to changing business practices which provide the impetus for developing a non-technical skill set in undergraduates. Notably, today's entry-level graduates regularly interact with a range of stakeholders from different levels of seniority from their first day in the workplace. This requires more than an indepth understanding and ability to apply the technical aspects of one's field; with implications on ethical behaviour, self-management, self-regulation and effective communication skills. Reasons for this increasing reliance on finely-tuned interpersonal skills are many. First, organisational forms are more predominantly flatter, with matrix structures becoming increasingly common. The line of authority is no longer narrow and vertical with junior staff and senior management now frequently converging in functional teams, increasing the need for refined communication and collaboration skills across a range of audience levels.

Second, the rise in globalisation means organisations are increasingly operating across a range of international borders; a catalyst for virtual team-working, collaboration and communication. As international borders become more blurred,

"educational or professional mobility" (Playfoot & Hall, 2009: p.13) rises and emotional and social intelligence become significant in successfully interacting, managing and collaborating with staff from a broad range of backgrounds. Managing diversity is fundamental in today's workplace with the increasingly rich cultural mix of work teams.

Third, workforce composition has evolved so that four generations: traditionalists, baby-boomers, generation X and generation Y, are now working alongside one another (Eisner, 2005); each expected to adapt successfully to the other's traits and preferred communication methods, values and working styles. Popular sayings like 'the youth of today', 'you know what they are like' and 'the good old days' immediately spring to mind; thus highlighting the need to develop strong communication, conflict management and social intelligence skills in entry-level graduates.

In reference to changing business practices, global changes in working arrangements are relevant. An increasing number of women in the workforce ("As layoffs surge, women may pass men in job force", 2009; "Our workforce of women", 2010), a growing focus on appropriate work/life balance ("A work-life balance has never been more important", 2010) and a rise in self-employment ("Number of people 'self-employed' spikes in wake of GFC", 2010) have triggered a growth in 'teleworking' and/or working from home. The impact on the non-technical skill set is a growing reliance on attributes such as initiative, autonomy and organisational skills. Finally, contemporary organisational settings contribute to the impact of changing business practices. Organisations are fluid and in a constant state flux, requiring employees to be adaptable, flexible and able to deal with change management. For example, the global financial crisis has catalysed more rapid and extreme change as companies adapt to a more demanding financial system with tightening lines of credit, changes in consumer demand and the growing spotlight on ethical practices and corporate social responsibility. The ability to be adaptive and to show initiative and enterprise was reported as important in the study by Hancock et al. (2009).

In consideration of changing job roles, it is acknowledged that some business roles have now expanded beyond their traditionally narrow and discipline-focused roles. Accounting, for example, now encompasses risk and strategic management (Jones & Abraham, 2007); Marketing extends to change and strategic management (Tapp & Hughes, 2004) and Human Resource Management to continuous improvement (Hyland, Di Milia & Becker, 2005). These changing roles demand attributes beyond technical expertise and draw heavily on the non-technical skill set.

In combination, changing attitudes to the purpose of undergraduate education, changes in business practices and evolving job roles provide increased pressure for business degrees to develop both disciplinary knowledge and a broad range of non-technical skills. This is considered vital not only for achieving prescribed learning outcomes and successful performance in the workplace, but also for recruitment whereby employers appear to be favouring graduates of equal academic merit who have strong non-technical skills (Alsop, 2002; Hancock et al., 2009; Kavanagh, Hancock, Howieson, Kent, & Tempone, 2009).

Which skills?

The composition of the non-technical skill set most important in graduates from Bachelor degrees in Business has been the subject of much study and debate, although far less than its postgraduate counterpart, the MBA (see Jackson, 2009a). There is confusion over its required composition, attributed to problems in the design of competency modelling studies which often produce inconsistent and invalid findings (Male, 2005; Jackson, 2009b). A summary of perceived meanings of each non-technical skill deemed important in business undergraduates by Jackson (2010) highlights the extent to which competencies have different meanings to employers, both conceptually and on a day-to-day operational level in the workplace. Whilst caution must therefore be exercised in interpreting and comparing findings from studies identifying

undergraduate competencies valued by employers, there appears to be some consistency in findings.

There is general consensus that oral and written communication, team working and problem solving are vital in business graduates (Hancock et al., 2009; BCA, 2006; BIHECC, 2007; Alsop, 2002; Casner-Lotto & Barrington, 2006; Council for Industry and Higher Education [CIHE], 2008; Institute of Directors [IOD], 2007; Australian Industry Group [AIG], 2006a). Other non-technical skills considered significantly important are initiative and enterprise (Hancock et al., 2009; BCA, 2006), decision management (Association of Graduate Recruiters [AGR], 2007; CIHE, 2008), critical thinking (Braun, 2004; Graduate Careers Australia [GCA], 2007; Casner-Lotto & Barrington, 2006), ethical behaviour (CIHE, 2008; IOD, 2007), emotional intelligence (Akers & Porder, 2003 cited in Kavanagh et al., 2009) and work ethic (IOD, 2007; GCA, 2008; DiMeglio, 2008). For a more detailed breakdown of the relative importance and assessment of deficiency of each non-technical skill see Jackson (2010)'s extensive review of employer studies across developed economies.

In recognition of the synergistic and interrelated nature of competencies (Male, Bush & Chapman, 2009; Jackson, 2009b), more holistic profiles of required undergraduate skill sets were generated by Jackson and Chapman (submitted a) in a study of 211 Australian employers. Findings revealed there are three preferred types of business graduates; the 'Manager', 'Business Analyst' and 'People Person'. The 'Manager', the most significantly popular graduate profile, aligned with recent literature on required business undergraduate competencies with considerable importance assigned to leadership skills, capacity for innovation, ethics and social responsibility, confidence, work ethic and emotional intelligence. The Business Analyst profile epitomises the more traditional graduate where the development of higher order skills such as critical thinking, analysis and reasoning formed the capstone of undergraduate education. The importance of this profile is upheld by many educators (Candy & Crebert, 1991; Albrecht and Sack, 2000); Robert Half International

Financial Leadership Council, 2007) yet still represents – as it did in the study – only a minority view. The People Person profile embodies current preferences for soft skill development, such as team-working, communication, confidence, self-awareness and lifelong learning. It forms almost a true opposite to the Business Analyst profile, symbolising the common perception that soft skills are developed at the expense of higher order skills (Jackson & Chapman, submitted a).

How to develop the skills?

The majority of stakeholders in business undergraduate education and employment accept universities to be largely responsible for developing the non-technical skill set (Green et al., 2009; Savage et al., 2009). In a comprehensive study of key stakeholders in Accounting graduates, "the overwhelming view of interviewees is that it is the university's responsibility to develop non-technical skills in graduates. The only exception is teamwork, where the views were about 50:50 between the employer and the university being responsible" (Hancock et al., 2009: p.47). Amidst a backdrop of widening skill gaps and rising competition from developing countries, the pressure on higher education to develop industry-relevant, non-technical skills is gathering momentum. Across undergraduate business programs, mapping engagement with required skills against learning outcomes and benchmarking exercises against other programs is now commonplace. The development of threshold learning outcomes for all business degrees to be assessed by the new Tertiary Education Quality Standards Agency (TEQSA) adds further demands for business undergraduate programs to develop 'rounded' individuals. Whist the demand for individuals with a repertoire of strong disciplinary, higher order and soft skills is growing; one cannot help but question the somewhat passive role employers have assumed in their development.

Considerable attention has been paid to how non-technical skills are best developed in higher education (Business/Higher Education Round Table [BHERT], 2003). For a summary of

studies on and strategies for embedding non-technical skills in Accounting undergraduates across Australia, refer to Hancock et al. (2009). Pedagogical strategies across business schools are predominantly workplace learning/internship initiatives, stand alone core programs and embedding learning outcomes dedicated to non-technical skills into traditional disciplinary content (Jackson, 2009a). Despite considerable resources and efforts directed at developing non-technical skills, there remains significant divide between employer expectations and first-degree graduate offerings in Australia. Studies of Australian employers find business graduates deficient in many areas of the non-technical skill set (BIHECC, 2007; Playfoot & Hall, 2009; BCA, 2006). The implications are that business graduates lack the non-technical skills required for successful performance in the workplace; affecting productivity, retention, motivation and innovation within organisations and across the national economy.

In Australia, areas consistently cited as gaps in undergraduate skills are critical thinking (Jones & Abraham, 2007 cited in Hancock et al., 2009), ethical standards (Jones & Abraham, 2007 within AFF, p14; Kavanagh & Drennan, 2008); business acumen / awareness (Kavanagh & Drennan, 2008); communication (BCA, 2006; BIHECC, 2007; Hancock et al., 2009); teamwork (Hancock et al., 2009) and problem solving (BCA, 2006; Hancock et al., 2009). Again, possibly different interpretations by examined employers in the meaning of identified and examined competencies mean one must interpret such findings with care.

Generality of the skill set

There is debate on the extent to which non-technical skills, identified as important to employers, are generic. Those believing the skill set to be purely generic would advocate the same content is relevant across the different faculties. Many studies support the 'generality' of the non-technical skill set (Wolf, 1991; Billings, 2003; Bridges, 1993), findings indicating the need, acquisition and mastery of the skill set carrying across different business disciplines and indeed to other fields. Playfoot and Hall (2009)

maintain that "businesses and organisations in different countries are looking for individuals with a similar set of behaviours, skills and knowledge that can be adapted to specific work conditions" (p. 7). Jackson and Chapman in, their study of business academics in the UK and Australia (submitted b), found little variation in the competency requirements of business undergraduates across different academic disciplines nor across different work areas in a similar study of Australian employers (submitted a).

Others, however, believe context – more specifically discipline – influences the composition and thus acquisition of the generic skill set (Marginson, 1993; Jones, 2009; Tennant, 1999; Andrews, 1990). Hager and Holland (2006, p.288) stated that "different professions and occupations have somewhat different generic profiles, particularly when they are practiced in many different sorts of contexts". An assessment of the role of context is required for two reasons. First, to ascertain whether devised frameworks for developing non-technical skills can be applied across different faculties/disciplinary areas within the university setting and, second, whether non-technical skills developed at university can be successfully transferred from higher education to the workplace.

Reasons for undergraduate skill gaps

There are many possible reasons, in combination or isolation, for the continued existence of business graduate skill gaps. First, the true composition of the industry-required non-technical skill set has not yet been identified due to inadequate competency modelling processes. A major flaw in empirical studies on required competencies is, first, the assignment of ambiguous terms to competencies allowing misinterpretation by employers on what examined competencies are actually referring to in the workplace (Male, 2005). These competency terms can often be interpreted differently from stakeholders in different settings (Jackson & Chapman, submitted a; Leveson, 2000; Green et al., 2009). A second flaw is that studies are often based on examining abstract and non-measurable phenomena, rather than operational

behaviours (Male, 2005; Jackson, 2009b; Whitefield & Kloot, 2006). In combination, it is likely that studies generate "lists of skills based on perceptions of desirable attributes … largely rendered meaningless generalities" (Holden & Hamblett, 2007: p. 517). If educators are not clear on the precise nature of the required non-technical skill set, it is unlikely they will address and develop an appropriate mix of embedded skills; rendering current employability frameworks as highly subjective and possibly misleading.

Second, whilst the importance of understanding what employers need from educators is widely acknowledged (Playfoot & Hall, 2009; Abraham & Karns, 2009; Meredith & Burkle, 2008), some suggest that employer expectations are unrealistic and simply unachievable 'wish lists' (see Jackson, 2009). Here, university employability frameworks may be over-ambitious; causing cynicism amongst academics, disillusionment amongst employers and a breakdown in genuine efforts to bridge current graduate skill gaps. Empirical analysis of differences between undergraduate business curricula offerings and realistic graduate employer requirements, such as Rubin and Dierdoffs' (2009) study at MBA level, would be useful here. Gap analysis processes, where undergraduate content is revised in line with changing graduate employment opportunities, further ensures curricula remains relevant (Phelps, Aggarwal & Taylor, 2006).

 Third, assuming the appropriate identification of the required skill set, some universities remain ambivalent or in some cases lack adequate resources to facilitate the development of the non-technical skills. It is important not to tar all business schools with the same brush when analysing criticisms of business school efforts in successfully educating undergraduates. Puto (2005 cited in Fleming, 2008) claims the size of business schools is significant with larger school's abilities to be innovative and timely in their response to required curricula changes hampered by inertia, tradition and bureaucracy. Fleming (2004 cited in Fleming, 2008) maintains that less research intensive universities in the USA are more likely to yield undergraduates with the required soft and

technical skills as there is a greater focus on innovative and effective teaching, reinforced through reward structures, as opposed to highly theoretical research achievements.

Playfoot and Hall (2009) reported a "significant disconnection between education systems and the needs of 21st century employers, both public and private", arguing the match between requirements and provision "appears ill-fitting in many countries" (p. 8). Barrie (2004) attributes this to the absence of a clear conceptual framework on generic skills, conjecturing that, without this, appropriate pedagogical initiatives for addressing the generic skill set are unlikely to be developed. Further barriers could be more institution or faculty-specific where high workloads, culture or administrative burdens mitigate against revising curricula to industry needs. On the other hand, some universities have undertaken considerable research and allocated significant resources to strategies for developing non-technical skills in business undergraduates. It could be that sufficient time has not elapsed for improvements to become apparent from adoption of such strategies.

It is possible that each of the above potential barriers is not, in isolation or combination, the reason for the reported business graduate skill gaps. Let us assume that appropriate non-technical skill set is being developed effectively in business undergraduate programs. It may be that the benefits of developing each competency, and the skill set more holistically, within the higher education setting is not being transferred effectively to the workplace (Leveson, 2000). The differences between transferring across disciplinary contexts and from the classroom to the workplace are acknowledged (Barnett, 1994; Bridges, 1993). Some believe transfer across different contexts rarely occurs (Hammer et al. 2005; Detterman 1993; both cited in Leberman, 2006); the inability of first-degree graduates to effectively transfer a set of developed soft and analytical skills providing due explanation for the persistence of skill gaps.

The Transfer Of Skills And Knowledge From Higher Education To The Workplace

The concept of transferring learned skills and knowledge across different contexts is an extremely important yet grey area in education theory and practice. Although Barnett (1994) maintains the inability to transfer from higher education to the workplace does not and should not matter as different skills should be valued by the two different settings, many educators contest this (Halpern & Hakel, 2003; Thompson, Brooks & Lizarraga, 2003). Indeed, Desse (1958) states "there is no more important topic in the whole psychology of learning than transfer of learning… There is no point to education apart from transfer" (p.213). From an employer's perspective, achieving solid returns on graduate employment through strong productivity and innovation, particularly in poor economic climates, should be sufficient motivation for industry professionals to further their understanding of transfer, the extent to which it occurs and assist in its facilitation in the workplace.

Not only do a plethora of different types of transfer exist, there is an abundance of somewhat confusing theories on how transfer happens, strategies for enhancing transfer, potential barriers to transfer and the extent to which it occurs. On reviewing transfer literature one becomes embroiled in theory and principles, the lack of empirical study glaringly apparent. The lack of instruments measuring transfer may be attributed to the absence of a clear conceptual framework; it is difficult to measure phenomena if there lacks consensus on how it actually occurs. As noted by Oates (1992):

> "there is a gap between our technical knowledge about transfer and our aspirations about enhancing and promoting it en masse in general education and vocational education and training. We have to plug this gap and do it pretty quickly. If we fail to do this, we will continue to have a plethora of competing, distinctive and different frameworks of core skills, transferable skills and so on, and we will be unable to differentiate those frameworks which are good from those which are bad" (p. 228)

To further complicate the situation, the literature on transfer makes little or no allowance for the traits and characteristics of the 'new graduate' (Rowarth, 2000). Generation Y, notoriously unique to their predecessors, may learn in dissimilar ways and could therefore transfer acquired skills and knowledge differently to previous generations. This adds further impetus to the need to review, culminate and possibly revise transfer theory into a more manageable and measureable conceptual framework.

Many (Rogers & Mentkowski, 2004; Austin, Weisner, Schrandt, Glezos-Bell & Murtaza, 2006; Hakel & Halpern, 2005) recognise the difficulties in explaining how transfer actually occurs; possibly explaining why transfer is often assumed with no action required of stakeholders in undergraduate education and employment (Ripple & Drinkwater, 1982). Some believe transfer between different contexts is extremely hard to achieve and rarely occurs (Hammer, Elby, Scherr & Redish, 2005; Detterman, 1993). The aim of this section is to structure our understanding of the concept and process of transfer and provide a clear direction for future research on measuring transfer and evaluating the extent to which it occurs.

What is transfer?

The multi-faceted and complex nature of transfer is highlighted by its range of different types. *Near* or *specific* transfer is defined as applying learned skills and knowledge where the situation in which one initiates his/her learning is similar in nature to the context from which the learning must be transferred; conversely *far* or *non-specific* transfer concerns skills very different to their learned context (Mestre, 2005; Leberman et al., 2006). Leberman et al. (2006) differentiated between *simple* and *complex* transfer by the nature of the tasks being transferred from one context to another. They also define *positive* transfer as that in which learning in one context improves learning in another and ne*gative* transfer where prior learning inhibits future learning. Prior learning plays a key role in the process of transfer whereby students take this knowledge and use it to help assess the new

context or situation they are in. This is sometimes referred to as the *J curve effect* (Mestre, 2002), in which students struggle to adapt prior learning to new scenarios although, in the long run, it is likely to enhance transfer.

Vertical transfer supports scaffolding in learning programs where simple skills are mastered first then students naturally progress on to more complicated content, their prior learning assisting them with this transfer. *Lateral* transfer is where students may be mastering a number of more complicated skills simultaneously (Gagne, 1965). An example might be an employability skills program where undergraduates are developing skills in communication, emotional intelligence, team working and initiative at any one time. Finally, where transfer situations are very similar to that in which the learner acquired a skill, it is likely that transfer will be *automatic*. For more different situations, it is likely transfer will require "conscious thought and intellectual effort'" and is termed *mindful* (Leberman et al., 2006: p. 5). These are synonymous with Perkin and Solomon's (1996) *low road* (automatic) and *high road* (mindful) transfer.

Theories of transfer

Transfer is thus deemed as the practice of applying knowledge and skills to either similar or different scenarios. For the latter, non-technical skills are sometimes perceived as the tools by which graduates can "select, adapt, adjust and apply one's other skills to different situations, across different social contexts and perhaps similarly across different cognitive domains" (Bridges, 1993: p.50). Table 1 summarises the theories of transfer which emphasise, instead, the role of cognitive processes and place little value on the role of non-technical skills in the process of transfer. These form the more traditional perspectives on transfer, concerned with the product of learning and what is 'transferred out' of a particular learning situation (Mestre, 2005).

Table 1. Summary of theories / approaches of learning transfer valuing cognitive abilities

Theory/approach	Summary
Formal Disciplines Approach	Also known as 'brain training' where rote learning would induce disciplined intellect (enhanced memory, attention and judgement) for transfer. Mainly discredited as a perception that we store abilities in our brains which we then call on as and when required. However, it is linked with more contemporary theories and the development of common cognitive abilities for different subjects.
Theory of Identical Elements	Evolved around the concept of associationism where stimulus-response pairings are made and transfer is based on the similarity and differences between the learning and the transfer situation. Ormrod (1998 cited in Leberman et al., 2006) stated that the more similar the transfer situation to the situation where learning took place, the more transfer will occur, that negative transfer can occur and no transfer will take place if stimuli and responses are different. Theory of identical elements (Thorndike & Woolworth, 1901 cited in Mestre, 2005) is an early example of transfer theory based on similarity of stimulus in the learning and transfer situation. This approach was, however, criticised as being limited to explaining only how transfer in similar scenarios occurs with no explanation for far transfer.
Generalisation Approach	Advocates that if understanding, as opposed to rote learning, is the underlying principle to a given behaviour then that can be applied (transferred) to a wide range of situations. An example would be understanding the principles of driving a car allows mastery in driving many different types of vehicles, trucks, buggies, transmission type and in foreign countries.
Knowledge Reconstruction	This is based on understanding the processes used by learners when facing a new situation: their collection of strategic, tacit, procedural and conceptual knowledge used to reconstruct existing knowledge in conjunction with the new (Leberman et al., 2006). This process is a cognitive one and involves reflection, generalising and abstraction (Bransford & Schwartz, 1999). Here transfer is dependent on conceptual similarity which, although accounts for far transfer, is difficult to relate to educational experiences and measurable learning outcomes (Mestre, 2005).

Table 1 (Cond). Summary of theories / approaches of learning transfer valuing cognitive abilities

Theory/approach	Summary
Information Processing	This is another input-process-output model of transfer which is applicable in training and where transfer situations are specific and similar but fails to account for complex transfer (see Leberman et al., 2006)
Schema Theory	This theory is based on learners having mental models (Senge 1990, cited in Leberman et al., 2006) which are constructed from previous experience and learning. When faced with new situations, these are drawn on, connections are made with the schema and learning is transferred. How learners organise these mental models and schema is vital as if they are unable to make connections with them in new situations, learning will not be transferred. Bereiter (1995) focused on the role of the learner as envisaging new situations and how to apply their acquired knowledge and experience rather than reproducing what they have been taught. He argues the potential for transfer lies in the learner and education should focus on building characters which can think about their learning and not simply reproduce what they are taught.
Cognitive Apprenticeships	Collins, Brown & Newman (1989 cited in Leberman et al., 2006) adapted the traditional craft apprenticeship model and outlined the four stages a learner progresses through before they are able to independently undertake and adapt tasks to new situations. Reflection is emphasised and the need to think about how methods and practice can be applied in new situations (Boud & Walker, 1990).

In contrast, Table 2 summarises more contemporary theories of transfer, highlighting the importance of non-cognitive abilities in the transfer process. They focus on analysing the "seeds for new learning" where graduates are not expected to have fully developed skills for immediate application in the workplace but, instead, are 'transferring in' the aptitude to learn how to appropriately act and solve problems in their new environment (Mestre, 2005: p.11). Each of the following theories, in different ways, capitalise on the non-technical skill set, in conjunction with cognitive capabilities, to assist graduates apply their technical know-how in the workplace.

Table 2. Summary of theories / approaches of learning transfer valuing non-cognitive skills and attributes

Model	Summary
'Actor oriented' model	Lobato (2003) advocated researching the processes in which a learner differentiated between the learning and transfer contexts. The emphasis shifts from the confines of what the researcher believes is important in defining similarities and what the learner experiences, thus introducing the importance of social and cultural influences on the transfer process.
The Transfer Matrix	The transfer of training and transfer of learning are often viewed synonymously and the transfer matrix can be applied to both. This involves identifying who needs to do what, and at what stage, to maximise transfer; including the identification of barriers to transfer (Newstrom, 1986 cited in Leberman et al., 2006).
Socio Technical Model	Many have emphasised the importance of the socio-cultural context, such as Lave and Wenger (1991) who argue that people learn by entering 'communities of practice' and then learn to fully participate in this context, rather than learning in isolation from it. Analoui (1993 cited in Leberman et al., 2006) emphasised the importance of the role of socialisation in the workplace and training location and advocated the use of learning contracts and experimental learning to maximise the transfer of learning. Others have highlighted the importance of supervisory support, organisational culture and the climate for change as forming social factors which influence transfer.
Preparation for Future Learning (PFL)	Introduced by Bransford and Schwartz (1999) who argued that transfer is not about replication but about preparation for future learning. They criticised the process of sequestered problem solving whereby learners are effectively 'shut away' to learn things and then apply them in traditional tests for transfer (synonymous with students preparing and learning for exams). They highlight the importance of place and time in transfer and assign the pessimism on transfer as being due to methods of measurement and experimental processes. Instead they advocate an appropriate measure of transfer would be on the ability to learn new information and making connections with prior learning; highlighting the importance of interpreting and understanding new and old scenarios.

Table 2 (Cond). Summary of theories / approaches of learning transfer valuing non-cognitive skills and attributes

Model	Summary
Fuzzy trace theory	This might be perceived as a hybrid of traditional and contemporary theory as it is based on cognitive processes yet also gist, the ability to recognise similar content, as being fundamental to transfer (Wolfe, Rayna & Brainerd, 2005). Here, transfer relies on 'literal similarity' to original learning and gist-based intuitions or reasoning on the transfer situation, resulting from prior learning.
Principle based theory of Transfer	Haskell (2001) outlined 11 educational principles underpinning a general theory of teaching for transfer and believed we need to move beyond the simple near-far transfer terms as these can mean different things to different people. Haskell promotes six levels of transfer, ranging from non-specific to creative, of knowledge and skills. This theory is not advocated as new but simply integrates historical research to make some sense of an extensive debate on a fundamentally important concept.
Piaget's Model of Transfer	Here effective graduate performance in the workplace, and thus the extent to which they are transferring what they are learning from the classroom, is a function of "(i) the existing skills strategies, constructs etc of the individual and (ii) the features of the new situation/task which faces her/him" (Oates, 1992: 32). Here the graduate is managing change between the different classroom and workplace scenarios, determining the extent to which transfer occurs.

As a result of this shift in focus, there is now greater emphasis in education on the 'preparation for future learning' (Bransford & Schwarz, 1999), such as the learning of generic attributes, rather than the 'learning to learn' which focused more on memory and knowledge organisation. Mestre (2005) believes these polar conceptual frameworks for transfer explain variations in perception of whether transfer between the classroom and workplace can actually take place. If one adopts the former, more quantitative approach to transfer where the object-like phenomena of skills and knowledge are carried as a whole from one situation to another; it is unlikely this will ever be achieved. If, however, the mastery of skills and knowledge in a given scenario, being the classroom, will equip the learner sufficiently to attempt to perform these acquired skills in a new scenario then transfer has occurred.

Let us assume, aligning well with recent literature and current practice, that the contemporary approach to transfer is adopted and the value of non-technical skills in business undergraduate education is acknowledged amongst educators and industry professionals. Narrowing our focus on the issue of transfer, let us also assume that an appropriate and achievable non-technical skill set has been identified and developed adequately by universities. Why are undergraduate skills not, therefore, translating successfully from higher education to the workplace; causing skill gaps to persist? The answer lies in one or both of the following; first, the process of transfer is failing between these two particular settings and/or, second, there is 'noise' disrupting an otherwise healthy process.

The process of transfer: step theory

The process of learning and transfer are inexorably intermingled and can be likened to a series of steps. The undergraduate acquires a range of skills and knowledge at university; some technical and others comprising the non-technical set, such as team working, communication skills, emotional intelligence, confidence, initiative and self-management. Upon leaving university, they should be ready to build on their skill repertoire by applying their skills in a new environment. Their skill repository is synergistic and intertwined, their application of one skill relying on the utilisation of others. As they try to apply acquired skills in a new context, they are constantly learning by adapting and enriching their skill base with new experiences and applications. They have taken a valuable step in mastering a particular skill, or group of skills, at a new level and are building on their resumé of operationalised skills and knowledge. Against a backdrop of extreme professional mobility, graduates proceed through a myriad of different work contexts and more challenging job roles reapplying, and therefore enhancing, their learned skills and knowledge to new situations.

Step theory encompasses elements of both traditional and contemporary transfer theory where cognitive processes transfer, to a certain degree, acquired skills and knowledge. Whilst a graduates' preparation for lifelong learning enhance their propensity to further develop their skill repertoire in new workplace scenarios; requiring the successful development of an undergraduate skill set comprising both disciplinary and non-technical skills. Leberman et al. (2006) state "life-long learning has become a necessity and transfer of learning provides the vehicle for this to occur" (p.3) yet the relationship is actually two-way and interdependent. One feeds the other; the desire for life-long learning motivating the learner to effectively transfer and transfer allowing the learner to scaffold acquired chunks of knowledge and skills in their quest for lifelong learning.

The realisation, at this stage, should be that we are not concerned with the transfer *of* learning, deemed an external phenomenon to the learning process, as transfer *is* learning. Learning is a model encompassing transfer and practice, each enhancing performance in the other. This link between transfer and learning is recognised by Haskell (2001) who argues transfer is "the very essence of learning" (Leberman et al., 2006: p. 29).

Factors affecting the process of transfer

So why is the process failing graduates as they transition from education to the workplace? Unfortunately, the step from higher education to the workplace is far greater than from one workplace context to another. The differences are more significant in terms of culture, access to support and available resources; thus transfer is more challenging at this level. Wolf (1991) argues that even a small difference between the learning context and new application context can impede graduates, to the extent that transfer will not occur. Candy and Crebert (1991) studied the vast differences between workplace learning and university learning, highlighting factors such as the prescribed and structured nature of learning at university to its self-reflective counterpart in the workplace, the element of surprise in which first-degree graduates believe the

work environment will reflect the same order of supervision, control and structure as at university, and how learning at university is de-contextualised. Further issues are that problem cases in university are specially created scenarios which are structured, prescribed and reward correct answers whereas at work, problems are "ill-defined, ambiguous and open-ended" (p.579) and frequently have no right or wrong answer. University education rewards students for analysis and reflection, while most workplaces reward concrete, goal-directed actions. Further differences are in communication modes, with university focusing mainly on the written form (e.g., lecture notes and assignments) and workplaces focusing mainly on the oral form (e.g., meetings and informal discussion); differences in assessment practices, and; differences in pacing and encouraged time use. A very problematical element is the individual nature of university education which emphasises personal achievement and personal rewards, in contrast to the collaborative nature of work which stresses team goals, team achievements and team results. The extent of these differences may explain the graduate's inability to successfully make the step from higher education to the workplace.

In this context, 'noise' is factors inhibiting or enhancing a graduate's ability to transfer acquired skills and knowledge to the workplace. A broad range of influential factors have been identified; most studies on transfer pointing to varying combinations of each. Understanding the nature and extent of prior learning (Bransford & Schwartz, 1999; Lobato, 2003; Hakel & Halpern, 2005); students' personal characteristics (Baldwin & Ford, 1988; Analoui 1993, cited in Leberman et al., 2006; Ellis, 1965); learning program content, structure and design (Ellis, 1965; Baldwin & Ford, 1988; Gregoire, Propp & Poertner, 1998 cited in Leberman et al., 2006); teaching strategies (Bransford & Schwartz, 1999; Hakel & Halpern, 2005; Mbawo, 1995) and the extent of collaborative learning (Halpern, 2004) are factors originating from the learning context.

Examples of influencing factors deriving from the workplace setting are the level of available managerial and supervisory support (Newstrom, 1986 cited in Leberman et al., 2006; Austin et al., 2006; Marginson, 1993); degree of peer or collaborative support (Lave & Wenger, 1991; Austin et al., 2006; Holten, Bates, Selho & Carvalho, 1993) and learner motivation levels (Leberman et al., 2006). In a review of three case studies on transferring learning across different contexts, Leberman et al. (2006, p.119) concluded that transfer is a "multi-dimensional process and is mediated by the characteristics of the individual…the learning/training program and the social/cultural contexts". The key to unleashing successful transfer in graduates may be due consideration and allowance for these factors by both educators and graduate employers.

Implications for future research

A discussion of strategies for enhancing transfer, common to many reviews of transfer, is deemed premature at this stage. First, an assessment of the extent to which universities are developing an appropriate non-technical skill set in business undergraduates is required. As argued by Oates (1992): "it's like convicting an innocent person; not only do you waste time and vital resources in winding up with the wrong person, the person you really wanted escapes you" (233). Down (2006) advocates evaluating whether skills taught at university enable graduates to learn from their work; the importance of graduates 'learning to learn' widely supported (Candy, Crebert & O'Leary, 1994; Bransford & Shwartz, 1999). As learners manage change in new contexts through adapting their skill repository, they must demonstrate a supreme form of independent learning. An assessment of whether we are "producing self-directed learners who have the necessary skills and attributes to effectively interact with and reflect on the context of their work" (Hager & Holland, 2006: p.203) is essential.

Second, an empirical examination of the processes recent graduates undertake when transferring skills across both similar

and different contexts. Given the severity of the higher education to workplace step, the processes adopted in both the steps between different organisational contexts and / or job roles and the step from classroom to the work setting should be examined and compared. Analysis of the step process requires assessing the role of both cognitive and affective competencies and how these relate to the original learning, building on previous studies in this area (Perrone & Vickers, 2003; Holden & Hamblett, 2007).

Third, an empirical study identifying the nature and impact of influencing factors on the transfer process. Fourth, the construction of a measuring instrument assessing the extent to which transfer occurs in a range of step contexts. Transfer is identified by assessing graduate performance in existing skills in new workplace contexts and the time taken to master the given skills to an acceptable level of competence in the new environment. This confirms the interlinking roles of learning and transfer; "we are interested in the skills which enhance performance in a wide range of settings and are instrumental in reducing learning time in new settings" (Oates, 1992: p.233).

Importantly, the responsibility for transfer lies with higher education providers, graduate employers and the students themselves. Students must engage with learning material and be motivated to apply their learning in their new workplace context; educators must implement pedagogical practices which actively engage learners, ensure content is current and relevant and, along with graduate employers, must follow prescribed strategies for transfer which will both nurture the process and minimise any associated noise. The preconception that this process remains the responsibility of educators is untrue and acknowledgement of this triangular relationship is essential.

Given the extent of resources, energy and time allocated to the identification, embedment and measurement of non-technical skills within the education arena, it is no less than a travesty that the same has not been done for transfer. Future studies will allow graduates, professional associations and employers to consider and

contribute to the transfer process (Savage, Davis & Miller, 2007). Findings will assist in constructing a meaningful conceptual framework for the transfer process, our understanding of the transfer steps becoming an extension of learning theory. The framework will define tactics for employers of graduates and educators to ease the overwhelming step from higher education to the workplace and combat inhibiting noise factors and capitalise on those factors facilitating the transfer process. A set of informed strategies for enhancing transfer, relevant to the modern graduate, will build on the significant amount of work already done in this area (Haskell, 2001; Ladyshewsky, 2001; Lim & Johnson, 2002). The effort and resources required for effectively researching transfer are considerable yet the rewards are potentially great: enhanced productivity and less induction costs for employers; easier transition from education to work for graduates and the satisfaction for educators that the pedagogical practices employed to develop non-technical skills in undergraduates are effective.

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