

Learning Styles as a Predictor of Meta-Cognition Among Undergraduate Students at Albalqa' Applied University

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Abstract

The purpose of this study was to examine if learning styles (concreteness, reflectiveness, abstractness and experimentation) predict meta-cognition (knowledge of cognition, regulation of cognition and cognition processing). Participants of the study consisted of 715 students (males and females) selected randomly from different faculties of Albalqa' Applied University. Two questionnaires on learning styles and meta-cognition were administered to members of the sample during academic year 2013/2014. Regression and correlation analyses were used for data. Results indicate that there is significant positive correlation between the dimensions of learning styles and meta-cognition. Results also indicate that learning styles significantly explain and predict all sub-dimensions of meta-cognition.

Key words: Learning styles; Meta-cognition; Undergraduate students

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INTRODUCTION

The term meta-cognition was first brought to the literature by Flavell (1976, 1979), and Flavell, Miller and Miller (1993). Meta-cognition is defined as thinking well, understanding and controlling one's learning (Schraw & Dennison, 1994; Brown, 1978). Meta-cognitive skills

refer to intentional regulation of study strategies. During a learning process, meta-cognitive skills allow students to select an appropriate strategic intervention, monitor the execution of the strategy, and evaluate its effectiveness (Baker, 1989; Artzt & Armour-Thomas, 1992; Schraw & Dennison, 1994; Dunslosky & Thiede, 1998; Boekaerts, Pintrich, & Zeidner, 2000).

Harris (2003) believes that meta-cognition is concerned with guiding the learning process itself and so includes strategies for planning, monitoring and evaluating both language use and language learning; key elements in developing autonomy.

Students with high meta-cognitive and self-regulatory abilities actively involved in their own learning process plan and monitor the task they are focusing on, their own study attitudes and the task and the study attitudes fit together (Zimmerman & Martienz-Pons, 1986). On the other hand, meta-cognition skills involves the process of individuals deciding what strategy to use in what situations as result of the meta-cognition experiences they have lived, using the strategy, monitoring learning, changing the strategy if learning has not taken place and trying a new strategy.

Oxford (1990) believes that meta-cognition strategies provide a way for learners to coordinate their own learning process. Livingston (1997) suggests that meta-cognition refers to higher order thinking that involves active control over the cognitive process which influences learning. Biggs also discusses the role of meta-cognition in learning, utilizing the term meta-learning to define the application of meta-cognition to student learning (Biggs, 1985; Biggs, 1988). Wang, Haertel and Wealberg (1990) stats that meta-cognition to be a most powerful predictor of the learning.

Cornford (2002) stats that from a cognitive psychology perspective, effective learning through the lifespan is dependent upon effective information processing and the

possession and quality of basic learning-to-learn skills and knowledge meta-cognition strategies and resource management strategies may provide adult students with the most promising tools to enhance their success in distance education courses.

The positive role of meta-cognition in learning is supported by three theories of learning, cognitive development, behaviouristic and information processing learning theories (Hoskin, 2000). Ertmer and Newby (1996) state that meta-cognition facilitates the strategies of expert learners and that reflection provides the critical link between knowledge and control of the learning process. Meta-cognition influences the outcome of learning (Anderson, 2001; Buttler & Winne, 1995; Davis, 2003; Efklides, 2006; McCrindle & Christensen, 1995; Nashon, Anderson, & Nielsen, 2005).

1. RESEARCHES ON THE RELATIONSHIP BETWEEN META-COGNITION AND LEARNING STYLES

Yesilyurt (2013) found meta-cognition awareness appeared to significantly and positively affect the study process at level of .39.

Cakiroglu (2007) found correlation between meta-cognitive strategy instruction is effective in increasing students reading comprehension levels and developing meta-cognitive reading comprehension skills levels.

Hekkila and Lonka (2006): a correlation was found among learning approaches, regulation of learning (self-regulation), cognitive approaches and achievement.

Shannon (2008): Students were then asked to reflect on which meta-cognitive strategies best fit their learning styles. The results were then tallied to determine which strategies were preferred within the seven learning style groups.

Ozsoy, Memis, and Temur (2009) found that there is no significant relationship between meta-cognition and study habits and attitudes.

Caliskan and Sunbul (2011) found learning strategies interaction increased awareness of strategies and meta-cognitive knowledge and it was effective in using meta-cognitive skills, it was also found that using meta-cognitive skills increased achievement.

Rad (2012) found relative average direct linear relationship between metacognition and training-learning process in which as meta-cognition increases, training-learning process increases and vice versa, by decreasing meta-cognition, training-learning process decreases.

2. STATEMENT OF THE PROBLEM

The meta-cognition skills to be able to monitor and regulate one's own learning are an important aspect of the lifelong learning process. The importance of meta-cognition in the learning process is illustrated by a series of experimental

studies designed to assess the impact of meta-cognition skills on learning performance across many disciplines (Manita & Veenman, 2010). Therefore, the problem with the current study is to examine the relationship between meta-cognition and learning styles among undergraduate students at Albalag's Applied university.

3. STUDY PURPOSE AND QUESTIONS

The purpose of this study was to examine the relationship between meta-cognition and learning styles among the students of the Albalag's Applied university in Jordan.

The specific study questions that guided this study were:

RQ1. Is there relationship between the students meta-cognition and their learning styles?

4. SIGNIFICANCE OF THE STUDY

The basic goal of this study is to determine the relationships between meta-cognition and learning styles.

In addition, this study is very important for many reasons: (i) meta-cognition to be an important part of teaching and improving one's learning. (ii) The study has significance for universities that support student's success and quality education.

5. MATERIALS & METHOD

5.1 Population and Sample of the Study

A total of 715 undergraduate students from Albalag's Applied University in Jordan (270 male and 445 female) were involved in this study. The average age of the respondents is 20 years old. Data were collected to measure student's meta-cognition questionnaire and learning styles questionnaire.

5.2 Instruments

Two survey instruments were used in this study. Each is described as following.

Meta-cognition Questionnaire (MQ)

The instrument used in this study was developed by Schraw and Dennison (1994) with permission of the first author was used to measure students' meta-cognitive awareness. The MQ consists of 52 statements which students rate as being false or true on a five point likert scale. The two components of meta-cognition discussed above are represented within the scale, meta-cognitive knowledge and meta-cognitive regulation. Within the MQ these are referred to as the knowledge of cognition factor and the regulation of cognition factor. Within the inventory there are 17 questions related to the knowledge of cognition factor for a possible point total of 85. There are 35 questions related to the regulation of cognition factor for a possible point total of 175. The factor scores are calculated by adding the scores on questions related

to each of the factors. Higher scores correspond to greater meta-cognitive knowledge and greater meta-cognitive regulation. In addition to the knowledge of cognition score and the regulation of cognition score a MQ total score is derived by summing responses to all 52 questions.

Learning Styles Questionnaire (LSQ):

The learning styles questionnaire developed by Romero & Tepper, (1992). The instrument consisted of (41) items that relate to learning styles four dimensions: concreteness (7) items, reflective (7) items, abstractness (7) items and experimentation (7) items. The scale was a five-point Likert-type response scale: (1) strongly disagree, (2) disagree, (3) don't know, (4) agree, and (5) strongly agree. Reliability coefficients for the Learning Styles Questionnaire established for the eight scales as follows: concreteness (0.72), reflective (0.76), abstractness (0.79) and experimentation (0.72). In this study, the reliability coefficient was calculated using a cronbach alpha and was found to be (0.72, 0.65, 0.61, 0.72) for concreteness, reflective, abstractness and experimentation respectively

5.3 Data Collection

The two questionnaires (meta-cognition and learning styles) were administered at the senior Albalqa'a Applied

University. The participants were given oral description of the objectives of the questionnaires and that their response would be used only for research purposes. Participants were given 35-45 minutes to respond, and they were ensured that the obtained data would be kept confidential

5.4 Data Analysis

Data of meta-cognition and learning styles were computed separately with the help of Excel. Then the Statistical Package of Social Science (SPSS) (V: 17) was employed to compute the data gained in the study. The statistical procedure of stepwise multiple regression was the main analysis for testing the relationship between meta-cognition and learning styles.

5.5 Results

To facilitate understanding the results of this study, questions of this study are divided into one questions.

Results related to study question: Is there relationship between students meta-cognition and their learning styles?.

To answer this question, the correlation coefficients between meta-cognition and learning styles are presented in Table 1.

Table 1
Correlation Between Meta-Cognition and Learning Styles (n=715)

Meta-cognition	Learning styles			
	Concreteness	Reflective	Abstractness	Experimentation
Regulation of cognition	0.63*	0.70*	0.63*	0.62*
Knowledge of cognition	0.67*	0.75*	0.65*	0.63*
Cognition processing	0.59*	0.61*	0.66*	0.60*

*(p<0.01)

Table 1 shows that the regulation of cognition is positively related to the concreteness, reflective, abstractness and experimentation learning styles (p=0.01). The knowledge of cognition is positively related to the concreteness, reflective, abstractness and experimentation learning styles (p=0.01). And the cognition processing

is positively related to the concreteness, reflective, abstractness and experimentation learning styles (p=0.01).

Multiple Regression Analysis:

Table 2 shows the results of multiple regression analysis using learning styles as predicted to meta-cognition.

Table 2
Results of Regression Analyses Predicting Scores of Learning Styles of Meta-Cognition

Meta-cognition	Learning styles	R	R ²	F	β	T
Regulation of cognition	concreteness	0.733	0.537	205.824	0.170	4.026
	reflective				0.332	8.580
	abstractness				0.174	4.295
	experimentation				0.159	3.928
Knowledge of cognition	concreteness	0.795	0.633	305.818	0.171	4.530
	reflective				0.464	13.466
	abstractness				0.101	2.812
	experimentation				0.160	4.421
Cognition processing	concreteness	0.709	0.503	179.791	0.099	2.255
	reflective				0.191	4.758
	abstractness				0.336	8.005
	experimentation				0.180	4.292

Results given in Table 2 show that the concreteness, reflective, abstractness and experimentation is a significant predictor of regulation of cognition ($R^2=0.537$, $F=205.824$, $p=0.05$). This results was supported by the close moderate correlation between the four variables ($r=0.733$). Approximated 53.7% of the variance of the student's regulation of cognition was accounted by learning styles. Concreteness, reflective, abstractness and experimentation is a significant predictor of Knowledge of cognition ($R^2=0.633$, $F=305.818$, $p=0.05$). This results was supported by the close moderate correlation between the four variables ($r=0.795$). Approximate 63.3% of the variance of the student's knowledge of cognition was accounted by learning styles. Concreteness, reflective, abstractness and experimentation is a significant predictor of cognition processing ($R^2=0.503$, $F=179.791$, $p=0.05$). This results was supported by the close moderate correlation between the four variables ($r=0.709$). Approximate 50.3% of the variance of the student's cognition processing was accounted by learning styles.

DISCUSSION

Meta-cognitive skills are knowledge student performance about one's own learning process (Flavell, 1987). The term also refers to an individual's awareness, evaluation and regulation on their own thinking activity. In other words, people with strong meta-cognition skills can control and manage their own thinking and the outcomes of their thinking process. The primary purpose of this study was to examine the relationship between learning styles and meta-cognition of university students in different faculties at Albalag'a Applied university in Jordan. The results indicated that Table 1 shows that the regulation of cognition is positively related to the concreteness, reflective, abstractness and experimentation learning styles. The knowledge of cognition is positively related to the concreteness, reflective, abstractness and experimentation learning styles. And the cognition processing is positively related to the concreteness, reflective, abstractness and experimentation learning styles. The ability to be meta-cognition to be able to monitor and regulate one's own learning is an important aspect of the lifelong learning process. The important of meta-cognition in the learning process is illustrated by a series of experimental studies designed to assess the impact of meta-cognition skills on learning performance across many disciplines. Our findings are consistent with other results (Cakiroglu, (2007); Hekkila and Lonka, (2006); Shannon, (2008); Ozosy et al, (2009); Caliskan and Sunbul, (2011) Rad, (2012)) which found a positive relationship between learning styles and their use of meta-cognitive strategies.

From the theoretical standpoint, the following line of research is suggested for the future: (a) The university needs to have a better role to increase the effectiveness of

students' learning styles through academic and training programmers. (b) the researcher recommend conducting other studies on other variables in different university.

REFERENCES

- Anderson, M. D. (2001). Individual characteristics and web-based courses. In C. R. Wolfe (Ed.), *Learning and teaching on the World Wide Web*. (pp.47-68). San Diego: Academic Press.
- Artzt, A. F., & Armour-Thomas, E. (1992). Development of a cognitive-metacognitive framework for protocol analysis of mathematical problem solving. *Cognition and Instruction*, 9, 137-175.
- Baker, L. (1989). Metacognition, comprehension monitoring, and the adult reader. *Educational Psychology Review*, 1, 3-38.
- Biggs, J. (1985). The role of metalearning in study processes. *British Journal of Educational Psychology*, 55, 185-212.
- Biggs, J. (1988). The role of metacognition in enhancing learning. *Australian Journal of Education*, 32(2), 127-138.
- Boekaerts, M., Pintrich, P. R., & Zeidner, M. (Eds.). (2000). *Handbook of self-regulation*. San Diego: Academic Press.
- Brown, A. L. (1978). Knowing when, where, and how to remember: A problem of metacognition. In R. Glaser (Ed.), *Advances in instructional psychology*, Vol. 1 (pp.77-165). Hillsdale: Erlbaum.
- Buttler, D. L., & Winne, P. H. (1995). Feedback and self-regulated learning: A theoretical synthesis. *Review of Educational Research*, 65, 245-281.
- Caliskan, M., & Sunbul, A. (2011). The effects of learning strategies instruction on meta-cognitive knowledge, using meta-cognitive skills and academic achievement, primary education sixth grade Turkish course sample. *Educational Sciences: Theory & Practice*, 11(1), 148-153.
- Cornford, I. R. (2002). Learning-to-learn strategies as a basis for effective lifelong learning. *International Journal of Lifelong Education*, 21(4), 357-368.
- Coutinho, S. A. (2007). The relationship between goals, metacognition, and academic success. *Educate*, 7(1), 39-47.
- Davis, E. A. (2003). Characterizing and fostering productive reflection in prospective elementary science teachers. A paper presented at the American Educational Research Association annual meeting. Chicago
- Dunslosky, J., & Thiede, K. W. (1998). What makes people study more? An evaluation of factors that affect self-paced study. *Acta Psychologica*, 98, 37-56.
- Efklides, A. (2006). Metacognition and affect: What can metacognitive experiences tell us about the learning process?. *Educational Research Review*, 1, 3-14.
- Ertmer, P. A., & Newby, T. J. (1996). The expert learner: Strategic, self-regulated and reflective. *Instructional Science*, 24, 1-24.
- Flavell, J. H. (1976). Metacognitive aspects of problem solving. In L. B. Resnick (Ed.), *The nature of intelligence* (pp.231-235). Hillsdale, NJ: Erlbaum.

- Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive developmental inquiry. *American Psychologist*, 34, 906-911.
- Flavell, J. H., Miller, P. H., & Miller, S. A. (1993). *Cognitive development* (3rd ed.). Englewood Cliffs, NJ: Prentice Hall.
- Harris, V. (2003). Adapting classroom-based strategy instruction to a distance learning context. *TESL Internet Journal*, 7(20).
- Hekkila, A. & Lonka, K. (2006). Studying in higher education: Students approaches to learning, self-regulation, and cognitive strategies. *Studies in Higher Education*, 31(1), 99-117.
- Hoskin, P. W. O. (2000). Affecting increased student achievement in geoscience education by instruction in metacognition: A small class case study. Retrieved from http://www.usq.edu.au/electpub/ejist/docs/Vol7_no2/CurrentPractice/Affect_student_ach.htm
- Livingston, J. A. (1997). Metacognition: An overview. Retrieved from <http://www.gse.buffalo.edu/fas/shuell/cep564/Metacog.htm>
- Manita van, der Stel, & Veenman, M. V. J. (2010). Evelopment of metacognitive skillfulness: A longitudinal study. *Learning and Individual Differences*, 20, 220-224.
- McCrindle, A., & Christensen, C. (1995). The impact of learning journals on metacognitive and cognitive processes and learning performance. *Learning and Instruction*, 5, 167-185.
- Nashon, S. M., Anderson, D., & Nielsen, W. (2005). Students' metacognitive traits as pointers to their subsequent knowledge construction. *Conference Proceedings CD of the National Association for Research in Science Teaching (NARST)*, Dallas, Texas.
- Ozsoy, G., Memis, A., & Temur, T. (2009). Maticognition, study habits and attitudes. *International Electronic Journal of Elementary Education*, 2(1), 154-166.
- Oxford, R. L. (1990). *Language learning strategies: What every teacher should know*. USA: Heinle & Heinle.
- Rad, M. R. (2012). The relationship between metacognition and students training-learning process. *Middle-East Journal of Scientific Research*, 11(8), 1095-1099.
- Romero, J. E., & Tepper, B. J. (1992). Development and validation of new scales to measure Kolb's (1985) learning style dimensions. *Educational and Psychological Measurement*, 52(1), 171-180.
- Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology*, 19, 460-475.
- Shannon, S. V. (2008). Using metacognitive strategies and learning styles to create self-directed learners. *Institute for Learning Styles Journal*, 1, 14-28.
- Wang, M. C., Haertel, G. D., & Walberg, H. J. (1990). What influences learning? A content analysis of review literature. *Journal of Educational Research*, 84, 30-43.
- Yesilyurt, E. (2013). Metacognitive awareness and achievement focused motivation as the predictor of the study process. *International Journal Soc. Sci & Education*, 3(4), 1013-1026.
- Zimmerman, B. J., & Martinez-Pons, M. (1986). Development of a structural interview for assessing student use of self-regulated learning strategies. *American Educational Research Journal*, 23(4), 614-628.