

## **Adjusting to university study: The experiences of students from a manufacturing background undertaking university level study<sup>1,2</sup>**

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A recent trend in university study has been the recognition of non-traditional criteria for entry into undergraduate study, particularly for mature aged students. One increasingly common mode of entry has been through recognition of prior learning (RPL) whereby comparable industrial/commercial experience has been seen as equivalent to more formal modes of matriculation. In this study, the academic experiences of 33 male students from an industrial background were investigated as they completed a two year education degree. The purpose of the study was to investigate the quality of student adjustment to an academic environment following extensive industrial training and experience. It was hypothesised that some difficulty in academic adjustment to university study may be experienced by this group, potentially manifesting in less successful outcomes. Students completed a series of questionnaires relating to learning (approaches to learning, self regulation and epistemological beliefs) as well as a series of open ended questions relating to academic and social adjustment. Data indicated that students had developed a positive learning profile, indicated by a bias towards deep learning, adaptive self-regulation and a relatively sophisticated epistemology. However, the continued naive belief in the structural simplicity of knowledge appeared to have a significant diminishing effect on the quality of adjustment and on the quality of learning outcomes. Open ended responses revealed patterns of academic adjustment consistent the flawed understanding of the nature of university learning. Implications of these data for both RPL entry and ongoing support are broached.

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During an introductory class on "Professional Preparation for Teaching", students were asked to think of a topic of interest and to develop a series of objectives that might underlie the teaching of that topic. Among the class were a group of students undertaking a shortened course in teacher training based upon their prior experience as tradesmen in industry. One of

the students, from a metalworking background, determined that he would prepare a lesson on "making a toolbox" - a typical task in junior secondary design and technology. When asked to explain the major purpose behind the activity of building a tool box, the student replied that it was clearly to "carry tools around". When probed for further objectives, the student was at a loss to conceptualise what learning beyond the processes involved in construction could be an outcome of the exercise. A discussion ensued in which several other potential outcomes were broached with the student - understanding of the properties of metal, understanding the principles behind hinge selection and use, and so forth. It was then suggested to the student that these might not only be measurable outcomes of the activity, but might also provide the basis for further studies of fabrication with metal, thus providing a conceptual knowledge base upon which deeper understanding could be built. The student readily identified with these possible outcomes. Tellingly, his comment was to the effect "Wow - they never explained it to us like that in TAFE".

What implications are there to this anecdote? It would seem first and foremost that while highly motivated, the student's engagement with the learning context was premised on a somewhat limited conception of what learning entailed and of where the possibilities of learning could be taken. This is not necessarily an unusual premise for novice teacher education students - or for that matter any other beginning university students (eg. Cantwell & Hempenstall, 2001). Their limited tertiary education experiences would be likely to be associated with a relatively naive conception of learning and knowing - one which could be reasonably expected to assume more sophisticated forms through continued higher education. However, in this instance, aspects of the student's background may also act as mediating influences. Like an increasing number of students undertaking teacher education programmes in Australia, this student obtained entry into a shortened programme based upon a recognition of prior learning and experience (RPL) in a cognate field. In this instance, the student entered the Bachelor of Education (Design & Technology) degree from a metalworking trades background as part of a retraining package following the closure of a major industry.

In a recent paper, Trowler (1996) raised concerns about the degree to which entry via RPL in the British context has been able to balance accreditation of relevant experience with the need to recognise the unique demands of learning in a university context. Most salient in this context is the level and abstraction of the knowledge to be acquired and understood relative to other forms of post compulsory education. As Trowler (1996) has noted, there are significant epistemological and cultural factors potentially impinging on the success of RPL students:

What candidates are effectively being asked to do is to convert practical knowledge ... into a form of propositional knowledge which is conceptual, explicit, coherent and organised along disciplinary lines ... (p20)

Implicit in Trowler's (1996) contention is that there are significant qualitative differences in the kind of knowledge expected of students learning in a university environment, and the kind of knowledge more typically associated with industry learning. In a similar vein, Rawson (2000) questions the applicability of essentially "skills" based curricula to the espoused objectives of depth of personal learning typical of university learning (also Biggs & Collis, 1989).

Debate reasonably exists, therefore, as to whether there are specific issues of concern that may separate RPL entry students from not only mainstream school leavers but also from other non-traditional entry adult students. There is certainly a wealth of evidence pointing to the success of mature aged entry students in the university system (Archer, Cantwell & Bourke, 1999; Cantwell, Archer & Bourke, 2001; Hoskins, Newstead & Dennis, 1997; Richardson, 1994). Much of this research, however, has focussed on mature aged students entering university via some form of preliminary or enabling programme. For these students, orientation to university study (both epistemologically and culturally) is generally an explicit component of the enabling course, thus providing a platform from which subsequent undergraduate study can spring. Our own research, for example, indicates an extremely strong undergraduate performance amongst those mature aged students who successfully matriculate from these enabling courses (Cantwell et al., 2001; also Hoskins et al, 1997).

For students entering university directly via RPL, however, there is a generally tacit presumption that the developmental changes typically associated with completion of enabling study are in fact present on enrolment - that the prior learning in cognate fields has seen, a priori, the construction of an appropriate representation of the discipline among RPL students. Trowler (1996) sees in this kind of reasoning three problematic assumptions. These include a failure to identify the ontological limitations to the presumed everyday learning; the presumption of reflectivity in everyday experience; and the presumption that the reflection that does occur is necessarily equivalent to the presumed requirements for university study.

Given the problematic nature of the assumptions underpinning RPL enrolment, the present study aims to evaluate the degree to which RPL students possess the assumed metacognitive sophistication both upon entry to university and through the experience of university. By metacognitive sophistication we refer here to three particular domains of metacognitive knowledge that we argue underpin Trowler's (1996) three problematic assumptions of RPL. It may reasonably be argued that the quality of reflectivity emerges from an interaction between the understandings of the nature and limitations of knowledge and knowledge acquisition; understandings of the quality and form of motivation driving the use of particular categories of learning strategies; and understandings of the nature of complexity underlying learning and of the potential mechanisms for orchestrating such learning. As Cantwell (2000) has argued, these kinds of metacognitive knowledge manifest in the individual learner in the form of dispositions - in a sense as internalised and overlearned patterns of response to challenging learning situations. That is, how we determine the form of engagement in learning is reflective of our own constructed metacognitive knowledge - our individually constructed "text book" of learning providing the explanations of our prior learning and directions for resolving the challenges of current and future learning.

For the RPL students involved in the present study we hypothesise that the salient metacognitive knowledge brought to the context of university study will be most reflective of

the assumptions of trade learning and practise. This, we suggest, will manifest primarily in a less sophisticated understanding of the nature of knowledge as the object of both analysis and acquisition. Following Schommer's (1993) conceptualisation of epistemological knowledge, we distinguish between the form and structure of knowledge (as indicated by Schommer's description (in the naive form) of knowledge as both *simple* in structure and *certain* in form) on the one hand, and the presumptions of process underlying the acquisition of knowledge (again in the naive form, belief in *innate ability* and *quick learning*). We hypothesise that the industrial experience of the trade background RPL students is likely to be both effortful and subject to individual skill development. What is more problematic in our view is the translation of understandings of the form and structure of knowledge from industry to academia. The possibility of disjuncture between the understanding of the process of knowledge acquisition and understanding of the object of those processes presents a potentially powerful barrier to effective transition to university study. This possibility in turn relates a potentially paradoxical disjuncture between motivational states and perceptions of the object of learning. Typically mature aged students at university present, in Biggs' (1987a) terms, with predominantly deep learning intentions (Archer et al, 1999; Richardson, 1994). That is to say, mature aged students, to a significantly greater extent than younger university students, are motivated by a desire for personal fulfilment, and tend to adopt learning strategies consistent with the desire to construct personally meaningful representations of the knowledge to be learned. Not surprisingly, then, mature aged students also typically report a greater willingness to adaptively respond (in Cantwell & Moore's (1996) terms) to the strategic demands of learning. The paradox, however, lies in the potential disjuncture between expressed motivational and self-regulatory dispositions and the naivety of the initial understanding of the object of learning - that is in the structure and form of knowledge to be engaged and understood. In a qualitative sense, the conception of deep learning underlying these students' approach to learning, and the strategic flexibility acknowledged as necessary to achieve this, may indeed be overlaid onto the enduring, but naive "practical knowledge" emanating from the industry background.

In summary, we aim in this study to examine the relationships between the qualities of metacognitive knowledge brought to university study by a specific group of mature aged learners - those entering under RPL from an industrial background - as potential mediators of both the quality of adjustment to university study and to academic achievement.

### **Method**

*Subjects:* The study included 33 students who had entered into a two year Bachelor of Education (Design & Technology) course on the basis of prior industrial experience. All respondents were male. Mean age of participants was 39 years (sd. 7.50), ranging from 28 to 56 years. Twenty-three of the participants were married, 10 were single. Prior to obtaining their trade qualification, 22 of the students completed a secondary education up to Year 10, while a further 11 completed secondary education up to Year 12. Twenty-four of the participants had obtained trade qualifications in the metal trades, with the remaining nine spread across a variety of trades areas. Mean length of time in these occupations was 14.18 years (sd. 7.79 years). Seven of the participants had begun their study in 1998; 12 in 1999, 7 in 2000 and 7 in 2001. Twenty two of the students were sponsored under the retraining programme provided by BHP, while the remaining 9 students were private enrolments.

### *Materials*

Materials for the study consisted of a demographic information sheet, three questionnaires and a series of open-ended questions. Demographic information sought included age, marital status, prior schooling, trade background, years in previous occupation, sponsorship and year of enrolment. Three questionnaires relating to aspects of learning were provided.

Schommer's (1993; 1998) *Epistemological Beliefs Questionnaire* was included as a measure of student understanding of the nature of knowledge. The version used was a shortened form of 42 items presented on a five point Likert Scale. Four beliefs about knowledge may be identified. In their naive form these include a belief in Simple Knowledge, a belief in the Certainty of Knowledge, a belief in Innate Ability to acquire knowledge, and a belief in Quick Learning. Reliability estimates (Cronbach alpha) were acceptable for all scales (Belief in Innate Ability, .69; Belief in Simple Knowledge, .60; Belief in Quick Learning, .70; Belief in Certain Knowledge, .66).

Biggs' (1987b) *Study Process Questionnaire* was included as a measure of the underlying conception of learning driving engagement. The approach reflects an interaction of motivations and strategic choices. Three approaches may be identified: a Surface Approach, a Deep Approach and an Achieving Approach. The questionnaire includes 42 items presented on a five point Likert scale. Reliability estimates for the three scales were acceptable (Surface approach, .60; Deep approach, .81; Achieving approach, .81).

Cantwell and Moore's (1996) *Strategic Flexibility Questionnaire* provided a measure of the manner in which students metacognitively deal with issues of complexity in learning. The questionnaire includes 21 items presented on a five point Likert scale. Three self-regulatory orientations may be identified: an Adaptive self-regulatory orientation, and Inflexible self-regulatory orientation and an Irresolute self-regulatory orientation. Reliability estimates for the three scales were acceptable (Adaptive, .73; Inflexible, .73; Irresolute, .70).

Students were also asked to provide written responses to 10 open-ended questions addressing such concerns as expectations and feelings on enrolment, reactions to course participation, feelings towards the support mechanisms available, and perceptions of any change in motivation and goal.

Finally, academic achievement information was obtained from university records in the form of a cumulative 7-point GPA. The GPA is calculated on the basis of academic grade achieved in individual subjects weighted by the credit point allocation for that subject. Subjects attracting an Ungraded Pass (such as teaching practices) are not included in the calculation of the GPA. A High Distinction equals a seven, Distinction equals a six, a Credit a five, a Pass a four, and a Fail a zero. The mean GPA for subjects in this study was 4.42 (sd 1.09, range 2.21 - 6.69), representing a pass average.

#### *Procedures:*

Students received the questionnaires as a package in normal class time. After explaining the purpose of the study and obtaining informed consent, students completed the questionnaires at home and returned them by mail to the researchers. Approximately 50 questionnaires were distributed, with 33 returned.

### **Results**

We examine firstly the profile of the respondents as a group. By way of comparison, data from comparison populations are included. The sources of these comparative data are indicated in the various tables. All statistical analyses were conducted using *Statistica for Windows, v6*, (StatSoft Inc., 2001).

*Epistemological beliefs:* Scale mean responses to the *Epistemological Beliefs Questionnaire* are included in Table 1. It should be remembered that the lower the score, the more sophisticated the epistemological belief. A repeated measures ANOVA indicated significant differences in the pattern of responses to the epistemological belief scales ( $F$  3,

96 = 39.20,  $p < .001$ ) Post hoc Scheffé analysis indicated a significantly more naive belief in Simple Knowledge compared to all other scales. That is, while these students held relatively sophisticated understandings about the active and effortful manner in which knowledge is acquired, they reported slightly less sophisticated understandings of the tentativeness of that knowledge, and significantly more naive understandings of the structure of that knowledge. The comparative data indicated that other undergraduate students tended to see knowledge as relatively complex, but were more naive in relation to both the certainty of knowledge and the processes by which knowledge is acquired. Practising teachers, on the other hand, tended to report more sophisticated beliefs across the board. We suggest that the pattern reflected by the RPL students is consistent with the essentially procedural knowledge typical of trade level education. The resilience of this conception of a simple structure to knowledge is reinforced in the comparison across time. Assuming homogeneity amongst the RPL group - that is a lack of cohort difference on initial enrolment - then any difference in the pattern of response to the Epistemological questionnaire as a function of year of entering university may well be taken as indicative of an institutional effect modifying epistemological beliefs.

**Table 1:** Comparison of the reported epistemological beliefs of RPL students with those of other selected groups

	RPL Industry (n=33)	Under 20 Undergraduates (n=55) <sup>1</sup>	Over 25 Undergraduates (n=66) <sup>1</sup>	Practising Teachers (n=184) <sup>2</sup>
Quick learning	2.26	3.05	2.95	2.05
Innate Ability	2.17	2.43	2.42	2.05
Certain Knowledge	2.41	2.45	2.40	2.18
Simple Knowledge	2.92	2.19	2.10	2.36

1 data sourced from Cantwell & Hempenstall (2001)

2 data sourced from Scevak, Cantwell & Chan (in progress)

To test this proposition, a 4 (Year of Enrolment) X 4 (Epistemological belief scale) ANOVA was conducted. The analysis revealed no significant effect for year of enrolment on epistemological belief ( $F_{12,66} = 0.07$ , ns). In other words, these students retained a belief in the essential simplicity of knowledge despite exposure to quite complex and abstract material in the course of their study.

*Approaches to Learning.* Scale means from responses to the *Study Process Questionnaire* are included in Table 2. A repeated measures ANOVA indicated significant

differences in the pattern of response to this questionnaire ( $F_{2,64} = 5.02, p < .01$ ). Post hoc Scheffé testing revealed scores on the Deep approach to be significantly higher than scores on the Surface approach. This finding is consistent with expectations for mature aged students, as for example, the pattern of response of mature aged enabling students in Cantwell and Grayson's (in press) data. A 4 (Year of Enrolment) X 3 (Approach scale) ANOVA revealed no significant change in the pattern of response as a function of year of enrolment ( $F_{6,56} = 1.79, ns$ ). In summary, RPL students appear to maintain a bias towards a deeper approach to learning over the duration of their study.

*Self-regulatory control.* Scale mean responses to the *Strategic flexibility Questionnaire* are included in Table 3. Repeated measure ANOVA indicated a significant difference in the pattern of response to the SFQ items ( $F_{2,64} = 3.57, p < .05$ ). Post hoc Scheffé testing indicated a near significant ( $p < .1$ ) bias towards adaptive control processes above both inflexible and irresolute control. No effect for time of enrolment was evident in the pattern of responses ( $F_{6,56} = 1.63, ns$ ). In summary, like other mature aged undergraduates, the respondents appear to adopt a functional self-regulatory profile that is maintained for the duration of their study.

*Academic achievement.* At a purely descriptive level, approximately one-third of the respondents (10 students) achieved a GPA of less than 4.00 - that is, a failure level. A further one-third (10 students) achieved a pass level GPA, while the remaining third achieved at a credit level (10 students) or higher (2 students). The relationships between the measures of individual differences and academic achievement were assessed using zero-order correlations. These are included in Table 4. Due to the limitations of the sample size, only two of the

**Table 2:** Comparison of the reported approaches to learning of RPL students with those of other selected groups

	RPL Industry	Enabling Students aged under 211 (n=131)	Enabling students aged over 211 (n=58)	Enabling students entering via TAFE based certificate1 (n=28)
Surface Approach	3.12	3.36	3.08	3.37
Deep Approach	3.49	3.08	3.34	3.03
Achieving Approach	3.25	3.25	3.21	3.19

1 data sourced from Cantwell & Grayson (in press)

**Table 3:** Comparison of the reported approaches to self-regulatory control of RPL students with those of other selected groups

	RPL Industry (n=33)	Under 20 Undergraduates (n=55) <sup>1</sup>	Over 25 Undergraduates (n=66) <sup>1</sup>
Adaptive control	3.37	3.07	3.30
Inflexible control	3.03	3.11	3.16
Irresolute control	3.05	2.99	3.04

<sup>1</sup> data sourced from Cantwell & Hempenstall (2001)

Measures yielded significant relationships with academic achievement: a belief in Simple Knowledge and Irresolute strategic control were both significantly associated with poorer academic performance. Nonetheless, other relationships were substantial if non-significant. Positively associated with academic achievement were a deep approach, more sophisticated epistemological beliefs and both adaptive and inflexible strategic control. Surface learning was negatively associated with academic outcomes.

**Table 4:** Zero-order correlations between measures of individual differences and academic achievement

	GPA
Surface Approach	-.23
Deep Approach	.32
Achieving Approach	.13
Belief in Innate Ability	-.21
Belief in Simple Knowledge	-.36*

Belief in Quick Learning	-.31
Belief in Certain Knowledge	-.32
Adaptive control	.22
Inflexible control	.28
Irresolute control	-.41*

\*  $p < .05$

The data present a profile of RPL students that in a number of ways is typical of mature aged students returning to university study (Archer, Cantwell & Bourke, 1999; Richardson, 1994). As a group, the RPL students report a deep approach to learning, an understanding that the processes of acquiring knowledge involve effortful and strategic behaviours, and an understanding that such learning may be facilitated by the flexible use of cognitive strategies. However, in two other areas the RPL group differed from the traditional mature aged student profile. These were to do with naive understandings about the complex structure of knowledge, and the capacity to strategically orchestrate complex information. Clearly in relation to perceptions of the structural complexity of knowledge, and less so, but nonetheless notably so, in relation to the certainty of knowledge, the RPL group presented with stable naive understandings. These we argue to be artifacts of the students' background in industry. That is to say, the nature of the technical training undertaken by these students, and the nature of their occupational experiences, both contribute to an epistemological framework in which knowledge (and task) may be conceived of in terms of simple, often procedurally defined, structures. The nature of the work is rarely such as to explicitly encourage the transformation of everyday procedural knowledge into its more structurally complex underlying propositional form. Moreover, the experience of university learning appeared to do little to change this fundamental belief - hence a logical disjuncture between intent, assumptions of appropriateness in strategy use and assumptions of appropriateness in defining the object of learning on the one hand and outcome on the other. Such disjuncture may be presumed to manifest in the strong negative correlation between achievement and irresolute strategic control.

If we take, then, the notion of belief in simple knowledge as the preeminent belief of these students, and if we then utilise this belief as the fulcrum around which other beliefs and outcomes may be centred, then a potentially defining profile is able to be constructed. As may be identified in Table 5, a belief in the structural simplicity of knowledge correlates strongly with a range of other individual differences and academic outcomes, including surface learning, a rejection of deep learning, a belief in quick learning and certain knowledge, a loss of strategic control over learning and poorer academic outcomes.

Analysis of the open ended questions provided some support for these conclusions. Case 31 is illustrative. This student presented as surface oriented with a naive belief in simple knowledge and seeing the regulatory demands of university learning in terms of either the application of known algorithms or the reporting of confusion in unravelling the complex demands of learning. The GPA achieved by this student was 2.21. In short, the student presented with a dysfunctional learning profile and unsuccessful academic outcomes. For this student, the key to successful learning was to be in uncovering the "system" - in determining what routines and procedures would open the door to understanding and academic success.

**Table 5:** Relationships between a Belief in Simple Knowledge and other measures of individual differences

	Belief in Simple Knowledge
Surface Approach	.62*
Deep Approach	-.46*
Achieving Approach	0.14
Belief in Innate Ability	.35*
Belief in Quick Learning	.48*
Belief in Certain Knowledge	.62*
Adaptive control	-.34*
Inflexible control	.36*
Irresolute control	.56*
Academic achievement	-.36*

\*  $p < .05$

From the outset, the student was aware of the potential difficulties, but saw the key in understanding the system (and knowing one's place in that system):

*I was the Boss. I knew my job and what was required of me and was reasonably confident in that. But uni you come in cold, don't know the system or anyone else. It's a whole new culture and learning curve. If you don't learn the system quickly I believe it would be easy to sink*

Later in the degree, the student became somewhat hostile towards the "system" for its failure to reward effort:

*Not fortunately satisfied with the way the system works Failing an assignment did not impress me after the amount of work I had put into it*

In this instance the students' attribution for potential success is totally linked to effort - here a quantitative conception that ignores the underlying need to qualitatively change the driving conception of knowledge that is ultimately limiting the students' ability to conceptualise what indeed is required by university level learning. The increasingly hostile attitude of the student reflected a similarly increasing awareness that the systems that worked in the past were clearly less applicable at university - however, what it was that university learning represented remained somewhat of a mystery:

*I think the difference from TAFE to uni is larger than I expected. Completing a Certificate IV course in Community Services (welfare) with distinction last year and then coming and so far looking at pass or possible credit is a big difference*

Case 15 represented another illustrative example. Like Case 31, Case 16 presented with a clearly naive belief in the simplicity of knowledge. However, where Case 31 linked this naivety with a disposition towards surface learning and with confusion in strategic control, Case 15 was less clear in the driving approach to learning. The student reported as high on all approaches to learning. Further investigation revealed this to reflect a confusion of motive/strategy combinations. The student reported higher surface and achieving motives whilst at the same time endorsing both deep and achieving strategies. The combination is suggestive of an extrinsic motivation coupled with a high degree of competitiveness and organisation, but which in turn are coupled with the less congruent meaning centred strategies. Not surprisingly, then, the student also endorsed the need to be flexible in learning whilst simultaneously reporting uncertainty in strategic control. The initial reaction of this student to university learning, then, was also not surprisingly one of confusion:

*When I first attended class I had no idea what to expect. I was feeling apprehensive about whether I was smart enough to be able to complete the course. ....*

Tellingly, the students' later reactions reflected the confusion of driving beliefs: the trade background appeared sufficient to cover the technical subjects involved in the Design and Technology curriculum, but was appearing dramatically less appropriate to dealing with the more theoretically oriented subjects:

*I had no problems with my D & T subjects. However, I did have problems with the [Psychology of Teaching] subject. I had problems writing in the style that was required... and hence I failed.*

The student appeared to have a growing insight into the reasons for these difficulties - awareness of the need for more sophisticated study skills, increasing awareness of the gap between TAFE and university level study. However, in a manner consistent with the competitive "achieving approach", blame was to a degree externalised to the lecturing staff:

*Study skills were lacking. I have always had good time management skills ....  
Self learning, not being spoonfed information like previous [TAFE] studies ....  
At uni, the lecturers seemed to be operating on another planet*

## Discussion

Our major purpose in this study was to examine the relationships between the metacognitive attributes of students enrolling in university under RPL entry and their adjustment to the experience of university study. Based on earlier research (Archer et al, 1999; Cantwell et al, 2001; Cantwell & Grayson, in press) we hypothesised that in many respects the RPL students studied here would present with attributes typical of mature aged entry students in general - an orientation towards deeper learning coupled with a willingness to engage in active and adaptive self-regulation. At the same time, we further hypothesised, following Trowel's (1996) critique of RPL entry in the British context, that elements of the prior industrial history of these students may act as a point of disjuncture for these students by imposing limits on the epistemological possibilities driving the students' learning.

The data gave support to these conjectures. The RPL students presented with a bias towards deeper learning and adaptive self-regulation. Moreover, while their epistemological beliefs acknowledged the role of effortful and strategic learning in acquiring knowledge, as a group the students also reported beliefs about the structure and form of knowledge consistent with the notion of a practical rather than propositional knowledge - that is a retained belief in the fundamental simplicity and certainty of knowledge. Most importantly, these dispositions endured over time, suggesting that these students internalised little by way of a fundamental questioning or restructuring of the driving belief systems. Not surprisingly, the relationships between these beliefs and academic performance were clearly in the directions predicted by theory.

While it should be acknowledged that not all the RPL students involved in this study performed poorly - two thirds of the respondents achieved at a passing grade or higher - there are nonetheless concerning tendencies in the data. The enduring strength of the students' belief in the fundamental simplicity of knowledge, and the relationship between this belief and less functional learning dispositions and poorer academic outcomes is perhaps the issue of greatest concern emerging from the data. Several explanations for this may be offered, including within individual factors; cultural factors and structural factors within the course itself.

We would suggest that belief is amenable to change under two conditions: that the individual is open to change, and that the dissonance occurs under conditions that are both sympathetic to the affective consequences of belief change and sympathetic to the time frame required for belief change to occur. For these students it is reasonable to speculate that both structural factors within the degree (eg. short time frame, varied epistemological demands across subjects; lack of explicit support mechanisms) as well as cultural factors (eg. trade background, relatively technical conceptions of teaching; conceptions of masculinity, power and retraining) contributed to a lessening likelihood of within individual change. This is not to suggest that the naive or less functional beliefs about learning held by many of these students are not changeable. The simple anecdote reported at the beginning



of this paper illustrates the ease with which such change can be initiated. However, it would also seem reasonable to us to suggest that where potential "at risk" factors may be readily identified (as in the case of RPL entry), some form of support beyond mere attendance at lecturers and tutorials may well be mandated. Whether this support take the form of formalised workshops or less formal study groups, it seems to us from a Vygotskian perspective that the fundamental changes in beliefs about learning required by many of these students mandates that some form of scaffolding be in place if the metacognitive knowledge driving these students' learning is to match the expectations of university level study.

## Notes

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