Are values more important than learning approaches?
Factors influencing student performance at an international university

Petra Lietz
International University Bremen*, Germany

Bobbie Matthews
Flinders Institute of International Education, Adelaide, Australia

Paper presented at the AARE 2006 Conference, Adelaide Australia

*Jacobs University Bremen as of spring 2007
Are values more important than learning approaches?
Factors influencing student performance at an international university

Abstract

Educators frequently face the question regarding the extent to which they can actually influence student learning, particularly as learners are also influenced by a complex network of many different factors. Specifically, it is of interest to identify so called malleable variables - that is factors which can be influenced by educators compared with variables that educators are unable to change. In this study, data from a cohort of 207 students pursuing a Bachelor degree at a German international university where the language of instruction is English are examined to investigate the way in which various background factors influence student performance. In particular, how students’ values – as measured by the Portrait Values Questionnaire (PVQ) (Schwartz et al. 2001) - and approaches to learning – as measured by the Study Process Questionnaire (SPQ) (Biggs 1987b) – operate to influence student achievement both directly and indirectly. Results indicate that values and learning approaches have a similarly moderate impact on achievement once other factors, such as gender and whether students are enrolled in an Arts or a Science degree have been taken into account.

Introduction

The background discussion of prior research relevant to the analyses in this paper is structured as follows: In the first part, one of the two central themes, namely values, is defined and followed by relevant research into the topic. Then, research is presented that investigates the relationship between values and student background factors, such as gender and interest in arts or science, on the one hand and between values and their impact on performance on the other hand. The second part is structured in a parallel way by first defining the second central theme, namely learning approaches, and then discussing relevant research. A presentation of research into the relationship between background variables and learning approaches on the one hand and between learning approaches and learning outcomes in the form of achievement on the other follows. In the third and final part of the introduction, research into the interrelationship between values and learning approaches is presented.

Values – Definition and prior research

Values hold a critical place in a number of academic disciplines including social psychology, sociology, anthropology, education, philosophy, religion and history (Feather 1975). The very diversity of meanings of the construct of values requires a focus, which in this investigation is the social psychological nature of values and value systems. Values, as defined by Williams (1979 p. 20), refer to interests, desires, goals, needs and standards of preference. They are analytical constructs by definition and are not object-bound. People may have similar values but to different
degrees. Values have cognitive, affective and behavioural aspects. Consequently values also serve as criteria for the choice of actions and they may become criteria for judgments and preferences. The use of value judgments is found together with systems of knowledge and belief, and as judgments of what ‘should be’ in relation to what ‘is’. Therefore, changes in values may affect concepts of reality. Different societal groups often have very different patterns of values. This may occur in the hierarchical arrangement of values, in their order of importance and in the relationships that exist among them (Anderson and Krathwohl 2001, Williams 1979).

Allport (1924) and Rokeach (1973) were notable among the many research workers who carried out early work into the measurement of values. Schwartz also undertook studies that modified and advanced earlier work. He developed an instrument that was suitable for the assessment of contemporary value constructs in Western value systems. Schwartz (1992, 1994a, 1994b, 1996) also argued that his value survey was a suitable instrument for the measurement of values at the individual level within particular cultures. The instrument, called the Portrait Value Questionnaire, that is discussed in the Methods Section, (Schwartz et al. 2001), has been validated in more than 200 samples from more than 60 countries. Confirmatory factor analyses of the data (Schwartz and Boehnke 2004, Spini 2003) provide strong empirical evidence for a theoretically postulated arrangement of ten values with a circular structure as depicted in Figure 1.

![The prototypical structure of value systems](image)

**Figure 1** The prototypical structure of value systems  

Within the circular arrangement depicted in Figure 1, adjacent value types are compatible and opposites may cause conflict. Figure 1 also shows the four groups into which the 10 value types are combined and which form two bipolar dimensions, whereby conservation and openness to change form one bipolar dimension and self-transcendence and self-enhancement the other one. In this way, Schwartz (1992) combines the ten value types into four higher order types representing the four quadrants of a circular space. For example, value types that involve conservation combine security, conformity and tradition to create a dimension that is ideationally opposed to having independent thought and action and reflects an openness to change in contrast to self-limitation and preservation of traditional thought. Therefore, self-transcendence is opposed to self-enhancement and openness to change is opposite to conservation.
Values – Relationships to background variables (e.g. gender) and performance

Feather (1998) reported a study of psychology students enrolled in introductory classes at the Flinders University in Adelaide, South Australia (n=186), University of Kansas in the United States of America (n=114) and the University of Manitoba in Winnipeg, Canada (n=310). Students responded to the ‘tall poppy scale’ – a scale measuring the degree to which participants are in favour of bringing down or rewarding high achievers. He used the Rokeach Value Survey (Rokeach 1973), a self-esteem scale and an equalitarianism scale to assess this character trait. Multivariate analyses of variance (MANOVA) with nation and gender as independent variables provided evidence of difference between the three nations on all value composites, whereby the greatest difference emerged for the conformity value with American students attaching a considerably greater importance to this value than did Australian students. Gender differences emerged for only two of the five value composites, namely for the prosocial values (e.g. a world at peace, equality) and the affiliative contentment values (e.g. happiness, loving) with female students attaching greater importance to these values than did male students. MANOVAs were also undertaken to examine differences in attitudes towards equality and ‘tall poppies’ as well as differences in students’ self-esteem. Here, the greatest gender differences were found for self-esteem with female students expressing a lower self-esteem than male students while the greatest differences between nations emerged for the desirability of equal treatment and opportunity and a respect for human rights with the Australian sample scoring higher on these values than those in the American sample.

In an analysis of data from three cross-sectional studies in Detroit, USA, in 1958, 1971 and 1983, Alwin (1984) examined the way in which various background characteristics of parents influenced the values passed on to their children. Results showed a considerable effect of the educational level of parents on whether they raised their children to be more obedient, think for themselves, work hard or help others in need. Thus, parents with more years of education placed a greater emphasis on autonomy than less well educated parents who instilled in their children the value of obedience. Overall, education and occupation showed an effect on the type of value conveyed to children by parents whereas number of children, family income did not. Similarly, in a study of factors influencing attitudes towards the environment, Buttel (1979) found a considerable effect of educational background on environmental values after taking into account other important variables such as gender and age.

That differences in values also exist between students pursuing different majors was proposed by Useem (1989) and supported in a study of 785 students enrolled in two large universities in urban environments in the Northeast of the United States by McCabe, Dukerich and Dutton (1991). The authors who used the Rokeach (1973) terminal values instrument found that liberal arts majors placed a greater emphasis on values such as a world at peace, a world of beauty, equality and wisdom, while other majors appeared to consider a comfortable life and happiness more important.
Learning approaches – Definition and prior research

The initial impetus for differentiating various learning approaches or styles was based on a study undertaken by the Swedish team of Martön and Säljö (1976a, 1976b). Their report described an investigation undertaken with university students who were asked to read an academic paper and then were questioned as to what they had learned and how this learning had come about. The students’ responses indicated that they tended to use two principal ways of processing the information. Some tried to memorise details or key words in order to answer subsequent questions and tended to focus on the word or sentence level. Others attempted to understand the message imparted by the passage globally and focused on themes and principal ideas and tried to process the content for meaning. These approaches and associated reading strategies were called ‘surface’ and ‘deep’ approaches respectively.

Based on these ideas and findings, Biggs (1987a, 1996) described three distinct learning approaches, namely surface, deep and achieving. Each approach was a composite of a motivation that encouraged a type of learning as well as a strategy for the implementation of the motivation. Together they formed an approach to learning. The surface approach was characterised by limited, but directed aspirational goals. The deep approach was based on the desire to learn as much about a topic as possible and the achieving approach could be recognised by a competitive attitude to learning that led to ego enhancement. Based on these ideas, Biggs (1987a) developed and validated two instruments, one aimed at measuring approaches to learning among adolescents (the Learning Process Questionnaire, LPQ) and one aimed at measuring approaches to learning among adults (the Study Process Questionnaire, SPQ).

Learning approaches – Relationships to background variables (e.g. gender) and performance

Evidence of gender differences in learning styles was presented by Picou, Gatlin-Watts and Packer (1998). The study was aimed at investigating learning style differences of Hispanic-American students whose primary language was Spanish rather than English in United States. border universities. Data obtained from a convenience sample of 187 students who were fluent in Spanish from five universities in the Texas-Mexican border area were analyzed. Results showed that female students followed the concrete sequential learning approach, whereby these individuals preferred factual over abstract concepts with a tendency to break down problems into logical steps, to a greater extent than did male students. In contrast, male students preferred the abstract sequential learning style, whereby the person was not deterred by poorly organized materials, but was a good reader and an intent listener.

Spicer (2004) studied the relationship between academic achievement and approaches to learning between two separate sub-samples of students, one of final year students studying Human Resource Management (n=107) and the other sample of second year students enrolled in a Bachelor of Work Behaviour and Performance (n=72) at an English University. The Individual Learning Levels questionnaire (Spicer and Sadler-Smith, 1998) was used to measure whether students followed an adaptive or a generative approach to learning. Results showed positive correlations between academic achievement as measured by annual grade average and learning
approach whereby the generative approach to learning was linked to higher performance. This link, however, was not significant.

Ng and Renshaw (2002, 2003) correlated achievement goals with values that were assumed to mediate and influence the means of achievement. Results of the study showed that mastery goals were associated with motivations or engagement patterns and strategies that were consistent with a deep approach to learning. This approach was related to positive learning outcomes. In contrast, performance goals were associated with motivations and strategies that tended to be superficial in nature and consistent with a surface approach to learning and yielded a lower level of achievement (Chan 2002, Grant and Dweck 2001; Hau and Salili 1996, Lai and Biggs 1994, Salili 1996, Watkins, 2003).

Cano (2005) showed that older female students tended to score higher on the deep and achieving approaches to learning than younger male students. However, he noted that these results may have been tempered by academic demands such as a dense curriculum and time limitations. Research also appears to confirm the conclusions that (a) deep and achieving approaches to learning tend to be associated with academic success and (b) surface approaches are negatively linked to learning (Cano 2005, Watkins 2001). Further, Cano (2005) and Schommer (1998) conclude that epistemological beliefs and approaches to learning change as students advance in their academic pursuits and that the relationship between epistemological beliefs and intellectual or academic outcomes such as Grade Point Averages (GPAs) may be mediated by students’ approaches to learning.

Wilding and Andrews (2006) found that a higher GPA was related to greater use of the achieving approach to learning with a concomitant decrease in importance of wealth and status goals. They also found that older students with higher entrance scores on the British Advanced (‘A’ level) examinations tended to achieve better academic results overall regardless of the academic discipline.

In terms of differences in learning approaches between different disciplines, it is interesting to note that Biggs (1987b) in the norming of the SPQ found science students to have a higher raw score on items measuring the surface approach than arts students. Likewise, science students were required to have a higher raw score than arts students in order to be considered in the highest percentile for the achieving strategy.

**Relationship between values and learning approaches**

Life values have been found to be significantly related to learning approaches in previous studies. Wilding and Andrews (2006) showed that study approaches formed part of a wider approach to living whereby students who used a deep approach to learning preferred more altruistic life goals or values than students who chose to use a more superficial learning approach. The surface approach tended to be associated with the acquisition of wealth and status that were considered to be important life goals to some students in their sample. Older students who were high achievers in examinations reported a greater desire to succeed than younger students who did not express such a desire. However, those less motivated by values and life goals associated with either wealth or status tended to produce better academic results as indicated by higher ‘A-level’ entrance examination scores and higher Grade Point Averages (GPAs). Wilding and Andrews (2006) and Biggs (1987a) also noted that study approaches tended to become more superficial and less deep and achievement oriented during the first and subsequent years of
university study. In addition, changes in both life values and approaches to learning seemed to be unrelated to academic performance. Nevertheless, students who showed a need or desire to achieve demonstrated stronger academic performances.

Matthews (2004) found that values were also related in various ways to different approaches to learning. Thus, students who had low Integrity values showed a preference for surface learning with a strong positive correlation to achievement motivation whereas students who were low in values associated with the Confucian ethos indicated a strong positive preference for the deep strategy and achieving motivation approaches to learning.

Lietz et al. (in press) found that particular values or life goals were associated with specific learning approaches. By way of canonical correlation analysis, they related the ten values as postulated by Schwartz et al. (2001) to Biggs’ (1987a) six subscales that formed the three learning approaches. On the side of the values, two latent variables emerged from the analyses. These were labelled ‘Self-enhancement’, which was mainly formed by the values of power and achievement, and ‘Self-transcendence’, to which the value of benevolence contributed positively and power and achievement negatively. On the side of the learning approaches, three latent variables emerged, namely ‘Achievement learning’, ‘Surface learning’ and ‘Deep learning’. While the former reflected the achieving motive and strategy the second was linked positively to the surface motive and negatively related to the achieving motive and the third was linked positively to the achieving motive, the deep motive and strategy and negatively to the surface motive and strategy. The four latent variables, in turn, were found to be linked whereby ‘Self-enhancement’ gave rise to the ‘Achievement learning’ in the form of the first canonical variate while ‘Self-transcendence’ gave rise to the ‘Surface learning’ in the form of the second canonical variate.

Evidence to support the view that learning approaches are not static but can be changed depending on the desired goals or students’ values has been presented by Wilding and Andrews (2006). They showed that where individuals were seeking an in-depth understanding in a given academic area, a deep approach was sought. However, if a high level of achievement was the desired goal, a surface approach to learning was the preferred means to accomplish this end. However, above all, the key to success, as exemplified in the achieving approach to learning (Biggs 1987a, 1996; Watkins and Biggs 1996, 2001), was to utilise the appropriate strategy in the correct context to achieve optimum results as measured by students’ GPAs. These findings confirm the observations and comments gathered in interviews by Ho and Crookall (1995), Matthews (2004) and Tang (1996) that learning approaches are somewhat flexible and may be modified according to the perceived demands of the task involved.

A study which examined patterns of gender and race differences in values and learning approaches and their relationship to achievement was conducted by Rouse and Austin (2002). Data were collected from three ethnic groups of students from a mix of socioeconomic levels, namely 78 Hispanic-Americans, 145 African-Americans and 145 Euro-Americans in their second year of high school in an urban school district in the South-West of the United States. Results were reported for each ethnic group by gender and by high or low achieving group. In general, the means for each of the subscales were closer together for the high and low achieving male students than for the high and low achieving female students. The evidence suggested that, in general, for each of the three ethnic groups, high-achieving female students had higher scores than high-achieving male students across the academic domains,
measuring learning and on subscales measuring homework effort, making friends and quality of friendships, extracurricular activities and personal traits such as trust and information seeking behaviour. Indeed, the combined male and female high achievers showed significantly higher scores on all subscales than the lower achievers across all ethnic groups.

**Methods**

**Sample**

The intended target population for this study were students who had started their three-year Bachelor of Arts or Bachelor of Science degree at an international university in Germany, where English was the language of instruction, in September 2004. While the 228 students in the target population came from 45 countries, the largest groups were from Bulgaria (n=46), Germany (n=21) and Romania (n=45). This article analyses data collected from 207 students (or 90 per cent of the student group) who participated in September 2005 in the second wave of this longitudinal study that was designed to follow the cohort of students for the duration of their undergraduate studies by collecting data from them in four waves based on Willett’s (1989, 1997) multiwave design.

In line with the proportions of the population, 41 per cent of the sample was female students and 59 per cent were male students. About two thirds of the students (65 per cent) were enrolled in the School of Engineering and Sciences (SES), that offered majors in the natural sciences, mathematics as well as Electrical Engineering and Computing while about one third (35 per cent) were enrolled in the School of Humanities and Social Sciences (SHSS) that offered majors in the arts and literature, history, psychology as well as integrated social sciences – a combination of economics, studies of the mass media, politics, and sociology.

**Instruments**

The participants completed three questionnaires, namely the Portrait Values Questionnaire (PVQ), (Schwartz et al., 2001), the Study Process Questionnaire (SPQ), (Biggs, 1987b), and a student background questionnaire which are described in detail below.

*Portrait Values Questionnaire (PVQ).* This questionnaire was composed of 40 items that were designed to measure the ten value dimensions with examples given next to each dimension in brackets, namely: (a) self-direction, (four items); (“Thinking up new ideas and being creative is important to her.” “She likes to do things in her own original way.”), (b) stimulation, (three items); (“He thinks it is important to do lots of different things in life.” “He always looks for new things to try.”), (c) hedonism, (three items); (“He seeks every chance he can to have fun.” “It is important to him to do things that give him pleasure.”), (d) achievement, (four items); (“Being very successful is important to her.” “She likes to impress other people.”), (e) power, (three items); (“It is important to her to be in charge and tell others what to do.” “She wants people to do what she says.”), (f) security, (five items); (“It is important to him to live in secure surroundings.” “He avoids anything that might endanger his safety.”), (g) conformity, (four items); (“He believes that people should do what they’re told.” “He thinks people should follow rules at all times, even when no-one is watching.”), (h) tradition, (four items); (“She thinks it is best to do things in traditional ways.” “It is
important to her to keep up the customs she has learned."), (i) benevolence, (four items); ("It’s very important to help the people around him." “He wants to care for their well-being."), and (j) universalism, (six items); (“He thinks it is important that every person in the world be treated equally." “He believes everyone should have equal opportunities in life."). Participants had to respond to each item on a six-point Likert-type scale ranging from (1) “not like me at all” to (6) “very much like me”. The questionnaire was administered in two versions, one for female and one for male students. The versions were identical except for the words that indicated the gender of the respondents. The internal reliabilities in terms of Cronbach’s alpha (α) were 0.67 for benevolence, 0.70 for universalism, 0.60 for self-direction, 0.68 for stimulation, 0.78 for hedonism, 0.81 for achievement, 0.84 for power (after removal of item 2), 0.68 for security, 0.74 for conformity, and 0.69 for tradition.

Study Process Questionnaire (SPQ). This questionnaire consisted of 42 items whereby each of the six subscales was comprised of seven items. There was no consideration of gender difference on the SPQ questionnaire; although the gender of participants was recorded as a demographic variable. The SPQ was designed to measure the following concepts; an example from each scale is included: (a) achieving motivation (“I would see myself basically as an ambitious person and want to get to the top, whatever I do.”); (b) achieving strategy (“I try to work consistently throughout the term and review regularly when the exams are close.”); (c) deep motivation (“I find that at times studying gives me a feeling of deep personal satisfaction.”); (d) deep strategy (“I find that I have to do enough work on a topic so that I can form my own point of view before I’m satisfied.”); (e) surface motivation (“Whether I like it or not, I can see that further education is for me a good way to get a well paid or secure job.”); and (f) surface strategy (“I think browsing around is a waste of time, so I only study seriously what’s given out in class or in the course outlines.”). Participants responded to each item using a five-point Likert-type scale that ranged from (1) “Never or only rarely true of me.” to (5) “Almost or almost always true of me.” The internal reliabilities as indicated by Cronbach’s alpha (α) of the subscales were 0.72 for surface motivation, 0.62 for deep motivation (after the removal of items 32 and 38 from the scale), 0.77 for achieving motivation, 0.76 for surface strategy, 0.70 for deep strategy, and 0.75 for achieving strategy. The questionnaires were completed online and it was possible to build in safeguards to avoid having missing data. Consequently, there were no missing data from responses to either the PVQ or the SPQ questionnaires as students were prevented from continuing to respond if they had accidentally omitted a question.

Student background questionnaire. This questionnaire included questions concerning age, gender, country of origin, number of countries visited or lived in prior to starting tertiary studies, parental education and occupation, students' perceived levels of English proficiency, major field of study, religious beliefs, reasons for tertiary studies and intentions after the completion of the degree. Some questions were adapted from existing sources (Oppenheim 1992). Missing data on this questionnaire were handled by pairwise deletion in the analysis.

Analyses

The main purpose of this analysis was to examine the relative effects of values and learning approaches on learning outcomes while taking into account certain student background factors such as gender, parental education as an indicator of socio-economic status and whether or not students were enrolled in a Science degree or
an Arts degree. Therefore, a path model (see Figure 2) was hypothesised based on theoretical considerations, logic and the prior research discussed above.

Path models and their analysis are based on the statistical technique of path analysis which is aimed at surpassing correlation as mere association and directed towards the examination and confirmation of specified causal relationships between variables. Path analysis was originally developed in the biological sciences (Wright 1934) and was later adapted to the social sciences by Duncan (1966), and to educational research by Peaker (1971).

![Diagram](image)

**Figure 2** The relative effects of values and learning approaches on achievement-Hypothesised model

The path model depicted in Figure 2 arranges the variables under consideration in three major groups, namely antecedents, mediators and outcomes and illustrates through the arrows the general direction of causation which is assumed to flow from left to right. Antecedents such as gender, parental education and whether students pursue an arts or a science degree are considered to precede all other, later, variables. Antecedents, in turn, are considered to have an effect on values and learning approaches as the mediating variables.

The ordering of the mediators whereby values are considered to be predictors of learning approaches is in line with the theory of values put forward by Feather (1975). Feather (1975) considers values and their role in educational choice and adjustment to be the predictor variables while the learning motivations and strategies are regarded as the criterion or outcome variables. In other words, the students’ preferred ways of learning are assumed to depend on and be influenced by the students’ values. This positioning of values as precursors to learning approaches is
also supported by the canonical correlation analyses reported by Lietz et al. (in press). It should be noted that mediators can be either dependent variables (e.g. values being dependent on gender) or independent variables (e.g. values predicting learning approaches).

Finally, the way in which the outcome variable - here achievement - may be influenced is either directly or indirectly by any of the preceding variables. Thus, gender, for example, may influence achievement either directly or indirectly through any of the variables measuring values or learning approaches. In other words, the model allows the examination of whether gender differences emerge for achievement as well as whether gender differences arise for any of the variables measuring values or learning approaches while taking into account all other variables.

The software program Mplus (Muthén and Muthén, 1998-2005) was used to analyse the hypothesized path model. Mplus is a versatile analytical tool in that it allows the analysis of variables of different measurement scales, namely continuous, ordinal or nominal data. In addition, Mplus permits the combining of measured or observed variables into latent variables or constructs. Moreover, the program enables the researcher to estimate direct as well as indirect effects. Finally, Mplus allows the analyses of data at a single level (e.g. student data only) or multiple levels (e.g. student and teacher level data) to take into account the nested structure of many data sets in the social sciences and education.

Prior to undertaking the path analysis, all mediators were formed outside MPlus in SPSS (Statistical Package for the Social Sciences, Version 14) through a principle component factor analysis with varimax rotation to combine the observed variables (e.g. seven items measuring each of the six sub-scales of achievement motivation, achievement strategy, deep motivation, deep strategy, surface motivation and surface strategy). The variable measuring achievement, namely the cumulative Grade Point Average (GPA) at the end of the third semester, was already available as a continuous variable ranging from 5.0 for failing students to 1.0 for excellent students. Thus, as all dependent variables in the model were continuous, Mplus was employed to undertake a path analysis with continuous dependent variables.

A fully recursive path model was analysed, meaning that the input statement specified all possible paths whereby all earlier variables in the model were allowed to influence all subsequent variables in the model, either directly or indirectly. A correlation matrix (see Appendix 1) derived from the SPSS data set containing the information on all variables in the model for the 207 students in the sample was used as input data. Based on convention and experience in other path analyses (e.g. Cheung et al. 1990, Keeves 1992, Sellin 1990) all path coefficients (designated with the letter ‘p’) ≤0.09 were considered trivial and removed from the analyses. In this way, the path model was trimmed and the results of the final path model obtained.

Results

Figure 3 illustrates the results of the analyses.

It will be recalled that the question that this paper seeks to address is whether values or learning approaches are more important contributors to achievement. The answer is that they are both of about equal importance. Figure 3 shows two direct effects of values on achievement, namely Stimulation (p=0.12) and the Achievement value (p=-0.15). As higher achievement manifests itself in a lower GPA, the negative sign of the Achievement value means that those who value achievement more highly obtain a lower GPA – hence perform better than their peers. In contrast, the positive
The sign of the path coefficient for Stimulation indicates that students who look for adventures, like to try different things, like surprises and find it important to have an exciting life, have higher GPAs which means that they perform less well than their fellow students. From among the learning approaches, the only direct effect on achievement emerges from Surface motivation (p=0.21). The positive effect means that students who choose their courses largely with a view to the job situation, see education as a means to getting a well paid or secure job, and find time spent on materials that are not being examined by lecturers a waste of effort show higher GPAs which means that they perform less well than their peers. Thus, while two values have an effect on achievement and only one of the learning approaches variables has an effect, the learning approach has the larger effect, or about the same size as the other two combined.

In addition to the three direct effects by mediators, only one other variable, namely Male, has a direct effect on achievement (p=0.19). Since Male is coded so that male students are assigned a higher code, the positive effect on achievement indicates that male students have a higher GPA. In other words, male students perform at a lower level than females in the current study.

The remaining discussion of results revolves around medium to large path coefficients, in line with the guidelines provided by Cohen (1969, 1992) who considers coefficients between |0.10| and |0.25| weak or small, between |0.25| and |0.40| medium and values greater than |0.40| large or strong.

Figure 3 The relative effects of values and learning approaches on achievement- Final model (n=207)
A number of medium effect sizes emerge from the antecedent Male, most of them with a negative sign, indicating that gender differences favour female students. Thus, female students value Self-direction (p=-0.44), Stimulation (p=-0.22), Achievement value (p=-0.27), Power (p=-0.39), Benevolence (p=-0.23) and Universalism (p=-0.35) more highly than their male counterparts.

Likewise, the antecedent variable Science shows a number of important effects in the model. Thus, students enrolled in a Science degree value Self-direction (p=0.19), Conformity (p=0.35), Tradition (p=0.40), and Universalism (p=0.35) much more highly than their fellow students who pursue an Arts degree. The impact of this antecedent on the learning approaches is interesting in that Science students follow a deep learning strategy (p=0.27) to a greater extent than Arts students who, in turn, show a higher achievement strategy (p=0.28). In other words, Science students more often think of real life situations to which the material that they are learning could be applied, place new materials in the context of old ones and see these in a new light, study sufficiently hard to form their own points of view before they are satisfied and spend their free time finding out more about topics of interest to them. Arts students, in contrast, try to work consistently throughout the term, summarize suggested readings, do assignments as soon as possible after they are given out and reread notes to ensure their legibility.

The results of the analyses also reveal some interesting insights into the relationships between the two sets of mediators, namely values and learning approaches. First, two values, namely Power and Benevolence, do not affect any of the variables measuring learning approaches. Self-direction, in contrast, influences five of the six variables, to varying degrees. Thus, Self-direction impacts positively on Achievement strategy (p=0.11), Deep motivation (p=0.29) and Deep strategy (p=0.23) and negatively on Surface motivation (p=-0.17) and Surface strategy (p=-0.21). Hedonism, in contrast, shows a positive link to the surface learning approach (Surface motivation p=0.24, Surface strategy p=0.17) and a negative effect on Achievement strategy (p=-0.15) and Deep motivation (p=-0.13). In other words, students who are self-directed are creative, make their own decisions and are independent follow the deep learning approach to a greater extent while students who want to enjoy themselves and have fun are less likely to be motivated to understand topics in depth or to relate newly acquired information to material already studied.

The largest effects between values and learning approaches can be observed between the Achievement value and the Achievement motivation (p=0.63). The size of the effect demonstrates how strongly the desire to show one’s abilities and being successful as well as the importance of being ambitious and getting ahead in life is linked to being prepared to sacrifice immediate popularity with fellow students for success in one’s studies, to consider the getting of high grades as a competitive game that is to be won and to excel in one’s studies.

Medium effect sizes emerge between Conformity and Surface motivation (p=0.31) and Conformity and Surface Strategy (p=0.39) as well as between Security and Surface motivation (p=0.31). These results illustrate that students who think that people should do as they are told, should behave properly, should respect parents and older people and should be polite to other people at all times choose and pursue their education largely because it helps them to obtain a well paying and secure job. They learn best through memorizing, rote learning and studying from notes prepared by the lecturer. Moreover, rote learning, studying from notes prepared by the lecturer whose thoughts and ideas they believe should be accepted is favoured by students.

Are values more important than learning approaches?
who value living in secure surroundings, who want things to be organized and clean and who are interested in a stable government and living in a safe country.

One noteworthy point is the absence of the antecedent variable measuring parental education from the final model. While it was hypothesized based on prior research that parental educational background would make a difference to the type and intensity of values that are evidenced, the current study does not support this hypothesis. However, this might be a result of characteristic of the sample as those students who are accepted into and continue with tertiary level education have been shown to come from relatively well-educated backgrounds (Mullen, Goyette and Soares 2003). As a consequence, parental education might be too homogenous to result in notable differences between the students in the sample.

Overall, the variance explained in the outcome variable ($R^2=21\%$), achievement, is moderate. Indeed, the model has a greater explanatory power for the variables measuring Surface motivation ($R^2=29\%$) and Surface strategy ($R^2=29\%$) than for the outcome variable. While the chi-square ($\chi^2$) goodness-of-fit index is highly significant ($\chi^2=637.77$, df=95, $p$-value=0.00) indicators such as the Tucker Lewis index (TLI=0.24) and the CFI (0.56) indicate a rather inadequate fit of the model to the data. Moreover, high modification indexes (MIs) point to changes that could be made to improve the model. In particular, MIs suggest freeing three parameters in order to allow Universalism to correlate with Benevolence, Tradition with Conformity and Security with Conformity. However, as the aim of the analysis was not to arrive at the best-fitting model but to test the hypothesized relationships, no changes were undertaken on the basis of the modification indexes.

Summary and conclusion

In summary, using data from the second wave of a longitudinal study of undergraduate students at an international university, it was shown that values and learning approaches were equally important in explaining differences in academic performance. While two values, namely the Stimulation value and the Achievement value influenced academic performance as compared with only one of the variables measuring learning approaches, namely Surface motivation, the latter effect had approximately the same strength of the other two combined. The signs of the effects indicated that a higher emphasis on the Stimulation value - which incorporates looking for adventures, doing different things and liking surprises – and Surface motivation – which captures students who are motivated in their studies mainly because of better job opportunities - resulted in lower performance. The negative effect from the Achievement value to academic performance indicated that students who valued achievement more highly also performed at a higher level as achievement was measured in such a way that a lower Grade Point Average indicated better performance.

As all variables under examination were allowed to influence the outcome variable, namely achievement, either directly or indirectly through other variables, it is noteworthy that the only other factor which influenced academic performance directly was gender with female students achieving at a higher level than their male counterparts. Gender differences also emerged with respect to a number of other variables in the model whereby female students valued Self-direction, Stimulation, Achievement value, Power, Benevolence and Universalism more highly while male students valued Tradition more highly and showed a greater Achievement motivation than female students.
Differences, too, were found between students pursuing an Arts degree and students enrolled in a Science degree. While Science students valued Self-direction, Conformity, Tradition and Universalism and followed a Deep learning strategy to a greater extent than their classmates, the Arts students practiced Achievement learning strategies more than their fellow Science students.

In addition, the evidence presented in this paper has shown quite clearly the way in which values may influence learning approaches. Thus, students who value Self-direction more highly follow the Deep approach to a greater extent and the Surface approach to learning to a lesser extent than their fellow students. Students with hedonistic values show an opposite pattern in that they follow the Achievement strategy and Deep motivation to a lesser extent and lean more towards the Surface approach to learning.

The relatively strong effects surrounding Conformity and Tradition might, to a certain extent, be a reflection of the sample as a bit less than half the participants came from Eastern Europe (22 per cent Bulgarians and 22 per cent Romanians) and prior research has demonstrated the higher level of conservatism in people from former communist regimes (Bardi and Schwartz 1996, Schwartz and Bardi 1997, Schwartz, Bardi, and Bianchi 2000, Xiran 2005).

As regards the practical implications arising from this study, it should be noted that educators should encourage the Achievement value and discourage the Stimulation value with its emphasis on excitement and adventure in order to enhance academic performance. Where students are seen to place too much emphasis on the instrumental character of their education in terms of merely putting them in a better position to obtain good jobs, educators may wish foster the intrinsic motivation of students in the subjects by trying to capture students’ interest in the subject matter through topical discussions and activities aimed at highlighting the relevance of the content taught.

Finally, the model explains only 21 per cent of the differences between high and low achievers who are half way through their three-year undergraduate Bachelor degree. Thus, it would be of interest to identify other variables that could add to the explanatory power and render the model a more appropriate representation of factors influencing the achievement of tertiary students.
References


Appendix 1 Input data for Mplus analysis

Lower triangle correlation matrix preceded by means and standard deviations

Variables are in the following order:

.60 .65 -.01 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 2.23
.49 .48 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
1.00 1.00 .63
1.00
.29 1.00
-.11 -.16 1.00
-.13 -.07 .01 1.00
-.12 .01 .03 .01 1.00
-.03 .17 .13 .23 1.00
-.14 -.03 .07 .06 .16 .00 1.00
-.18 -.08 .11 .44 .05 .02 .21 1.00
-.04 -.03 -.07 .33 .14 .55 -.06 .11 1.00
-.19 .03 -.07 .25 .23 -.06 .22 .21 .16 1.00
-.11 -.02 .04 .17 .20 -.05 .33 .19 -.07 .37 1.00
-.12 .21 -.11 -.06 .18 .62 -.08 -.11 .40 -.20 -.17 1.00
-.12 .12 -.07 .10 .58 .37 -.04 .02 .30 .26 .20 .25 1.00
-.02 .01 -.09 .64 -.04 .14 -.08 .30 .30 .21 .14 .05 .12 1.00
-.11 -.10 .05 .30 .09 .28 -.14 .14 .39 .19 .16 .23 .24 .44 1.00
-.06 .02 -.03 .21 .21 .05 -.09 .10 .11 .35 .18 -.04 .29 .35 .43 1.00
-.05 .12 -.04 .21 .14 .04 .02 .13 .22 .39 .29 .01 .31 .31 .53 .56 1.00
-.02 .05 -.04 .15 .09 .49 .18 .12 .44 -.09 .04 .36 .14 .26 .16 -.16 .02 1.00
.10 .07 .08 .11 .02 .56 .08 .09 .41 -.17 -.07 .45 .09 .28 .20 -.12 -.02 .69 1.00
.15 .09 -.10 -.23 .13 .21 .22 -.15 .04 -.05 .13 .21 .06 -.18 -.12 -.21 -.13 .28 .22
1.00