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Skills, learning styles and success of first-year undergraduates

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ABSTRACT This study investigates the relationships between students' confidence in their generic skills on entry to university, their learning styles and their academic performance in first year. Research based on a large cohort of Scottish undergraduates found that students generally entered university feeling very confident that they already possessed good skills, and there was a suggestion of over-confidence in that those who failed the year entered with slightly higher confidence than other students. However, those students who withdrew during the year had significantly less confidence. The most significant combination of factors in explaining success in first year were a low score on the activist learning style scale and high initial confidence in the skills of self-reliance, time management and teamwork, together with lower initial confidence in written communication skills. The implications of this research are discussed and some suggestions made for improving educational practice.

KEYWORDS: *academic performance, business undergraduates, generic skills, learning styles, retention*

Introduction

The number of students who fail to complete their undergraduate studies, either through failure or through deciding to withdraw from their programme of study, has been an issue for some time (SCEE [Select Committee on Education and Employment], 2001). This is particularly a feature of first year, with around ten per cent of UK full-time higher education students withdrawing during or at the end of their first year (Yorke, 2002: 12).

Reasons that students give for why they withdraw in their first year have been widely researched, and a good review of the literature can be found in

Hall (2001). The issue is a complex one, and the decision to withdraw usually results from 'an accumulated combination of problems' (Hall, 2001: 18). Commonly given reasons are 'wrong choice of field of study, academic difficulties, financial problems, poor quality of the student experience, unhappiness with the social environment, and dissatisfaction with institutional provision' (Yorke, 2004: 20). Retention rates and reasons for withdrawing have been found to vary by subject studied, gender (Johnston, 1997) and social background (Raab, 1998), although studies at different institutions have found opposing results about the effect of age (Johnston, 1997). Opinions seem to differ on the extent to which differences in the characteristics of the students on entry (such as motivation, entry qualifications, personal circumstances) form the most important factors in retention compared to their experiences on or shortly after starting their undergraduate courses (Davies and Elias, 2003; Floud, 2003).

Retention and skills

Lack of academic skills, such as essay writing and note taking, has been found to be one reason commonly given by mature students for withdrawal (McGivney, 1996), and lack of self-management skills and/or study skills is commonly given as a reason by younger students (Yorke, 1999). Poor time management has also been identified as contributing to students withdrawing or failing (Fitzgibbon and Prior, 2003). University teaching staff, when asked why students do not succeed, cite the need for study skills enhancement (Johnston, 1997). Qualifications and Curriculum Agency (QCA) key skills test scores have certainly been found to correlate strongly with A-level performance (Murphy et al., 1997) and low Scottish Qualifications Authority (SQA) core skill qualifications have been linked to withdrawal from further education in Scotland (McGuire, 2000; 2001).

Students tend to enter university with high confidence in their key skills, particularly those of communication and working with others, and, for many, in improving their own learning (Cook and Leckey, 1999; Murphy et al., 1997). However, this confidence may not be well founded, and only in the more objective skills of IT and numeracy have students' self-estimates been found to correlate well with actual assessment of these skills (Murphy et al., 1997). Students do not recognize that their existing study skills may no longer be sufficient at university (Johnson, 1997; Lowe and Cook, 2003) and may resent the need to change them (Richardson, 2003).

Academic performance has also been found to be correlated with some key skills. For example, confidence in the long-term planning aspect of time management, though not daily planning, has been shown to be correlated with academic performance in first year at university (Trueman and Hartley, 1996). Similarly, lack of confidence in written communication skills has been

found to be correlated with poor performance on an accounting degree, though only in later years of the course and no such correlation was found in first year (Gardner et al., 2005). Lack of confidence in oral communication showed no consistent correlation with academic performance in any year.

Learning styles

Students' learning styles are known to affect their performance at university (Marriott and Marriott, 2003; Sangster, 1996). A student's 'learning style' reflects his or her preference(s) for the four stages of the adult learning cycle: having an experience (the activist stage), reviewing the experience (the reflector stage), concluding from the experience (the theorist stage), and planning the next steps (the pragmatist stage) (Honey and Mumford, 1992). All four stages are necessary for fully effective learning but, as Honey and Mumford explain, 'most people develop preferences which give them a liking for certain stages over others. The preferences lead to a distortion of the learning process so that greater emphasis is placed on some stages to the detriment of others'. Honey and Mumford's Learning Style Questionnaire (LSQ) provides four scores for each student, one for each of the stages of the learning cycle.

High scores on the reflector scale and low scores on the activist scale have been shown to be positively correlated with marks on objective tests at university though not on essay style examination questions (Sangster, 1996). Similarly, students with a preference for the theorist stage have been shown to be more successful in university accounting courses than those with a preference for the activist stage (Marriott and Marriott, 2003).

To summarize, lack of study and self-management skills is one of the common reasons given by students and staff to explain withdrawal or poor performance in first year at university. Many students enter higher education with high confidence in their skills, which does not always accord with the skills that they actually have or need. Studies have shown that students' performance in higher education correlates with their confidence in some key skill areas and also, but separately, with their learning style scores. This study investigates, for one particular group of first year students, the relationships between their success in the year, their initial confidence in a range of key skills, and their scores on the four scales of the Honey & Mumford LSQ. Demographic factors such as age, gender and social class will be taken into account.

Methodology

A study was conducted, taking as its sample a large group of undergraduates starting university in the year 2001/2. These students were all full-time, first year students at a post-1992 Scottish university business school, studying

programmes ranging from accounting to languages. The student group was 75 per cent Scottish with six per cent from England, five per cent from Northern Ireland and four per cent from Mainland China. Although half of the students were aged 18, 23 per cent were 21 or over. All the students studied six out of eight modules in common, three per semester, the remaining module each semester being programme-specific. The core modules were assessed by a mixture of examination and coursework. The coursework included essays, group work, oral presentations and investigations. The coursework weighting ranged from 30 per cent to 100 per cent.

In their second week at university, students were asked about their confidence in each of the generic and study skills which make up the first level of the university's Employability Skills and Attributes Model. These are the skill levels that students could be expected to have achieved by the end of first year at a Scottish university and can be seen in Figure 1. The list comprises 34 individual skills under nine skills area headings. Students were asked, for each skill, to rate how confident they felt with that skill on a range from 5 ('High confidence') down to 1 ('Low confidence'). There was no evidence of rushed responses or incomplete questionnaires. The questionnaire also asked students about the extent of their previous full- and part-time work experience.

In the same week as completing this questionnaire, students completed Honey and Mumford's Learning Style Questionnaire (Honey and Mumford, 1992) and the scores on each of the four scales (activist, reflector, theorist and pragmatist) were recorded for each student. An excellent summary of learning styles is given in Coffield et al. (2004). Honey and Mumford's LSQ was used in this study as the students were already completing this as part of one of their modules. Although there is debate about the validity of the LSQ, its 'test-retest reliability' is high (Coffield et al., 2004: 73) and the current study does not use the Honey and Mumford 'labels' but simply the students' scores on each of the LSQ scales. However, when asked to reflect on how well Honey and Mumford's descriptions of the labels applied to them, students expressed surprise at how well they did. Other data were collected from the student database including ethnic grouping, nationality, term-time residence and social class.

At the end of year Programme Board, marks for the students in the six common modules were recorded, as was the progression decision. A total of 219 complete records were available for analysis. To aid the analysis the 34 detailed skills were grouped together where they were in the same skill area and where the student responses were highly correlated. This reduced the number of skills to 13:

Time management
Setting and achieving goals

Getting help and information
 Notes (taking and organizing)
 Bibliography
 Written communication
 Spoken communication
 Numeracy
 IT skills
 Problem solving
 Self reliance/taking responsibility
 Teamwork
 Self evaluation

In addition to looking at the relationships between student marks or progression and their initial skills confidence, their learning styles and their demographic details, multiple and logistic regression were used to determine the interaction and relative importance of the various factors.

Results

Skills confidence on entry

The students' responses to the detailed skills questionnaire are shown in Figure 1. With 5 for the highest confidence down to 1 for the lowest, the mean scores were high. The highest average was 4.6 for 'using a word processor effectively' followed by 4.5 for 'working as a member of a team'. The lowest mean was 3.4 for 'compiling a bibliography', followed by 3.5 for 'presenting a straightforward spoken argument to a small group of people'.

Younger students were significantly more confident than the older ones for the IT skills ($r = -0.3$, $p = 0.000$). The overall IT average for 17 and 18 year olds was 4.4, dropping for each age group to only 3.6 for students aged 30 or more. There were no other strong correlations of skills confidence with age.

When comparing gender differences, females were slightly more confident than males for self evaluation (mean 4.0 compared to a male mean of 3.8, $p = 0.078$). They were, however, significantly less confident than the male students at numeracy (mean 3.7 compared to male mean 4.1, $p = 0.005$).

None of the demographic variables such as social class, nationality and ethnic grouping showed statistically significant differences in students' confidence in their skills. Although 50 per cent of the sample had worked full-time, 14 per cent for more than a year, and 82 per cent had worked part-time, the extent of students' work-experience showed no significant correlations with skills confidences, over and above the age factor.

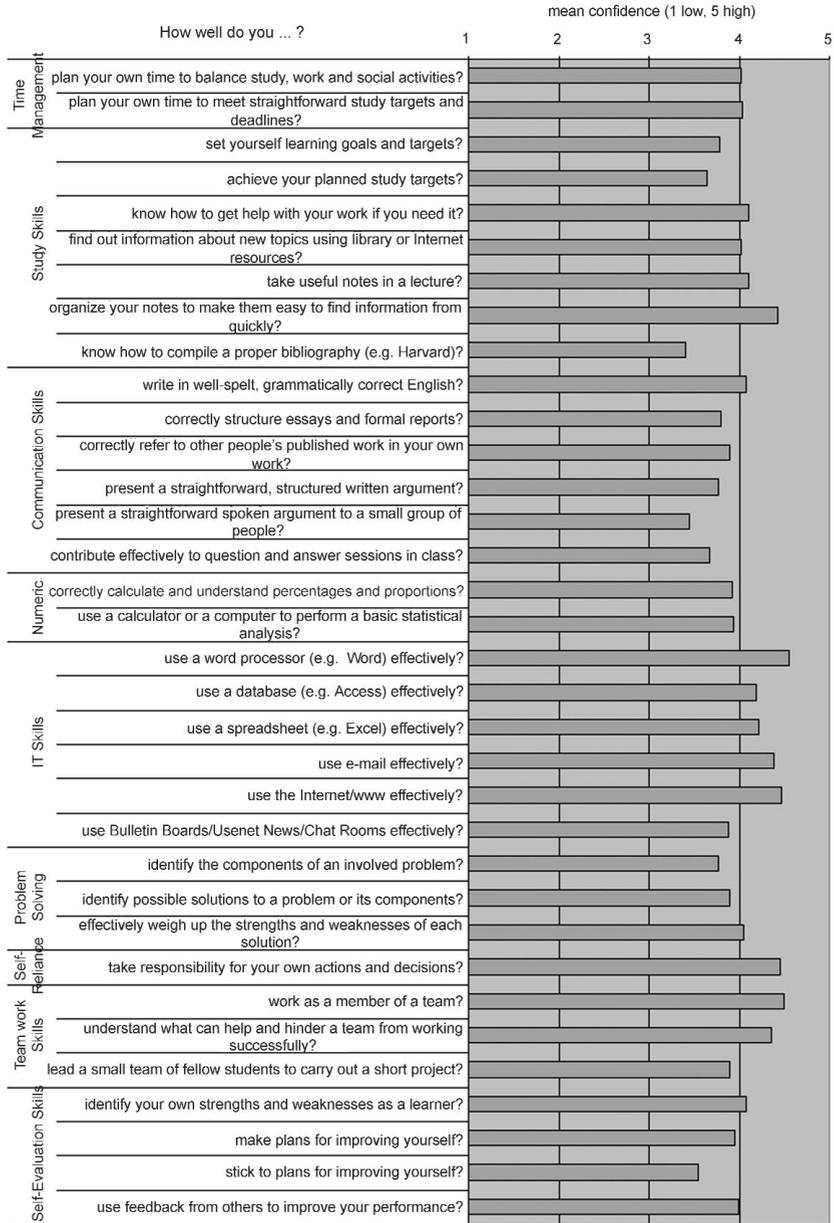


Figure 1 Mean responses to detailed skills questionnaire

Skills confidence on entry, retention and success

In Figure 2 the mean score on the 13 grouped skills is shown for each of four groups of students:

- W is the mean score of students who had officially withdrawn from the university prior to the September Examination Board;
- F is the mean for students who still had fails in more than two modules after the August resit diet and so were not eligible to proceed to the second year of their course;
- PR is the mean score of students who had fails in one or two modules after the resit diet but were allowed to proceed into second year carrying those modules; and
- P is the mean for students who had passed everything by September.

The students who withdrew during the year had, at the start of the year, been significantly less confident about many skills, particularly time management, taking and organizing notes, spoken communication, teamwork and self evaluation. In contrast, the students who failed at the end of the year had been more confident than other students about many skills, particularly their communication skills.

Those students who passed all their modules had rated themselves better at time management and self reliance than any other group and better at all the other skills than the students who failed one or two modules.

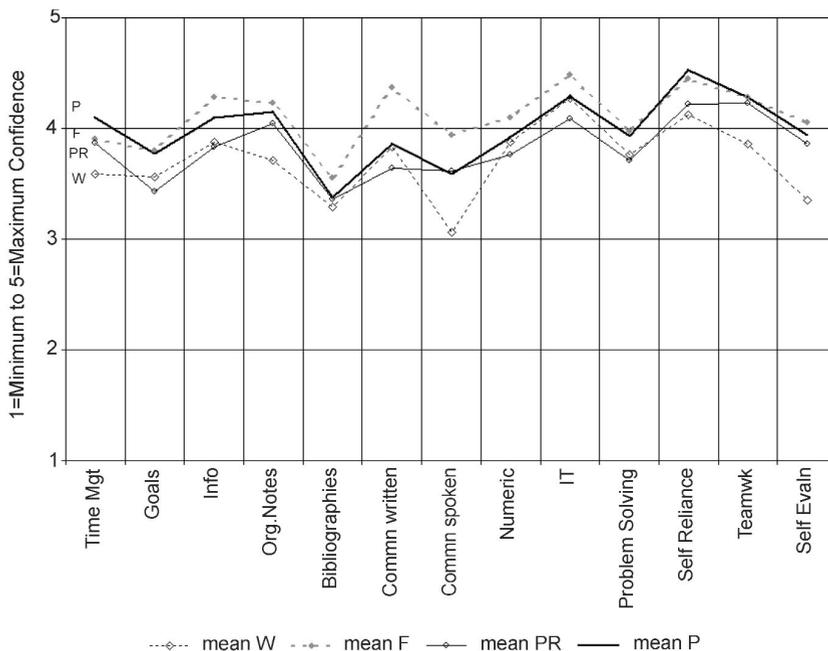


Figure 2 Mean skill self ratings (at start of the year) by student progression status

When investigating correlations between skills confidence and the average marks (coursework and examinations combined) over the six common modules, those students who rated themselves most highly in the following skills at the start of the year gained, on average, higher marks. These relationships were all significant, though not strong.

Self reliance ($p = 0.001$)

Time management ($p = 0.002$)

Self evaluation ($p = 0.019$)

Setting and achieving goals ($p = 0.036$).

None of the other skills were significantly correlated with the module marks.

Learning styles, skills and success

The students in the study displayed mean scores on the four learning styles that very closely matched the norms given by Honey and Mumford (1992) for A-level and diploma students, who would be at a similar stage in their lives to most students just starting a Scottish university course.

There were several correlations between students' skill confidence and their scores on the Honey and Mumford Learning Style Questionnaire: see Table 1.

Table 1 Significant correlations between LSQ scores and skills confidence

<i>Activist</i>	<i>Reflector</i>	<i>Pragmatist</i>	<i>Theorist</i>
High scores significantly positively correlated with:			
Spoken communication ($p = 0.000$)	Time management ($p = 0.009$)	Setting & achieving goals ($p = 0.008$)	Problem solving ($p = 0.001$)
Teamwork ($p = 0.000$)		Time management ($p = 0.016$)	Setting & achieving goals ($p = 0.007$)
Written communication ($p = 0.048$)		Problem solving ($p = 0.018$)	Spoken communication ($p = 0.034$)
Getting help & info ($p = 0.050$)		Spoken communication ($p = 0.022$)	
		Numeric ($p = 0.026$)	
High scores significantly negatively correlated with:			
	Spoken communication ($p = 0.012$)		

All the correlations shown in Table 1 are statistically significant, indicating a tendency for those students in the sample with, say, high scores on the activist scale to feel more confident about their teamwork skills. However, none of the correlation coefficients was more than 0.34 so, for individual students, a high activist score, say, does not necessarily mean high confidence in teamwork skills.

Students with a highly activist learning style performed less well in all subjects in their first year, including those with a high proportion of coursework in the assessment ($p < 0.004$). Students with a highly reflective learning style did best in non-quantitative subjects ($p < 0.011$), whereas students with highly theoretical learning styles did better in accounting ($p = 0.013$).

Other factors and success

The percentage of male students failing the year (19%) was significantly higher than that of females (7%) ($p = 0.000$), although the percentages proceeding into second year carrying modules was very similar for both sexes, as were the percentages withdrawing. The average marks of all those students who were eligible to proceed to the next year did not differ significantly between the sexes, neither overall nor by individual modules. Several studies have also indicated the general under-performance of male students (see Johnson, 1997), but it is interesting in this study that the problem seemed to occur mainly in those students who failed to engage with their course yet did not officially withdraw, a fact that concurs with anecdotal tutor reports.

Neither social class nor age were significant factors in whether students passed their first year. Age was significantly positively correlated with the average mark ($p = 0.008$), but this was the result of the high average marks gained by the students over 21 who survived to the end of the year – 48 per cent of those students achieved an average mark of 70 or more compared to only 9 per cent of younger students. For students of 21 or under, average mark showed no correlation with age.

Where students lived during term-time was a marginally significant factor in their success ($p = 0.08$), with fewer of the students who owned their own home or lived in privately rented accommodation passing all their modules compared to students living with parents or in university accommodation (56% passed compared to 64%). Correspondingly, more failed too many modules to be allowed entry into Year 2 (21% failed compared to 10%). 75% of these students were over 18 on entry, with 21 per cent over 24 years old, but the pattern was independent of age and occurred for all age groups.

Combinations of factors for success

In the regression modelling of the combination of factors explaining a high average mark, the best fitting model contained the factors:

- a low activist score (the most significant factor);
- high initial confidence in the skills of:
 - self reliance (second most important factor),
 - time management, and
 - teamwork;
- low initial confidence in written communication.

The other variables, including gender, do not have a significant effect on the average end-of-year mark over and above these five. Low confidence in written communication skills is not by itself directly correlated to the average mark, but enters the model as a combination with confidence in the other five skill variables. This reinforces the importance of 'self reliance', 'time-management' and 'teamwork', since it suggests that students do well if they can specifically pick these out as their strengths rather than exhibiting a global confidence.

The logistic regression investigating the combinations of factors explaining success (passing all modules) in the year yielded very similar results. A low activist score continued to be the most significant factor, and higher confidence in time management, lower confidence in written communication, and either higher confidence in self reliance or higher confidence in teamwork were the other significant factors in the best multiple model. In this model, however, time management is more significant than self reliance or teamwork.

Discussion

Age, gender, low scores on the activist learning style and good time management skills have all previously been shown to be separately related to success at university in some way. However, these factors are themselves inter-related and this study has shown how they work in combination. A low activist learning style score is the most important factor, but confidence in self-reliance, time management and teamwork skills have also been shown to be important, as well as the adverse affect of entering university over-confident in written communication skills.

The inclusion of time management as an important factor is in agreement with the findings of Trueman and Hartley (1996). However, unlike their study, no significant difference was found in time management skills for older v younger students, nor for female v male students. Lower marks associated with possible over-confidence in written communication skills

may show the effect of the findings by Richardson (2003) that some students come to university with very fixed ideas about essay and report writing, and seem almost to resent having to change their written methods from those they learned at school.

This study has also shown a difference between those students who chose to leave during the year and those who actually failed the year, the former having lower initial confidence than the successful students in many skills, while the latter were more confident than the successful ones particularly in their communication skills. It is interesting to speculate whether the higher skills confidence of the students who failed the year was over-confidence, and whether, because they felt so confident, they did not concentrate sufficiently on their studies.

The overall high level of skills confidence is consistent with previous research. The male supremacy in number skills was also found by Murphy et al. (1997), but, unlike them, this later study found no gender difference for IT skills nor for most communication skills. It may be that IT is ceasing to be seen as a male preserve, at least for prospective business school students. The finding that students with greater prior work experience showed no higher confidence in their skills is unlikely to imply that the work did not allow development of these types of skill, but either that work experience may have made students more aware of their skill limitations, or that students were not aware of the extent to which they were developing transferable skills at work.

The link between the strength in the theorist learning style and success in accounting is consistent with the findings of Marriott and Marriott (2003); the link between high scores on the reflective scale and higher marks in non-quantitative subjects is new. The negative correlation between high scores on the activist scale and academic performance for all subject areas and all types of assessment goes further than the findings of Sangster (1996), who found such correlation only for objective tests; however, his study involved second year students whereas first years have had less chance to adapt their learning styles to the demands of university assessment.

Although based on a reasonably large group of students, the results are from a single intake. They are also only for business school undergraduate students, and from a single university. For future research it would be useful to ascertain whether the same danger/success factors apply to later intakes, to other student groups, in other subject areas and at other types of university. Attendance data, not reliably kept for this student group, or other measures of learner engagement would be useful factors to include in future investigations.

It would also be interesting to determine what aspects of first year university learning are so adversely affected by these factors and what changes to the first year experience would help to address the problem. For example,

would a change of teaching or assessment approach help the activists do better, and can concentration on developing time management, self-reliance and teamwork skills improve student retention? Would very early formative assessment address over-confidence in written communication? Early indications in later years at this university are that merely alerting students to the danger factors is sufficient to concentrate the minds of those with activist learning styles and to make most students think harder about the need to develop their skills.

The use of skills confidence is a snapshot of the students' feelings on a particular day – in this case the start of the students' second week at university. It is prone to dependence on their worries and experiences in the preceding week of their course. It would be valuable to compare how their confidence changes over those crucial first few days or weeks of their university course. The analysis has also treated the responses as being on an interval scale, although comparisons with use of the median responses rather than the mean suggest that there is no real problem here.

Another specific area for future research would be to investigate the reasons behind the finding that students who owned their own home or lived in privately rented accommodation were less likely to pass, across all age groups.

Implications for practice

The main implications for practice to be taken from this research are:

1. Students with a highly activist learning style are less likely to succeed in first year. Such students should be made aware of this, and encouraged to develop their other learning styles, as well as to plan their learning to take account of their identified strengths and weaknesses. This strategy, undertaken with the next year's cohort of students at the same university, was seen to successfully spur many activists on in their studies: activists like challenges!
2. Lecturers should be aware of the potential problems and needs of students with different learning styles, and plan the learning opportunities they provide appropriately. Some ideas for appealing to different learning styles are given in Honey and Mumford (1992; 2006). A useful summary appears in the Campaign for Learning web page.
3. The relationship between learning styles and skills confidence suggests the generic skills that various styles of learner feel that they need support in, and hence can guide the type of activity planned. For instance, it would appear that first year students with high reflector scores feel least confident in their spoken communication so activities could be planned to suit that type of learner. Similarly, time management development

- activities could be planned to suit those who prefer an activist or a theorist learning style. (Honey and Mumford, 2006, contains some ideas.)
4. Students who rate themselves with good skills in self-reliance, time management, and teamwork are likely to do better in first year at university. Provision aimed at helping students to develop these skills during first year may help to improve performance overall. In the university where this study took place, it has been found beneficial to alert new students to the importance of these skills. Helping students to reflect on their skills can form part of personal development planning (Graham and Westwood, 2005).
 5. Surprisingly, work experience prior to entering university does not seem to affect either students' confidence in their skills nor their first year success. It may be that many students do not recognize that they can develop transferable skills through their employment. Therefore, raising students' awareness of this and encouraging them to reflect on the skills they are learning through their part-time work may be advantageous for all students. Davies (2000), in the DfEE funded project 'Working for Skills' where materials were developed to help students recognize and develop the employability skills that they are gaining through their part-time work, found that having the materials opened 'students' eyes ... to the value of their existing skills'. The Higher Education Academy Employability pages offer some valuable tools and resources.
 6. Students who arrived at university feeling very confident in all the study skills did not do as well as those who recognized the need to improve in some areas, particularly in written skills. Very early formative assessment of students' written skills, with good feedback, might allow them a more realistic perception of their actual standard in this area before any damage is done by over-confidence.
 7. Underperformance of male students occurred mainly in those who entered with high confidence in their study skills and attended badly at tutorials. Early tutorial activities aimed specifically at challenging these students might be worth considering.

This study has concentrated only on generic skills, learning style scores and demographic factors. As evidenced by the literature discussed earlier, success in university first year is a complex issue and many other less tangible issues are involved. Even the best regression model found in this study only explains 25 per cent of the variation in student performance. The significant factors explaining success were found to be a combination of low activist score, high initial confidence in the skills of self-reliance, time management and teamwork, and low initial confidence in written communication. Research following up the withdrawals and failures to identify

how these factors link to the reasons given for withdrawal (such as academic personal or financial difficulties, or dissatisfaction with the university experience) would add further to the understanding of success at university in the first year.

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Biographical notes

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