

# Relationship between Learning Strategies and Motivation by using Structural Equation Modeling Approach

Mohamad Azrien Mohamed Adnan [1], Mohd Sahari Nordin [2], Mohd Burhan Ibrahim [3]

[1] Academy of Islamic Studies  
University of Malaya Nilam Puri,  
Kelantan  
mdazrien@um.edu.my

[2] Institute of Education  
International Islamic University  
Malaysia  
msahari@ium.edu.my

[3] Institute of Education  
International Islamic University  
Malaysia  
burhanibrahim@live.com

## ABSTRACT

This paper aimed at examining the learning strategies constructs and to investigate the relationship between learning strategies and motivation in Arabic courses. The study uses a questionnaire as the information-gathering instrument, and the participants comprised students from two public universities in Peninsular Malaysia who are studying Arabic language. A total of 139 students were selected for this study. The questionnaire's construct validity was tested using confirmatory factor analysis. Confirmatory factor analysis indicated that a model including factors representing the dimensions metacognitive self-regulation, organization and peer learning was the best fit. Significant correlations between motivation and learning strategies subscales (metacognitive self-regulation and organization) provided preliminary evidence of predictive validity of the measure. Metacognitive self-regulation strategy has positive correlation with organization and peer learning strategy. The organization strategy was also positively correlated to peer learning strategy. The metacognitive self-regulation and organization have significant effect on motivation. Contrary to our expectation, peer learning has no significant effect on motivation.

**Keywords:** *Learning strategies, motivation, and structural equation modeling*

## INTRODUCTION

Learning strategies play an important role in second/foreign language learning and the role of learning strategies in student learning has been explored by many researchers in recent years ([Lai, 2009](#); [Li & Chun, 2012](#); [Macaro, 2001](#); [Mohamad Azrien & Shukeri, 2011](#); [Qiufang & Lifei, 2004](#)). It is believed that the use of effective learning strategies is an important factor for successful learning and that students may need a variety of strategies to regulate their own learning ([Marsh, Hau, Artelt, Baumert, & Peschar, 2006](#); [Zimmerman & Martinez-Pons, 1990](#)).

Researchers have defined learning strategies in various ways. [Mayer \(2007\)](#) explained that a learning strategy refers to the cognitive processes developed by students during learning to improve the quality of learning and help the students achieve their respective goals. [Zimmerman \(2000\)](#) suggested that learning strategies should be incorporated into the framework of self-regulated learning (SRL), which refers to "self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals" (p. 14). The use of learning strategies, therefore, can be viewed as a sub-construct of SRL.

Self-regulated students participate proactively in the learning process emotionally, motivationally and cognitively. These students have their intention of self-activated and self-directed efforts in order to gain knowledge and skills by using specific strategies ([Nota, Soresi, & Zimmerman, 2004](#)). [Pintrich, Smith, Garcia, and McKeachie \(1991\)](#) have come up with a manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ) which categorized self-regulated learning into two main strategies. First is a cognitive and meta-cognitive strategy which includes rehearsal, elaboration, organization, critical thinking and meta-cognitive self-regulation. Second are resource management strategies which include time and study environment, effort regulation, peer learning and help seeking.

[Zimmerman and Martinez-Pons \(1986\)](#) identified 14 commonly used academic self-regulated learning strategies which include: self-evaluation, organizing and transforming, goal setting and planning, seeking information, keeping

record and monitoring, environmental structuring, self-consequences, rehearsing and memorizing, seeking peer assistance, seeking teacher assistance, seeking adult assistance, reviewing tests, reviewing notes and reviewing texts. They used a structured interview called self-regulated learning interview schedule (SRLIS) in order to assess how these strategies were implemented.

Learning strategy is not enough to improve student achievement. Students should be motivated to use strategies, and organize cognitions and their efforts (Paris, Lipson, & Wixson, 1983). Motivation is the internal power that drives individuals to act in order to satisfy their desire (Yates, 2004). Mohamad Azrien (2006) explored the relationship between motivation components and self-regulated learning components in an Arabic course. In his study, the construct validity was tested using exploratory factor analysis. His findings revealed that most of the factors in the motivation components were significantly correlated with the self-regulated learning components. Therefore, this study aims is aimed at confirming the relationship between learning strategies and motivation in Arabic courses taken by Arabic students of two public universities in Malaysia.

## Theoretical Framework and Hypothesis Development

### Self-Regulated Learning Theory

According to self-regulated learning theory, self-regulated learning is an integrated learning process, which occurs when individuals attempt to adjust the characteristics of their own behaviour, motivation, and cognition to best suit their own learning. Pintrich (1999) described self-regulated learning as an active, constructive process whereby learners set goals for their learning plan actions and monitor, regulate and control their cognition, motivation and behaviour.

An important aspect of self-regulated learning theory is that student learning and motivation are interdependent. Their learning strategy enables them to be self-aware, knowledgeable, and decisive in implementing their learning strategy. While in terms of motivation, they possess high self-efficacy, self-attribution and intrinsic task interest. Their self-motivation is also evident in their continuing tendency to set higher learning goals for themselves when they achieve the earlier goals (Zimmerman, 1990). In that level, self-regulated learners are not only self-directed but are self-motivated as well.

According to Pintrich et al. (1991), learning strategies can be classified into cognitive, metacognitive, and resource management strategies. In this study, we only used cognitive and metacognitive strategy as our theoretical framework. The cognitive and metacognitive strategies can be further classified into metacognitive self-regulation, organization and peer learning. Paris et al. (1983) suggested that using self-regulated learning strategies promotes students' motivational beliefs. Therefore, it is expected that metacognitive self-regulation, organization strategy and peer learning strategy have some effects on motivation. Figure 1 shows the conceptual framework of self-regulated learning strategies and motivation.

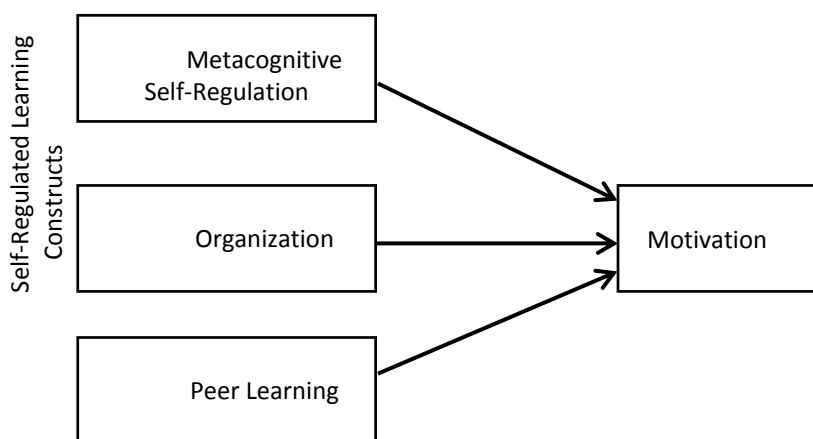


Figure 2: Conceptual Framework of Self-Regulated Learning Strategies and Motivation

### Metacognitive self-regulation

Metacognition refers to the awareness, knowledge and control of cognition (Pintrich et al., 1991). It contains three essential skills, namely planning, monitoring and evaluating. Planning refers to the appropriate selection of strategies and the correct allocation of resources that affect task performance. Monitoring refers to one's awareness of

comprehension and task performance and evaluating refers to appraising the final product of a task and the efficiency of that task performance. This can include re-evaluating the strategies used. Therefore in this study, it is hypothesised that:

Hypothesis 1: Metacognitive self-regulation strategy has an effect on motivation

### **Organisation strategy**

Organisation strategy is a deeper processing strategy which includes activities such as selecting the main idea from reading text, outlining text or reading material and using a variety of specific techniques for selecting and organising the ideas for example sketching a network and mapping the important ideas (Pintrich, 1999). These activities results in students being actively involved in the task and should result in better performance. In the current study, it is hypothesized that:

Hypothesis 2: Organizational strategy has an effect on motivation

### **Peer learning**

Communication and discussion with peers can help a student clarify and elaborate more on reading materials. Peer learning strategy includes activities of collaboration, communication and discussion with peers during the process of learning (Pintrich et al., 1991). The activities can help students to clarify and elaborate more on learning materials. These activities are normally found in cooperative learning as students will interact with their peers within the group. According to Stefanou and Salisbury-Glennon (2002), the use of peer learning indicated significant effects due to involvement in a learning community on motivation. Therefore, it is hypothesized that:

Hypothesis 3: Peer learning strategy has an effect on motivation

## **RESEARCH METHODOLOGY**

The proposed model and hypotheses were estimated by structural equation modeling (SEM), which is a powerful multivariate technique for analysing causal models. A structural equation modeling composed of a measurement model and a structural model. The measurement model is estimated using confirmatory factor analysis (CFA) to test whether the latent variables possess sufficient construct validity. The structural model is used to present the relations of causal effects among the latent variables. The data analysis proceeded with the two-step approach of the structural equation modeling. In this study, the motivation is the endogenous variables. The exogenous latent variables include metacognitive self-regulation, organization and peer learning.

### **Sample description**

The questionnaires was adopted and adapted from the Motivated Strategies for Learning Questionnaires (MSLQ) originally developed by Pintrich et al. (1991). This instrument was one of the most frequently used (see for example Easton & McColl, 1997; Gay, Mills, & Airasian, 2006). Each item was measured on a seven-point Likert scale, ranging from not at all true of me (= 1) to very true of me (= 7). Data were collected from two public universities in Malaysia. The participants in this study were university students who enrolled in undergraduate degree programmes in Arabic language study. The population was sampled by cluster sampling methods. A total of 220 questionnaires were sent and 139 were returned. Respondents who participated in this study consisted of 27 men (19.4%) and 112 women (80.6%). All the subjects had formally studied Arabic for six years in high school. They ranged from the second semester up to the final year.

### **Reliability**

To examine the internal consistent reliability of the observed item questionnaire, Cronbach's alpha was assessed. The resulting alpha values ranged from .650 to .904, which were above the acceptable threshold, as shown in Table 1.

## RESULT

*Assessment of the Measurement Model*

The measurement model was assessed by confirmatory factor analysis (CFA). According to [Segars and Grover \(1993\)](#), the measurement model should be evaluated first before generating the best overall model fit. The hypothesized 3-factor measurement model was evaluated using confirmatory factor analysis to assess the factorial validity of the measurement model.

The values for composite reliability (CR) and average variance expected (AVE) were needed in order to obtain the divergent validity. [Yates \(2004\)](#) suggest that the recommended threshold of average variance extracted is 0.5, while [Hair Jr, Black, Babin, Anderson, and Tatham \(2010\)](#) suggest that the recommended threshold of composite reliability should be greater than 0.7. All composite reliabilities measures of constructs exceed the recommended threshold of 0.7. The factor loadings that are smaller than the recommended level of 0.5 should be removed. Discriminant validity can be tested by comparing the square roots of the AVE with the correlations among the constructs. All of the square roots of the AVE by constructs were greater than the correlation among constructs as shown in Table 1, so discriminant validity was supported. In brief, the measurement model assessment, including convergent and discriminate validity measures, was satisfactory.

The overall model fit was assessed in terms of four measures. These indices included: the chi-square/degree of freedom ( $\chi^2/d.f$ ), the traditional chi-square (CMIN), the degree of freedom (DF), the Comparative Fit of Index (CFI) and the Root Mean Square of Error Approximation (RMSEA) ([Hair Jr et al., 2010](#)) to obtain a model fit. The CFI value must exceed 0.90 and the RMSEA value must be lower than 0.08 ([Schumacker & Lomax, 2004](#)) in order to obtain an acceptable fit with the data. [Hayduk \(1988\)](#) suggests that  $\chi^2 / d.f$  should not exceed 3. Accordingly, all the fitness measures in this research fell into acceptable ranges using CFA. Consequently, the proposed model provided a suitable fit.

Table 1: Estimates of the measurement model

Construct	Item	Factor Loading	Cronbach's alpha	CR	AVE
Metacognitive	Read the task carefully	0.789	.879	0.909	0.598
	I check again if I made a mistake	0.773			
	I try to remember what the lecturer said	0.807			
	I try to remember the fact	0.745			
	I try to put together the information from class	0.750			
Organization	I work hard to get good grade	0.618	.821	0.825	0.543
	While reading, I stop once in a while	0.844			
	I think what to learn	0.643			
	I can concentrate on my course work	0.762			
Peer Learning	I reflect all the steps in the procedure of task solving	0.682	.807	0.808	0.584
	I identify student for help	0.769			
	I ask another students	0.747			
	I try to work with other students	0.776			

We estimated the proposed model by using structural equation modeling with the maximum likelihood estimation method. The chi-square goodness-of-fit test showed that the model did not fit the data well,  $\chi^2 = 94.533$ ,  $p < .05$ . Although the model did not fit well by the chi-square test, the baseline comparisons fit indices of CFI were close to or exceeded 0.9 (CFI = 0.959) and the ratio chi-square /d.f. is 1.525. The RMSEA showed a value of 0.066 indicating a good model fit. Accordingly, the recommended thresholds and results of the measurement model fitness indicate a good model fit. Figure 2 shows the results of the measurement model.

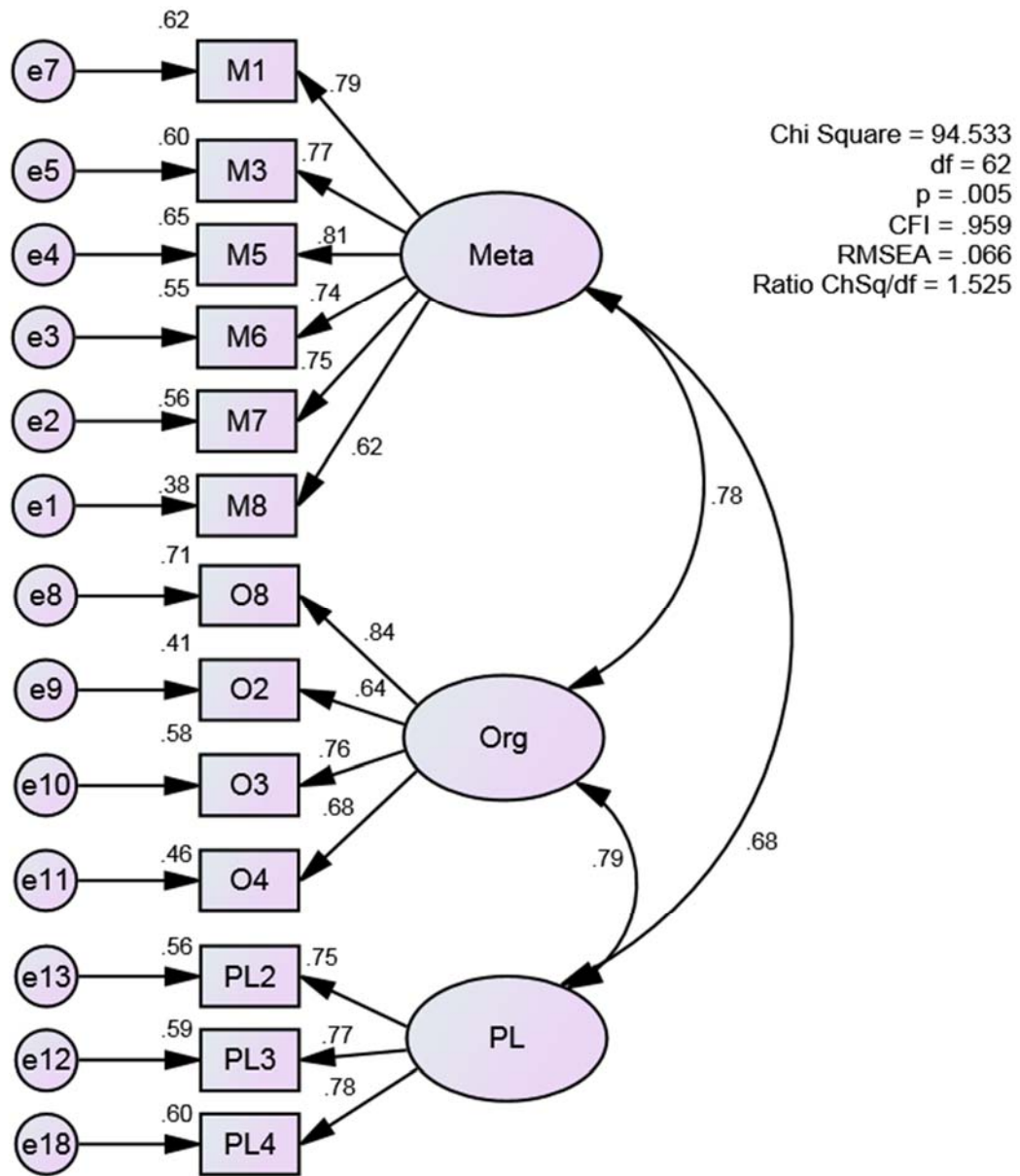


Figure 3: The Measurement model of Students' Learning Strategies

### Analysis of Path Coefficient

Based on the good fit of the measurement model, the path coefficients of the structural model were then estimated. Figure 3 shows the results of path coefficient analysis.

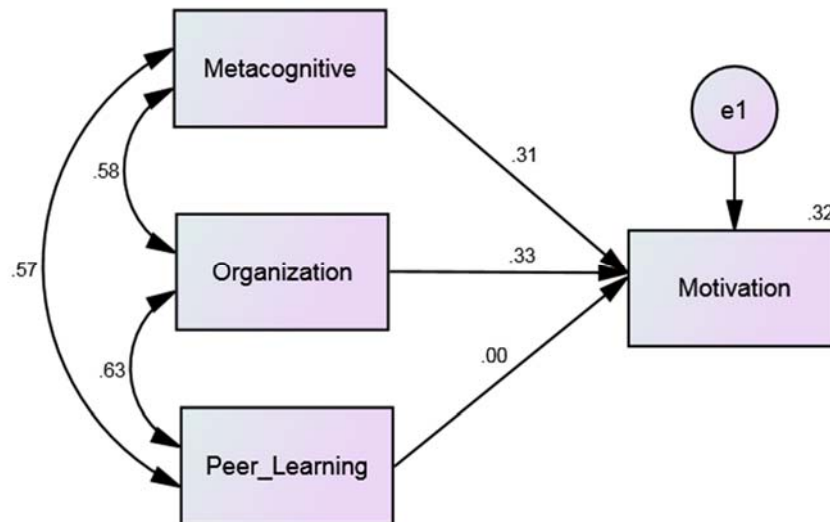


Figure 4: Relationship among learning strategies constructs and motivation

### Empirical Findings

According to the path coefficient, results showed that organization strategy was positively correlated to peer learning strategy and metacognitive self-regulation strategy ( $r = 0.63, p < .001$  and  $r = .58, p < .001$ , respectively). The results indicated that students, who had a better organization strategy, would have better peer learning and metacognitive self-regulation strategy. Peer learning strategy was significantly correlated with metacognitive self-regulation strategy ( $r = .57, p < .001$ ). Students who had more strategies in peer learning were found to be using more strategies in metacognitive self-regulation.

Metacognitive self-regulation strategy has direct influence on motivation ( $\beta = 0.31, p < .001$ ), supporting hypothesis 1. Organizational strategy also has direct influence on motivation ( $\beta = 0.33, p < .001$ ), supporting hypothesis 2. Contrary to expectation, peer learning strategy has no significant effect on motivation ( $\beta = 0.00, p < .998$ , so hypothesis 3 was not supported).

### DISCUSSION

This study was conducted to assess the reliability and validity of the students' learning strategies instrument by applying confirmatory factor analysis to a Malaysian case and to examine the relationship between learning strategies construct and motivation. The results of the CFA provided support for a three-factor model of learning strategies consisting of metacognitive self-regulation, organization and peer learning. Results suggested that the three-factor model was the best overall fit to the data. The metacognitive self-regulation dimension was represented by six indicators related to reading task carefully, reading again, checking task from mistakes, trying to remember what the lecturers said, trying to remember the facts, trying to put together the information, and trying to work hard to get good grade. The organization dimension was represented by four indicators which are stopping once while reading, thinking what to learn, concentrating on the course work, and reflecting all the steps in the procedure of task solving. The peer learning dimension was represented by three indicators namely identifying students, asking friends, and working with other students.

Considering our findings for the structural model, where we examined the relationship between learning strategies constructs and motivation, the results revealed that metacognitive self-regulation and organization were significantly correlated to motivation. The  $R^2$  of 0.322 suggested that the independent variables accounted for 32.2% of the total variance explained by the independent variable, which indicated a good effect size.



The results of this study have practical implication for language learning strategies. The preliminary predictive validity evidence suggests that the questionnaire may be useful for teachers who wish to identify students who are in need of instruction in how to self-regulate their learning. Language teachers could use the questionnaire at the item or subscale level to help identify particular weaknesses in their students' learning approaches. Teachers would do well to introduce and implement such strategies as how to formulate and develop a concept, how to create analogies, and how to apply a mnemonic device in order to help their students maintain their learning strategies.

#### Future Research

This study was conducted in only two public universities involving a small sample size. It is therefore restricted in terms of its generalizability. Thus further research is required to validate the instrument with students from other higher educational institution, and with a bigger sample which would allow generalising of the findings. Also, future studies may examine the causal effect between learning strategies, motivation and achievement.

#### REFERENCES

- Easton, Valerie J., & McColl, J. H. (1997). Statistics glossary. Retrieved from <http://www.stats.gla.ac.uk/steps/glossary/sampling.html#clustsamp>
- Gay, Lorraine Rumbel, Mills, G. E., & Airasian, P. W. (2006). *Educational research: Competencies for analysis and applications* (7th ed.). Boston, MA: Pearson Education.
- Hair Jr, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2010). *Multivariate data analysis*. Englewood Cliffs, NJ: Prentice Hall.
- Hayduk, Leslie A. (1988). *Structural equation modeling with LISREL: Essentials and advances*. Baltimore, MD: JHU Press.
- Lai, Ying-Chun. (2009). Language learning strategy use and English proficiency of university freshmen in Taiwan. *TESOL Quarterly*, 43(2), 255-280.
- Li, Jie, & Chun, Cecilia Ka-wai. (2012). Effects of learning strategies on student reading literacy performance. *Reading*, 12(1).
- Macaro, Ernesto. (2001). *Learning strategies in foreign and second language classrooms*: London, UK: Continuum.
- Marsh, H. W., Hau, Kit-Tai, Artelt, Cordula, Baumert, J., & Peschar, J. L. (2006). OECD's brief self-report measure of educational psychology's most useful affective constructs: Cross-cultural, psychometric comparisons across 25 countries. *International Journal of Testing*, 6(4), 311-360.
- Mayer, Richard E. (2007). *Learning and Instruction*. Englewood Cliffs, NJ: Prentice Hall.
- Mohamad Azrien, & Mohamed Adnan. (2006). *Motivasi, pembelajaran pengaturan sendiri dan pencapaian akademik dalam Pengajian Bahasa Arab di kalangan pelajar universiti di Malaysia*. (Master of Education Project Paper), Universiti Kebangsaan Malaysia, Bangi.
- Mohamad Azrien, Mohamed Adnan, & Shukeri Mohamad. (2011). Language learning strategies and self-efficacy belief in Arabic language learning: A Malaysian context. *Asean Journal of Teaching & Learning in Higher Education*, 3(2), 48-59.
- Nota, Laura, Soresi, S., & Zimmerman, B. J. (2004). Self-regulation and academic achievement and resilience: A longitudinal study. *International Journal of Educational Research*, 41(3), 198-215.

Paris, Scott G, Lipson, Marjorie Y., & Wixson, Karen K. (1983). Becoming a strategic reader. *Contemporary Educational Psychology, 8*(3), 293-316.

Pintrich, P. R. (1999). The role of motivation in promoting and sustaining self-regulated learning. *International Journal of Educational Research, 31*(6), 459-470.

Pintrich, P. R., Smith, D. A. F., Garcia, Teresa, & McKeachie, W. J. (1991). *A manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ)*. Ann Arbor, MI: National Center for Research to Improve Postsecondary Teaching and Learning.

Qiufang, Wen, & Lifei, Wang. (2004). Challenging the effectiveness of L2 learning strategy studies. *Foreign Language World, 2*, 2-7.

Schumacker, R. E, & Lomax, R. G. (2004). *A beginner's guide to structural equation modeling*. Mahwah, NJ: Erlbaum.

Segars, A. H., & Grover, Varun. (1993). Re-examining perceived ease of use and usefulness. *MIS Quarterly, 17*(4), 517-525.

Stefanou, Candice R., & Salisbury-Glennon, Jill D. (2002). Developing motivation and cognitive learning strategies through an undergraduate learning community. *Learning Environments Research, 5*(1), 77-97.

Yates, Lyn. (2004). *What does good education research look like?* Paper presented at the Why Learning? Seminar, Australian Museum/University of Technology Sydney.

Zimmerman, B. J. (1990). Self-regulated learning and academic achievement: An overview. *Educational Psychologist, 25*(1), 3-17.

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13-39). San Diego, CA: Academic Press.

Zimmerman, B. J., & Martinez-Pons, M. (1986). Development of a structured interview for assessing student use of self-regulated learning strategies. *American educational research journal, 23*(4), 614-628.

Zimmerman, B. J., & Martinez-Pons, M. (1990). Student differences in self-regulated learning: Relating grade, sex, and giftedness to self-efficacy and strategy use. *Journal of Educational Psychology, 82*(1), 51.