

**EDU008 by James Anthony, Michael Wormald**

**“Assessment of the validity of use of the Approaches to Study Skills Inventory for Students (ASSIST) within the context of a professionally accredited post-graduate accounting programme in South Africa”**

**Abstract**

Increased emphasis by professional bodies on fostering life-long learning has resulted in interest the education literature around student approaches to learning. The aim of this paper is to provide a contextual validation of the applicability of the Approaches to Study Skills Inventory for Students (ASSIST) – a self-reported inventory used to classify student approaches to learning as either: Deep, Surface or Strategic. The ASSIST was tested within the context of a professionally-accredited, post-graduate accounting programme, at an established South African university. The intention is to serve as a basis for further research within this context to provide insights for accounting educators into both student approaches to learning, and factors in the learning environment that may contribute to such approaches.

The ASSIST was administered to a group of volunteer students studying the Post-Graduate Diploma in Accounting (PGDA) at the University of Cape Town (UCT). The validity of use of the ASSIST survey was tested by confirmatory factor analysis. Patterns of response for the cohort of students sampled compared favourably with international studies identified in the literature. The findings of this study therefore indicates that the ASSIST survey is applicable within the context administered and the results can be used to gain further insights into the approaches to learning of accounting students within this context.

**Keywords**

Approaches to learning; ASSIST; accounting; confirmatory factor analysis.

### Introduction

The International Federation of Accountants (IFAC) has described the skill of life-long learning as “critical to meet the needs of the users of professional service” (Introduction to International Education Standards, IFAC 2009:42). Due to the inherent risk of information obsolescence over time, professional accountants should be able to assimilate new information. IFAC describe life-long learning as potentially consisting of “an understanding of the flow of ideas and events” and “an ability to conduct inquiry, carry out logical thinking and understand critical thinking” (IES3, IFAC 2009:63). IFAC also describes the use of a “surface approach to learning” as “not in the long-term interests of prospective professional accountants and the profession” (IES2, IFAC 2009:51).

The South African Institute of Chartered Accountants (SAICA), as a member of IFAC, has developed a new competency-based framework for current and prospective SAICA-members. Echoing the views expressed by IFAC, this Competency Framework (SAICA 2010) makes specific mention of a member developing the fundamental competencies that foster life-long learning (SAICA Competency Framework 2010:5). Such fundamental competencies include “the ability to apply oneself” (SAICA Competency Framework 2010:7). However, SAICA has delegated the role of educating prospective South African Chartered Accountants to academic institutions (SAICA Competency Framework 2010:6). It therefore stands to reason that academic institutions have a role to play in fostering a student’s ability to practice life-long learning.

Jackling and de Lange (2009) conducted research in Australia into the divergence of accounting education and the expectations of employers. The research revealed that there appears to be a distinct lack of generic skills being taught at universities in Australia specifically within the realm of accounting education. To combat this, some universities have developed policies to develop technical skills in related disciplines as well as qualities serving the learner beyond graduation – including the skills of life-long learning (IFAC 2009), effective communication, organisational skills and ethical behaviour (Jackling & de Lange, 2009). Like South Africa, member Australian

accounting bodies also subscribe to the IFAC codes requiring members to commit to life-long learning through continuous professional development programmes (Jackling & de Lange, 2009; IFAC, 2009). However, accounting curricula are technically complex and high in volume leading to little time to incorporate new interventions to develop generic skills. Such high volume has been seen as correlated with a Surface approach to learning (Diseth, 2007; Lizzio, Wilson and Simons, 2002) and the accounting education literature reveals a mix of Surface (Ballantyne, Duff & Larres 2008) and Deep/Strategic (Hall, Ramsay & Raven 2004; English, Luckett & Mladenovic 2004) approaches to learning developing over time. With a perceived high-volume workload in South African accounting education and if students do in fact perceive accounting information as being reproductive in nature, as Byrne and Flood (2004) suggest, this raises the concern that South African accounting students may be adopting a Surface approach to learning. However, according to the literature, encouraging a deep approach to learning and discouraging a surface approach to learning is believed to give students the best chance of achieving academically (English *et al.* 2004; Davidson 2002; Ramburuth & Mladenovic 2004) as well as developing the skills of life-long learning (IFAC 2009).

Marton and Säljö (1976a, 1976b) were amongst the first published authors to define approaches to learning as either 'deep' or 'surface'. The main focus of their research was to identify the processes and strategies that students undertook to learn and how these processes may influence the outcome of understanding and recall of information. Marton and Säljö (1976a) defined deep-level processing as being "directed toward comprehending" (Marton & Säljö 1976a:8) while surface-level processing as having "a reproductive 'conception' of learning" meaning to be "forced to keep to a rote-learning strategy" (Marton & Säljö 1976a:7). These 'processes' have become more commonly known as approaches to learning in education literature. However, the work of Marton and Säljö (1976a, 1976b) aimed at identifying approaches to learning at a task-specific level. Their research focussed on attempting to induce specific approach to learning strategies and measuring these against desired learning outcomes for specified tasks.

Biggs (1987) and Entwistle and Ramsden (1983) furthered the approaches to learning literature through the development of self-reported inventories – surveys used to measure student approaches to learning. The assumptions underlying these inventories include the stability of student motive and strategies that influence the process by which a student chooses to learn (Biggs 1979). This allowed Biggs (1987) and Entwistle and Ramsden (1983) to group students according to a predominant approach – the approach to which they will revert in the absence of influence.

The development of self-reported inventories enabled researchers to capture a large number of responses in a time-effective manner. Such information could then be used to inform further research as well as assist in the design and evaluation of teaching and learning interventions. Given the emphasis placed on fostering productive learning behaviours in professional accounting students, it stands to reason that investigating such behaviours serves as a constructive starting point in evaluating teaching and learning in a professionally-accredited learning environment.

This research paper serves to evaluate the applicability of the Approaches to Study Skills Inventory for Students (ASSIST) within the context of a professionally-accredited postgraduate accounting programme in South Africa. The ASSIST has been applied in contexts ranging from psychology (Marton & Säljö 1976a, 1976b; Diseth, Pallesen, Brunborg & Larsen 2009; Diseth 2001, 2007) to science (Prosser & Trigwell 1991; Trigwell, Prosser & Waterhouse 1999), however, it is essential to test the reliability of such an instrument when used in a new context. The sections that follow include an investigation of the literature regarding approaches to learning and the measurement thereof through the use of self-reported inventories followed by a discussion of the data collection and analysis for the validation of the use of the ASSIST in a South African accounting-education context. The paper concludes with the implications of the findings and possible further research.

### **Student approaches to learning**

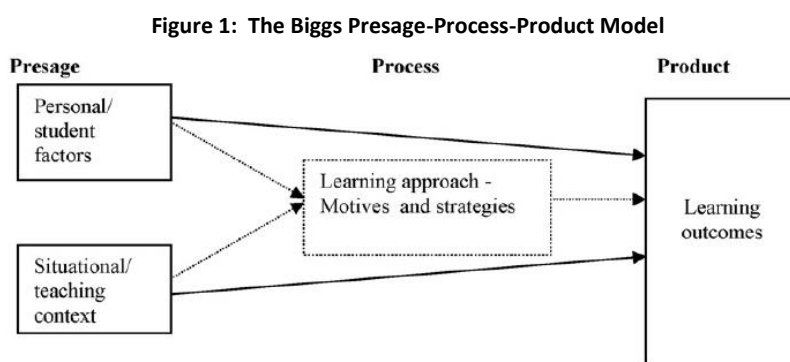
Results from the work of Marton and Säljö (1976a, 1976b) indicated that students do indeed adapt their approach to learning based on anticipated assessment requirements. These anticipated

assessment requirements were informed by past experience – in this case prior assessments. Where prior assessments had been designed to induce a recall of factual information with no express need for inherent understanding of the material, students adopted a surface approach thereafter. Where assessments had been administered to induce expression of understanding, students adopted a deep approach thereafter (Marton & Säljö 1976a). Therefore, one can say with confidence that students can vary their approach to learning over time and in response to changing factors in the learning environment (Marton & Säljö 1976a; English *et al.* 2004; Ramburuth & Mladenovic 2004; Davidson 2002; Diseth *et al.* 2009).

While Marton and Säljö (1976a, 1976b) proved that students adopt differing approaches to learning based on their conceptions of learning at a task-specific level, the education literature moved swiftly into the development of self-reported inventories (Biggs 1979, 1987; Entwistle & Ramsden 1983) to assist in the measurement of student approaches to learning in a more holistic sense – investigating the most commonly used or predisposed manner in which students approach learning. Biggs (1979, 1987) justified the development and use of self-reported inventories through the assumption that students in tertiary education should have developed fairly stable motives for learning and therefore stable strategies for going about learning. Biggs, Kember and Leung (2001) identify three key motives: keeping out of trouble with minimal effort (associated with a fear of failure); engaging with a task appropriately (associated with intrinsic interest); and to maximise grades (associated with achievement). These motives were each linked with a congruent strategy: selective memorising (or surface learning); seeking meaning (or deep learning); and optimal time and space management (or strategic learning) (Biggs, Kember & Leung 2001). It is this third motive and congruent strategy that resulted in the description of a third dominant approach to become known as the “Strategic” (Entwistle & Ramsden 1983) or “Achieving” (Biggs 1979, 1987) approach. These ideas of motive and strategy were used by Biggs (1978 as cited in Biggs 1979) to assist in the development of the Study Process Questionnaire (SPQ). Entwistle and Ramsden (1983)

relied on similar student and educational psychology factors to develop the Approaches to Study Inventory (ASI).

Delving deeper into Biggs' (1979, 1987) theory of motivation and strategy, we can gain clarity on what may drive a student to adopt one approach over another. Biggs' 3-P model (Presage-Process-Product – refer Figure 1 below) outlines a dynamic system in which an interaction exists between student factors and teaching context (Presage), on-task approaches to learning (Process) and learning outcomes (Product) (Biggs *et al.* 2001). Therefore student factors, such as motivation (Biggs 1979, 1987, 1999; Biggs *et al.* 2001), prior learning and achievement (Davidson 2002; Duff 2004; Diseth *et al.* 2009) interact with the teaching environment (Davidson 2002) and student



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assessment (Marton & Säljö 1976a, 1976b) and teaching. This interaction influences the approach to learning adopted by the student in that context which will influence the learning outcomes and achievement (English *et al.* 2004; Ramburuth & Mladenovic 2004; Davidson 2002; Diseth *et al.* 2009). However, the learning outcomes and the approaches to learning adopted will in turn influence both the way in which the teacher develops assessment and teaching material as well as the manner in which a student tends to approach learning (Biggs *et al.* 2001).

The importance of student approaches to learning is highlighted when considered in the light of constructive alignment (Biggs 1996, 1999). A student leaving tertiary education should be adequately prepared to work in the field toward which they studied and have the ability to practice

life-long learning (IFAC 2009; Biggs *et al.* 2001). However, these learning outcomes will only be achieved if there is constructive alignment (Biggs 1996) between educational objectives, the manner in which content is taught, the assessments that are used to measure those learning outcomes and the approach to learning that students tend to adopt. Such theory and increased emphasis by professional bodies has led to an increased focus on student approaches to learning by academic institutions (Entwistle & McCune 2004).

### Measuring student approaches to learning

Two predominant forms of educational research exist. Lucas and Mladenovic (2004:400) describe the contrasting methods of phenomenographic research and inventory-based research as follows: “Interview research permits access to a rich and detailed source of qualitative variation. Inventories, however, provide access to a greater number of students and support the identification of quantitative variation in a statistical sense”. Due to the investigatory nature of this research, the use of self-reported inventories was favoured in an attempt to obtain a broad overview of general student tendencies based on a larger sample size. Such information can inform future complimentary phenomenographic research.

Biggs (1987) and Entwistle and Ramsden (1983) developed self-reported inventories based on the results of their own phenomenographic research (predominantly interviews). Each inventory represents a number of statements designed to represent a quality attributable to either a Deep, Surface or Strategic approach to learning. Students indicate their strength of agreement or disagreement to each statement on a five-point Likert scale. Through the use of exploratory and confirmatory factor analysis, this list of statements is tested for reliability of response. Reliable statements are retained while statements providing inconsistent results are modified or removed altogether. Responses to the final inventories are captured and collated together to provide some indications as to the strength by which students tend to favour each of the three approaches to learning.

Both the Study Process Questionnaire (SPQ) (Biggs 1978, as sighted by Biggs 1979; Biggs 1987) and the Approaches to Study Inventory (ASI) (Entwistle & Ramsden 1983) were considered for possible use in this research. Both of these inventories have been revised through repeated use in different contexts but remain the foundation for self-reported inventories. The SPQ has been revised and adapted to become the Revised 2-Factor Study Process Questionnaire (Biggs *et al.* 2001), while the ASI has undergone several revisions (Tait & Entwistle 1996), the most recent of which resulting in the Approaches to Study Skills Inventory for Students (or ASSIST) (ASSIST 1997; Entwistle, Tait & McCune 2000).

While the three-factor-structure of the SPQ and ASI/ASSIST has become part of mainstream literature, there remains conflict as to whether this multi-factor structure is indeed appropriate (Kember, Wong & Leung 1999). Whilst testing the SPQ, Kember *et al* (1999) suggested the use of a 2-factor model for use in basic investigations but also suggested the introduction of a more complex instrument to assess more complex strategy and motive elements. In contrast to this, reliability testing of the ASSIST survey has repeatedly confirmed the appropriateness of the three-factor model. For example, Diseth (2001) performed exploratory and confirmatory factor analysis on a Norwegian version of the ASSIST and found the instrument to be appropriate. Byrne, Flood and Willis (2004) describe the use of the ASSIST as being more prevalent. They also highlighted calls for the use of such inventories and the measurement of student approaches to learning internationally – they bulk of research having taken place in the United Kingdom and Australasia. For the purposes of comparability of this study with that of Byrne, Flood and Willis (2004), and others where the ASSIST has been applied, the use of the ASSIST has been favoured. Furthermore, the ASSIST survey questions appear to be more relevant to the experience of the students sampled in this study.



The ASSIST survey measures responses to 52 statements (summarised in Table 1 overleaf) serving to measure thirteen subscales that in turn serve as indicators for the three main scales of Deep, Surface and Strategic approaches to learning.

As a caveat to the use of the ASSIST survey, whilst testing the reliability of the Norwegian version of the ASSIST, Diseth (2001) found problems with the subscales 'Monitoring Effectiveness' and 'Alertness to Assessment Demands'. Both of these factors tended to load on more than one factor – both Deep and Strategic. This is consistent with the results of Flood and Wilson (2008) and shall be important to consider in this research.

**Table 1: Three main scales (approaches) and their associated subscales  
(ASSIST 1997; Entwitle, Tait & McCune 2000)**

<p><b>Deep Approach Subscales:</b></p> <p>Seeking Meaning (SM)</p> <p>Relating Ideas (RI)</p> <p>Use of Evidence (UE)</p> <p>Interest in Ideas (II)</p> <p><b>Strategic Approach Subscales:</b></p> <p>Organised Studying (OS)</p> <p>Time Management (TM)</p> <p>Alertness to Assessment Demands (AD)</p> <p>Achieving (AC)</p> <p>Monitoring Effectiveness (ME)</p> <p><b>Surface Approach Subscales:</b></p> <p>Lack of Purpose (LP)</p> <p>Unrelated Memorising (UM)</p> <p>Syllabus Boundness (SB)</p> <p>Fear of Failure (FF)</p>
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### **Approaches to learning as a contextual response**

The development of approaches to learning inventories has led to their application in a variety of contexts including psychology (Marton & Säljö 1976a, 1976b; Diseth *et al.* 2009; Diseth 2001, 2007), science (Prosser & Trigwell 1991; Trigwell, Prosser & Waterhouse 1999), health science (Leung & Kember 2003) and accounting (Booth, Lockett & Mladenovic 1999; Byrne & Flood 2004; Byrne *et al.* 2004; Hall Ramsay & Raven 2004; Flood & Wilson 2008 and others). The majority of studies into approaches to learning in an *accounting* context have confirmed the applicability of inventory-based research.

Much of the above literature argues in favour of context being as specific as at a course level. Meyer and Eley (1999 as cited by Lucas & Mladenovic 2004) argue that that approaches to learning

could be discipline or even subject specific. The key question remains: What is the definition of subject or discipline-specific? Is the accounting programme a discipline, or can each of the four core subjects of the UCT PGDA (Financial Reporting, Managerial Accounting and Finance, Taxation and Corporate Governance) be considered disciplines of their own? The answer to this question may lie in the differences or similarities of the learning environments for each subject.

Kember and Leung (2005) investigated the influence of the learning environment on the development of the generic capabilities of students undertaking a degree. They described a suitable teaching environment as “characterised by a focus on understanding, the active participation of students in learning activities, a coherent curriculum, and assessment which focused on analytical skills and self-learning capability” (Kember & Leung 2005:245). Based on the research of Trigwell, Prosser and Waterhouse (1999), classes where teachers focus on knowledge transmission by the teacher is associated with increased likelihood of students adopting a surface approach to learning. Conversely, although with a less strong relationship, students tend to practice a deeper approach where the teacher is student-focussed and actively involved in changing student conceptions of learning (Trigwell, Prosser & Waterhouse 1999). This implies that, if factors within the learning environment such as the approaches to teaching differ between subjects, differing contextual response may be observed.

Such results were echoed in the studies of Lizzio, Wilson and Simons (2002), Davidson (2002) and Diseth (2007) in which heavy workload, bad teaching environment and inappropriate assessment methods were found to influence students toward the use of a surface approach to learning. The strongest predictors of students using a Deep approach to learning were found to be positive perceptions regarding the quality of teaching and appropriateness of assessment (Lizzio *et al.* 2002; Davidson 2002; Diseth 2007). Such positive perceptions of the learning environment were seen to positively influence academic achievement (Davidson 2002) and perceived as best developing generic academic and workplace skills (Lizzio *et al.* 2002). This aligns with Diseth’s conclusion

that student perceptions of the learning environment affect their approach to learning which in turn affects their academic achievement. Furthermore, the use of questions requiring understanding as well as appeal to the achieving nature of students and downplaying or reducing workload are seen to be potential improvements to the learning environment (Diseth 2007). These conclusions are consistent with the ideas of John Biggs on the 3-P model and constructive alignment.

### Approaches to learning in accounting education

The above literature has supported approaches to learning being a response to a context and therefore understanding approaches to learning in an *accounting* context becomes an important consideration (Lucas & Mladenovic 2004). A number of studies have been performed in the accounting field internationally and conflicting results exist.

Byrne and Flood (2004) investigated the conceptions of learning amongst Irish accounting students and found the majority of students viewed accounting knowledge as reproductive in nature – although all six levels of conceptions of learning were evidenced (Säljö, 1979 as cited by Byrne & Flood 2004). This conception that knowledge is reproductive in nature is thought to be associated with a surface approach to learning (Byrne & Flood 2004). Should this conception result in a surface approach to learning that becomes pervasive to the method of study adopted across multiple contexts, such learning behaviour may be to the detriment of the accounting profession (IES2, IFAC 2009:51). Furthermore, Biggs (1999 as cited by Biggs *et al.* 2001) argues that the generic aim of good teaching is precisely to encourage a deep approach and discourage a surface approach with the aim of creating life-long learners.

Flood and Wilson (2008) utilised the ASSIST to measure approaches to learning of students immediately prior to writing their final professional accounting exam in Ireland. Results from this study indicated that students preferred a Strategic approach to learning, believed to be linked to students engaging in learning activities that were most likely to lead to examination success. To this end, ‘Alertness to Assessment Demands’ and ‘Monitoring Effectiveness’ were strong Strategic

factors for students of that study. Whilst the deep approach was not favoured, strong responses were noted for 'Seeking Meaning' and 'Relating Ideas' subscales.

Whilst the above studies measured conceptions and approaches to learning at a particular point in time, several longitudinal studies have been conducted to measure changes in student approaches to learning over time – often introducing changes in the learning environment to measure the effects of teaching interventions. Hall *et al* (2004) changed the learning environment by implementing group-work tasks in an attempt to induce a 'deeper' approach to learning in first year accounting students. Similarly English *et al* (2004) introduced interventions to improve first year accounting students' writing skills. Using the SPQ to measure approaches to learning, results of both studies showed a statistically significant increase in the Deep approach through this implementation.

Ballantine, Duff and Larres (2008) implemented case studies to change the learning environment for undergraduate accounting and business students in three Irish universities. Using the ASSIST to measure approaches to learning, and contrary to the results of Hall *et al* (2004), results indicated a statistically significant increase in the Surface approach to learning over time. Delving deeper into the result of the subscales indicated a statistically significant increase in the Deep subscales of 'Relating Ideas' and 'Use of Evidence' but also achieving a significant increase in the Surface subscale of 'Lack of Purpose'.

### **The context of this study**

The SAICA-accredited Postgraduate Diploma in Accounting is considered to be the flagship programme of the College of Accounting, a department within the Commerce Faculty at the University of Cape Town. Approximately three hundred students graduate each year progressing to write the SAICA Initial Test of Competence (ITC) – the first of two professional examinations.

The student body studying the PGDA at UCT is diverse in terms of gender, race, culture, nationality, quality of schooling and degree programme. Entwistle, Tait and McCune (2000)

sampled a group of South African students from a ‘historically disadvantaged’ university when testing the initial pattern of responses for the Approaches to Study Skills Inventory for Students (ASSIST 1997). They described the South African context as being “a totally different culture and educational context” (Entwistle *et al.* 2000:37). Entwistle *et al.* (2000) concluded that for the South African sample, ‘Relating Ideas’ and ‘Achievement’ played less defining roles in the Deep and Strategic factors respectively than in their Scottish sample. Furthermore, ‘Fear of Failure’ appeared to be related to both Surface and Deep factors in their South African sample. The University of Cape Town may be subject to similar ‘historically disadvantaged’ influences, however, the accounting-specific context (given the professionally-accredited nature of the programme) and the maturity of the students sampled in this study may negate such disparities. In fact, this study is focussed on examining learning behaviours of students studying a ‘first-world’ programme in a traditionally ‘developing’ country.

### Methodology

The use of the ‘approaches to learning’ construct in higher education is both a convenient and well defined construct within which different groups of students can be analysed. The literature has established the theoretical underpinnings of ‘approaches to learning’ framework (Lucas & Mladenovic 2004) upon which this research is based. The approach to learning framework largely assumes a constructivist perspective – students experience and respond to a particular environment or context (Lucas & Mladenovic 2004). Therefore, this research does not attempt to classify individual students as ‘deep’ or ‘surface’ learners. It is understood that a student adopts a specific approach in response to a particular context (Lucas & Mladenovic 2004). While the use of phenomenographic research techniques can provide greater detail as to how specific students respond to learning in a specific context, the use of self-reported inventories allows the sampling of a greater number of students. A larger sample size allows for a clearer picture of the population response to a context and can serve as a basis for further phenomenographic research.

Haggis (2003) argues that such constructs as ‘approaches to learning’ may in fact have become outdated given changes in higher education over time. She argues that such constructs may not fully account for context-specific situations in which students may find themselves that may influence their learning behaviours. While this argument stands, this research serves as a preliminary investigation into the learning behaviours of students within this context in order to serve as a basis for further research.

As part of a larger study, the first step in understanding the approaches to learning of UCT PGDA students is performing a validation of the inventory tool to be used to measure such approaches. Given that the ASSIST was developed in an environment that may be different to that of this study (Entwistle *et al.* 2000), it is essential to test that the statements contained in the ASSIST are interpreted consistently and in accordance with their initial design. To this end, the ASSIST survey (unmodified) was completed by a sample of students and the pattern of responses was analysed using confirmatory factor analysis. This was done to test that the three main approaches – Deep, Surface and Strategic – were exhibited as a factor and that each of the subscales correlated most with the approach that they were designed to measure. Furthermore, due to the argument of different disciplines shaping learning behaviours (Lucas & Mladenovic 2004), students were requested to respond to the survey specifically with regards to the subject of Financial Reporting. This subject is thought to be the main area of specialisation for the Chartered Accountant (South Africa) qualification and the subject for students have attended the most courses. Financial Reporting accounts for 108 HEQF credits at an undergraduate level while the remaining three subjects of Managerial Accounting and Finance, Taxation and Corporate Governance (including advanced Auditing as well as ethical requirements and the King code for effective corporate governance) account for between 36 and 72 HEQF credits at undergraduate level.

### Data Collection and Analysis

The PGDA class of 2009 was approached to complete the ASSIST survey on a voluntary basis. The population generally represents fourth and fifth year students having completed either a Bachelor of Commerce degree majoring in accounting, or a Bachelor of Business Science degree majoring in finance and accounting. For the purposes of this study, no distinction has been made between Bachelor of Commerce and Bachelor of Business Science students as the main focus of this study is to investigate the approaches to learning of the cohort as a collective.

The survey was administered in late August of 2009, approximately one month prior to the writing of the final PGDA examinations, by which point, the vast majority of the work has been completed. The ASSIST was accompanied by a coversheet requesting basic demographic information such as gender, ethnicity and educational history. 76 completed surveys were received from a class of approximately 330 students representing a response rate of 22.7%. The sample consisted of 42.1% female respondents, 56.6% male respondents and 1.3% failed to specify.

The ASSIST survey is designed to capture student tendencies to exhibit thirteen attributes, known as subscales, that grouped together represent tendencies toward each of the three approaches to learning, described as main scales. Responses are measured on a five-point Likert scale from 'Disagree', 'Disagree Somewhat', 'Neutral', 'Agree Somewhat' to 'Agree'. Each of the four statements representing each subscale in an approach is designed to invoke a similar response from students. Similarly, each of the subscales believed to be attributes of one of the approaches should be highly correlated to that factor and the other subscales within that approach.

It must be made clear that students will respond based on their own perceptions of how they learn or approach specific tasks. These perceptions may be open to bias including bias in perceived similarity between theory and reality, response bias in terms of students responding being more inherently interested and therefore may respond differently to the general population as well as gender bias – for example, men may have a tendency to be more overconfident in their abilities and



therefore respond more strongly to certain statements than women or generally interpret statements differently (Willows 2012; Willow & West 2012; de Lange & Mavondo 2004). To minimise any bias in responses associated with answering each of the four subscale questions consistently due to perceived similarities when asked together as a group of questions, the questions are presented in a randomised order.

It is this deliberate design of the instrument and the correlation or co-variation of responses to specific statements that makes confirmatory factor analysis appropriate. In simple terms, factor analysis groups together variables (in this case subscales) that exhibit some degree of multicollinearity with other variables. This grouping is done in a linear fashion in a manner that explains the greatest amount of common variance. This linear grouping allows the reduction of the number of factors that explain variation in the response data. The desired output from a factor analysis based on the inventory design should be that each of the subscales should correlate to their corresponding approach – in other words, ‘Seeking Meaning’, ‘Relating Ideas’, ‘Use of Evidence’ and ‘Interest in Ideas’ should correlate most with the Deep factor and the responses to each of these subscales should exhibit consistent variability. These groupings are determined by the strengths to which each subscale is correlated with one of the factors – it is likely to load on all three factors but be particularly highly correlated with one factor.

### Results

Confirmatory factor analysis utilising maximum likelihood extraction with oblique rotation was performed and Cronbach Alphas were calculated for each of the main scales as a means of supporting the results of the factor analysis. Confirmatory factor analysis requires a sufficiently large sample size and therefore a Kaiser-Meyer-Olkin Measure of Sampling Adequacy was generated at 0.732 – results greater than 0.7 are considered appropriate although any value above 0.5 is considered acceptable. Furthermore, a Bartlett’s Test of Sphericity was performed to confirm

the existence of some relationship between the variables being tested and this proved significant at a 1% level.

Confirmatory factor analysis using maximum likelihood extraction with oblique rotation in the IBM Statistics Package for the Social Sciences (version 20) resulted in the following Pattern Matrix:

**Table 2: Factor analysis of 13 sub-scales compressed in 3 components**

**Financial Reporting**

**Pattern Matrix<sup>a</sup>**

	Component		
	1 - Strategic	2 - Deep	3 - Surface
Seeking Meaning		.711	
Relating Ideas	-.245	.857	
Use of Evidence		.695	
Interest in Ideas		.457	
Organised Studying	.486		
Time Management	.926		
Alertness to Assessment Demands	.255	.241	
Achieving	.774		
Monitoring Effectiveness	.222	.530	-.246
Lack of Purpose	-.242		.417
Unrelated Memorising			.828
Syllabus Boundness			.441
Fear of Failure			.460
Cronbach Alpha	.741	.723	.609

Extraction Method: Maximum Likelihood. (all values below 0.2 excluded)

Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 6 iterations.

The above factor analysis technique extracts factors in the order of most explanatory power. Therefore, the first factor extracted represents the factor that explains the greatest amount of common variance, *et cetera*. Positive factor loadings represent positive correlation with that factor whilst the greater the negative factors loading, the more uncorrelated that subscale is to that factor. These factor loadings represent a correlation or regression coefficient and values greater than 0.4 are considered relatively strong (Field 2009). Factors extracted are not automatically allocated a

label of Deep, Surface or Strategic but rather extracted in order of explanatory power and the researcher will allocate labels to each factor based on the expected and actual subscale groupings.

Based on the results above, each of the subscales correctly loaded onto a specific factor in a manner consistent with the research of Byrne *et al* (2004) as well as Flood and Wilson (2008). However, as per the above tables, certain sub-scales have loaded onto more than one factor. The subscales of 'Monitoring Effectiveness' and 'Alertness to Assessment Demands' are consistently problematic. Such inconsistencies in factor loadings are consistent with the results of prior international research (Entwistle *et al.* 2000; Byrne *et al.* 2004; Flood & Wilson 2008; Diseth 2001). This inconsistent loading does not invalidate the instrument for use in this context as has been established by the literature. An interesting observation is the consistent weakness in the loading of the 'Alertness to Assessment Demands' subscale both in this study and that of Byrne *et al.* (2004). Byrne *et al.* (2004) cited the nature of their sample – predominantly first year students – as a possible cause of the weakness of the loading of this subscale. They argued that such a subscale may be more relevant to final year students. These results appear to refute this argument. Furthermore, contrary to the findings of Entwistle *et al.* (2000), both 'Relating Ideas' and 'Achievement' play an equal if not greater defining role in the Deep and Strategic factors for this sample in comparison to their study.

Confirming the appropriateness of results from the confirmatory factor analysis above, Cronbach Alphas were calculated for the subscales of each of the above three factors and ranged from 0.609 to 0.741. Field (2009) expresses that values above 0.7 are preferred but any value above 0.5 is acceptable. This range of Cronbach Alphas is also comparable to the study of Flood and Wilson (2008) but slightly lower than the findings of Byrne *et al* (2004) and Entwistle *et a.* (2000).

### Conclusion

The consistency of the results of this study with those of prior international studies inspires confidence that the South African learning environment for accounting education, at least at the University of Cape Town, is perhaps not as vastly different as other international universities as

inferred by Entwistle *et al.* (2000) – although the University of Cape Town is unlikely to be labelled a ‘previously disadvantaged’ university. Results from this study serve to confirm of the applicability of the ASSIST survey in a South African accounting-education environment. Results obtained are consistent with that of research preformed in the United Kingdom, Ireland and Norway.

The use of the ASSIST can now allow accounting educators to gain insights into student approaches to learning both at particular moments within a degree as well as measure changes in such approaches over time within the context of the University of Cape Town. This may provide valuable insights for accounting educators to understand the factors within the learning environment that can influence student approaches to learning and put into practice John Biggs’ theory of constructive alignment (Biggs, 1999).

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