

SELF-REGULATED LEARNING AS PREDICTOR OF ACADEMIC PERFORMANCE

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Abstract

The goal of this study was to research the hypothesis that self-regulated learning (SRL) predicts academic performance in second-year Economics studies. In the theoretical underpinning, self-regulated learning as related to academic performance was explored. Data was analysed using descriptive, correlation analysis and hierarchical regression. A correlation matrix and hierarchical regression revealed a relationship between different aspects of SRL and academic performance. In conclusion, the study recommends that teaching and assessment methods should be used to empower students to apply self-regulated learning strategies. This could greatly enhance their academic performance.

Keywords: Academic performance; self-regulated learning; correlation analysis; hierarchical regression

1. INTRODUCTION

Economics forms the basis of all BCom degrees offered at universities and at the University of the Free State (UFS). The pass rate for the undergraduate Economics courses at the UFS for the past couple of years has been dismal. In 2011, the pass rates for Ekn 114 (First year economics – first semester), Ekn 214 (Second year economics first semester) and Ekn 314 (Third year economics first semester) were 34%, 42% and 35% respectively (Department of Economics 2012). The low pass rates in all the Economics undergraduate courses have prompted the question regarding which cognitive and non-cognitive factors predict academic performance in Economics.

Several studies have been done on different predictors of academic performance. Numerous factors have been researched and no conclusive evidence has been found as an all-inclusive prediction of academic performance (Diseth 2003; Diseth, Pallasen, Brunborg and Larsen 2010; Ferla, Valcke and Cai 2009; Mayes, Calhoun, Bixler and Zimmerman 2009; Ning and Downing 2010; Smrtnik-Vitulic and Maya 2011; Van der Westhuizen, De Beer and Bekwa 2011).

Against this background, the present study endeavoured to answer the following research question: Does self-regulating learning (SRL) predict academic performance in second-year Economics? The prediction was analysed by controlling for co-founding variables.

The remainder of the article is structured to provide a literature review, explain the methodology, and analyse the results and findings. The findings are explicated in the final discussion of the results.

2. CONCEPTUAL ANALYSIS OF SELF-REGULATED LEARNING

Self-regulated learning (SRL) can be described as a self-directed process by which learners transform mental abilities into academic skills (Wolters 2003). SRL concepts can be related to a diverse number of different theories and perspectives of learning. The conceptual basis of self-regulation is not restricted to a specific theory or group of theories. The construct of SRL encapsulates its adaptability to accommodate each learner's unique learning process and learning strategy, which personally suit him/her to achieve the predetermined academic goals or outcomes (Dunaway 2011; Hean Craddock and O'Halloran 2009; Jordan, Carlile and Stack 2008).

SRL has been defined in several ways:

“Self-regulated students are self-regulated to the degree that they metacognitively, motivationally and behaviourally are active participants in their own learning process” (Zimmerman 1989).

“Self-regulation refers to self-generated thoughts, feelings, and behaviors that are orientated to attaining goals” (Zimmerman 2002).

The concept of SRL offers a wide perspective on the process of learning. SRL comprises the inherent need to achieve goals related to learning as well as success by working actively and implementing strategies (cognitive, affective, motivational and social), which lead to self-initiated and regulated applications. The construct of SRL encapsulates the adaptability of each learner in expressing his/her unique learning approaches and processes in order to achieve personal goals and outcomes (Boekaerts 1999; Dowell and Small 2012; Pintrich 2004; Ultanir 2012).

Characteristics regarding SRL as adapted from Boekaerts (1999) differ to include researchers' hypothetical orientations. However, a few common perceptions emerged, namely that participants are metacognitively, motivationally and behaviourally involved in their own learning. Metacognitive processes refer to the planning, setting of goals, organising, self-monitoring and self-evaluation throughout the process of learning. Students who apply SRL are therefore able to be aware and knowledgeable about their approach to learning. Motivational processes include self-efficacy, self-attributions and intrinsic task interest. Behavioural processes relate to the creation of an environment conducive to learning, seeking advice, self-instruction and self-reinforcement to contribute to the learning process (Boekaerts 1999; Pintrich 1999; Puustinen and Pulkkinen 2001; Winne 1996; Zimmerman 1990).

3. METHODOLOGY

The study used a non-experimental survey design to answer the research question: Does self-regulating learning (SRL) predict academic performance in second-year Economics? The study was based on a post-positivistic paradigm ensuring objectivity of the researchers and precision in the handling of the data (Clark 1998; Ryan 2006).

The confounding variables for this study were age, gender, ethnicity and the psychosocial well-being of the students. These variables were measured by means of a biographic questionnaire and the Psycho-Social Wellbeing Scale (Viljoen 2012). Because confounding variables influence the results of a study in their relationship with the dependent or independent variables, these were controlled for by building them into the design. They were considered to be independent variables and their effect on the study was measured according to the MaxMinCon principle, thus ensuring internal validity of the design (McMillian and Schumacher 2001).

3.1 Sampling

The population for this study comprised all the undergraduate students registered for Economics at the University of the Free State. The convenience sample, selected from this population, consisted of all second-year students registered for Economics 214 during 2013. The number of participants were $N = 200$. The sample comprised of 82 (41.2%) male students and 117 (58.8%) female students, 116 (61.1%) black students and 74 (38.9%) white students. The minimum age of the respondents was 19 and the maximum age was 42.

3.2 Measuring instrument

One of the best instruments to measure SRL is the Motivated Strategies for Learning Questionnaire (MSLQ) as a measure of self-regulation (Zimmerman 2008). The development of the MSLQ (Pintrich 2004) was a process which was started in 1980 by Bill McKeachie and Paul Pintrich. The MSLQ was developed to assess and validate students' use of SRL strategies.

The Motivated Strategies for Learning Questionnaire (MSLQ) (Duncan and McKeachie 2005; Mills and Blankstein 2000; Pintrich and DeGroot 1990) assesses a student's motivation, study habits and learning skills for the course. The motivation section is based on three general motivational dimensions: expectancy, value and affect. Expectancy indicates the student's self-efficacy in terms of his/her belief in his/her ability, expectancy of success, judgment of ability to do the task and confidence in his/her ability to do the task. The value component focuses on why students engage in the specific academic tasks, while the affect component determines the student's level of test anxiety.

The learning habits and skills section is based on three dimensions, namely cognitive strategies, metacognitive strategies and resource management. Cognitive strategies refer to the student's use of strategies in the processing of information. Metacognitive control strategies refer to strategies used by students in controlling and regulating their own cognition. The strategies are planning, monitoring and regulating of learning activities. Resource management are the strategies used in controlling resources such as time, an appropriate place to study, regulation of effort, peer learning and seeking help.

3.3 Data collection

The collection of data took place on 23 and 24 April 2013. Second-year Economics is offered in Afrikaans and English on different days and during different time slots; two days were therefore required to collect the data. Afrikaans students completed English questionnaires. It should be noted that Afrikaans-speaking students at this university are fluent in English because they have school-level English up to matric. The researcher conducted and supervised the collection of the data. Data was collected at different venues on the campus of the UFS. Students were informed of the purpose and goals of the research and anonymity of participation.

3.4 Ethical considerations

To ensure the study complied with ethical standards, permission to conduct the study was obtained from the Department of Economics, participants signed an informed consent form and the study accepted the guidelines as prescribed by the Faculty of Education of the UFS.

4. RESULTS

The hypothesis of this study was tested by using a correlation analysis and hierarchical multiple regression. Data was captured by the Department of Information and Technology Services of the UFS. Results were analysed by using the univariate and multivariate statistics of SPSS (a software package for statistical analysis in social sciences). Univariate statistics are data with one dependent variable and more than one independent variable. Multivariate statistics are techniques used for analysing data where there are many independent variables and many dependent variables (Tabachnick and Fidell 2007). The results of the correlation analysis and hierarchical multiple regression are discussed in the next section.

4.1 Correlation analysis

It should be noted that not all dimensions of the MSLQ were significantly related to academic performance. However, the dimensions which were significantly related to academic performance render this study valid.

Academic performance correlated significantly with the following SRL dimensions, namely self-efficacy, learning strategies, organisation, metacognitive self-regulation, environment management and effort regulation. A later regression analysis revealed that once all the dimensions of the MSLQ had been analysed and inter-correlated with the biographical confounders, they became significant in total.

Academic performance (N = 200) correlated significantly and positively with the following SRL dimensions and total scores on the MSLQ (see Table 1). The statistical significance of the correlation coefficients is indicated by p. A value of $p < 0,05$ reflects statistical significance. The Pearson's correlation coefficient used in this study measured the linear relationship between two variables (Hinkle, Wiersma and Jurs 1988).

- total scale MSLQ ($p = 0.046 < 0.05$; Pearson = 0.141);
- self-efficacy ($p = 0.000 < 0.05$; Pearson = 0.26);
- learning strategies ($p = 0.032 < 0,05$; Pearson = 0.151);
- organisation ($p = 0.039 < 0.05$; Pearson = 0.146);
- metacognitive self-regulation ($p = 0.043 < 0.05$; Pearson = 0.143);
- environment management ($p = 0.024 < 0.05$; Pearson = 0.159); and
- effort regulation ($p = 0.000 < 0.05$; Pearson = 0.159).

Table 1: Relationship between academic performance and self-regulated learning (scores on the MSLQ)

Variable	Variable	Significance	Pearson's correlation
Academic performance	Total	0.046	0.141
	Self-efficacy	0.000	0.26
	Test anxiety	0.001	-0.223
	Learning strategies	0.032	0.151
	Organisation	0.039	0.146
	Metacognitive self-regulation	0.043	0.143
	Environment management	0.024	0.159
	Effort regulation	0.000	0.159

Considering the contribution of the sub-dimensions to this result the following should be mentioned:

- Self-efficacy is defined in terms of individuals' perceived capabilities to attain designated-type performances and to achieve specific results. Self-efficacy is also very sensitive to several other contextual factors such as one's own motivation, thought processes, affective

states and actions, and changing environments (Pajares 1996). The prediction of self-efficacy of academic performance can be attributed to factors such as choices of student activity, effort, persistence and emotional reactions. Self-efficacy can therefore be responsible for the improvement in students' methods of learning and academic performance (Zimmerman 2000).

- Test anxiety, a sub-dimension of the MSLQ, is a vital factor in the research field of academic performance. In the present study, academic performance was negatively (-0.223) related to test anxiety. The negative correlation indicates that participating students with a high academic performance had low test anxiety.
- Learning strategies include cognitive, metacognitive and resource management strategies, which students could use to improve their academic performance.
- Organisation forms part of cognitive strategies to enable the selection of the main idea, and could be applied to recall, comprehend and understand information.
- Metacognitive strategies pertain to the awareness and the perception of one's mental or thinking processes. Metacognitive strategies (Pintrich 1999; Winne 1996) consist of planning or the setting of goals, monitoring or self-teaching and regulation or rereading, modifying of cognition and giving feedback on the progress made in learning and reaching academic outcomes. Different studies (Brackney and Karabenick 1995; Elliot, McGregor and Gable 1999) found that the application of metacognitive and motivational study strategies were positive predictors of academic performance.
- Environment management as an SRL function causes learners to use environmental opportunities (time, an appropriate place to study, regulation of effort, peer learning and seeking help) to contribute to their academic performance. By taking charge of the environment, self-regulating learners could use their environment to contribute to their learning process.

Effort regulation or volition (Chen 2002; Zimmerman 1990) refers to the ability to deal with failure, to persist in academic activities, and to build resilience to setbacks. Students who regulate their effort show a tendency to maintain focus and effort despite distractions. Participating students reported that they were able to concentrate and keep on studying even if the learning content was not interesting. Effort regulation is often related to motivation and can be viewed as an action control strategy and commitment to achieve one's study goals and to control the energy to achieve them. Effort regulation can therefore indicate a strong predictor of academic performance because it functions as self-driven determination.

All of the above strategies form part of SRL strategies (Zimmerman 1989) which students could apply in learning. Therefore, this result indicates that students using dimensions of SRL improve their academic performance.

4.2 Hierarchical multiple regression

A hierarchical multiple regression was run to predict the relationship between SRL (MSLQ) and academic performance. This prediction indicates which percentage of the variance in the dependent variable is predicted by the independent variables. In this analysis, the effect of the confounding variables on the dependent variable is also indicated, contributing to the internal validity of the study.

Table 2 describes four regression models which are labelled –

- Model 1: containing demographic variables gender, age and ethnicity;
- Model 2: containing the previous psychosocial background;
- Model 3: containing the psychosocial background; and
- Model 4: containing all motivation subscales and all learning strategy subscales.

Abbreviations for the different variables used in the table are as follows:

R-squared = the “per cent of variance explained” by the model.

F-change = the significance of the prediction.

The addition of the previous psychosocial background of students, followed by the present psychosocial background of students, and then all of the motivation subscales of the Motivated Strategies for Learning Questionnaire and all of the learning strategy subscales of the Motivated Strategies for Learning Questionnaire improved the prediction of academic performance, over and above the demographic variables age, gender and ethnicity. As can be seen in Table 2, in Model 1, the demographic variables gender, age and ethnicity were statistically significant predictors of academic performance, adjusted $R^2 = 0.044$, $F(3, 182) = 3.806$; $p = 0.011$, significantly explaining 4.4% of the variance in academic performance.

The addition of previous psychosocial background (Model 2) did not lead to a statistically significant increase in R^2 , with R^2 change = 0.000, F -change (1,178) = 0.000, $p = 0.991$. Similarly, the addition of present psychosocial background (Model 3) also did not lead to a statistically significant increase in R^2 , with R^2 change = 0.003, F -change (1,177) = 0.478, $p = 0.490$. Thus, previous psychosocial background did not add significantly to the prediction of academic performance, while controlling for the demographic variables. Present psychosocial background also did not add significantly to the prediction of academic performance, after controlling for demographic variables and previous psychosocial background.

The addition of motivated strategies for learning (all motivation subscales) and motivated strategies for learning (all learning strategy subscales) (Model 4) did add significantly to the prediction of academic performance, after controlling for demographic variables, previous psychosocial background and present psychosocial background, with R^2 change = 0.205, F -change (16.161) = 3.021, $p = 0.000$. From Table 2, it can be seen that the full model (Model 4), now consisting of demographics, previous and present psychosocial background, motivated strategies for learning (all motivation subscales) and motivated strategies for learning (all learning strategy subscales), did statistically significantly predict academic performance (adjusted $R^2 = 0.177$, $F(20, 182) = 2.957$, $p = 0.000$), explaining 17.7% of the variance in academic performance. Because of the interrelationship of all confounding variables, Model 4 together with the confounding variables predicted academic performance. However, it should be noted that Model 4 consisted of all the scores of the MSLQ scale except the total score. The total score was left out of Model 4 preventing multicollinearity in the analysis.

Table 2: Model summary

Model	R	R-square	Adjusted R-square	Std. error of the estimate	Change statistics					Durbin Watson
					R-square change	F-change	df1	df2	Sig. F-change	
1	.245 ^a	.060	.044	13.202	.060	3.806	3	179	.011	
2	.245 ^b	.060	.039	13.239	.000	.000	1	178	.991	
3	.250 ^c	.062	.036	13.259	.003	.478	1	177	.490	
4	.517 ^d	.267	.177	12.251	.205	3.021	15	162	.000	1.874

5. FINDINGS AND DISCUSSION

The results revealed that self-efficacy, learning strategies, organisation, metacognitive self-regulation, environment management and effort regulation are significantly and positively related to academic performance. The hierarchical multiple regression revealed that the total of all self-regulating scales did add significantly to academic performance. Self-regulated students are proactive learners who incorporate self-regulated processes (goal-setting, self-observation, self-evaluation, self-reflection and self-adoption) with learning strategies (management of study time, using resources, managing the environment) and self-motivational beliefs (self-efficacy, intrinsic interests) (Cleary and Zimmerman 2004). These students will regulate their academic behaviour in four phases (Winne 1996, Winne and Hadwin 2008), namely forethought planning and activation, monitoring, control, and reaction and reflection. These phases occur simultaneously and dynamically with interaction between the different phases.

Students direct their own effort to acquire knowledge by using specific strategies to achieve goals on the basis of self-efficacy perceptions.

In SRL, self-motivation is considered as intrinsic, and it is believed that it would motivate students to undertake academic tasks, aim to understand the content, and regulate their learning in such a way as to continue when being challenged by academic tasks. However, this study acknowledged that students' backgrounds and classroom context influence students' use of motivational, cognitive and learning strategies. In this context, student applying SRL where students with well-developed self-regulation skills can monitor their understanding, regulate their effort and seek help when needed. Some SRL factors are domain-specific and others are more general. SRL abilities, in this study, focused on specific aspects of SRL in Economics. Students who apply SRL need to use different strategies to plan, monitor and evaluate their learning activities (meta-cognitive strategies), as well as control their motivation and emotion (volitional strategies) (Gonzales 2013).

The emergence of SRL as concept has deepened our understanding of the fundamental processes of cognition, metacognition and resource management strategies in learning. SRL has achieved the merging and integration of the concepts of cognition, metacognition, behaviour and environmental management, which have until recently developed separately (Dowell and Small 2012; Jones, Estell and Alexander 2008). 'Cognitive strategies' refers to the integration of new knowledge into prior knowledge and the contribution strategies make in learning, remembering and understanding new tasks. 'Metacognitive strategies' refers to the planning, monitoring and evaluation of the student's own cognition, and the way a student reflects on the learning strategies in the setting of goals, planning and regulating of his or her own effort. 'Resource management' refers to the management and control of other people and the environment in the learning process, and includes effort, use of time, establishment of a study environment and help seeking.

SRL integrates three aspects, namely cognition, individual motivation and goal-directed behaviour. A student's self-awareness of his or her current level of information is key in that student becoming a self-regulated learner. A student's self-schemata act as positive or negative motivation to apply SRL strategies (Pintrich and Garcia 1994). Self-regulating strategies include a much wider range than this study could include, such as self-evaluation, seeking information, organising, transforming information, goal setting, planning, record keeping, self-monitoring, environment structuring, persistence, rehearsing and memorising.

The strategy a student will use is not spontaneous, but is determined by the attributes of the strategies, self-regulating mechanisms and beliefs about efficacy of goal-orientated behaviour. Cognitive engagement, practice and experience are also required in deciding which strategy to apply (Jacobson and Harris 2008). Each student's use of SRL strategies will therefore be unique in terms of individual preferences and circumstances.



6. CONCLUSION

The importance of this study is that it indicates that neither biographical factors nor affective determinants, as measured by the Psycho-Social Wellbeing Scale, were vital to performance in second-year Economics in this particular study. Due to practical reasons and because of randomisation of the sample, the results could not be generalised.

The meaning of these results for lecturers of Economics is that SRL and specifically factors such as self-efficacy, test anxiety, learning strategies, organisation, metacognitive self-regulation, environment management and effort regulation should be brought to bear in class. In a higher education situation with large classes and time constraints, this is a difficult task. Higher education institutions should provide opportunities to make students aware of the importance of these factors. Consultation hours of lectures could be utilised to discuss these factors with students.

Identifying the factors that influence academic performance of students could improve the targeting of interventions and support services of at-risk students' academic problems. Understanding the distinctive features of students' SRL contributes to understanding critical factors of students' academic achievement. The challenge remains for the integrated learning approach of SRL to be implemented in each academic domain or subject, but especially in Economics. Integrating the design of the learning environment and the analysis and formulation of curricula, teaching methods and assessment should be used to encourage and teach students the application of SRL. Students must be empowered to become self-regulated learners whereby they proactively set goals, monitor performance processes and outcomes, evaluate their performance, and then make adjustments to improve their performance (Cleary and Zimmerman 2004). Lecturers should be aware of the different types of prior knowledge on which students can draw and they should invite students to make use of such knowledge in the specific subject or domain. Developing SRL strategies and making students more aware of the different SRL strategies that could be applied in learning Economics might enhance students' academic performance.

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