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# Exploring student adaptation to new learning environments: some unexpected outcomes

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**Abstract**: The emerging knowledge-based society is transforming pedagogical practices in the post-compulsory education sector. One feature of this transformation is the substantial investment in new learning environments (NLEs), characterised by decreasing use of face-to-face teaching and a corresponding increase in use of information and communication technologies. While the rapid evolution of NLEs has been driven by economic/commercial forces and technological advances, and advocates claim enhanced learning outcomes, there is little critical understanding of' how this is achieved or manifested. This paper reports empirically-based research that is seeking to develop a grounded understanding, from the learners' perspective, *of* the effects of participation in NLEs. The research site is an Australian purpose-built flexible learning mode university campus where web-based resources augment on-campus face-to-face activities. The research design involves a three-year longitudinal study of students, tracking their developmental patterns in perceptions, attitudes and beliefs. Data collection involves annual measures of learning approaches, perceptions of learning environments and epistemological reflections, along with biannual group interviews. Outcomes of aspects of the first year data are reported. highlighting patterns in students' reactions not evident in previous literature and which have potentially significant pedagogical implications.

**Keywords:** deep approaches to learning; surface approaches to learning; epistemological reflection; flexible learning; information technologies, communication technologies, new learning environments; peer-based learning; perceptions of learning environments; traditional learning environments.

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## 1 Learners and learning environments

Technological innovation is driving the emergence of a knowledge-based society and this is transforming teaching and learning in post-compulsory education, and especially in universities. Such transformations include how teaching and learning are to be supported, with increasing reliance on new learning environments (NLEs). In this paper NLEs are characterised by decreasing reliance on face-to-face teaching, a greater use of peer-based learning tasks, and an increasing reliance on information and communication technologies (ICTs), particularly the use of the Internet [1]. They also include a change in what is to be learned, with an increasing emphasis on the development of "the knowledge, skills and understanding which [learners] can use as a basis to secure further knowledge and skills" [2, para. 4.14].

There is extensive research literature on learners' experiences in more traditional learning environments (TLEs), and this has guided teaching innovations in those types of environments [3-5]. On the other hand, research into the educational efficacy of NLEs is necessarily in its infancy. The impetus for the development and use of NLEs has been associated more with innovations in information technology rather than an enhanced understanding of human learning in NLEs [6]. Further, there is an increasing realisation that investment in NLE infrastructure alone does not necessarily improve access or learning outcomes [7].

There is a need to explore NLEs in terms of students' overall experiences rather than a narrower focus on the use of ICTs as a set of intervention strategies for extending the reach of higher education. Such intervention projects often address 'process' issues from Biggs 3P model [3]. What we are arguing, along with Biggs and others, is that a broader set of factors need to be investigated and understood, including a more socio-environmental approach to process issues. The introduction of NLEs inevitably involves new processes, tools, values, dispositions and assumptions. What students bring to these environments, and how they respond once in them, must influence whether they effectively participate and learn in them. Thus the huge financial investments from both the private and public sector directed to developing NLEs are not yet matched by substantial empirical evidence that suggests how learners become acculturated to them, or the impact of that acculturation on their approach to learning.

In investigating TLEs, Prosser and Trigwell [4] argue that, while students' perceptions of their context and their situation in that context vary, there are systematic patterns in the relationship between these and the approach to learning adopted, and their learning outcomes. Those patterns reflect spirals of experience that draw on both the understandings and capacities that students bring to their learning [4, p.73], and demands and opportunities that are subject specific [4, p.70]. Individuals have to interpret or make sense of contexts, and "interpretation begins with conceptions that are replaced by more suitable ones" [8, p.267], where 'suitability' is seen as an ontological challenge. Thus, lived experience leads to meanings that are contextually grounded in culture and community, where all are constantly co-evolving.

Just as Prosser and Trigwell [4] investigated students' approaches to learning in TLEs, there is now a need to review their (and related) work in order to develop valid and useful insights into how learners' participation in NLEs impacts on their prior dispositions to learning. Support for this can be seen in the literature on online learning or computer-based learning where it is argued that learners require a new mindset to function effectively in NLEs [7,9,10]. The thesis underlying this work is that NLEs initiate new opportunities and demands on students compared to those provided by TLEs, thereby inviting students to reconstitute their views of themselves as learners and their approach to learning in particular ways.

Assuming that research into students' experiences in TLEs can be projected to NLEs can at best be simplistic, and at worst dangerous. Studies need to focus on deeper and more sustainable factors in the NLEs in order to assist in understanding

- the ways learners engage in learning as a result of their participation in NLEs
- how they reconstruct their beliefs about the learning process, context, tools and artefacts in NLEs
- how this new understanding can assist to improve the educational effectiveness of the design and operation of NLEs.

These issues are being explored in a three year project, funded by the Australian Research Council. Data collection began in 2002. This paper focuses on the first issue, and is based on the data collected in the first year of that larger project.

## 2 Research design, site and sample

A longitudinal research design involving discipline-based cohorts is being used to track developmental patterns in learners' perceptions of themselves as learners and of their learning environments. This approach was adopted in the belief that changes in beliefs require time to manifest themselves and to be recognised by the individual.

The principal site for this project is the purpose-built Logan Campus of Griffith University**,** located 35 km south of Brisbane, Australia. Details of the rationale, design, development and implementation of the campus can be found in Taylor and Blaik [11]. This setting is unique in that all students, in all programs, experience learning in NLEs, as defined earlier. All teaching involves at least a web-supplement level of online delivery [12]. That is,

> "Enrolled students can access [via the Web] information on units of study that is additional to that available in the university's calendar or handbook. The information may include course descriptions and Study guides, examination information, assessment overview, reading lists and other online learning resources. The information is used to supplement traditional forms of delivery." [12, p.37]

On this campus NLEs also involve the use of the Blackboard course management software as the standard interface with this information. Its use facilitates access to a range of additional tools for interaction and/or communication, and many units of study incorporate their use as optional or compulsory activities. Most teaching retains some face-to-face component.

The current sample consists of cohorts in their first year of Business and Primary Education degrees on Logan Campus in 2002. Complete questionnaire data had been collected from 58 (30:28 m:f) Business students and 46 (39:7 m:f) Education students. In addition, focus group interviews were conducted with three groups of Business students and one group of Education Students.

## 3 Data collection procedures

Data was collected at the cohort and subgroup level. Cohorts provide written responses to three questionnaires.

- A short form of the Study Process Questionnaire (SPQ) developed by Fox, McManus and Winder [13]. The SPQ is a well established and commonly used instrument designed to identify students' approaches to learning [14]. The 18-item Short Form has six subscales and two second order factor structure - a deep and a surface approach to learning (after Zeegers [15]). Items included in the questionnaire include: "*I find that at times studying gives me a feeling of deep personal satisfaction:, and "I generally restrict my study to what is specifically set as I think it is unnecessary to do anything extra".* Respondents rate themselves on a five point scale, from (1) 'if the item is *rarely true* of you' to (5) `if the item is *usually true* of you'.

- The Perceptions of Learning Environments Questionnaire (PLEQ) [16]. This semi-structured open-response questionnaire invites students to identify aspects that they perceive help or hinder their learning in specific learning environments that they nominate from a supplied list. The original list (large and small group lectures. - seminars, one-to-one teaching, practical settings on and off campus) was augmented in this study by the addition of 'informal or self-directed peer group learning activities', 'formal or lecturer-required peer group learning activities', and - web-based learning environments'. These additions invite respondents to address these essential features of NLEs. A typical response provides a 'statement' and a 'reason'. For example, "In seminars, my learning is helped when the tutor gives practical examples (statement) because it increases my understanding of the concept (reason)".

- The Measures of Epistemological Reflection (MER) [17]. This short-essay questionnaire is designed to assess student epistemological development in terms of six domains: roles of the learner; roles of the teacher; rotes of peers; roles of assessment; the nature of knowledge; and,

the process of decision-making. The following set of questions from the instrument relate to the first of those domains, i.e., roles of the learner.

> "Do you learn best in learning situations which focus on factual information or situations which focus on ideas and concepts?
>
> Why do you learn best in the type of situation you chose above?
>
> What do you see as the advantages of the choice you made above?
>
> What do you see as the disadvantages of the choice you made above?
>
> If you could give advice to anyone on how best to succeed in university studies, what kind of advice would you give them?' Talk about what YOU believe is the key to doing well in university studies."

All three instruments have been used in TLEs in tertiary settings (e.g. Baxter Magolda [18], Clarke [ 19], Prosser & Trigwell [4]).

Focus group interviews involving subgroups of the cohorts allowed exploration of particular topics, including: students' expectations of university life; how they have been changed by university experiences; current and future challenges of university life; perceived responsibilities of themselves and their teachers for their learning; and, forms and quality of support for their learning.

## 4 Findings

This section provides an overview of some of the findings. Given that these findings are based on the first year of the project we view them with both scepticism and delight. Our scepticism reflects tentativeness over their 'stability' and generalisability. Our delight reflects their challenge to some of our expectations - the research team approached the topic with an open mind, and some professional scepticism.

### *4.1 Approaches to learning*

The relatively small size of the two cohorts studied means that most statistical tests are of questionable value. Nevertheless, the data from those cohorts can be compared with the results from other larger studies. In particular, it can be compared with that of Zeegers [15, and personal communications]. An analysis and comparison yields some unexpected outcomes.

1 On only one subscale (surface motive) is there any difference between the two cohorts. In that case, Business students tend to express a greater reliance on surface motives than do the Education Students.

2 By comparison with the students sampled by Zeegers, these cohorts tend to indicate:

- equivalent reliance on surface motives
- decreased use of surface strategies
- decreased reliance on deep motives
- increased use of deep strategies.

### *4.2 Perceptions of learning environments*

Data collected in TLEs using the PLEQ and detailed elsewhere [16,19], led to the identification of a large number of bipolar categories (i.e. positive and negative comments). The focus in the discussion here is on the responses associated with NLEs. The addition of the peer-learning and web-based learning environments as new options gave rise to a number of new categories shown below in *italics*. As with the categories that emerged from the study of TLEs, these new categories tended to be bipolar.

Exposure to NLEs was characterised by involvement with ICTs:

- *Electronic access to content/material* ("Lecture notes have been posted", "Information can be retrieved" [+]).
- *Availability of computer system* ("I sit for an on-line test" [+], "Uni system is offline'° [-]).
- *Computer system design* ("User friendliness is optimised" [+],"I don't understand something" [-]).

and involvement with group activities:

- *Group dynamics* ("We meet regularly", "We work together to get answers" [+],"Not able to find a group", "We had conflict" [-]).
- *Effect on group dynamics* ("Workload may be shared equally", "Everybody gets a chance to participate" [+], “Groups are already formed", "Don't know who they are" [-])

These comments indicate first that students are finding the NLEs to be integral and salient to their learning and second that the NLEs, like TLEs, can provide both satisfactions and challenges.

### *4.3 Epistemological reflections*

The MER instrument was derived as an interview protocol. Given its use here as a written-response instrument, it is not surprising that student responses tended to be quite unlike the ‘data rich' examples provided by Baxter Magolda [18] and discussed more recently in Baxter Magolda [20]. This made interpretation of responses in terms of her categories somewhat difficult. Thus, no attempt was made to locate individual students in general ‘categories of epistemological orientation' given the relative paucity of our data. Rather, where the data allowed, their epistemic reflection was rated in each of the six domains of the questionnaire. Independent categorisation by two members of the research team yielded essentially identical patterns of categorisation across those domains. The trends included:

- Individuals did not display a consistent pattern of epistemological reflection across the six domains. In particular, for each individual there tended to be one domain in which their epistemological reflection was most advanced.
- The domains in which the most complex epistemological reflections tended to be found were ‘decision making' and ‘nature of knowledge'.
- The domain in which the least complex epistemological reflections tended to be found was ‘the role of teacher'.

## 5 Implications

The intention of using the three instruments was to provide opportunities for triangulation across the data sets, in addition to the opportunity for exploration of longitudinal patterns in terms of each instrument.

The SPQ results are of considerable interest, primarily because they are counter-intuitive. First, this campus was established in a socio-economically disadvantaged community, and the majority of the student cohorts are drawn from that community. Experience suggests that academics teaching at this campus tend to see these students as less academically inclined, and more likely to use surface strategies than ‘normal' students. The data challenges that assumption. In particular, these students tend to be less likely than students at other university campuses to express a commitment to surface motives. On the other hand, they tend not to be less likely than students at other university campuses to express deep motives.

Second, most commentary on the 'surface-deep' distinctions in terms of students' approaches to learning, assume a strong correlation between motive and strategy. That is, low surface motives are assumed to be associated with reduced use of surface strategies. Further, most commentary also assumes that teaching practices need to target both motives and strategies in order to achieve promote deeper approaches to learning. Again, this data tends to challenge both assumptions.

Of particular interest to our research is the finding that these students appear to be less likely to adopt surface strategies, and more likely to adopt deep strategies than their counterparts at other campuses, or even their own motives, suggest. One clear implication is that they are adopting a deeper approach to learning, an approach that reflects factors other than their own motives. We turn to the other instruments to suggest some possible contributors to this phenomenon.

The PLEQ data show a high level of engagement with the experienced learning environment, including engagement with specific elements of the NLEs, especially the ICTs and group activities.

This suggests that these students have experienced a relatively successful transition to these NLEs. The corollary is that those aspects of the NLEs have not alienated these students. Indeed, as elaborated below, these students seem to have found new opportunities for learning through accessing these particular features of the NLEs.

Tile MER data provide additional insights, three of which warrant highlighting here. First, the existence of inconsistent patterns of epistemological reflection across tile six domains implies that individuals are being epistemologically ‘stretched' by the particular requirements of participation in these learning environments. The relative importance of having to make decisions as a ‘stretching’ activity reinforces the general proposition that learning activities that incorporate elements of choice are desirable, as argued by Biggs [3] These findings suggest additional values to those associated with motivation and ownership; often used to justify choice as a design feature of learning activities in NLEs.

Second, the opportunity to use ICTs was an unexpected contributor to the opportunity to develop more sophisticated epistemological reflections on ‘the nature of knowledge'. Here the stimulus question was *"When two sources explain the same thing differently, can one be more correct than the other?"* The first probe question is *"When two explanations are given for the situation, how would you go about deciding which explanation to believe? Please give details and examples."* Those with the more sophisticated level of reflection often referred to the potential to use ICTs in the decision process. For example, one respondent answered the second question thus: "Question my lecturer, question the actual author if possible by e-mail." This response suggests that some of these students clearly believe they have opportunities to direct questions to sources in ways that those in TLEs do not.

Third, there is very little evidence to suggest that, in this context, the role of teacher was leading to a ‘stretching' of epistemological reflections. This sits uncomfortably with literature that focuses on the role of teachers, such as Ramsden [5] and Prosser and Trigwell [4], which implies that the approach to teaching is centrally important to the learning outcomes. In this setting there is a marked preference for a number of ‘standard' indicators of good teaching; including ‘clear goals', 'appropriate workload' and ‘appropriate assessment', all of which are scales in the Course Experience Questionnaire (see Prosser & Trigwell [4]). On the other hand, there is very little evidence that these characteristics are balanced by teaching that challenges how students think about themselves as knowers or learners, or even how they think about the information presented. Instead, those challenges are more likely to be associated with the student themselves, or with their peers.

Evidence for this is most easily found in the transcripts of the focus groups. For example:

I Who challenges you most to think for yourself - for example, yourself, your peers, your tutors, your lecturers?
S I I think that for me it's a combination of me and my peers.
S2 Yeah, I agree. We don't get much contact with lecturers or tutors. They're trying to take away the spoon and make us get out there and fend for ourselves. That's where the online resources are really good.

In another group:

I Apart from commitment, what else is important to your success?
Sa If you can form a good group....
Sb I really think group work is the key to getting through.
Sc You're developing your skills whilst you're doing it. Not only what you're discussing but there's your skills of listening, being; more empathetic...
Sd Seeing somebody else's point of view and being able to go "yeah, ( haven't really thought about it in that way", and draw on other people's experiences and that.

One of the central features of the approach to the pedagogical design of all teaching on this campus was the use of group-based learning tasks, as discussed more fully in Taylor and Blaik [11]. Allied with this commitment was the attention given to ensuring that students had an opportunity to revise their views about the value of group work, and to develop appropriate skills, as discussed in Taylor [10]. Thus, it was the approach to the design of and induction into the learning environment, rather than the approach to content-focused teaching per se, that was centrally important to learning opportunities and the resulting outcomes in terms of challenges to, and the development of, these students' epistemic beliefs.

What appears to be emerging from this data is a sense that the development of more sophisticated capacities for epistemological reflection are arising in and through the challenges and opportunities associated with the `learning environment', rather than with the 'teaching environment' (where the latter is seen relatively directly associated with the actions of the lecturer and/or tutors). A related implication is that those who design NLEs need to focus on this broader agenda. That is, a narrow focus on 'the delivery' of clear goals, appropriate workload, and appropriate assessment may be insufficient to create opportunities for learning that are likely to stretch the epistemological sophistication of students. These cautions are highly consistent with the findings of Katung, Johnstone and Downie [21, p.57]:

> "An individual's level of processing of learning material is not fixed: it appears to be affected by the individual's total learning experience. The question of how to encourage this development becomes not just pertinent but urgent."

These findings are highly suggestive of ways to encourage development of particular learning strategies. Those strategies are themselves strongly associated with the development of 'knowledge, skills and understanding which [learners] can use as a basis to secure further knowledge and skills', as called for by Dearing and his colleagues [2].

## 6 The future

There is a related sense that the intention to focus on students' approaches to learning and epistemic beliefs is providing a very useful lens to look at student's experiences of these NLEs. The interpretations offered here will become increasingly important as tentative hypotheses to be investigated in the subsequent sampling of student's development. In particular we expect that the influence of particular teachers on student's approaches and epistemic beliefs will be manifested within the longitudinal study.

As the first sample in a three-year study, this work inevitably raises more questions than answers. At a very general level, it provides support for the thesis underlying the research, namely that NLEs initiate new opportunities and demands on students compared to those of TLEs thereby inviting students to reconstitute their views of themselves as learners in particular ways. For example, these students appear to be experiencing an invitation, even a requirement, to become less teacher-dependent in their approach to learning. And they indicate both an awareness of and a valuing of the set of resources provided to assist them in achieving this independence.

On the other hand, there is a lack of strong evidence for the development of learner autonomy, seen primarily as an individualistic construct. Rather, the evidence points to a strong relationship between the over-all learning environment, and its constraints and affordances, and the capacities that students are developing. This interpretation is consistent with other evidence from students on this campus, where third year students tend to equate "work on campus" with "group work rather than formal class contact" [11, p.83]. Indeed, rather than learner autonomy, the twin features of NLEs involving use of ICTs and peer-based learning tasks appear to be promoting the development of community - a learning community. And within this community students are tending to use strategies that the educational research community regards as deep rather than surface. Given the recognition that "online learning is not the complete panacea that many originally envisaged" [12, p.1], these findings suggest the possibility of significant 'collateral benefits' for student learning from the investment in NLEs.

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