

The Relationship among Conceptions of Knowledge, Approaches to Learning, Personality, and Academic Success

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Abstract

Presently, there is much interest in how students study and what skills best facilitate their academic performance. The aim of this study was to examine how students' conceptions of knowledge, approaches to learning, and personality relate to academic success. An online survey was completed by 198 first-year tertiary students, including 116 off-campus psychology students. This paper will report the relationships among the key variables. As expected, Quick Learning and Simple Knowledge variables positively predicted a Surface learning approach. In contrast, Innate Ability, Simple Knowledge, and Certain Knowledge variables negatively predicted a Deep learning approach. Innate Ability negatively predicted a Strategic learning approach. However, students' conceptions of knowledge did not predict academic success. As expected, students who adopted a Surface learning approach experienced lower academic success. Contrary to expectations, however, Deep and Strategic learning approaches did not positively predict academic success. An interesting finding was that Intellect positively predicted a Deep learning approach. Further, Conscientiousness, Intellect, and Emotional Stability positively predicted a Strategic learning approach and negatively predicted a Surface learning approach. Personality also predicted academic success. Neuroticism negatively predicted academic success; Conscientiousness positively predicted academic success. The implications of these findings are discussed.

Introduction

In the past 25 years, we have witnessed developmental changes in the ways students undertake the task of learning in higher education. Indeed, there are students at university whose learning style deviates from those styles adopted by the brightest and most committed students. Therefore, diverse study skills could be one of the major reasons the attrition rate for university enrolment in Australia is at 18.5% (Buckridge, 2004). Students are currently under pressure to succeed and universities have recognised the need to increase retention rates. Thus, better understanding those factors that influence student success in tertiary education is

imperative. Non-cognitive, individual differences factors are thought to play a key role in student learning, including personality traits and approaches to learning. Conceptions of knowledge have also been recognised as a potential predictor of academic success (Cantwell & Scevak, 2004).

Conceptions of Knowledge

The terms conceptions of knowledge and epistemological beliefs are interchangeable (Hofer & Pintrich, 1997). Personal epistemology "examines what individuals believe about how knowing occurs, what counts as knowledge and where it resides, and how knowledge is constructed and evaluated" (Hofer, 2004, p. 1). Students' conceptions of knowledge are thought to develop progressively through their educational experiences (Perry, 1970, as cited in Hofer & Pintrich, 1997). According to Perry, a student will progress through the stages by first thinking that knowledge is certain and absolute and finally to a readiness to make a personal stand on issues. This process occurs while accepting that all knowledge and ideas are ultimately relative. Perry acknowledged that some students can remain stagnate for long periods and that many students only reach the final position of making a commitment to a personal perspective at the end of their degrees.

Schommer (1990) extended this work, defining conceptions of knowledge as a system of independent beliefs that have the potential to influence comprehension and learning. Schommer identified four beliefs: (a) Simple Knowledge, in which knowledge is characterised as isolated facts; (b) Certain Knowledge, where knowledge is absolute; (c) Innate Ability, where ability to learn is inherent; and (d) Quick Learning, where learning is quick or not-at-all. Schommer showed that the more students believed in Quick Learning, the more likely they were to oversimplify conclusions and achieve less academic success. Thus, Quick Learning is related to the Surface learning approach, which in turn, negatively predicts academic performance (Cano, 2005; Dahl, Bals, & Turi, 2005). Further, Schommer found that experienced university students are more likely than first-year students to write tentative conclusions. Similarly, Schommer-Aikens and Hutter (2002) showed that graduate students typically believe in complexity and tentative knowledge, and are therefore likely to take on multiple perspectives.

Approaches to Learning

Approaches to learning are conceived as the individual differences in intentions a student has when faced with a learning task (Diseth, 2003). They reflect the strategies an individual uses to achieve a particular goal. The student approach to learning (SAL) tradition distinguishes between deep, surface, and strategic learning approaches (see Entwistle & McCune, 2004 for a review). A Deep approach involves finding meaning in what is being studied to maximise understanding. A Surface approach involves investing little time in the academic task and merely memorising information with rote-learning. A Strategic approach involves being guided by the assessment criteria and enhancing self esteem through competition.

Research has investigated the relationships between these three approaches to learning and academic success. The SAL paradigm argues that high achievement can be predicted by a Deep approach, either alone or in combination with a Strategic approach (Boyle, Duffy, & Dunleavy, 2003; Diseth & Martinsen, 2003). In contrast, low achievement can be predicted by a Surface approach to learning (Biggs, 1999). Indeed, the Surface approach to learning has consistently been found to negatively correlate with academic success (Boyle et al.; Diseth, 2003; Diseth & Martinsen).

Personality

Despite the continued debate about the exact number of factors comprising personality, most research has favoured use of a five-factor model (Goldberg, 1999): Emotional Stability, Extraversion, Intellect, Conscientiousness, and Agreeableness. Each factor is bipolar. People low on the Emotional Stability trait (i.e., high on Neuroticism trait) tend to experience such negative feelings as embarrassment and low self-esteem. Individuals high on Extraversion trait tend to be social and assertive. The Intellect trait, also known as Openness to Experience, is characterised by attributes such as open-mindedness and a willingness to experience novel situations. Individuals high on the Agreeableness trait are altruistic, flexible, and cooperative. Conscientiousness is characterised as being responsible, hardworking, and trustworthy.

Previous research has shown that most of the five personality traits predict academic success, although the findings have been mixed (Diseth, 2003). Conscientiousness is the trait most consistently positively correlated with academic performance (Diseth; Nguyen, Allen, & Fraccastoro, 2005). Intellect has also been positively associated with academic success in undergraduate studies (Burton & Nelson, 2006). Introverted students are expected to outperform extraverts (Entwistle & McCune, 2004), however, findings are inconsistent. In contrast, Neuroticism and

Agreeableness are generally not associated with academic success (Busato, Prins, Elshout, & Hamaker, 2000).

Research Aims

Current research is focussed on whether personality traits predict the approaches to learning that students adopt (Busato et al., 2000; Diseth, 2003; Duff, Boyle, Dunleavy, & Ferguson, 2004; Zhang, 2003). Positive predictive relationships have been found between the trait Openness to Experience and the Deep approach to learning (Busato et al.; Diseth; Duff et al.; Zhang). In contrast, Conscientiousness has been shown to predict the Strategic approach to learning (Diseth; Duff et al.; Zhang), and Neuroticism is a predictor of the Surface learning approach (Busato et al.; Diseth; Duff et al.; Zhang).

The present study aimed to examine the relationships among conceptions of knowledge, approaches to learning, personality, and academic success in a sample of first-year psychology students. First, the relationship between conceptions of knowledge and learning approaches was explored. It was hypothesised that Quick Learning beliefs would be positively related to the Surface learning approach. Second, the relationship between personality and academic success was examined. It was expected that academic success would be positively correlated with Conscientiousness and Intellect, and negatively correlated with Neuroticism. Third, the relationships among personality, learning approaches and academic success was examined. It was hypothesised that Emotional Stability would negatively predict the Surface learning approach and that Conscientiousness would positively predict the Strategic learning approach. Finally, it was hypothesised that academic success would correlate positively with the Deep and Strategic learning approaches and negatively with the Surface approach.

Method

Participants

A total of 198 first-year Foundation Psychology A students at the University of Southern Queensland participated for course credit. Of these, 116 were distance students and 82 were enrolled on-campus. The average age of the sample was 28.63 years ($SD = 10.16$), with an age range from 16 to 57. There were 166 females and 31 males. The males had a mean age of 29.48 years and the females had a mean age of 28.47 years.

Measures

The self-report survey was developed for use in a longitudinal study of individual differences in student

achievement. However, only those measures relevant to the current research aims will be discussed here.

The 52-item Approaches and Study Skills Inventory for Students was used to measure the three approaches to learning adopted by students (Entwistle & McCune, 2004). Participants indicate their relative agreement with statements by using a 5-point Likert-type scale, ranging from 1 (*disagree*) to 5 (*agree*). The Deep approach scale contains four, four-item subscales (seeking meaning, relating ideas, use of evidence, and interest in ideas). The Surface approach scale includes four, four-item subscales (lack of purpose, unrelated memorising, syllabus boundness, and fear of failure). Total scale scores for both the Deep and Surface learning approaches could theoretically range between 16 and 80. The Strategic approach scale consists of five, four-item subscales (organised study, time management, alertness to assessment demands, and monitoring effectiveness). Total scale scores could theoretically range between 20 and 100. Entwistle and McCune reported acceptable reliabilities for the Deep ($\alpha = .84$), Strategic ($\alpha = .80$), and Surface ($\alpha = .87$) learning approaches.

The Understanding of Knowledge questionnaire (Schommer, 1990) measures the beliefs students adopt regarding knowledge: Quick Learning, Innate Ability, Simple Knowledge, and Certain Knowledge. Participants rated the 44 items using a 5-point Likert scale. Innate Ability scores theoretically ranged from 13 to 65; Simple Knowledge scores ranged from 16 to 80; Quick Learning ranged between 7 and 35; and Certain Knowledge scores ranged between 8 and 40. The instrument has acceptable internal consistency ($\alpha = .74$; Schommer, 1990).

The short form of the International Personality Item Pool (IPIP, Goldberg, 1999) was used to measure the Big-Five factors of personality: Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Intellect. The IPIP consists of 50 questions, with 10 items used to compute a total score for each major personality factor. Respondents used a 5-point Likert-type scale to rate each statement, ranging from 1 (*very inaccurate*) to 5 (*very accurate*). Total scores for each personality factor could theoretically range between 10 and 50. Goldberg (1999) showed that the IPIP scales each demonstrated acceptable internal reliabilities, with coefficient alpha estimates ranging between .79 (Conscientiousness) and .87 (Extraversion). The IPIP scales show acceptable reliability estimates when administered online (cf. Burton & Nelson, 2006).

Academic success was measured by grade point average (GPA).

Procedure

The current data was collected on-line from a sample of first-year psychology students. The total testing time for

the Internet-administered test battery was about 2 hours. Testing was carried out over a 12-week period. Personalised feedback was provided to each participant, summarising each student's learning preferences, strengths, and weaknesses, and outlining strategies for optimising individual student learning environments.

Results and Discussion

Key Findings

Table 1 shows the means and standard deviations for all variables. The average GPA is slightly higher than a credit (B). For the conceptions of knowledge variables, participants scored highest on the Simple Knowledge beliefs and lowest on the Quick Learning beliefs. The descriptive statistics observed for the three approaches to learning are comparable to those reported by others (Diseth, 2003). Participants, on average, scored highest on the Agreeableness trait and lowest on the Emotional Stability trait. These findings replicate the findings of Burton and Nelson (2006). Alphas ranged between .66 and .91, indicating satisfactory internal consistency.

Table 1: Summary Statistics: Conceptions of Knowledge, Approaches to Learning, Personality, and Academic Success ($N = 198$).

Scale	<i>M</i>	<i>SD</i>	α	No. of Items
Conceptions of Knowledge				
Innate Ability	30.57	4.23	.69 ^a	13
Simple Knowledge	47.33	4.05	.60 ^a	16
Quick Learning	16.55	3.72	.70 ^a	7
Certain Knowledge	18.97	3.41	.66 ^a	8
Learning Approaches				
Deep	62.53	8.45	.85	16
Strategic	74.20	11.60	.87	20
Surface	45.68	10.19	.84	16
Personality				
Extraversion	32.39	8.65	.91	10
Agreeableness	41.64	5.73	.83	10
Conscientiousness	35.37	6.53	.82	10
Emotional Stability	30.52	8.38	.89	10
Intellect	36.18	6.02	.81	10
Academic Success				
GPA	5.35	.99	-	-

Pearson's product moment correlations were computed for all variables shown in Table 1. As shown in Table 2, Emotional Stability negatively correlated with Surface approach; Conscientiousness positively correlated with the Strategic approach. An interesting finding was that Innate Ability correlated negatively with all three learning approaches and five personality

traits. As expected, Quick Learning correlated positively with the Surface learning approach; it negatively correlated with all personality traits. Similar correlation trends were evident for the Certain Knowledge variables. In contrast, Simple Knowledge correlated negatively with both the Deep learning approach and with the Intellect trait.

Table 2 shows that all four conceptions of knowledge variables correlated negatively with GPA. As expected, GPA correlated positively with both the Deep and Strategic learning approaches and negatively with the Surface learning approach. The positive correlation between Conscientiousness and GPA was also expected. The nonsignificant correlation between Emotional Stability and GPA was in line with expectations. However, it was interesting to observe the positive correlations between GPA and the Agreeableness and Intellect traits.

A series of regressions was performed to further investigate the relationships between conceptions of knowledge, personality, and approaches to learning variables. First, each of the three learning approaches was regressed onto the four conceptions of knowledge variables, $R^2 = .05$, $F(4, 197) = 2.57$, $p < .05$. The result indicated that Quick Learning ($\beta = .28$, $p < .05$) and Simple Knowledge ($\beta = .19$, $p < .05$) were significant positive predictors of the Surface approach. Further, Innate Ability ($\beta = -.21$, $p < .05$), Simple Knowledge ($\beta = -.17$, $p < .05$), and Certain Knowledge ($\beta = -.22$, $p < .05$) were all significant negative predictors of the Deep approach. Innate Ability was also a significant negative predictor of the Strategic approach ($\beta = -.19$, $p < .05$).

Second, the three learning approaches were each regressed onto the five personality traits, $R^2 = .15$, $F(5, 197) = 6.53$, $p < .05$. As expected, Intellect was a significant positive predictor of the Deep approach ($\beta = .46$, $p < .05$). This finding implies that students who are

open-minded and imaginative are more likely to find meaning in their study materials. Conscientiousness ($\beta = .52$, $p < .05$), Intellect ($\beta = .16$, $p < .05$), and Emotional Stability ($\beta = .13$, $p < .05$) were significant positive predictors of the Strategic approach. Thus, students who are responsible and able to manage the challenges associated with tertiary study are more likely to monitor their study effectiveness and develop a keen alertness to the assessment requirements. Emotional Stability ($\beta = -.34$, $p < .05$), Intellect ($\beta = -.39$, $p < .05$) and Conscientiousness ($\beta = -.16$, $p < .05$) were significant negative predictors of the Surface approach. This finding supports previous research that suggests Neuroticism is a key predictor of the Surface learning approach (Zhang, 2003).

Third, to test the hypothesis that approaches to learning are important predictors of academic success (GPA), a regression analysis including the three approaches to learning was conducted. The result indicated that GPA was significantly predicted by approaches to learning, $R^2 = .18$, $F(1, 197) = 6.69$, $p < .05$. However, only the Surface learning approach was a significant predictor of GPA, $\beta = -.17$, $p < .05$, in the negative direction. This is consistent with previous research (Diseth, 2003), and indicates that students who focus on pieces of information in an atomistic way are less likely to achieve academic success.

Implications for Student Learning

Consistent with previous research, Quick Learning significantly predicts the Surface approach (cf. Cano, 2005). The current data indicates that Simple Knowledge is also a significant positive predictor of the Surface approach. These findings imply that students with strong beliefs in knowledge as being absolute and isolated, and learning as being instinctive and fast, are likely to adopt a Surface approach to learning. Such students will typically study without reflecting on either

Table 2: Correlation matrix: Conceptions of knowledge, approaches to learning, personality, and GPA.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Innate Ability	1.00												
2 Simple Know	.25**	1.00											
3 Quick Learn	.39**	.27**	1.00										
4 Certain Know	.35**	.29**	.46**	1.00									
5 Deep	-.33**	-.29**	-.23**	-.34**	1.00								
6 Strategic	-.25**	-.06	-.20**	-.16*	.56**	1.00							
7 Surface	-.26**	.32**	.41**	.32**	-.45**	-.42**	1.00						
8 Extraversion	-.24**	.02	-.14	-.07	.10	.11	-.10	1.00					
9 Agreeable	-.36**	-.13	-.30**	-.28**	.26**	.19**	-.21**	.32**	1.00				
10 Conscient	-.16*	.01	-.18**	-.14*	.21**	.57**	-.30**	.02	.20**	1.00			
11 Emot Stabil	-.14*	-.11	-.17*	-.11	.13	.24**	-.41**	.24**	.10	.17*	1.00		
12 Intellect	-.31**	-.25**	-.34**	-.34**	.44**	.27**	-.46**	.34**	.35**	.19**	.10	1.00	
13 GPA	-.19**	-.14**	-.28**	-.21**	.32**	.30**	-.33**	-.10	.19**	.20**	.06	.21**	1.00

Note. Simple Know = Simple Knowledge; Quick Learn = Quick Learning; Certain Know = Certain Knowledge; Agreeable = Agreeableness; Conscient = Conscientiousness; Emot Stabil = Emotional Stability.

* $p < .05$, ** $p < .01$.

purpose or strategy, and treat information as unrelated bits of knowledge. The current results further indicate that first-year psychology students show a strong tendency to believe that knowledge is certain (cf. Schommer, 1990).

The negative relationships between Innate Ability and the Deep and Strategic learning approaches is contrary to expectations. This finding implies that first-year university students are still in the process of becoming familiar with course requirements and are yet to take a personal perspective on knowledge. It would therefore be worthwhile to track how students' behaviours and knowledge beliefs change over time to determine if experience or confidence mediates academic success. This study provides a useful starting point for future research designed to examine the relationship between conceptions of knowledge and academic success.

Conclusion

This study extends previous research by examining the relationship among conceptions of knowledge, personality, approaches to learning, and academic success. The results showed that students with weak concepts of knowledge are more likely to adopt a Surface approach to learning. Further, students who adopt a Surface approach to learning achieve low academic success. In contrast, students who are helpful and open-minded achieve academic success in first-year studies. Future research should track students to determine how learning approaches are influenced by an individual's beliefs and knowledge. Key questions would include how experience and educational level shape student learning and conceptions of knowledge.

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