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Self-regulated learning in higher education: Identifying key component processes

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Abstract

The concept of self-regulated learning is becoming increasingly relevant in the study of learning and academic achievement, especially in higher education, where quite distinctive demands are placed on students. Though several key theoretical perspectives have been advanced for self-regulated learning, there is consensus regarding the central role played by student perceptions of themselves as learners. There are two general aims of this positional article. The first is to emphasise self-regulated learning as a relevant and valuable concept in higher education. The second is to promote the study of those constituent elements considered most likely to develop our understanding beyond a mere description of those processes thought to be involved in self-regulated learning. A case is presented for learning style, academic control beliefs and student self-evaluation as key constructs which contribute to an increased understanding of student self-regulated learning and which facilitate the application of self-regulated learning in pedagogy by enhancing its tangibility and utility.

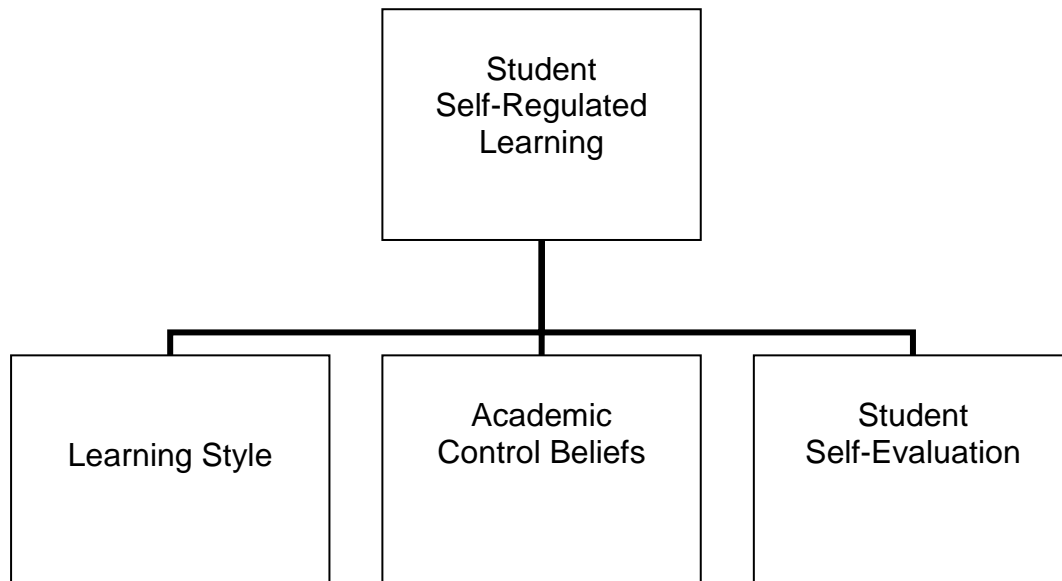
Introduction

In their volume *Self-Regulated Learning and Academic Achievement*, Zimmerman and Schunk (2001) note how the fascination with self-understanding and self-regulation has seen a recent shift in focus to learning and academic achievement processes. They conceptualise self-regulated learning as the way in which learners control their thoughts, feelings and actions in order to achieve academically, and, in a climate of rapid change in human context with a particular emphasis on technological advancement, they consider self-regulated learning to have become an essential requirement for individuals, particularly with regards to maintaining the capacity for employment and lifelong learning.

Whilst there are a number of key theoretical perspectives offered for self-regulated learning, all seem to share the common belief that 'student perceptions of themselves as learners and their use of various processes to regulate their learning are critical factors in analyses of academic achievement' (Zimmerman, 2001, p.2). Zimmerman and Schunk (2001) go on to describe self-regulated learning research as seeking to explain how individuals invoke systematic and regular methods of learning to improve performance and to explain how learners adapt to changing contexts. It is on this basis that the current article provides an account of learning style, academic control beliefs and student self-evaluation as pivotal constructs underlying key component processes through which students self-regulate their learning (Figure 1). In this positional article it is suggested that each of these constructs can be aligned with those themes identified by Zimmerman

as present in the major self-regulated learning theories. These include *motivation, self-awareness, key processes, social and environmental influences and acquisition of self-regulated learning.*

Figure 1. Likely constructs underlying student self-regulated learning



The article considers the relevance of learning style, academic control beliefs and student self-evaluation to a general model of student self-regulation proposed by Boekaerts (1999). In doing so, pertinent issues such as Coffield *et al.* (2004) and Rayner's (2007) suggestion that the future pedagogical utility of learning styles may lie in the development of metacognitive knowledge and awareness are addressed in the context of student self-regulated learning. The article has two general aims. The first is to emphasise self-regulated learning as a highly relevant and valuable concept in higher education. The second is to promote the study of those constituent elements and processes considered most likely to develop our understanding of self-regulated learning

beyond the mere description of processes thought to be involved in self-regulated learning (see Baumert *et al.*, 2000).

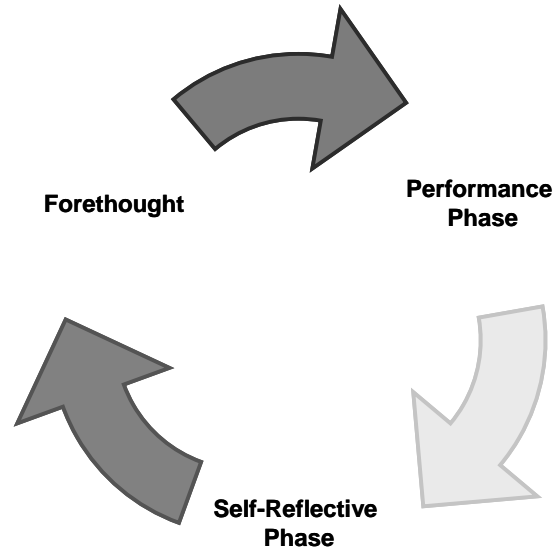
Self-regulated learning

Self-regulated learning is considered to be separate from mental ability or academic performance skill. Instead, it refers to a self-directed process through which learners transform mental abilities into task-related academic skills (Zimmerman, 2001).

Woolfolk (2004) states the general influences on student self-regulated learning as *knowledge* about themselves, the subject area, the task, strategies for learning and the context in which they will apply learning; *motivation to learn* where students value learning not just performance, are intrinsically motivated and learning is self-determined and not controlled by or dependent on others; and *volition* or will-power where students are able to protect themselves from and know how to deal with and resist distractions. While Zimmerman (2002) suggests three phases of self-regulated learning: *Forethought*, involving task analysis (goal setting, strategic planning) and self-motivation beliefs (self-efficacy, outcome expectancies, intrinsic interest/value, learning goal orientation); *Performance*, involving self-control (imagery, self-instruction, attention focussing, task strategies) and self-observation (self-recording, self-experimentation, self-reflection phase); and *Self-reflection* involving self-judgement (self-evaluation, causal attribution) and self-reaction (self-satisfaction/affect, adaptive/defensive). Figure 2 represents the interactive nature of self-regulatory processes according to Zimmerman's

(2001) three-phase cyclical model involving forethought, performance and self-reflection.

Figure 2. Three phases of self-regulated learning (after Zimmerman, 2002)



In line with a social cognitive perspective (Bandura, 1986), self-regulated learning occurs as a result of reciprocal causation between three influence processes: *personal processes* such as perceptions of ability (e.g. academic self-efficacy) and self-motivation (e.g. goals); the *learning environment*, including task demands and encouragement from teachers; and *individual behaviour* such as performance outcomes (e.g. previous marks/grades) (Singer & Bashir, 1999; Zimmerman, 1989). Zimmerman (1989) states that 'students can be described as self-regulated to the degree that they are metacognitively, motivationally, and behaviourally active participants in their own learning process' (p.329).

Key component processes in self-regulated learning

Singer and Bashir (1999) have described self-regulated learning as a *meta* construct defined as ‘a set of behaviours that are used flexibly to guide, monitor, and direct the success of one’s performance’ and ‘to manage and direct interactions within the learning environment in order to ensure success’ (p.265). Both the theoretical and empirical literature related to self-regulated learning (occasionally referred to as *academic self-regulation*) presents a number of examples which—directly or indirectly—illustrate the relevance of learning style (i.e. preferred ways of responding to learning tasks, including cognitive processes and behaviour, Peterson *et al.*, 2008), perceived academic personal control (i.e. ‘beliefs about their capacity to influence and predict daily life events’, Perry, 2003, p.3) and student peer assessment and self-assessment (i.e. student evaluation of the academic quality of their peers’ and their own work) to self-regulated learning. It is these three constructs then which provide the focus for this article, in which it is suggested that—certainly according to a social cognitive perspective (Schunk, 2001)—each plays a key role in the development and practice of student self-regulated learning.

Self-regulated learning theories also seek to explain why, despite the apparent capacity to learn in terms of advantages in mental ability, social economic status and quality of education, some learners fail to achieve academically (Zimmerman, 2001). Those authors offering leading theoretical perspectives on self-regulated learning are in agreement regarding the critical nature of students’ self-perceptions of themselves as learners and their use of self-regulatory processes in our understanding of academic achievement

(Zimmerman, 2001). This reflects a general consensus that students' ability to learn can be improved through metacognitive and motivational strategies (Zimmerman, 2001). Zimmerman also refers to feedback, including peer assessment and self-assessment, as a form of social learning relevant to self-regulated learning.

Three common criteria are highlighted by Zimmerman which he considers to apply across most self-regulated learning theoretical perspectives: (1) purposive use of specific processes, strategies or responses by students to improve their academic achievement; (2) the use of a self-orientated feedback loop involving students monitoring the effectiveness of their learning strategies and responding to feedback with changes in self-perceptions or learning strategies; (3) a motivational dimension—involving self-efficacy beliefs—which determines choice of particular self-regulatory processes, strategies or responses.

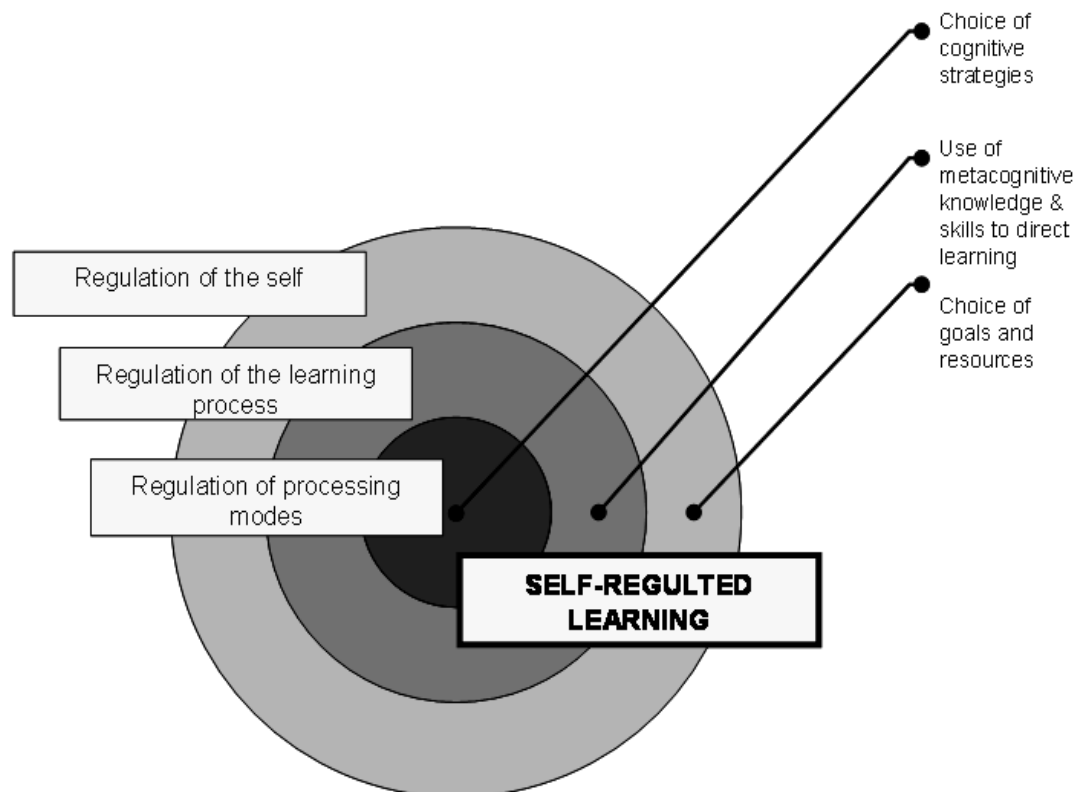
On the basis of Zimmerman's account of the major self-regulated learning theories, it seems reasonable to assert that learning style, academic control beliefs and student self-evaluation are constructs central to the advancement of self-regulated learning research and practice. Support for such an assertion is provided by Schunk's (2001) social cognitive perspective on self-regulated learning which implicates self-efficacy and outcome expectancies in the *motivational* (i.e. providing learners with representations of future consequences and enabling goal setting) and *self-awareness* (i.e. as a self-perceptive state emerging from self-observation) aspects of self-regulated

learning; learning style in the *self-awareness* and *key processes* aspects of self-regulated learning, whereby there is self-observation and self-judgement (i.e. metacognition) comparing existing performance with learning goals and subsequent self-reaction effects affecting the *performance phase* and involving adopting learning strategies or approaches most likely to help achieve goals; and peer assessment and self-assessment in *self-awareness* [metacognition], *key processes* (i.e. self-observation and self-evaluation), *social and environmental influence* (i.e. nature of the task, enactive mastery experience influencing self-efficacy) and *acquisition* (i.e. capacity to make social comparisons and ability attributions) aspects of self-regulated learning.

Boekaerts' conceptual model of self-regulated learning

Boekaerts' (1999) conceptual model of self-regulated learning provides a clear illustration of the relevance of learning style, perceived academic personal control and peer and self-assessment constructs to self-regulated learning. Boekaerts recognises the significance of each of the constructs in more emphatic and explicit terms, stating that our understanding of self-regulated learning has been informed by, and shaped by, three schools of thought: *learning style* research; theories of the *self*; and research on *metacognition*.

Figure 3. Three-layered conceptual model of self-regulated learning (Boekaerts, 1999, p.449)



Boekaerts proposes a three-layered conceptual model of self-regulated learning (Figure 3 & Table 1). The inner layer (i.e. learning or processing styles) represents regulation of cognitive strategies or learning styles (i.e. the typical way students learn) and is considered crucial for describing the quality of students' self-regulation process. By 'quality' Boekaerts is referring to the association which some learning style theorists have drawn between certain styles or approaches and regulation style. An example is Vermetten, Vermunt and Lodewijks (1995) who present evidence of associations between a *deep* approach to learning and a preference for opportunities for *internal* regulation of learning, and between a *surface* approach to learning and a preference for *external* regulation. The second of Boekaerts' layers represents the use of metacognitive knowledge and skills to direct learning. The development and

utilisation of metacognition is presented as a regulatory process and includes *monitoring, evaluating* and *correcting* skills (Table 1). These skills clearly reflect elements of student peer assessment and self-assessment skill and—according to Coffield *et al.* (2004) and Rayner (2007)—may represent the future pedagogical utility of learning style approaches, i.e. to develop metacognitive knowledge and awareness. The third and final layer of Boekaerts' model is concerned with regulation of the *self* and motivation (i.e. 'motivation control system'). Information about the self-perceptions of learners is presented as an essential element for understanding self-regulation, i.e. *why* students are prepared to do what they do and don't do what they may be expected to do. Work examining academic self-efficacy and academic locus of control is clearly situated within this *motivational control system* proposed by Boekaerts (1999), within which she refers to the students' ability to 'activate positive scenarios' and to 'value the task and to consider oneself competent to perform it' (p.453).

Table 1. Boekaerts' model of self-regulated learning - adapted by Baumert *et al.* (2000, p.5)

Cognitive/Metacognitive Regulation	Motivational Self-Regulation
<p>Domain-specific knowledge</p> <p>Cognitive learning strategies</p> <ul style="list-style-type: none"> • Memorisation strategies • Deep processing • Transformation <p>Metacognitive learning strategies</p> <ul style="list-style-type: none"> • Planning and goal setting • Monitoring • Corrective strategies 	<p>Motivational orientations</p> <ul style="list-style-type: none"> • Self-directed cognitions (self-concept of abilities, self-efficacy, control beliefs) • Motivational preferences (interest, task orientation, ego orientation, intrinsic motivation) • Test anxiety • Subjective theories of ability <p>Situational motivational state Attention, effort, persistence</p> <p>Volitional features of action control</p> <ul style="list-style-type: none"> • Protection from competing intentions • Coping with success and failure

Pintrich and De Groot (1990) have conducted empirical work which relates to the motivational, cognitive and metacognitive aspects of Boekaerts' model. Their work focused on the three components of self-regulated learning which conform to those proposed by Boekaerts. Namely *cognitive strategies* used to learn, remember and understand material, *metacognitive strategies* for monitoring and modifying cognition and effort management strategies and *motivation* involving control beliefs and self-efficacy, intrinsic value and goals, and test anxiety. Pintrich and De Groot examined the nature of any intra and inter component associations. Self-efficacy and intrinsic value were positively correlated with both cognitive and metacognitive strategy use, with students who exhibited positive self-efficacy and high intrinsic value being more likely

to use cognitive strategies and self-regulatory metacognitive. Self-efficacy, intrinsic value, use of cognitive strategy and use of self-regulatory metacognitive strategy were all positively correlated with academic achievement. Regression analysis identified self-efficacy and self-regulatory metacognitive strategy as significant predictors of average grade. As Pintrich and De Groot point out, their findings provide an empirical base linking the components of a general model of student self-regulated learning and, it is suggested here, underline the significance of learning style, perceived academic control and student peer assessment and self-assessment skill [metacognitive skill] in any such model.

Self-regulated learning – pedagogical utility

Achieving a greater understanding of self-regulated learning as a rapidly emerging concept in education remains a high priority endeavour for research and practice-based educationalists (Baumert *et al.*, 2000; Zimmerman & Schunk, 2001). The relevance of the constructs of learning style, perceived academic control and student self-evaluation skill in this endeavour is illustrated clearly and consistently in the recent relevant literature around self-regulated learning. Chong (2007), for example, examines the role of personal agency beliefs [including self-efficacy and self-concept] in self-regulated learning, noting how the development of self-regulatory skill is critical, particularly when the cognitive demands of the learning situation are increased and effective learning is required. In a further example, Kirby and Downs (2007) attempt to exploit student self-assessment practices to cultivate a deep approach to learning, self-regulated learning and metacognitive skill

development in foundation programme students who currently display a surface approach and who show evidence of adopting *performance* rather than *learning* goals.

Self-regulated learning - implications for policy and practice in higher education

Whilst work aimed at developing further our understanding of self-regulated learning is set to continue, there are already several key messages for higher education regarding student individual differences and self-regulated learning which have immediate implications for institutional policy and practice. Perhaps the most far reaching of these is the extent and range of student individual differences existing in any given cohort and the need to accommodate such diversity within 'normal practice'. This renewed focus on individual differences in learners can be explained in terms of two significant emerging factors affecting—particularly *higher*—education. These are increased student diversity; and increased diversity in modes of delivery, with a particular emphasis on information communication technologies. This is a trend which is set to continue to increase given government initiatives to significantly increase both the student population in higher education and diversity within that population. Government policies relating to widening participation in higher education and presenting a framework for the future of higher education (Department for Business, Innovation and Skills, 2009; Department for Education and Skills, 2003a & b), along with legislative equality, diversity and inclusion policy governing legal rights for equal access to education, are set to continue to change the typical student profile in higher

education in terms of both numbers and diversity. Constraints on future public financing of higher education (Department for Business, Innovation and Skills, 2009) will also dictate changes in the manner in which courses are delivered.

Higher education as a whole is facing greatly increased student numbers as compared with previous years (Higher Education Statistics Agency, 2010; Universities and Colleges Admissions Services, 2010), with the student profile in many institutions now dominated by non-traditional students (National Centre for Education Statistics, 2000). This has created a student population which has been described by Coomes and DeBard (2004) as one of the most diverse ever and by Sax (2003) as the most educationally ambitious.

This emphasis on diversity, together with evidence that the level of support provided by educational institutions in identifying and addressing diversity in student populations is a significant factor in student adjustment and development in higher education (Noldon & Sedlacek, 1998) underlines the relevance of individual differences research to higher education pedagogy. Self-regulated learning seems to offer a mechanism capable of both representing student individual differences in learning and implementing changes in normal practice which reflect the individual needs of students. The relevance of self-regulation has already been recognised in other sectors of education. Both Duckworth *et al.* (2009) and Meyer *et al.* (2008) have authored extensive government funded reports examining, and promoting, self-regulated learning—and independent learning as a related concept—in school education. Each of these reports provides guidance on the

implementation of self-regulated learning which applies equally to higher education. The guidance points include: not all students are equally predisposed to self-regulate but aspects of self-regulation improve as a result of effective teaching and learning practices; self-regulated learning requires the development and deployment of learning strategies, positive self-efficacy and pursuance of meaningful goals; introducing curriculum strategies which focus on the development and enhancement of cognitive skills, metacognitive skills and affective skills to improve self-regulated learning; student self-monitoring and self-evaluation are important factors in the development of self-regulated learning; self-regulated learning improves with practice; self-regulated learning can be improved through guidance, modelling and effective strategies; self-regulated learning requires an 'enabling environment' including the physical setting, material resources and social interaction and positive support from teachers and peers; there is a particular emphasis on information communication technologies as a tool to support self-regulated learning; self-regulated learning involves a new role for teachers which focuses on process-orientated teaching with students actively involved in the learning process, i.e. 'learn how to learn'; any interventions to promote self-regulated learning are likely to be long-term; implementation requires a 'whole-school' approach involving the support of both senior management and teachers. To this list should be added an emphasis on practioner-led initiatives which are recognised and valued by institutional management; consensus among management and teaching staff so that there is consensus clarity for students and conflict is avoided.

Overall, higher education institutional policy and practice should be *enabling*, in that they should reflect the need for opportunities to model and practice self-regulated learning for both students and teaching staff in order to address misconceptions and misunderstanding, demonstrate value and allow the development of appropriate skill sets for self-regulation.

Conclusion

It was not the intention of the article to provide an extensive explanation of or examination of self-regulated learning theory. Rather, it was to emphasise the development of self-regulatory learning skills in students as a priority for higher education (Baumert *et al.*, 2000) and to draw attention to those psychological constructs identified as instrumental in the development of self-regulated learning.

Noting an inevitable uncertainty surrounding what individuals will need to know in the future, Baumert *et al.* (2000) suggests assuming a 'dynamic model of continuous acquisition of new knowledge and skills' (p.2) – with self-regulated learning being viewed as a central element in such a model. Self-regulated learning is thus considered a vital prerequisite of successful acquisition of knowledge and of particular importance in sustaining lifelong learning (Baumert, *et al.*, 2000). In conceptualising self-regulated learning, Boekaerts (1999) proposes a layered model involving three regulatory processes: regulation of the *self* (goals); regulation of the *learning process* (metacognitive knowledge and skills); and regulation of *information processing modes* (cognitive strategies). These processes are directed or

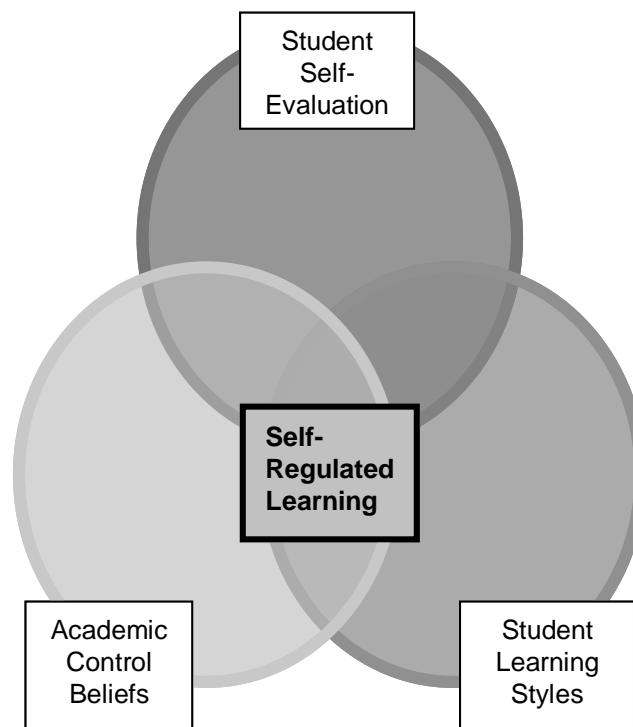
determined through the *mutual dependency* of the individual constituent cognitive, metacognitive and motivational components of the model. So, it is the *aggregated effect* of these components which determines the efficacy of the self-regulation process, with deficiencies in any component adversely affecting the degree to which the student self-regulates their learning. Figure 4 represents how the composite influence of learning style, academic control beliefs and student self-evaluation on student self-regulated learning might be conceptualised.

It is suggested then that focusing on those constituent constructs identified within the underlying conceptual architecture of self-regulated learning will offer a manifesto for the development of self-regulated learning skills in students and, thus, provide a rationale for the pedagogical utility of the self-regulated learning concept. Such an argument is stronger in the case of those constructs where understanding is more advanced and for which valid and reliable methods of measurement have already been developed.

Although describing self-regulated learning as a complex construct existing at the 'junction of many different research fields' (Boekaerts, 1999, p.447), Boekaerts (1997; 1999) does refer to learning style, academic personal control and metacognitive skill development as major influences in the development of self-regulated learning theory. The relevance of these constructs is also noted by other authors in their accounts of self-regulated learning (e.g. Schunk, 2001; Zimmerman & Martinez-Pons, 1990) and it would seem reasonable to pursue a programme of work which examines and

models the influence of learning style, academic control beliefs and student self-evaluation on self-regulated learning. This might involve exploring learning style as a metacognitive process (Coffield *et al.*, 2004; Rayner, 2007), examining motivational processes through academic self-efficacy interventions (Schunk, 1989) and evaluating student peer assessment and self-assessment as valuable forms of monitoring and corrective strategies (i.e. metacognitive regulation, Baumert *et al.*, 2000; Cassidy, 2006).

Figure 4. Conceptualisation of the composite Influence of key component processes of self-regulated learning



Boekaerts (1999) goes on to describe self-regulated learning as a powerful construct which allows the various components of successful learning to be described. Empirical studies centred on measurable constructs such as learning style (Entwistle & Tait, 1996), academic self-efficacy (Cassidy & Eachus, 2002a) and student self-assessment (Cassidy, 2006), are likely to provide a major contribution towards the advancement of self-regulated learning research and practice. Such work would also reflect the sentiments of Zimmerman (1990), who strongly advocates the need for the study of *component processes* to contribute to a growing understanding of the distinctive features of students' self-regulated learning.

As a final point for this paper, it should not be overlooked that each of the constructs suggested for advancing the conceptualisation and application of self-regulated learning present their own particular thorny issues and limitations which remain to be fully resolved. Some of the major issues include the conceptual fragility of learning style approaches highlighted—most notably—by Coffield *et al.* (2004), the precise nature and subtle conceptual distinctions within personal control beliefs described by Bandura (2006) and how these might be captured by psychometric measures which reflect contemporary educational contexts (Cassidy & Eachus, 2002a & b; Eachus & Cassidy, 1997 & 2006), and an imperative for student peer assessment self-assessment emphasized by Boud (2008) and Cassidy (2006 & 2007). Nevertheless, these constructs remain prevalent in conceptual accounts of self-regulated learning and are considered critical factors in our understanding of student academic achievement.

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