

# Changing Academic Environment and Diversity in Students' Study Philosophy, Beliefs, and Attitudes in Higher Education

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## Abstract

The diversity of students in higher education in Australia and elsewhere has changed significantly over the past two decades. The existing literature has provided limited clarity in terms of their effects on teaching and learning or on the way in which social and cultural changes shape what university students think about the teaching and learning process.

Employing a large data set of survey responses from a leading Australian university, this paper provides an analysis of student perceptions of the teaching and learning process, in regard to their study philosophy, beliefs, and attitudes. Survey data were analysed in two stages. First, factor analysis was used to explore themes (or dimensions) within the survey. Multivariate analysis of variance was then undertaken using students' factor scores as dependent variables, and age, sex, ethnicity, study discipline, study level, academic performance, and sex-ethnicity interaction as grouping variables.

Three factors (Deep Learning, Expediency, and Responsibility) appeared to reflect students' study philosophy, beliefs, and attitude toward teaching and learning. Students' response on the three factors varied according to age, sex, ethnicity, study discipline, and academic performance, and sex-ethnicity effects. Students in business-related disciplines appeared to display greater expediency than peers in other disciplines, treating university education like any other commodity.

**Keywords:** student diversity, paradigm shift, learning philosophy, constructive alignment, phenomenography, deep learning, expediency, responsibility, Australia

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## INTRODUCTION

In the late 1980s, a week into his first academic job at a Go8 university in Australia, the first author was struck by an observation by a senior professor at the Department of Economics. The professor asked how the author was going with his classes but before he could reply, the professor went on, “There should not be any problem. You have a captive audience. What I mean by captive audience is that you have a selected group of students who wanted to be trained economists.”

More than a decade later the situation had undergone a radical change, as Biggs (2003, p. 1) narrates:

In the days when university classes contained highly selected students enrolled in their faculty of choice, the traditional lecture and tutorial seemed to work well enough. However, the expansion, restructuring and refinancing of the tertiary sector in the 1990s has meant that classes are not only larger but quite diversified in terms of student ability, motivation and cultural background.

Later studies recognise phenomenal changes in the context of teaching and learning in higher education (see for example, Harman, 2005; Vardi, 2011). As Vardi stated:

Over the past 20 years, the educational context in the Western world has changed in a number of key ways. A major change has been the enormous increase in student numbers resulting from international student growth and increased domestic participation. A second change, in part as a result of the first, is the change in the nature of the student population: no longer an elite cohort, but a student body with varied learning needs and aspirations. ... These demands on teachers have resulted in a need for changes to be made in how teaching and assessment is carried out in order to better cater to the differing backgrounds and learning styles (p. 2).

The impact of the contextual change manifests in several important ways but pivots around two outcomes: (a) the students increasingly perceive as customers (Gruber et al., 2010) and university education as a commodity for consumption, they seek “edutainment” that leads to the commoditisation of education; (b) higher education has entered into new market-oriented forms of relations with their student consumers and the business world (Poynter, 2002; Ritzer, 1998). Furthermore, public funding cuts, as Biggs and Tang (2007) have stated, derive from

the neo-conservative belief that education has personal benefits for which one should have, as for any other goods. That changed the nature of university education to corporatise and competitive for identified markets.

This change has resulted from, as well as resulted in, the process known as “McDonaldisation” of higher education (see Deem et al., 2007; Hartley, 1995). McDonaldisation was summarised conceptually by Ritzer (1998; see also Smart, 2002) as “efficiency”, “calculability”, “predictability”, and “control”. The fast-food industry serves as the modern model including: a decentralised franchised structure of ownership; global markets; rational scientific processes of production and management; emphasis on "means of consumption" of standardised products. Poynter (2002, p. 67) observed, “the modularisation of knowledge into bit-size chunks, and the reinvention of the student as consumer have played an increasingly significant role in assisting in the creation of a new kind of malleable workforce”. The fundamental business dictum that the customer (in the present case, the student) knows best fundamentally alters the teacher-student relationship that is manifested in consumer satisfaction surveys that form an integral part of the industrial relations domain at the university level (Furedi, 2002). The McDonaldisation of higher education has resulted in establishing the primacy of the vocational and professional orientation with a discernible trend away from what used to be primarily academic focus until about two decades ago.

Star and Hammer (2008) presented a somewhat different perspective and challenged the “dichotomy that conceives of a fundamental disjuncture between the idea of universities as institutions of vocational education and the more traditional conception of universities as key institutions in the formation of reflective practitioners, social critics and good citizens” (p. 237). Notwithstanding this, the dominant discourse of change points to students being the consumer of a service (a commodity) provided by the institutions of higher education. The existing literature has provided limited clarity about their effects on teaching and learning or on the way in which these changes shape what university students think about the teaching and learning process.

## **REVIEW OF LITERATURE**

Three strands of literature seem relevant in the context of the present paper: paradigm shift, research on student learning, and diversity of the student population.

### **Shifting Paradigm in Higher Education**

There has been a paradigm shift in higher education in the United States and elsewhere in the developed world in that the role of institutions has changed from *providing instruction* to *providing learning*. As Barr and Tagg (1995, p. 13) stated, “We now see that our mission is *not* instruction but rather that of producing *learning* with every student by *whatever* means works best”. Colander (2004) viewed teaching as a holistic system incorporating important interactions that affect its performance. Furthermore, Colander recommended a common sense approach that lies halfway between the old paradigm of teaching (providing instruction) and the new paradigm (providing learning) with the central being that “ultimately content, not delivery, determines whether one is or is not a good teacher” (p. 63). On the whole, the common sense approach is more student-centred than the old paradigm.

The superiority of the common sense approach appears to be empirically supported by recent study (Moulding, 2010). In analysing students’ perceptions and learning experience in a large mental health course, Moulding stated:

Perhaps most significantly, the quantitative findings suggest that it is not individual teaching strategy *per se* that is important to students’ perceptions of what helps their learning in this context. Qualitative analysis helped to unpack this further, with integrated course design, content that is relevant to real life and teacher enthusiasm emphasised by many students as having been the most useful for their learning. This more student-centred course also achieved much higher student satisfaction ratings and grades than an earlier, more teacher-directed course (p. 164).

### **Research on Student Learning**

Research on student learning taking contexts into account originated in Sweden in the 1970s with that of Marton (1975), and Marton and Säljö (1976a; 1976b) that made a distinction between deep and surface learning. As Brockbank and McGill (2007, p. 42) reported:

- (a) *Deep* – Concentrating on what the discourse is about and associated with an active approach to learning, and a desire to get the grasp of the central message, making connections and being able to draw conclusions and wider implications. As Marton (1975) stated, “those who succeed best ... seem to have an approach that aims beyond the written or spoken discourse itself towards the message the discourse is intended to communicate and these students *feel themselves to be the agents of learning*” (p.137); and
- (b) *Surface* – Concentrating on the discourse itself with heavy if not exclusive reliance on memory and associated with a passive approach to learning that amounts to remembering some disjointed facts with little or no real comprehension or understanding of the central message let alone being able to draw appropriate conclusions and wider implications.

The Swedes employed phenomenography, which represents a qualitative research methodology and investigates the qualitatively different ways in which people experience something or think about something (see Marton, 1981; 1986; Marton & Booth, 1997; Marton et al., 1997); Säljö, 1979). Akerlind (2005) stated that empirical, rather than theoretical or philosophical perspective formed the basis of phenomenography as an approach to educational research.

Since the works of Marton and associates, there has been a prolific growth in the literature investigating the issue of student learning taking contextual variables such as leaning environments into account. On one hand, these coincided with the works of Entwistle in the UK, and Biggs in Australia. Entwistle focussed on psychology of individual differences — identifying the characteristics associated with deep and surface approaches to learning (Entwistle 1991; Entwistle, 2007, Entwistle & Hounsell, 1979, Entwistle et al., 1979; Entwistle & Ramsden 1983; Hounsell, 1979). On the other hand, Biggs (1979, 1987) concentrated on cognitive psychology.

Despite the differences in approaches (phenomenography, psychology of individual differences, and cognitive psychology), there is a common thread that binds together the three bodies of research on student learning – investigation of learning in an institutional context. The existing literature is replete with studies that deal with student learning experiences in

higher education (see e.g., Biggs, 1987, 1996a, 1999, 2003; Biggs & Tang 2007; Marton et al., 1997; Prosser & Trigwell, 1999; Trigwell & Prosser, 1991; Trigwell & Reid, 1998).

Biggs and Tang (2007) devised constructive alignment as a principle in teaching and learning that combines the underlying philosophy of constructivism and outcomes-based teaching education. Two basic principles underlie constructive alignment: learners construct knowledge with their own activities while building on their previous knowledge and learning experience, and the teacher aligns planned learning activities with learning outcomes.

Constructive alignment ultimately boils down to the level of engagement of the student with the academic process. Biggs and Tang (2007, pp. 8-10, 27) explained and identified the important challenges that the teacher is likely to face is to reduce the gap between Susan (academic and deep learner) and Robert (non-academic and surface learner) in regard to their engagement with the teaching and learning process. Note that Susan, for all practical purposes, teaches herself while Robert needs a lot of guidance. It poses a challenge to teach for Robert to learn more in the manner of Susan. This is somewhat similar to the example of Melissa and Antonio of Prosser and Trigwell (1999).

The question of “self-teaching” existed long before the concepts of constructive alignment or phenomenography came into prominence as the following real-life experience best described as “we do not have teacher, we have little choice but to learn by ourselves” suggests. In describing his experience as an undergraduate at the College of the City of New York (CCNY) during 1939-42, a leading 20<sup>th</sup> century economist, William J. Baumol (1986, p. ix), wrote:

A number of economists of note emerged from there, Kenneth Arrow (1972 Economics Nobel Laureate), Julius Margolis and Jules Joskow among them. But while the CCNY at that time had many gifted teachers, the department of economics had very few. It was clear to us students that many of them were thoroughly behind times, and could not teach us about the work of Keynes, Chamberlin and Joan Robinson which were then at the frontier. Besides, many of them could not just communicate very well. There seemed us to be little choice, and so we organized our own classes, each specializing in a different field, devouring as much of the relevant literature as we could and then lecturing on it to the others. I was assigned the microeconomics, and suspect that I learned more economics there than ever before or since. This experience has always

engendered uncertainty in my views on teaching. Can it be that, at least to some students, what is considered to be 'bad' teaching is really teaching in its most effective form, because it forces students to *think* and learn for themselves? ...”.

The present study acknowledges that research on Teaching Quality in Australia and the United Kingdom in the last two decades has the theoretical underpinnings of constructive alignment. Independent of the stream of literature on Teaching Quality, there has been a contemporaneous growth in research on the Scholarship of Teaching literature in the United States since the pioneering work of Boyer (1990). Between them, these two streams of research have elevated the status of teaching in academe (Chalmers, 2011). This notwithstanding teaching relative to research enjoys an inferior status (Chalmers, 2011) especially in research intensive universities.

### **Diversity of the Student Population**

Biggs's (1987) research that used the *Learning Process Questionnaire* (LPQ) and *Study Process Questionnaire* (SPQ) represented first major investigation of students' approaches to learning and studying. Biggs identified three types of learners – surface, deep, and achieving or perhaps more accurately, three approaches: surface, deep, and strategic. Since Biggs's work, Kember and Leung (1998) examined the dimensionality of learning of learning approaches and found that a two-factor model with surface and deep approaches rather than the three factor model with surface, deep and strategic fitted the data appreciably better. Kember and Leung (1998) concluded:

the achieving/strategic dimension is not a third category of the learning process construct. It is rather an additional dimension which can be present with both meaning and reproducing orientations. Further evidence for this conclusion could be drawn from the fact that the dimensions does not appear to have been found in the qualitative studies of particular learning tasks (pp.404-405).

Later studies (e.g., Biggs et al., 2001; Kember et al., 2004) extended their earlier analysis of student approaches to learning using a revised version of LPQ and SPQ that took cognisance of the significant changes in the higher education sector. Kember et al. (2004) confirmed the deep-surface two-factor model of Kember and Leung (1998).

Disciplinary perspective appears to be important in determining students' learning outcomes. Baik and Greig (2009) examined the impact of English as a Second Language (ESL) support not from a generic perspective, but specific to a discipline. Thus, discipline-specific approach

to language and academic skill support appeared more effective than the generic programme (see also Becker, 2004).

The high incidence of NESB students poses a special problem of its own in that they have different needs which require to be handled differently (Ballard & Clanchy 1991). Given the international students' importance in the diversity of the student population, teacher's attitudes appear very important (Ballard & Clanchy, 1991). Arenas (2009) suggested a transition from a teacher-focussed (knowledge transmission) to a student-focussed (encouraging knowledge creation and conceptual change) approach to teaching necessary for teaching international students. This appears to be an application of a variant of the constructive alignment theory of learning.

Other researchers (e.g., Johnson & Kumar, 2010; Rambruth & McCormick, 2001; Vandermensbrugge, 2004) analysed learning behaviour of overseas students in Australia. These studies have provided useful insights into their study behaviour. Vandermensbrugge, for example, questioned stereotyping students from non-English speaking background as rote-learners. Vandermensbrugge, however, considered popularity of memorisation as a way of learning in Asian nations to be at the root of portraying "Asian students as surface learners, who memorise, and have no deep approach to learning" (p. 420).

Others, such as Marton et al. (1996), found memorisation and understanding as related phenomena. Li and Chang (2001) reported that rote learning facilitated both acquisition of vocabulary and consolidation of knowledge. This supports an earlier study by Biggs (1996b, p. 63), in which the characterisation of Chinese students as rote learners was a "Western misinterpretation" stemming from a "mistaken interpretation of repetitive effort. Chinese students may be repetitive, but there is no evidence that they rote learn any more than their Western counterparts".

Rambruth and McCormick (2001) employing quantitative analysis suggested that overall approaches of the international students did not differ from those of the Australian students. Rambruth and McCormick, however, found significant differences between the two groups in certain constructs such as group learning, auditory learning, and tactile learning which they attributed to the impact of socio-cultural and environmental factors the respective student populations.

Johnson and Kumar (2010) employing qualitative analysis to study the learning behaviour and attitude of Indian students in Australia, found that prior learning experiences at home, active participation of family and parents, family pressure, and expectations in the country of origin. Furthermore, as Johnson and Kumar stated that the Indian students' "success in academic learning is cognizant with respecting the *difference in learning* they bring" (emphasis added, p. 224). Johnson and Kumar also found that the difference in learning varied inversely with the students' duration of experience with the Australian academic system.

The three studies on international students have one thing in common: their differences in ways of learning styles notwithstanding, stereotyping the NESB students as rote learners are a misnomer. Both Johnson and Kumar (2010) and Vandermensbrugge (2004) suggest the Australian academe to develop pedagogy of respect (Johnson, 2006) that embodies, amongst other things, respect for the whole person; an environment with a genuine recognition for difference; and reflectivity and inclusivity.

Regardless, the existing literature does not appear to deal rigorously with the varied needs of the diverse student population by analysing students' perceptions and teaching and learning in higher education and how these vary according to a set of grouping variables. For instance, how students' study discipline can affect their study philosophy. One could include in this list other differentiating characteristics such as sex, academic performance, ethno-linguistic background and so on or interactions between some of these grouping variables.

The present study directly addresses the issue of diversity of the student population and undertakes an in-depth quantitative analysis of its impact on students' perception of teaching and learning in a university setting. A rigorous analysis of heterogeneity of the student population has not received due attention in the existing literature even though some studies have focussed on specific aspects of the heterogeneity of student population in regard to learning philosophy in higher education.

In light of the above, the focus of the paper centres around the principal research question:

"Do students' study philosophy, beliefs and attitudes toward teaching and learning in higher education differ according to a set characteristics defining diversity in the student population?"

The main research question is underpinned by other relevant questions as aids to an in-depth analysis and understanding of the underlying issues. These are stated as follows:

- Can the students' perceptions in regard to their study philosophy, belief and attitude toward teaching and learning be categorised into a small number of representative constructs or factors that reflect students' patterns of response?

Do these factors or constructs:

- Vary according to students' sex, and ethno-linguistic backgrounds?
- Differ among students' study disciplines, age groups, and stage within their degree program?
- Vary with students' university performances?

Survey data are analysed in two stages. First, factor analysis, is used to explore themes (or dimensions) within the survey. Multivariate analysis of variance is then undertaken using students' factor scores as dependent variables, and age, sex, ethnicity, study discipline, study level, and academic performance as grouping variables. The three penultimate sections address these aspects of the paper.

## **METHODS, DATA AND RELATED ISSUES**

### **Participants**

This study uses data from a Group of Eight (Go8) university using survey of students at different study levels and disciplines in 2006 and 2007 employing the instruments described later in this section. In all, over a 1,000 students were surveyed. However, excluding the missing observations the usable sample size stood around 800 responses. Table 1 provides basic information about the participants. Respondents aged 25 years or younger dominated the sample, accounting for 93% of the observations.

The project aimed to create the largest number of discipline categories possible. Overall, business and related disciplines, and the social science disciplines dominated the data while science disciplines were still reasonably well-represented.

The majority of respondents (nearly 85%) came from undergraduate programs. Nearly two thirds of these were first- and second-year undergraduates.

Student academic performance was estimated from their reported grade-point average (GPA) while acknowledging that it may not always measure the intrinsic qualities that were the focus of attention in the study. The choice of cut-off points involved some trial and error with the final one shown in Table 1 having a sufficient number of observations in each category to allow for statistical power in the analyses.

The majority of students were enrolled on full-time and full-fee paying bases. Finally, four variables were chosen to reflect ethnicity: non-English language as mother tongue, overseas students, those born and/or raised in Australia, medium of instruction prior to enrolment in the Australian degree program.

### **Instrument**

The instrument was developed in several stages over a period of 3-4 months. The starting point was Biggs' *Learning Process Questionnaire* (LPQ) and *Study Process Questionnaire* (SPQ). Biggs (1987) represented the first major investigation of students' approaches to learning and study. Biggs identified three types of learners – surface, deep, and achieving. However, his study predated the massive changes that have taken place in the higher education sector. These may have transformed its earlier role as a provider and transmitter of knowledge to one of providing a service, as is widely perceived by many within and outside the university systems.

Based on the LPQ, and SPQ that included items on students' study philosophy and belief, the scope of this aspect was broadened by including items to seek students' views on commoditization of education as a product or good based generally on the McDonaldisation of higher education literature or the extent to which they believed that the quality of education they acquired depended more on the lecturer than on themselves. The final assessment battery included 39 items.

The instrument was refined through informal but regular discussions with academics in the School of Economics, and the School of Education and through regular (individual and small group) discussions with students from differing study disciplines, ethnic backgrounds, age groups, sex, academic abilities, and study levels. These discussions helped articulate the ideas embodied in the instrument. Furthermore, the present study uses some of the items from Biggs (1987) that have been validated by subsequent research (e.g., Biggs et al., 2001;

Kember et al., 2004; Rambruth & McCormick, 2001). Thus, the final version of the instrument is the outcome of extensive expert and stakeholder consultation. This provides a basis for content validity.

The instrument consists of a total of 39 items (latent variables). These broadly relate to students’:

1. Underlying motivation, learning philosophy and goals (24 items), for instance, “I chose my present degree program because of career prospects when I leave university”; “My aim is to gain a deeper understanding of the methods and techniques related to the course content”, and “The only way to learn the course material is to memorise by heart”;
2. Perception about the institutional learning process such as lecture and beyond (6 items) including items such as, “I judge the quality and value of the teaching and learning process almost exclusively by the classroom lecture”, and “Much of the learning for a course takes place outside of lectures”; and
3. Perception about higher education, sense of belonging and relative share of responsibility (9 items) including items such as, “I believe that acquiring educational qualifications is just like acquiring any item that I can buy from the market”, and “I believe that acquiring education and its quality depends on my motivation”.

Students’ responses to each item were given on a 5-point Likert scale with “1” representing a strong disagreement and “5” a strong agreement. Twelve questions sought information on various characteristics of the student population including age, sex, study discipline, level of study, ethnic and linguistic identity, student performance, and level of study amongst other things.

### **Procedure**

Ethical clearance preceded the initiation of research. Lecturers were contacted for gatekeeper permission to undertake the surveys. The researcher approached 20 lecturers in various disciplines. Fourteen consented to their classes being used for the survey.

The researchers informed all students and the relevant lecturing staff about the nature of the study and assured them of anonymity and confidentiality. A consent form and a participation

information sheet about the nature and purpose of the research were given to each student in the participating classes. The lecturers and students were asked to give written consent.

The survey was implemented in the 3<sup>rd</sup> or 4<sup>th</sup> week of the semester. Students received an electronic version of the questionnaire a day or so before the survey date. In the class, they received the hardcopies, which they completed and returned to the researcher. Respondents received necessary clarification upon request. Students took about 20 minutes to complete the questionnaire in the instrument.

Table 1 Frequency distribution of the probable independent variables

Variable	Description	% (Frequency)
<b>Age (Student's age, N = 1,073)</b>		
Group 1	Student aged $\leq 20$ years	67.0 (719)
Group 2	Student aged $>20 \leq 25$ years	26.0 (279)
Group 3	Student aged $> 25$ years	7.0 (75)
<b>Study Discipline (Student's study discipline, N = 773)</b>		
Discipline 1	Economics single or double majors outside the Faculty of Business Economics & Law (BEL)	26.8 (207)
Discipline 2	Economics double major within BEL	12.8 (99)
Discipline 3	Single and double non-economics majors within BEL	29.6 (229)
Discipline 4	Single or double majors in arts or social science disciplines	16.2 (125)
Discipline 5	Single or double majors in science disciplines	8.5 (66)
Discipline 6	Single or double majors in disciplines not included elsewhere	6.1 (47)
<b>Study Level (Student's level in the degree program, N = 1,027)</b>		
Lower undergraduates	First and second year students	63.6 (653)
Upper undergraduates	Third year students	21.1 (217)
Honours and postgraduates	Honours & postgraduate students	15.3 (157)
<b>Student Performance (Student's grade point average, GPA 1-7 scale, N = 1,073)</b>		
Low	GPA $\leq 5.0$	57.9 (621)
Medium	GPA $> 5.0 \leq 6.2$	28.8 (309)
High	GPA $> 6.2$	13.3 (143)
<b>Sex (Student's sex, N = 832)</b>		
Male	If the student was a male	48.0 (399)
Female	If the student was a female	52.0 (433)

Table 1 *continued*

<b>Enrolment (Student's enrolment status, <i>N</i> = 834)</b>		
Full-time	If the student was enrolled full-time	97.2 (811)
Part-time	If the student was enrolled part-time	2.8 (23)
<b>Mother Tongue (Student's mother tongue, <i>N</i> = 837)</b>		
English	A student with English as mother tongue	65.1 (545)
Non-English	A student with any non-English language as mother tongue	34.9 (292)
<b>Overseas (student's residential status, <i>N</i> = 837)</b>		
Yes	If the respondent was an overseas student	30.1 (252)
No	If the respondent was not an overseas student	69.9 (585)
<b>English (Student's prior medium of instruction, <i>N</i> = 834)</b>		
Yes	If the student completed her/his studies before this degree program in English	83.2 (694)
No	If the student did not complete her/his studies before this degree program in English	16.8 (140)
<b>Born (country of birth and/or upbringing, <i>N</i> = 833)</b>		
Yes	If the student was born and/or brought up in Australia	58.3 (488)
No	If the student was not born and/or brought up in Australia	41.7 (347)
<b>Full-Fee (If the student was paying full fee, <i>N</i> = 833)</b>		
Yes	If the student was paying full-fee	37.0 (310)
No	If the student was not paying full-fee	63.0 (527)

## RESULTS

### Derivation of Factors

Factor analysis was employed to derive an orderly simplification of the variables (i.e., items) to a small number of representative constructs or factors that reflect students' patterns of response. Factor analysis brings together items to which students respond in similar way. Criteria permitting factor analysis requires that the variables have roughly normal distributions and the data are at least ordinal (Brace et al., 2009). Field (2005) suggested that the data be measured at an interval scale, "which Likert scales are, perhaps wrongly, assumed to be!" (p. 641). The data did not satisfy formal inference tests of normality such as the Kolmogorov-Smirnov and Shapiro-Wilk tests. However, these tests have limitations when applied to large samples so a statistically significant test does not necessarily indicate whether the deviation from normality biases any further statistical procedures (see Field, 2005; Tabachnick & Fidell, 2007). The statistical analysis undertaken in this paper relies on a sample of nearly 800 participants. Because of this, and other diagnostics discussed subsequently, factor analysis was likely to yield distinct and reliable factors.

## Extracted factors

Factor analysis reduced the 39 variables to three factors. However, for the sake of interpretation and keeping the factors to a manageable number, the following six variables were excluded from final analysis because their inclusion neither increased the percentage of variance explained nor did they produce factor loading  $> .300$  on to any factor.

- “I think I would have done an easier ride if I chose another degree program.”
- “The highest possible grade in every course gives me an advantage in competing with others when I complete my degree.”
- “Any course can become very interesting once you get into it.”
- “I do not spend time learning materials that I know will not be asked in the exams.”
- “I believe that the customer-supplier model does not apply in case of acquiring education.”
- “The quality of the education that I can acquire depends equally on the lecturer as the supplier and me as the consumer.”

The number of variables included and the number of factors extracted resulted from criteria involving percentage of variance explained by the extracted factors and internal consistency.

The three factors explained about 29% of the total variance. While the explanatory power of the model is not especially high, it was deemed to be satisfactory given that extraction of a higher number of factors did not lead to any noticeable increase in the explanatory power. Cronbach's  $\alpha$ , was calculated using the items defining Factors 1, 2, and 3;  $\alpha$ -values were .763, .710, and .673 respectively, indicating acceptable internal consistency for all items sets. Table 2 sets out the results of factor analysis. For simplicity loadings  $< .3$  have been eliminated.

## Factor structure

**Factor 1: Deep Learning.** Items underlying this factor appear to reflect students' response pattern embodies a propensity for deep learning and extending their frontier of knowledge. These include students' commitment and motivation to: (a) gain a deeper understanding and applications of methods and techniques in wider contexts directly relevant to the current course and the degree program, and beyond; (b) gain exposure to a wider set of readings; and (c) aim for high academic achievements including highest possible grades. An inspection of these 14 items appeared to reflect students' commitment and motivation to deep learning.

**Factor 2: Expediency.** Variables underlying this factor related to students' beliefs in, in: (a) rote learning, with a focus on grades rather than learning outcomes in terms of acquisition of cognitive skills and knowledge, and a university education as a sort of game and with lectures as the only instrument of the teaching and learning process; (b) a commercial view of education with greater responsibility being placed on the lecturer for their learning than on themselves; and (c) the importance of career prospects and lack of seriousness in studies. An examination of the 11 items underpinning this factor reflects students' commercial view of higher education.

**Factor 3: Responsibility.** Items underlying this factor relate to students' beliefs about ownership of their university study. These included students' beliefs that: (a) the acquisition of higher education and its quality depended on their motivation, effort, and organisational skills. Students also believed that the quality of education that they could acquire depended much more on them than the lecturer; and (b) the real quality of the teaching and learning process consisted of: (i) a combination of lectures, self-study and other relevant academic activities; (ii) much of the learning taking place outside of lectures; and (iii) studying for higher education as a pre-requisite for a well-paid job. The central message embodied in the eight items epitomises students' commitment and motivation to take responsibility for their study and a sense of belonging to, and ownership of, learning outcomes and academic achievements.

### **Multivariate Analysis of Variance**

Multivariate analysis of variance was used to investigate whether students' philosophy, beliefs, and attitudes as reflected by the three factors were affected by age, sex, students' academic performance, their study discipline, level in the degree program, and ethnic identity. MANOVA creates a composite dependent variable, which is a linear combination of the existing dependent variables and maximises the difference between groups. Thus, MANOVA deals with the question: "Are mean differences in the composite dependent variables among groups at different levels of an independent variable larger than expected by chance?" (Tabachnick & Fidell, 2007, p. 247). One significant advantage of MANOVA in cases of several dependent variables is "protection against Type I error due to multiple tests of (likely) correlated dependent variables" (Tabachnick & Fidell 2007, p. 244). However, as Brace et al. (2009, pp. 297-298) suggested "this notion of protection is a little misleading

because a significant MANOVA often reflects a significant difference for one rather than all dependent variables. Therefore, it is probably best to ensure against a Type I error by applying a Bonferroni correction”.

Three important assumptions underlie MANOVA (Field, 2005): multivariate normality, homogeneity of covariance matrices, and absence of multicollinearity and singularity. The first of these cannot be tested using statistical packages such as SPSS. While normality of each dependent variable is necessary, it is not a sufficient condition for multivariate normality. However, as Stevens (1996, p. 243) stated, “a partial check on multivariate normality one could obtain the scatter plots for pairs of variables ... and see if they are approximately elliptical”. One could easily check the second and third assumptions using standard statistical packages such as SPSS.

For the purpose of this study, the scores of the extracted factors have been treated as the three dependent variables. Two of the three dependent variables (Deep Learning, and Responsibility) did not satisfy the formal inference tests (K-S and S-W) of normality while Expediency satisfied both of these tests. However, the relevant histograms for Deep Learning and Responsibility did not appear to show any marked departure from normality. As suggested by Stevens (1996), the bivariate scatter plots appeared to be approximately elliptical in shape. This provides further support for the view that the distributions of the dependent variables did not depart fundamentally from normality. The histograms and bivariate scatter plots are not presented in the paper for brevity.

A range of studies (e.g., Stevens, 2002) suggested small effect on Type I error from deviation from multivariate normality. Stevens (1980) suggested the use of a large sample size or a small number of dependent variables. The present analysis with a large sample size and only three dependent variables satisfied both these conditions. Thus, while the multivariate normality did not appear to be fully satisfied the probability of Type I error was likely to be low and the power of tests reasonably high.

Table 2: Three factors that account for students' study philosophy, beliefs, and attitudes in higher education

<b>Factor 1: Commitment &amp; motivation to deep learning [Deep Learning]</b>	
	Loading
My aim is to gain a deeper understanding of the methods and techniques related to the course content.	.673
My aim is to use methods and techniques in a range of settings during and beyond my current degree program.	.588
My university work can give me a feeling of deep personal satisfaction.	.568
While I am studying, I often try to think of how useful in real life the material that I am learning would be.	.510
I find most new topics interesting.	.506
I have a strong desire to do best in all of my studies.	.487
I have to do enough work on a topic so that I can form my own point of view before I am satisfied.	.464
I am interested in learning techniques and their real world applications more or less equally.	.459
I chose my present degree program because I am particularly interested in it.	.445
I spend a great deal of my free time finding out more about interesting topics, which have been discussed in class.	.436
I try to relate what I have learned in one course to what I already know from other courses.	.434
I usually try to read all the references suggested by my lecturer(s).	.394
I am interested in application of techniques rather than techniques themselves.	.394
My aim is to achieve the highest possible grade in every course.	.371
<b>Factor 2: Expediency &amp; commercial orientation [Expediency]</b>	
The only way to learn the course material is to memorise by heart.	.573
I resent having to spend a further three or four years after leaving school studying.	.568
One of the most important considerations in choosing a course is whether I will get top marks in it.	.568
I prefer courses in which I have to learn just facts, to those which require a lot of reading and understanding of material.	.535
I will continue my studies only for as long as takes to get a good job.	.535
I believe that acquiring educational qualifications is just like acquiring any item that I can buy from the market.	.524
I judge the quality and value of the teaching and learning process almost exclusively by the classroom lecture.	.480
I believe that I am the consumer and the lecturer (or teaching staff) is the supplier of education just like any other product.	.474
I see doing well in university as a sort of game.	.441
The quality of the education that I can acquire depends more on the lecturer than on me.	.427
I chose my present degree program because of career prospects when I leave university.	.311
<b>Factor 3: Sense of responsibility &amp; ownership [Responsibility]</b>	
I believe that acquiring education and its quality depends on my motivation.	.772
Acquiring education and its quality depends on my effort.	.749
Acquiring education and its quality depends on my organisational ability.	.678
The quality of the education that I can acquire depends more on me than the lecturer.	.569
I usually become absorbed in my work the more I do.	.430
I judge the quality and value of the teaching and learning process by a combination of factors such as lectures, lab/tutorial sessions, consultation, and self-study.	.372
Much of the learning for a course takes place outside of lectures.	.308
Studying is a good way to get a well-paid or secure job.	.303

Levene's test of equality of error variances was not significant for any of the dependent variables (respective  $p$ -values were .671, .169, and .264, for Deep Learning, Expediency, and Responsibility). Therefore, the assumption of homogeneity of covariance matrices has been met. Furthermore, a correlation matrix was generated that indicated little or no correlation between any pairs of dependent variables, which suggested the absence of multicollinearity and non-singularity. This notwithstanding, to minimise the chance of Type I error, this paper applies  $p < .01$  as the critical value and Bonferroni correction in all hypothesis tests.

### ***Multivariate test results***

MANOVA was carried out with Age (3 groups), Study Discipline (6 groups), Study Level (3 groups), Student Performance (3 groups), Ethnicity (2 groups), and Sex (2 groups) as independent (or more accurately, grouping) variables, and three dependent variables, Deep Learning, Expediency, and Responsibility. Note that ethnicity variable used here on the basis of mother tongue none of the three other possible proxies stated earlier appeared significant. For brevity, the results of the multivariate tests are not presented in this paper. From the values of all the relevant test statistics, including Hotelling's  $T^2$  and Wilks'  $\lambda$  and their statistical significance, it was evident that one could reject the null hypothesis of no-between group differences in all cases, Age ( $p < .01$ ); Sex ( $p < .01$ ); Ethnicity ( $p < .0001$ ); Study Discipline ( $p < .0001$ ); Level ( $p < .05$ ), and Student Performance ( $p < .0001$ ).

Thus, from the results of the multivariate tests, one could conclude that there were differences between groups on the dependent variables that reflected students' study philosophy, beliefs, and attitudes in higher education.

### ***Univariate test results***

An analysis of the univariate statistics was undertaken and reported later below, which discovers the origins of the significant intergroup differences.

**Sex:** Only one of the three study philosophy, beliefs, and attitudes variables (i.e., Expediency) differed significantly according to Sex (Table 3 and Figure 1). Male students displayed a greater degree of Expediency than female. In other words, males seemed significantly more likely than females to believe in grade maximisation, take a commercial view of education, or in memorising/fact learning as opposed to thinking or studying.

Table 3: Univariate  $F$  statistic and observed means for significantly affected study philosophy, beliefs, and attitudes variables ( $df = 1, 713$ ) with Sex as the grouping variable

Statistic	Significantly affected dependent variable	
	Expediency	
Mean square	12.84	
F-statistic	15.75	
p-value	< .0001	
Group mean		
Male	.13	
Female	-.12	

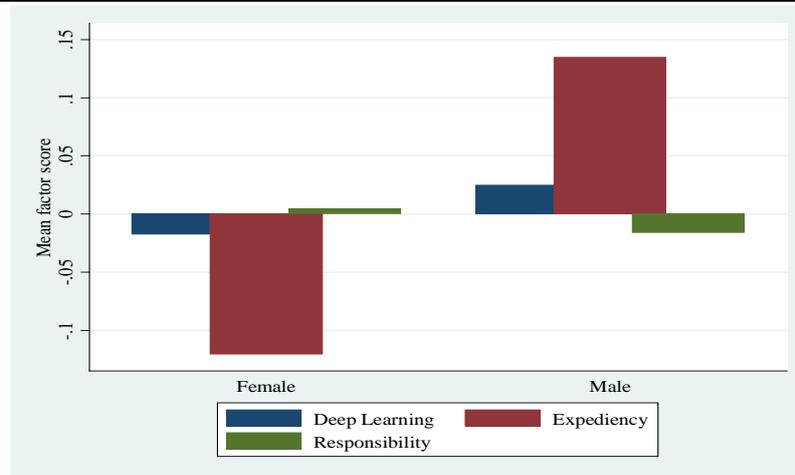


Figure 1: Study philosophy, beliefs, and attitudes variables differing significantly according to Sex: Expediency

**Ethnicity:** Two of the three dependent variables (Deep Learning, and Expediency) differed according to Ethnicity (Table 4 and Figure 2). Students with a non-English language as their mother tongue (NESB) appeared significantly more inclined toward Deep Learning than those with English as their mother tongue (ESB). However, the NESB students also appeared to display a greater degree of Expediency than the ESB students.

Table 4: Univariate  $F$  statistic and observed means for significantly affected study philosophy, beliefs, and attitudes variables ( $df = 1, 713$ ) with Ethnicity as the grouping variable

Statistic	Significantly affected dependent variable	
	Deep Learning	Expediency
Mean square	7.65	37.46
F-statistic	8.27	43.04
p-value	< .004	< .0001
<b>Group mean</b>		
English-speaking	-.10	-.19
Non-English-speaking	.19	.34

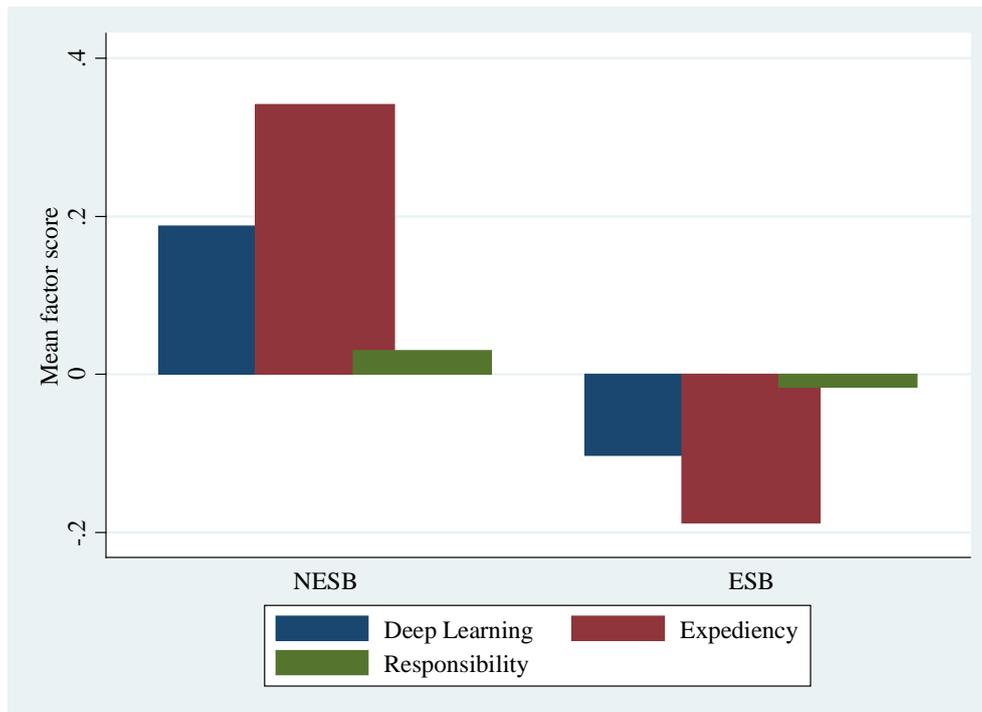


Figure 2: Study philosophy, beliefs, and attitudes variables significantly differing according to Ethnicity: Deep Learning, and Expediency.

**Study Discipline:** Only Expediency appeared to differ among students' Study Discipline (Table 5 and Figure 3). Multiple comparisons, based on post hoc tests, revealed that students in Single or Non-economics double majors within the Faculty of Business, Economics & Law (BEL) appeared to display significantly greater Expediency in their learning philosophy and belief than those in:

- (a) Economics single or double majors outside BEL,  $p < .003$ ;
- (b) Single or double majors in arts or social science disciplines,  $p < .0001$ ;
- (c) Single or double majors in science disciplines,  $p < .0001$ ; and
- (d) Single or double majors in any other disciplines not included elsewhere,  $p < .0001$ .

Differences between groups on Deep Learning did not reach statistical significance at the criteria  $p < .01$ .

Table 5: Univariate  $F$  statistic and observed means for significantly affected study philosophy, beliefs, and attitudes variables ( $df = 5, 713$ ) with Study Discipline as the grouping variable.

Statistic	Significantly affected dependent variable
	Expediency
Mean square	4.89
$F$ -statistic	5.614
$p$ -value	< .0001
<b>Group mean</b>	
Economics single or double majors outside the Faculty of Business Economics & Law (BEL) (Discipline 1)	-.05
Economics double major within BEL (Discipline 2)	.09
Single and non-economics double majors within BEL (Discipline 3)	.30
Single or double majors in arts or social sciences (Discipline 4)	-.23
Single or double majors in science disciplines (Discipline 5)	-.37
Single or double majors in any other disciplines not included elsewhere (Discipline 6)	-.45

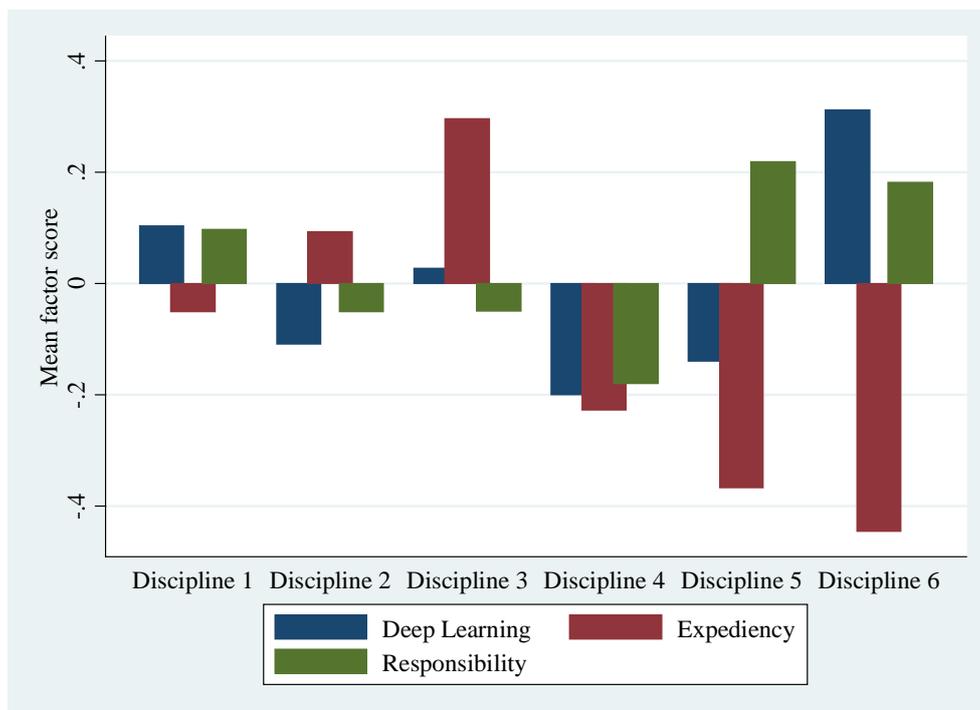


Figure 3: Study philosophy, beliefs, and attitudes variables significantly differing according to Study Discipline: Expediency

**Study Level** (lower undergraduate, upper undergraduate/postgraduate): Only Deep Learning achieved the desired level of statistical significance (Table 6 and Figure 4). Multiple comparisons from post hoc tests revealed that Deep Learning differed significantly among groups. For instance, Honours & postgraduate students appeared significantly more inclined to Deep Learning than lower undergraduates ( $p < .0001$ ), and upper undergraduates ( $p < .0001$ ). Thus, motivation toward Deep Learning appeared to vary directly with students' Study Level.

Table 6: Univariate  $F$  statistic and observed means for significantly affected study philosophy, beliefs, and attitudes variables ( $df = 2, 713$ ) with Study Level as the grouping variable.

Statistic	Significantly affected dependent variable
	Deep Learning
Mean square	4.51
$F$ -statistic	4.879
$p$ -value	$< .008$
<b>Group mean</b>	
Lower undergraduate	-.06
Upper undergraduate	-.15
Honours & postgraduate	.42

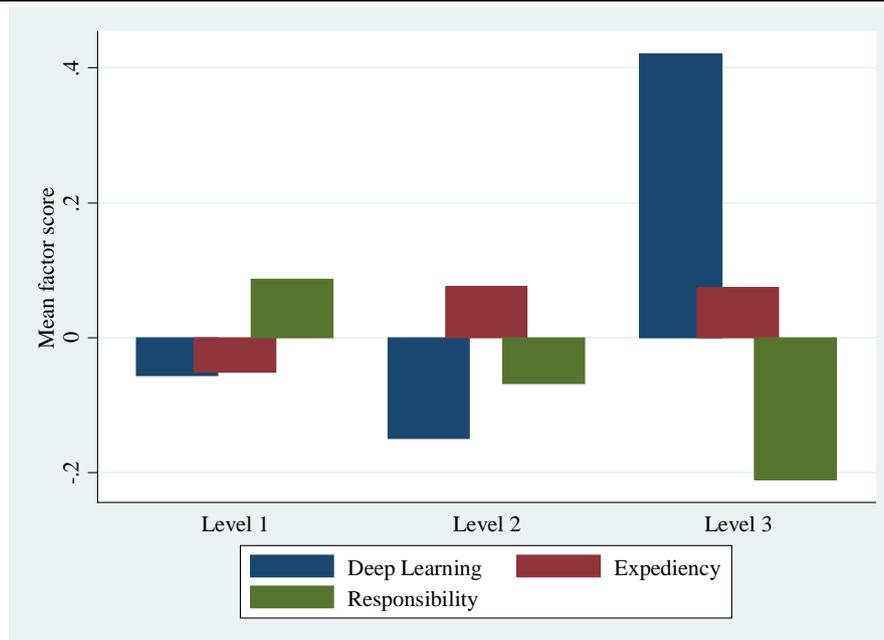


Figure 4: Study philosophy, beliefs, and attitudes variables significantly differing according to Study Level: Deep Learning

**Students' Performance:** Information presented in Table 7 and illustrated in Figure 5 shows group differences in students' performance on Expediency, and Responsibility. As revealed by post hoc multiple comparisons, the mean Expediency scores for students with a GPA  $\leq 5$  (low GPA) and GPA  $> 5 \text{ \& } \leq 6.2$  (medium GPA) appeared to be significantly higher than for students with GPA  $> 6.2$  (high GPA) at  $p$ -values  $< .001$  and  $.002$  respectively. Group differences were also shown for Responsibility. Students with GPA  $< 6.2$  appeared to be significantly more responsible than those with GPA  $\leq 5$  ( $p < .002$ ).

Table 7: Univariate  $F$  statistic and observed means for significantly affected study philosophy, beliefs, and attitudes variables ( $df = 2, 713$ ) with Student Performance as the grouping variable

Statistic	Significantly affected dependent variable	
	Expediency	Responsibility
Mean square	6.17	4.60
$F$ -statistic	7.087	4.934
$p$ -value	$< .001$	$< .007$
<b>Group mean</b>		
Low (GPA $\leq 5$ )	.11	-.09
Medium (GPA $> 5 \text{ \& } \leq 6.2$ )	.03	-.02
High (GPA $> 6.2$ )	-.24	.29

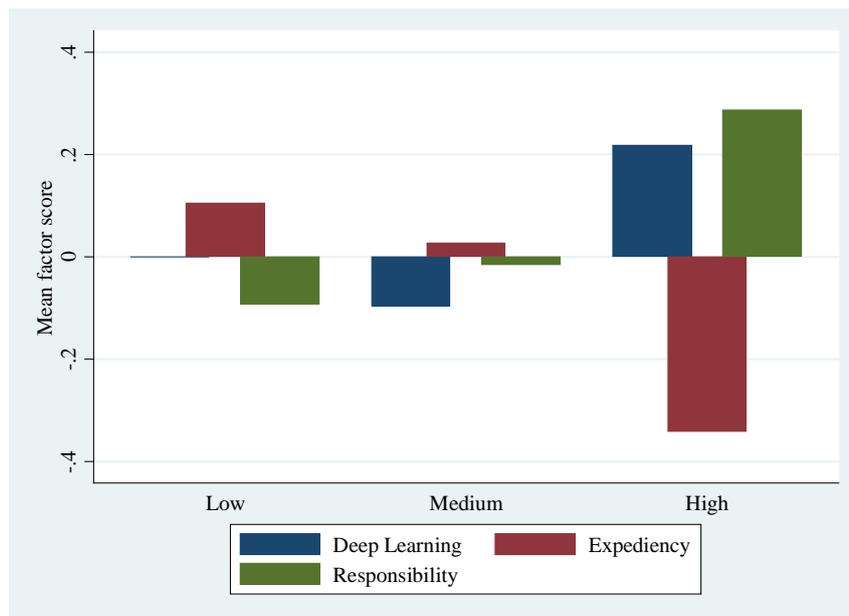


Figure 5: Study philosophy, beliefs, and attitudes variables significantly differing according to Student Performance: Expediency, and Responsibility.

**Age:** Only one of the dependent variables (Deep Learning) showed significant differences according to age (Table 8 and Figure 6). Figure 6 and post hoc multiple comparisons indicate that the mean Deep Learning score for students aged 25 years or above was significantly higher than the ones for the other two age groups (i.e., 20 years or younger, and those between 20 and 25 years) with  $p$ -values  $<.0001$  for both.

Table 8: Univariate  $F$  statistic and observed means for significantly affected study philosophy, beliefs, and attitudes variables ( $df = 2, 713$ ) with Age the grouping variable

Statistic	Significantly affected dependent variable	
	Deep Learning	
Mean square	4.63	
$F$ -statistic	5.009	
$p$ -value	$<.007$	
Group mean		
Age group 1 ( $\leq 20$ years)	-.11	
Age group 2 ( $> 20 \& \leq 25$ years)	.02	
Age group 3 ( $> 25$ years)	.58	

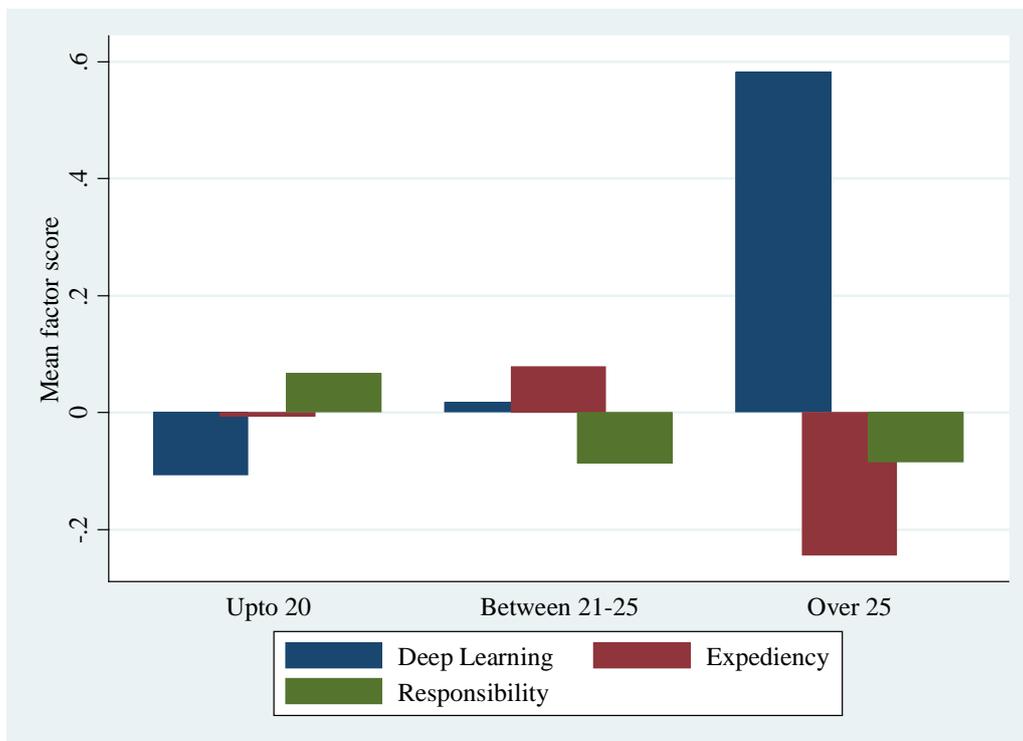


Figure 6: Study philosophy, beliefs, and attitudes variables significantly differing according to Age: Deep Learning

## Sex and ethnicity effects

This section reports data exploring the interaction effects of sex (male, female) and ethnicity [English speaking (ESB), non-English speaking (NESB)]. This is achieved by breaking down the data first by sex and then by ethnicity. The former examines sex specific effects on the remaining independent variables such as ethnicity, student performance and so on. For example, do ESB males differ from NESB males in regard to any of the dependent variables reflecting study philosophy, beliefs, and attitudes? The latter investigates ethnicity specific effect on the remaining grouping variables. As suggested by Field (2005) it is important to look at the distribution within groups.

### *Data split by sex*

Multivariate test results<sup>1</sup> suggested that one or more dependent variables reflecting female students' study philosophy, beliefs, and attitudes were affected significantly according to:

- Student performance,  $F(6, 726) = 3.694, p < .001$ ;
- Ethnicity,  $F(3, 363) = 13.854, p < .0001$ ; and
- Age,  $F(6, 726) = 4.454, p < .0001$ .

Male students differed in their study philosophy, beliefs, and attitudes according to variations in:

- Study Discipline,  $F(15, 998) = 2.379, p < .002$ ; and
- Ethnicity,  $F(3, 334) = 7.150, p < .0001$ .

Results of univariate tests (not presented in separate tables for brevity) revealed that for female students, differences in:

- Student Performance affected Expediency,  $F(2, 365) = 5.948, p < .003$ ; This contrasts with the results presented earlier in Section 5 suggest that for the combined data, two dependent variables (Expediency, and Responsibility) were affected by variations due to student performance.
- Ethnicity affected all the three dependent variables: Deep Learning,  $F(1, 365) = 8.038, p < .005$ ; Expediency,  $F(1, 365) = 21.663, p < .0001$ ; and Responsibility,  $F(1,$

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<sup>1</sup>Levene's test of equality of error variances was significant neither for females nor males for any of the three dependent variables (Deep Learning, Expediency, and Responsibility).

365) = 9.928;  $p < .002$ . Note that in the analysis in the preceding section using aggregate data (Table 4.5) ethnicity affected only Deep Learning and Expediency but not Responsibility.

- Age affected only Deep Learning,  $F(2, 365) = 10.085$ ;  $p < .0001$ .

For male students, differences in:

- Study Discipline affected Expediency,  $F(5, 336) = 4.961$ ;  $p < .0001$ ; and
- Ethnicity affected Expediency,  $F(1, 336) = 20.568$ ;  $p < .0001$ .

Results based on multiple comparisons of post hoc tests and pair-wise comparisons suggested that:

- Female students with low and medium performances ( $GPA \leq 5$ , &  $5 < GPA \leq 6.2$ ) displayed significantly greater propensity for Expediency than high performing females ( $GPA > 6.2$ ) with  $p < .002$  and  $p < .006$  respectively.
- NESB females appeared significantly more inclined toward Deep Learning, displayed a greater degree of Expediency, and appeared to be more Responsible than ESB females (respective  $p$ -values  $< .005$ ,  $< .0001$  &  $< .002$ ); and
- Females older than 25 years appeared to display greater inclination toward Deep Learning than those in two other age groups (respective  $p$ -values  $< .0001$  &  $< .0001$ ).
- NESB Male students appeared to display a greater degree of Expediency than ESB males ( $p < .0001$ ); and
- Male students in Single and non-economics double majors within BEL appeared to be more significantly inclined toward Expediency than those in Economics single or double majors outside BEL, Single or double majors in arts or social science disciplines, and Single or double majors in any other disciplines not included elsewhere (respective  $p$ -values  $< .001$ ,  $.001$  &  $.003$ ).

### *Data split by ethnicity*

Multivariate tests on data split by ethnicity<sup>2</sup> suggested that the study philosophy, beliefs, and attitudes of NESB students differed significantly due to differences in:

- Study discipline,  $F(15, 710) = 2.865, p < .001$ .

The ESB students differed in their philosophy, beliefs, and attitudes due to differences in:

- Study Discipline,  $F(15, 1373) = 2.884, p < .0001$ ; and
- Student Performance,  $F(6, 916) = 3.768, p < .001$ .

Univariate tests (tables not presented for brevity) revealed that for NESB students:

- Differences in Study Discipline did not affect Deep Learning,  $F(5, 240) = 2.860, p < .016$  as it did not satisfy  $p < .01$  criteria.

For ESB students, variations in:

- Study Discipline affected Expediency,  $F(5, 461) = 5.569, p < .0001$ ; and
- Student Performance affected Expediency,  $F(2, 461) = 5.425, p < .005$ ;

Results based on multiple comparisons of post hoc tests and pair-wise comparisons suggested that ESB students in:

- Economics double major within BEL appeared to display greater Expediency than those in Discipline not included elsewhere ( $p < .007$ ); and
- Single or non-economics double majors within BEL appeared more inclined toward Expediency than those in Single or double majors in arts or social sciences ( $p < .002$ ), and Single or double majors in science disciplines ( $p < .001$ ), and Discipline not included elsewhere ( $p < .001$ ).

These tests also revealed that medium performing ESB students ( $GPA > 5 \ \& \ \leq 6.2$ ) appeared more expedient than high performing ESB students ( $GPA > 6.2$ ) ( $p < .001$ ).

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<sup>2</sup>Levene's test of equality of error variances was not significant for either ethnic groups for Deep Learning, Expediency, and Responsibility.

## **DISCUSSION AND CONCLUSION**

In light of the preceding discussion, it is clear that students' perceptions in regard to their study philosophy, beliefs, and attitude toward teaching and learning in higher education can be categorised into a small number of representative constructs reflecting their response patterns. The latent variables defining each factor appeared to be internally consistent. Furthermore, these three extracted factors were linearly independent.

Based on the data used in this study, three factors appeared to reflect students' study philosophy, beliefs, and attitudes toward teaching and learning. The latent variables underlying each factor typified students' responses that varied between inherent commitment and motivation to gain a deeper understanding of the theory and wide-ranging applications of methods and techniques on the one hand, and their propensity to be guided by pragmatism bordering on expediency on the other, in their university studies. There appeared to exist a philosophical paradigm that one could treat university education like any other good that could be bought from the market and that its quality was dependent more on the lecturer than on the students' own motivation, effort, and organisational skills. These two dimensions apart, student responses reflected an underlying philosophical premise (Responsibility) that acquisition of higher education and its quality was primarily a function of the students' motivation, organisational ability and their own effort in academic work.

Students' response on the three factors varied according to age, sex, ethnicity, study discipline, and their GPA achievements. Business related disciplines (Single and non-economics double majors within BEL) consistently displayed greater expediency than students in other disciplines. Thus, the results of the statistical tests suggest that factors reflecting patterns of responses to study philosophy, beliefs, and attitude differ according to a set of variables epitomising the diversity in the student population.

What this suggests is the heterogeneity of the university student population and the variables that that represent this heterogeneity shape students' study philosophy, beliefs and attitudes. While the received wisdom is that students are customers (in a commercial sense), there appears to be a core group of students with beliefs about knowledge rather than grade maximisation per se. These students are keen adopt a learning approach that actively seeks not only to have good grasp of the central message, but also aims at acquiring the ability to draw correct conclusions and wider applications.

The teaching and learning environment, therefore, poses a challenge both to the staff and the students given the student clientele. A significant implication for policy makers at the school/department level and for the lecturer as an agent of the school/department is the need for diversification of the product s/he “sells” to the highly and perhaps increasingly diversified student clientele. In the end, the teacher’s challenge is the maximisation of student engagement in teaching and learning. For students, the challenge is the extent to which they rely on the lecture as the dominant, if only, determinant of educational quality, and/or how far they need to engage in self-study outside of lecture, given their objective – knowledge or grade maximisation.

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