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The Revised Approaches to Studying Inventory (RASI) and its use in management education

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ABSTRACT Learning styles research has been widely applied within the fields of management education and development. This article introduces an alternative concept of learning styles – approach to learning – which has scarcely impacted on the field of management learning. The development of an approach to learning instrument, the Revised Approaches to Studying Inventory (RASI) is described. I outline how approaches to learning may contribute to our understanding of teaching and learning in management education using a model of presage–process–product. Using confirmatory factor analysis (CFA), some psychometric properties of the RASI are examined using samples of business and management undergraduate students. CFAs support the hypothesized structure of Tait and Entwistle (1996). Consequently, use of the RASI by management educators is encouraged. The article concludes with some ways in which the RASI may be applied to enhance the quality of learning of management students.

KEYWORDS: *approach to learning, learning styles, management education, quality of learning*

Introduction

The concept of cognitive ‘learning style’ is virtually taken for granted in management development. The prominence of learning style theory (e.g. Kolb, 1976, 1984, 1985) in management development is in spite of the considerable lack of research support for the concept (see Ruble and Stout, 1994 for a recent review). Doubt has been placed on popular measures of

learning style, and alternative theories and instruments enjoying more positive acceptance from educational researchers have scarcely penetrated the literature in management development, let alone influenced its practice (Reynolds, 1997). This article addresses three issues: first, the emergence of an alternative to learning styles from educational research – approaches to learning; second, the development of an instrument to measure approaches to learning, the Revised Approaches to Studying Inventory (RASI); and third, some psychometric properties of the instrument using a sample of business and management students. The article concludes with a discussion of the results and indicates how management development researchers might use the instrument in applied research, or to enhance their educational efforts and enlighten their students.

Approaches to learning

Over the past three decades, education researchers have approached an understanding of learning from a phenomenological perspective. Qualitative methods have been employed to assess students' experience of learning and the ways in which they make sense of the individual approach to the tasks prescribed by their course of study. The work developed by these educational researchers has moved away from an assumption of stable personality characteristics and has placed greater emphasis on the choices an individual makes in selecting an approach to a learning task. Marton and Saljo's (1976) much-cited work identified two levels of processing: deep and surface. A deep approach entails looking for meaning in the matter being studied and relating it to other experiences and ideas with a critical approach. Students adopting a deep approach aim to understand the subject and are intrinsically interested in, and derive enjoyment from, studying. A surface approach can be thought of as a reliance on rote-learning and memorization in isolation to other ideas. Surface learners perceive the task of learning as an external imposition and they are externally motivated. They typically treat parts of the subject as separate entities and fail to integrate topics into a coherent whole. It is generally held that the development of a deep approach is consistent with the avowed aims of higher education (Hayes et al., 1997). A deep approach is likely to result from relevance to students' interests (Fransson, 1977), the interest, support and enthusiasm shown by the instructor (Ramsden, 1979) and where students have an opportunity to manage their own learning (Ramsden and Entwistle, 1981). An important finding is that a student's approach to learning is not wholly a characteristic of the individual student, and reflects, in part, their response to their perception of the learning environment. Conceptions of learning have been arranged into a hierarchical framework (Marton et al., 1993) and are shown in Table 1. These conceptions have been further reduced into two

Table 1 A hierarchy of conceptions of learning

<i>Level</i>	<i>van Rossum and Schenk (1984) categorization</i>	
1	Increasing one's knowledge	
2	Memorizing and reproducing	Reproducing (surface approach)
3	Applying	
4	Understanding	
5	Seeing something in a different way	Constructive (deep approach)
6	Changing as a person	

Adapted from Dart (1998: 225).

categories by van Rossum and Schenk (1984): 'reproducing' (or surface approach) for levels 1, 2 and 3, and 'constructive' for levels 4, 5 and 6.

The utility of educators measuring students' approaches to learning can be summarized as:

- encouraging a more systematic approach to academic teaching (Katz and Henry, 1988);
- assisting individual academics who are concerned to monitor and improve the effectiveness of their own teaching (Richardson, 1990);
- identifying students at risk through ineffective study strategies (Tait and Entwistle, 1996);
- observing the outcomes (Biggs and Collis, 1982) and experience of learning (Marton et al., 1984);
- evaluating the quality of student learning (Meyer and Muller, 1990).

The next part of this article identifies a model of student learning. This model describes those factors that affect a learner's approach to learning and their learning outcomes.

Approaches to learning as a source of understanding teaching and learning

That approach to learning is not a relatively fixed entity such as a trait but is malleable is an important finding. Biggs (1978) was one of the first researchers to attempt to model the relationship between students' prior experiences, their approaches to learning and the quality of their learning outcomes. The presage–process–product model (3Ps) of student learning (Biggs, 1978; Prosser et al., 1994) views students' perceptions of the learning and teaching context as the interaction between their previous experiences of learning and teaching and the learning and teaching context itself (Prosser and Trigwell, 1999). A version of this model is shown in Figure 1.

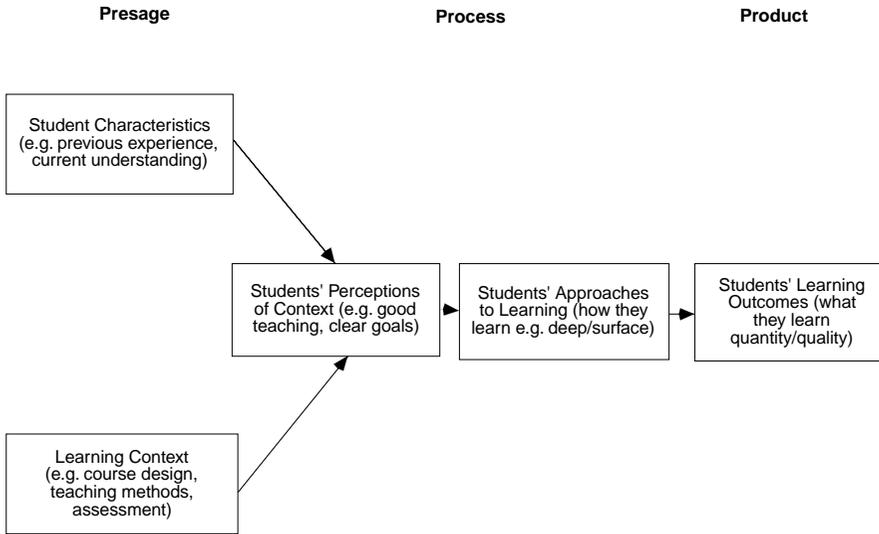


Figure 1 Presage–process–product model of student learning.
Source: adapted from Prosser and Trigwell (1999)

Researchers applying the approaches to learning paradigm see learning as contextually based and ‘bottom-up’ and criticize traditional theoretical models which apply variables such as intelligence or ability, and personality as being ‘top-down’ and ‘acontextual’ (Ramsden, 1992). SAL researchers claim their instruments are based on a theoretical rationale grounded in how students actually go about learning tasks in educational settings (e.g. classrooms and lecture halls) (Watkins, 1998).

Marton and Saljo’s (1976) seminal phenomenographic research showed that qualitative differences in outcomes were associated with qualitative differences in approaches to learning, and this has been replicated and extended in many studies since (see Marton and Saljo, 1997 and Prosser and Trigwell, 1999 for recent reviews). As Prosser and Trigwell (1999: 12) state emphatically:

Without exception, the results show that deep approaches to learning were more likely to be associated with higher quality learning outcomes. Learning outcomes, or ways of understanding which include the more complete ways of conceiving of something, are of a higher quality than those involving more limited conceptions. Students who are able to see the relations between elements of their understanding in a subject and are aware of how that understanding and those relationships can be applied in new and abstract contexts have a higher quality learning outcome than students who cannot.

These collective findings have much significance for all educators. The 3Ps

model proposes that the quality of student learning – in terms of learning outcomes sought or desired – is influenced by their approach to learning. Their approach to learning is in turn, influenced by their prior educational experiences, and the context of learning (the curriculum, teaching processes and assessment). To improve the quality of students' approaches to learning, it is suggested that instructors need to determine students' perceptions of the assessment, their workload, the teaching and support they receive (Ramsden, 1992; Trigwell and Prosser, 1991). Consequently, adapting the context to affect changes in students' perceptions may create differences in approaches to learning.

Phenomenographic investigations focusing on students' conceptions, how they approach learning, and qualitative differences between these conceptions and approaches have been extended by other researchers. These researchers employed a range of techniques to arrive at interpretative methods of modelling student learning. Notably, quantitative approaches, using psychometric methodologies, have been adopted to develop questionnaires to assess students' approaches to studying. The article proceeds by identifying the development of a commonly used questionnaire, the Approaches to Studying Inventory (ASI), and tests whether the instrument is suited to use by management educators by assessing some of the psychometric properties the instrument yields when applied to samples of business and management students.

The Approaches to Studying Inventory

Since its development in the UK, the ASI (Entwistle et al., 1979) has been one of the most widely used questionnaires on student learning in higher education. However, the nature of higher education has changed radically over the past 20 years, including a more diverse student population, and a significant reduction in per capita funding. To reflect these changes, the ASI underwent extensive revision in 1992 to create the Revised Approaches to Studying Inventory (RASI). The RASI is a 60-item questionnaire that assesses five dimensions: Deep Approach, Surface Approach, Strategic Approach, Apathetic Approach and Academic Aptitude. A reduced version of this inventory appeared in 1994 with 38 items, this time measuring five dimensions labelled: Deep Approach, Surface Approach, Strategic Approach, Lack of Direction and Academic Self-confidence. A later version, produced in 1995 used 44 items, identifying a sixth dimension: Metacognitive Awareness of Studying. Within the field of the psychology of education, metacognition is thought of in two distinct ways. It may refer to both the knowledge that human thinkers have about their own cognition, and their regulation of it (Forrest-Presley et al., 1985; Romainville, 1994). These two dimensions are connected; metacognitive knowledge can

be thought to influence regulation, and it is a consequence of regulation that an individual becomes conscious of their cognition. In this sense, the RASI explores the first dimension of metacognition: learners' metacognitive knowledge and the factors that influence them. It is this version of the RASI that is considered here.

A literature search reveals a general paucity of evidence considering the psychometric properties of any version of the RASI. Table 2 shows the extant measurement evidence of scores yielded by the RASI. Prudent scholarship suggests that the instrument should undergo further psychometric examination of the scores it produces before being used in applied research that may influence management education policy.

Tait and Entwistle (1996) using a sample of 640 UK undergraduate students and the 1992 version of the RASI, report scores with high internal consistency reliability (alpha coefficients ranging from .73 to .83 for the five dimensions) and high construct validity, indicated by a factor analysis. Sadler-Smith (1996) using a sample of 245 UK business students and a 38-item version of the RASI, reports scores of generally satisfactory internal consistency reliability (alpha coefficients ranging from .70 to .82 for four scales and an unacceptably low value of .29 for one scale, Lack of Direction) and high construct validity, indicated by exploratory factor analysis. In a study of business-related undergraduate students at institutions in Hong Kong ($N = 183$), using a 38-item RASI, Sadler-Smith and Tsang (1998) report moderate internal reliability consistency of the scores produced by the Hong Kong sample (alpha coefficients ranging from .41 to .73 for the five scales) with exploratory factor analysis being generally successful in reconstructing the three defining 'approaches' scales of the RASI. Using the Extended Logistic Model of Rasch (Rasch, 1980) and administering the 1994 38-item version of the RASI to a sample of 346 undergraduate students in Australia, Waugh and Addison (1998) identified that the instrument has satisfactory psychometric properties and confirmed its conceptual design from the five learning dimensions. Sampling MBA students, and employing a structural equation model with approaches to learning as the independent variables and academic achievement in four types of assessment as the dependent variables, Duff (2003) reports that approaches to learning, particularly high scores on strategic approach, are a useful predictor of performance in coursework (continually assessed assignments) and project work but have less validity in predicting success in closed-book examinations and oral presentations.

Despite the considerable amount of research into student approaches to learning across a range of disciplines, a literature search reveals only six published studies of business and business-related students' approaches to learning (Duff, 1997, 1999, 2003; Richardson, 1990; Sadler-Smith,

Table 2 Reported reliability and validity of previous studies of RASI

<i>Author</i>	<i>Sample</i>	<i>N</i>	<i>RASI version</i>	<i>Results</i>
Tait and Entwistle (1996)	UK undergraduate students	640	60-item, 1992	High internal consistency reliability (alpha coefficients ranging from .73 to .83 for five scales) High construct validity indicated by exploratory factor analysis
Sadler-Smith (1996)	UK business undergraduate students	245	38-item, 1994	Moderate internal consistency reliability (coefficients ranging from .29 to .82) Satisfactory construct validity – indicated by exploratory factor analysis – with exception of ‘Lack of Direction’ scale
Duff (1997)	UK business undergraduate students	240	30-item, 1995	High internal consistency reliability (alpha coefficients ranging from .80 to .82 for three scales) High construct validity indicated by exploratory factor analysis
Sadler-Smith and Tsang (1998)	Hong Kong undergraduate students	183	38-item, 1994	Moderate to satisfactory internal consistency reliability (coefficients ranging from .41 to .73) Satisfactory construct validity – indicated by exploratory factor analysis – with exception of ‘Lack of Direction’ scale
Waugh and Addison (1998)	Australian business undergraduate students	346	38-item, 1994	Conceptual design across the five learning measures established using Extended Logistic Measure of Rasch
Duff (2003)	UK MBA students	75	30-item, 1995	High internal consistency reliability (alpha coefficients ranging from .76 to .84 for three scales) High predictive validity with academic performance as dependent variable

1996; Sadler-Smith and Tsang, 1998). Given the utility of investigating approaches to studying there is clearly considerable potential for research in the management area.

The next part of this article reports some psychometric properties of RASI scores using a sample of business and management undergraduate students in the UK. The study extends the work undertaken by other researchers by using confirmatory factor analysis (CFA). CFA is, in principle, a superior method to the exploratory factor analysis employed previously, as it tests the hypothesized factor structure. I conclude with a discussion of some of the ways the RASI might enhance the efforts of management educators, enlighten their students and contribute to a further understanding of learning styles.

Method

Participants and instrument

The sample comprised 244 students enrolled in the Faculty of Business at a medium-sized UK university. Of the 240 useable responses to the RASI, 146 were from females and 94 from males. The average age of the sample was 22 years (SD 7.0); the youngest student was 16 years and the oldest was 52 years. There were 60 first-year students, 68 second-years, 109 third-years and 3 in their fourth year of study. The 3 fourth-year students were taking a third-year class, permissible under the institution's modular structure, enabling students to take two elective modules at a level below their core course of studies. The instrument was the 44-item 1995 version of the RASI (Entwistle and Tait, 1995). Respondents were asked to indicate their agreement on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Statistical analyses

CFAs were conducted with the SPSS version of AMOS v3.6 (Arbuckle, 1997). The sample size ($N = 240$) was satisfactory for the purposes of this study reflecting the relative complexity of the models being examined. In evaluating goodness-of-fit, I used a two-index presentation strategy outlined by Hu and Bentler (1999). This includes the maximum-likelihood based standardized root mean squared residual (SRMR), supplemented with the Tucker-Lewis Index (TLI). Hu and Bentler (1999) proposed that a TLI of around .95 or greater, along with an SRMR of around .08 or lower is indicative of good model fit to the data. Finally, for purposes of model comparison, the Expected Cross-Validation Index (ECVI) (Browne and Cudeck, 1993) is reported. The ECVI is useful for comparison of alternative models 'especially when sample size is not large, providing an indication of which

model yields a solution with greatest generalisability' (MacCallum and Austin, 2001: 212).

Results

Alpha coefficients for scores on the six dimensions of the RASI were: Deep Approach (.80), Surface Approach (.78), Strategic Approach (.81), Academic Self-confidence (.54), Lack of Direction (.79) and Metacognitive Awareness of Studying (.62). The alpha coefficients estimated for the three 'defining' approaches dimensions, Metacognitive Awareness of Studying and Lack of Direction indicated scores of strong to high internal consistency reliability. The internal consistency reliability estimate of the Academic Self-confidence dimension was more modest, and an item pruning exercise could only increase the alpha coefficient to .60.

To assess goodness-of-fit, three competing models were tested using CFA. The first was a one-factor model tested for comparison purposes only. The second was an adaptation of the hypothesized model of Entwistle and Tait (1995), consisting of six factors, being the three 'defining' approaches to learning scales, along with the three other dimensions of Academic Self-confidence, Lack of Direction and Metacognitive Awareness of Studying. Finally, a three-factor model was tested, consisting of only the three 'defining' approaches to learning dimensions.

Table 3 Factor correlations and fit indices for competing models tested at the instrument level

Factor	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>
One-factor model					
χ^2 (902) = 2364.072, ECVI = 12.281, SRMR = .1041, TLI = .937					
Six-factor model					
I. Deep Approach	—				
II. Surface Approach	-.07	—			
III. Strategic Approach	.50	.01	—		
IV. Metacognitive awareness	.60	-.02	.60	—	
V. Academic self-confidence	.32	-.27	.24	.34	—
VI. Lack of Direction	-.25	.28	-.37	-.30	-.28
χ^2 (888) = 1652.424, ECVI = 9.086, SRMR = .0840, TLI = .967					
Three-factor model					
χ^2 (402) = 723.804, ECVI = 4.251, SRMR = .0838, TLI = .979					

Note. ECVI = expected cross-validation index; SRMR = standardized root mean residual; TLI = Tucker-Lewis index.

Correlation coefficients shown in italics, statistically significant at $p < .01$.

The results of the CFAs are reported in Table 3. Predictably, the worst fit to the data was provided by the one-factor model (ECVI = 12.281; SRMR = .1041; TLI = .937). The hypothesized six-factor model of Entwistle and Tait (1995) fitted the data well (ECVI = 9.086; SRMR = .084; TLI = .967). However, the best fitting model was the three-factor model consisting of only the three 'defining' approaches to learning dimensions (ECVI = 4.251; SRMR = .084; TLI = .979).

Discussion

Results from the CFAs used in the present study with adult learners in business and management at a UK university indicate that the scores from the RASI are valid and reliable for this population. The measure, therefore, appears to have wide applicability for the specific facets of the ways individuals approach learning. As such, the RASI has the potential to inform strategies for instruction and remediation on the basis of these constructs.

The strongest GFIs from the CFAs reported in the present study support a multifaceted model of approach to learning for adult learners in business and management that consists of three factors. As Schwab (1980) observes, measures such as the RASI are often used before adequate data exist concerning their reliability or validity. In particular, the results supported the existence of one second-order (higher order) factor for the three 'defining' approaches scales of the instrument (Deep Approach, Surface Approach and Strategic Approach). Although the three-factor model provided the best fit to the data, the estimated six-factor model, including the dimensions of Academic Self-confidence, Lack of Direction and Metacognitive Awareness of Studying, provided satisfactory fit. An examination of the correlation matrix in Table 3 indicates that Metacognitive Awareness of Studying is closely related to Deep Approach ($r = .60$) and Strategic Approach ($r = .60$), and Academic Self-confidence is positively associated with Deep Approach ($r = .32$) and Metacognitive Awareness of Studying ($r = .60$). Lack of Direction is, however, negatively correlated with both Strategic Approach ($r = -.37$) and Metacognitive Awareness of Studying ($r = -.30$). The choice of whether to adopt the three- or six-factor model is therefore dependent on the user. If administration time is to be minimized, or if only the 'defining' approaches to learning are to be assessed, then a short-form 30-item RASI is most appropriate. If management practitioners or researchers seek to identify or describe the underlying relationship Metacognitive Awareness of Studying, Academic Self-confidence or Lack of Direction may have with the three 'defining' approaches to learning, the full 44-item questionnaire would be most appropriate.

Some potential applications for the RASI by management educators

For over 30 years, educators have successfully applied the approaches to learning paradigm to help them better understand learning and teaching within higher education. The final part of this article outlines briefly some of the ways management educators could successfully apply the RASI and the 3Ps model in their own teaching.

Improve teaching practice using the presage–process–product model

The 3Ps model emphasizes that the quality of learning outcome is directly affected by students' approaches to learning. The development of desirable (i.e. deep and strategic) approaches is dependent on an awareness of both students' learning situations and the contextual dependency of learning and teaching. Ramsden (1992) emphasizes that good teaching should be open to change and involves a constant process of assessing the effects of instruction on learning, and modifying instructional methods on the basis of that evidence. The second issue is that good learning and instruction are contextually dependent. Research applying the ASI has suggested that approaches to learning and associated learning outcomes may differ between disciplines (Entwistle, 1984; Meyer et al., 1990; Meyer and Watson, 1991). In general, arts students are believed to display higher levels of intrinsic interest in their studies and adopt a Deep Approach, whereas science students are more motivated by vocational concerns and adopt a Surface Approach (Ramsden and Entwistle, 1981; Watkins and Hattie, 1981). In this sense, the perceptions and experiences of the teaching and learning context may be shaped by the epistemology of the discipline (Lucas, 2001; Meyer and Eley, 1999). Although some contextual variables might be outside the control of management educators (for example, students' need to work part-time to support themselves), some variables such as workload and instructional methods clearly can be influenced by educators and administrators. One of the most important contextual variables that is said to influence approach to learning is assessment (Tang, 1999). Therefore, educators should look to adopt assessment methods that assess the cohesive and structural qualities of learning, rather than assessing discrete quantities. For example, multiple (objective) test questions and essay questions that are marked to preset answers with marks awarded for each piece of correct knowledge encourage rote-learning and memorization strategies – a surface approach. Assessment by continually assessed projects, portfolio and appropriate essay questions, which encourage students with the opportunity to demonstrate the quality and integrity of their learning promotes

active learning, facilitating a deep approach. Cooperative learning has been widely applied in the field of management education, and has been shown to encourage a deeper approach and improve the quality of learning outcomes (see Tang, 1999 for a recent review).

Identify students ‘at risk’ through poor learning strategies

Research applying the ASI generally finds academic performance to be positively correlated with the Strategic Approach and negatively correlated with Surface and Apathetic Approaches (Entwistle and Ramsden, 1983). High scores on Deep Approach are positively associated with academic performance, when the assessment procedure directly favours the demonstration of conceptual understanding (Entwistle et al., 2000). Therefore, Deep Approach and Strategic Approach are conceptually related as components of effective studying, with Surface Approach negatively related to Strategic Approach. This conception is analogous to Janssen’s (1996) categorization of an effective student – a *studax* – characterized as employing an approach of depth and strategy. Cluster analysis has explored the patterns of response using the ASI and later variants to identify sub-groups, which vary in terms of their levels of attainments and backgrounds (Entwistle et al., 2000; Meyer, 1991; Meyer et al., 1990; Meyer and Muller, 1990). These studies have typically uncovered one persistent low-attainment cluster, displaying what has been described as a ‘dissonant pattern of response’ (Entwistle et al., 2000: 33). However, a categorization of the academically weak is problematic as an analysis of such clusters contains rather different students (Entwistle et al., 2000). As one might expect, a common cluster identifies students who score high on Surface Approach and low on Strategic Approach. However, another cluster of failing students identifies students who score high on Deep Approach but low on Strategic Approach, suggesting students who seek understanding but are disorganized in their studying and unable to achieve it. These analyses suggest three things. First, administering the RASI to students and providing them with feedback about the results may encourage students to be more self-aware, develop an understanding of the determinants for success in higher education and encourage them to seek assistance when they encounter difficulty with their studies. Second, RASI scores will provide information to instructors to identify the ‘at risk’ students, to enable them to provide support and counselling either on an individual or group basis. Third, the RASI and 3Ps frameworks provide the means for educators to provide the necessary counselling to students in need of remedial support. Tait and Entwistle (1996) describe the development of a computer-based visualization tool, *StudentView*, based on the RASI, which provides instructors with information about the nature and extent of the study difficulties students’ experience. A related part of the package

provides customized guidance to individual students, providing advice which seems most appropriate to their existing patterns of studying.

Conclusion

As a result of the examination of multiple competing models in the present investigation, the RASI is confirmed as a measure of an overarching trait based on three orientations to learning. Using CFA as a technique extends the psychometric research surrounding the instrument. The results of the present study indicate that the instrument is suitable for correlational studies and applied research that may be used to influence the education and learning of managers and students of management. The RASI and the approaches to learning educational literature offer considerable utility to management learning researchers.

Students' approaches to learning are not perceived as stable, like a personality trait, but dynamic and likely to be modifiable under the influence of the educational environment (Fox et al., 2001; Zeegers, 2001). Measuring students' approaches can identify the relational nature of their learning approach. As the 3Ps model identifies, students may adopt an approach to learning that is evoked by their conception of the task and of learning, their prior experiences, and their perception of the situation. Prosser and Millar (1989) and Gibbs (1993) both identify how a student may adopt a deep approach during the teaching period and then move to more surface approaches as examinations for the educational programme loom. As Prosser and Trigwell (1999: 98) state:

The combination of evidence that, on the one hand, a deep approach to learning is desirable and a surface approach is less desirable and on the other hand the learning context (and in some cases students' perceptions) can be changed by university teachers and administrators to afford one or other approach, forms the basis of a powerful tool to improve the quality of students' learning.

Important issues for future research include: first, the psychometric properties of the instrument using samples of managers, rather than business and management students in higher education; second, the interaction of age, gender, occupation and approach to learning; and third, the cultural specificity and applicability of the model sampling individuals beyond the UK. Also, the broad context of management learning includes not only formal management education taking place in university business schools, but also work-based management development. Management development professionals could usefully apply approaches to learning concepts to informal learning contexts, developing items which capture the whole range of professional attempts to manage learning (Fox, 1994a, 1994b).

The 3Ps model emphasizes the importance of the experience of learning. In this sense, both the concepts of presage–process–product and associated measurement instruments should have considerable intuitive appeal to management educators.

Educational researchers have long argued that to systematically improve the quality of learning it is necessary to understand the process of learning. Approaches to learning models and inventories such as the RASI provide a framework to increase our understanding of how individuals learn. Applied work promoting the development of a deep approach in managers and students of management is likely to enhance the quality of management learning.

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