Making sense of how I learn: Metacognitive capital and the first year university student

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Abstract

The retention and engagement of students entering universities globally has been a significant priority area in higher education over the last decade in alignment with a widening participation agenda. Research focusing on the successful transition of first year students has been widespread and contributed to the current body of knowledge focusing on best practices in engaging first year students. This paper focuses on a factor of significant and growing importance in this context: critical thinking. We argue that students who are not equipped with sufficient metacognitive capital when entering university are at increased risk of attrition. Further, we suggest some possible avenues for intervention.

Introduction

The massification of higher education internationally over the last ten years has led to an emerging interest in factors that serve to promote positive institutional engagement (e.g. Bradley, Noonan, Nugent, & Scales, 2008; Nunan, 1999). Although the higher education sector has observed a steady rise in the population of students entering universities, high attrition rates across institutions have presented as an increasing concern (Braxton, Hirschy, & McClendon, 2011; McInnis, James & Hartley, 2000). This trend has generated a high level of interest, resulting in substantial research outcomes informing university policies and practices focusing specifically on first year student matriculation and engagement (Burnett, 2006; Kift, 2008; Kift, Nelson & Clarke, 2010; Krause & Coates, 2008;; McInnis, Hartley, Polesel & Teese, 2000; Pike & Kuh, 2005). Numerous studies have been undertaken to determine key variables that generate successful engagement for first year students. One of the factors identified as a predictor of success is the individual's preparedness to engage in their chosen program of study (Davies & Elias, 2003; Krause, Hartley, James & McInnes, 2005; Evans, 1999; Ozga & Sukhnandan, 1998). Another relates to the degree to which approaches to learning and teaching serve to motivate and inspire students (Burnett, 2007; Burnett & Larmar, 2011; Larmar & Ingamells, 2010; Lowe & Cook, 2003; Tinto, 2002). A third variable emphasises the significance of students developing purposeful relationships with their university peers and with faculty staff as a means of facilitating supportive networks to enhance learning and deeper integration into the academic and social culture of the institution (Burnett & Larmar, 2011; Kift et al., 2010; McGivney, 1996; Wilcox, Winn & Fyvie-Gauld, 2005). The development of relationships outside of university as a means of extending upon the support from within is another factor that serves to deepen student engagement and promote success (Pike & Kuh, 2005; Gerdes & Mallinckrodt, 1994).   A fifth variable includes the establishment of a clear work/life/study balance, with a range of studies recognising the correlation between time on task and academic success (Kift et al., 2010; McInnis & Hartley, 2002). Finally, motivational factors such as emotional responses to engagement as well as a sense of purpose in undertaking the chosen program of study are of significance to the ongoing success of students (Burnett & Larmar, 2011; Kift et al., 2010; Evans, 1999; McMillan, 2005; Lizzio & Wilson, 2004; McInnis et al., 2000).

While each identified variable is of significance, research indicates that student retention is usually influenced by multiple factors, with deeper engagement resulting from the dynamic interplay of a range of variables serving to provide a scaffold of support (Kift et a., 2010; Krause & Coates, 2008; Krause, 2006; Pike & Kuh, 2005; Gabb, Milne & Zhongjun, 2006; Davies & Elias, 2003). While there is extensive research focusing on these factors, there are also other variables that have not been adequately investigated that have the potential for substantially impacting on students' ability to cope with the transition to university. The central focus of this paper emphasises the significance of critical thinking as a key variable for effective engagement in academic learning. The key tenet of the paper highlights the significance of metacognitive capital in promoting retention and engagement. Our core thesis is that insufficient metacognitive capital

exposes students transitioning to university to increased risk of attrition. A model is presented that serves to redress key issues placing students at greater risk of disengagement that will facilitate the development of strategies explicitly aimed at improving metacognitive capital for first year students.

Technology, first year transition and learning to learn

The situation facing first year students in the 21st century is vastly different from that faced by previous generations of students. As discussed, there are a multitude of factors contributing to student success. When considering the increased use of blended and online learning in higher education, it is clear that numerous factors are contributing to a more complex environment for students to adapt to. For example, where once students spoke to an enrolment advisor or similar personnel, as part of the admission process, most institutions now require students to enrol in courses/units electronically, depriving them of direct contact with expertise about the best possible strategies for navigating through their degree program.

Once students are enrolled in degree programs, similar problems abound. The easier access to information has led to circumstances where students can access via massive open online courses or otherwise some of the best lectures in the world on a device that they carry in their pocket. This access to information has had a profound effect on the ways in which universities need to consider the design and delivery of teaching (see also Barnes & Tynan, 2007). While universities grapple with this new reality, students are making the most of this unprecedented access and working their way through their studies

sometimes in spite of the formal curriculum rather than because of it.

It is clear that an array of factors contribute to student success and retention. While technology is changing the first year experience in fundamental ways, there remains uncertainty as to the psychological underpinnings of these changes. A range of studies and reviews have been undertaken to determine the impacts of motivation and emotional factors on student retention and engagement. A comprehensive report by McMillan (2005) focusing on attrition in higher education in Australia identified the significance of the student experience in influencing retention rates. Specifically the findings of the research recognised that students who had a clear sense of purpose in undertaking their study program, including an emotional commitment to this endeavour, were motivated to complete their studies. Further, the report identified that students who had clear academic goals and were academically motivated and interested in their studies, were more likely to succeed in completing their degrees.

In a review by Evans (1999), student's career goals were a significant factor in promoting ongoing motivation, academic success and an overall improvement in student retention. Conversely, the report identified that students who were unclear about a future career direction were less likely to persist in their studies. Academic motivation was also recognised as a strong predictor of success. In an extensive review by McInnis et al. (2000), a range of studies highlighted motivational factors that influenced student disengagement from study including the "wrong fit" in terms of the program being undertaken, pressure from parents and teachers to engage in studies that were not of interest to the

individual, a lack of initial preparedness for university and a lack of support from within the institution that served to decrease student motivation. In an attempt to uncover the underlying cause of these fluctuations in motivation, Lizzio and Wilson (2004) examined first-year students' perceptions of their level of capability in relation to their chosen area of study. The investigation highlighted the significance of perceived relevance of skills being taught to student motivation. The findings of the study suggest that commitment to ongoing learning and ultimate completion of the student's program of study was influenced by the student's sense of purpose in their pursuit of future career goals.

In terms of motivation for study more broadly, Ramsden's (2003) exploration of learning in higher education emphasises the importance of motivation in engaging students in a deep learning approach. The student's prior experiences of learning and their interests in specific learning tasks are identified as key motivators for successful and ongoing engagement. "Intrinsic interest and a sense of ownership of the subject matter provides fertile ground for attempts to impose meaning and structure" (p. 65). Thus the capacity of incoming students to understand their own epistemological approach to learning has a profound effect on their ability to adapt to university study. The ability to recognise one's limitations in terms of knowledge acquisition and conceptualising effective and non-effective methods for gaining knowledge is a fundamental skill required of all university students. Many students entering the university environment are not cognisant of the ways they learn including engagement with knowledge (see Cassidy, 2007). There is a vast array of literature focusing on metacognitive

processes associated with learning that are primarily situated within non-tertiary settings (e.g. Alter & Oppenheimer, 2009). For example Winne and Nesbit (2010) provide a synopsis of contextual factors that are associated with the enhancement of metacognition such as peer-supported learning. Given the central importance of metacognitive processes in facilitating life-long learning, greater attention needs to be given to this phenomenon within the higher education sector, particularly in terms of what it means for beginning students in a universal higher education sector. The significant focus on strategies of engagement to enhance student success may typically overlook key higher cognitive functions that underpin a transformative approach to learning that ultimately enhances sustained student success that includes facilitation of deep autonomous approaches to learning.

Of particular concern for transitioning students in this new university environment is the development of the ability to self-monitor their learning. Students are often not well placed to accurately evaluate either their level of learning or their capability for learning (Cassidy, 2007). Of somewhat greater concern is that numerous studies on judgments of learning (JOLs) suggest that when information is easier to access and process, this can often lead to a level of overconfidence in gains in knowledge (Kruger & Dunning, 1999). These findings suggest that it is possible to make it easier for students who do not have effective strategies for monitoring their own learning. However, such strategies may lead to subjective gains in learning that do not match objective reality. It is possible in these situations that students have actually absorbed very little of the content to which they are exposed.

Ultimately, although it has been well established that there are a number of factors contributing to the successful transition of students to university, these factors now need to be reconsidered or reprioritised as a result of information becoming easier to access electronically and students being asked to interact with the institution and with teaching staff online rather than face-to-face. Putting the onus on incoming students to monitor their own level of understanding and knowledge development is fraught with problems and leads to the conclusion that more deliberate attention needs to be given to the metacognitive processing these students engage in as they transition to university.

Metacognition as a critical factor in first year transition

Given the significance of metacognition in enhancing student engagement, and its grounding in social constructivist approaches to knowledge acquisition, a shift of focus from co-curricular strategies that assume that students are ready to understand their own learning capacity is suggested. While substantial research effort has been undertaken that has contributed significantly to the enhancement of the student transition (see Nelson, Clarke, Kift, & Creagh, 2011), further attention needs to be given to developing a clearer link between transition strategies and learning approaches that assist students to understand how they learn. These could take the form of a twofold approach based on Schraw's (1998) conceptualisation of metacognition aimed at developing both an understanding of basic cognitive and learning processes and the enhancing of capability in self-monitoring learning progress.

It simply cannot be assumed that students enter university with the metacognitive capital that enables them to adapt to the learning activities at a tertiary level within a reasonable time frame. Moreover, the issue of overconfidence in learning based on the ease with which concepts are discovered and information gathered using information and communication technologies adds further risk of maladaptive self-monitoring. What is easy and fluent is not necessarily what leads to the greatest gains in learning (Yue, Castel, & Bjork, 2013). We hypothesise that as students struggle to make sense of their own learning processes as they engage with the curriculum, motivation, a sense of purpose and capability may diminish and lead to disengagement and ultimately higher rates of student attrition. It is therefore argued that metacognitive capital is a central factor that underpins identified variables that are traditionally attributed to student retention and engagement.

The literature recognises factors including a sense of purpose and emotional commitment to a program of study as being central motivational factors in promoting student engagement (Lizzio, 2006; Tinto, 1987). However, approaches to learning are often facilitated with a predominant focus on indoctrinating students to curriculum design located in a specific context in contrast to an approach that promotes critical reflection about the student's own learning. In other words, both the explicit development of self-monitoring strategies and the underpinning psychological processes are generally given little consideration in transition programs, either curricular or co-curricular. In this vein, Ennis (1992) argues that generic courses on critical thinking should be included as part of what students are required to complete in their

degrees. An alternative approach specifically incorporating this type of development encourages a process whereby students are able to evaluate their existing metacognitive capital resulting in the adaptation of existing approaches to learning to exploit individual strengths and existing capacities, thus creating conditions conducive to life-long learning. Both generic and personalised approaches thus provide opportunities for students to develop the metacognitive capital they have or build critical thinking skills more broadly.

Given the significant influence of emotional and motivational factors on student engagement, current approaches to learning in higher education give limited attention to the links between emotion, motivation and learning (Trigwell, Ellis, & Han, 2012). Failure to engage students emotionally and motivationally in turn influences a surface learning approach that fails to develop student insight into cognitive processes central to deeper engagement in learning (see also Diseth, 2011). As a result, a student's metacognitive capital and capacity for critical thinking remains static. In the last decade, there has been an emerging interest in the function of assessment as an experience of learning (see Gibbs & Simpson, 2004). Further, a focus on adaptive approaches to assessment that facilitate stronger retention of students has also been prominent in higher education (Yorke, 2001). Given these trends, assessment design emerging from first year curriculum that has an inherent focus on student retention may not necessarily serve to develop the lifelong learning skills necessary for ongoing success. As Tan (2007) asserts, there has been a long history of emphasis onstudent self-assessment as a core design principle in

higher education. While there has been extensive discussion of this principle in the literature, there is scant evidence that self-assessment is routinely included as part of the curriculum, particularly as it is often argued that students are indeed very poor at assessing the quality of their own work (Leach, 2012). This reinforces the notion that student assessment does not necessarily provide the learning experience to develop metacognitive capital, ironically in this case, because many believe they do not have the capacity for accurate self-assessment.

More directly within the realm of the first year experience in higher education, a central focus has been on the introduction and ongoing utilisation of study skills that centre upon the completion of course requirements in contrast to approaches that enable students to develop as autonomous learners. This trend has longer term implications across the student lifecycle. Within the first year, students are traditionally well supported through the facilitation of learning experiences that focus on the development of rudimentary study skills that largely emphasise the utility of learning in contrast to enhancing metacognition. This trend creates problematic transitional experiences for students beyond the first year, particularly where such learning support may become either limited or absent. A growing trend appears to be what has been termed sophomore or second year slump. This phenomenon is characterised by a distinct drop off in performance as students progress into the second year of their studies (see Loughlin, Gregory, Harrison, & Lodge, 2013). The existence of the second year slump would suggest that current approaches to supporting and enabling first year students

to become autonomous lifelong learners is not living up to expectations.

Metacognitive capital: Underpinning deep approaches to engagement

Research into metacognitive approaches has traditionally been located within the domains of educational psychology (e.g. Roberts & Erdos, 1993) rather than being specifically situated within the higher education literature. Although there is broad discussion focusing on reflective learning in higher education (e.g. Brockbank & McGill, 2007), this discussion does not focus heavily on theoretical understandings associated with metacognitive approaches to learning. Schraw (1998) argues that the accepted definition of metacognition for instructional purposes consists of two parts; "knowledge of cognition" and "regulation of cognition" (p. 114). In other words, both the understanding of thinking processes and the monitoring and adaptation of these processes by the learner are important. In the higher education setting, Knight and Yorke (2003) argue that metacognition is a vital component of graduate employability. The value of the development of metacognition through the degree program is therefore beyond question. What remains is to determine at what point this capability develops and to evaluate the cost of delayed metacognitive development for commencing students. For example, does a lack of knowledge about learning and cognition or an inability to effectively monitor learning operate as sleeper factors in attrition?
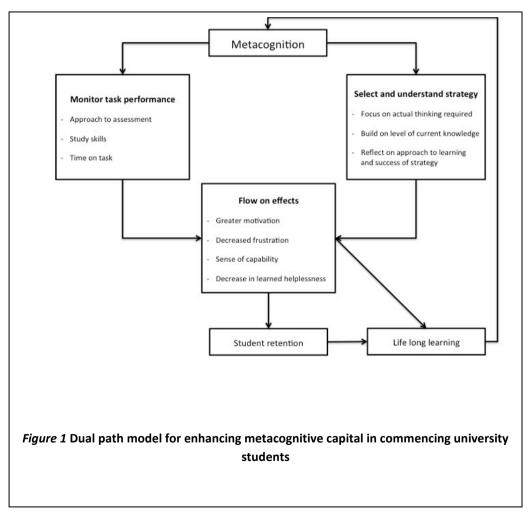
Drawing upon these definitions of metacognition, we propose the concept of metacognitive capital that serves to describe the learning and knowledge acquisition capacities and resources that students bring to the learning context. Metacognition's grounding in constructivism is significant given that individuals derive meaning about the world and ultimately engage in learning through social interaction and co-construction of new knowledge (e.g. Gunstone, 1991). Every student transitioning into the university environment brings with them a range of resources based on their backgrounds that will influence the degree to which they engage in metacognitive processes. Their awareness of these processes is usually limited with the exception of some individuals who may have experienced prior learning environments that have promoted awareness of individual approaches to learning that enhance engagement. In other words, they are taught to think about thinking. As we continue the journey from elite to mass higher education systems, one can clearly not assume that all students entering higher education have had the opportunity to be exposed to programs or experiences that directly aim to enhance their capability for metacognition.

Given the centrality of metacognition to learning and the significance of metacognitive capital to student success, further consideration of existing approaches to engaging students in learning processes within higher education is necessary. It appears that a dearth of research exists that gives credence to the foundational underpinnings of metacognition and its impact on student emotion and motivation in transition. As a means of more centrally locating the role of metacognitive processes of learning in higher education, the authors have drawn upon the work of Presseien (2001) to

develop a conceptual framework to inform existing practices associated with deeper engagement that promote lifelong learning. The model shown in Figure 1 is a reimagining of Presseien's model that emphasises task performance and strategy associated with learning. This model reconceptualises Presseien's framework by also giving consideration to key factors that serve to enhance student engagement.

The model integrates a range of variables that ultimately serve to facilitate greater student retention and encourage lifelong learning. Through the provision of opportunities to develop a deeper understanding of their own cognitive process and an enhanced capacity for monitoring their own learning, students are able to engage in university curriculum in a way that integrates positive study skills and supportive learning strategies that provide scaffolded support. This approach extends traditional methods of knowledge acquisition through the incorporation of experiences of learning

Figure 1 Dual path model for enhancing metacognitive capital in commencing university students

that require the individual to critically evaluate their approach to engaging in learning tasks and to appraise their capacity in terms of thinking processes. Further, experiences of learning are explicitly linked to key factors that promote student success. Such factors are signposted as part of the learning experience to reinforce their place in the development of student autonomy and the awareness and extension of metacognitive capital. Such factors include:

- a focus on cognitive processes required for specific tasks;
- building on the individual's current level of knowledge; and
- reflecting on the approach to learning and the success of the learning strategy

In Figure 1, the left-hand column centres on conventional interventions to assist in the process of learning how to learn at university. Such interventions include: development of assessment tasks that promote student engagement; facilitation of learning opportunities that enhance study skills; and structured experiences that direct students to manage their time to complete tasks. This can be monitored utilising, for example, learning analytics. The right-hand column extends these methods by explicitly addressing underlying cognitive strategies required to facilitate reflection necessary for the development of metacognitive capital. It is recommended that a shift in focus is required in the design of learning activities and assessment to an approach that explicitly considers the cognitive strategies necessary to complete such tasks.

The model presented in Figure 1 serves to inform both academic and professional personnel in the development and subsequent implementation of strategies specifically designed to increase metacognitive capital. Through the use of the model, curriculum can be designed that incorporates learning methods that focus on the development of ongoing critical reflection. Specific tasks can be developed that allow students to engage with the curriculum in a way where they meaningfully experience the process of accumulating new knowledge, reflect on the thinking processes that serve to integrate new information with their prior understandings, evaluate the impact of their cognitive processes on their learning and either continue to adopt processes that build metacognitive capital or replace strategies that do not serve to facilitate lifelong learning (Barnett & Coate, 2005, p. 24).

In considering the model and its application, a number of recommendations follow:

1) Curriculum design must include experiences of learning that allow students to reflect on the learning they have engaged with;
2) Follow-up learning experiences should integrate these reflections in order to facilitate students appraising the utility of these approaches to learning and potential benefits that enhance learning or detract from it;
3) Interventions aimed at assisting students who are struggling with transition need to focus not only on task performance but also on selecting and understanding the strategy they employ to engage with the task using a deeper learning approach.
4) In its current form, the model provides a theoretical framework that needs to be tested to determine its efficacy within the Higher Education context. Therefore, future research

should be undertaken that explores the model's application and relevance across a range of institutional settings.

Conclusion

This paper has focused on the significance of encouraging metacognitive processing as a means of enhancing university engagement and lifelong learning. Factors considered to be significant to the retention of students in higher education were outlined as a means of focusing on key variables associated with improving student success. The concept of metacognitive capital was introduced as an overarching determinant of student learning that serves to build upon existing approaches to student participation in higher education. A model was described that provides a conceptual framework to delineate the integration of conventional approaches to learning with strategies that promote the development of metacognitive capital which encourages deeper approaches to learning that not only can be implemented across the entire student lifecycle but also can ultimately facilitate learning across the lifespan. The identification of the need for future research to investigate the model's application within the Higher Education sector was also highlighted. Such research would serve to determine the implications of the model and its application for university staff and students. The potential impacts of the model could also be explored with a focus on its utility as well as its capacity to cultivate changes in student abilities that can be sustained over time. Finally, future evaluation of the model

would also highlight potential refinement of the model's framework to maximise its capacity to inform current practices in teaching and learning in higher education.

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