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Higher-Order Thinking among Professional Students of Punjab in Relation to Gender and Course Experience

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ABSTRACT

Professional education includes specialised training by incorporating enhanced knowledge and skills necessary for responsible entry into professional practice. It is designed to impart students with the competencies to be evaluative, creative and innovative. This is the base of higher-order thinking skills--critical thinking and self-regulation. Thus, the present study was carried out with an aim to investigate higher-order thinking in terms of critical thinking and self-regulation among professional students of Punjab in relation to gender and course experience. The data were collected via the Motivated Strategies for Learning Questionnaire (MSLQ) and Course Experience Questionnaire (CEQ). MSLQ and CEQ items were administered through a survey on a sample of 200 undergraduate professional students (95 Males and 105 Females) pursuing professional courses at Punjabi University, Patiala. The data were analysed using the two-way analysis of variance. The results revealed no statistically significant gender differences in critical thinking and self-regulation of professional students of Punjab. Also, it was found that the professional students having low and high level of course experience did not differ significantly in higher-order thinking i.e. critical thinking and self-regulation. Thus, it may be concluded that gender and course experience, neither independently nor conjointly, explain critical thinking and self-regulation of professional students of Punjab. However, it may be pointed out that professional students have shown moderate level of critical thinking and above average level of self-regulation. In other words, higher-order thinking skills among professional students need to be explored further for its causation and enhancement.

Keywords: Professional Education, Higher-Order Thinking Skills, Critical Thinking, Self-regulation, and Course Experience

Professional education encompasses teaching and learning specific skills, thereby, preparing students for the world outside the four walls of educational institutions. Its ultimate goal is aimed at the future, and to "foresee" in order to frame new sets of thinking skills in a certain new and novel way in order to satisfy the needs of future generations of people in ever changing society. All the young professionals should be prepared to think deeply and critically so that they become the innovators, educators, researchers, and leaders who can solve the most confronting challenges being faced by our nation and the world at large, both today and tomorrow. In the digital era, one of the major components that students, especially professional students require to use is higher-order thinking skills. This is when students use higher levels to think about what they are learning, understand the facts, infer them, and apply them in real-life situations so as to seek new solutions to problems in hand. Education in general and higher education in particular, can meet this objective only by embracing a higher-order thinking approach (Maan, 2019). Higher-order thinking enables students to think from different perspectives, triangulates them all and takes thinking to a whole new level than restating the facts. Creative thinking, critical thinking, reflective thinking, problem solving, decision-making and social and emotional skills altogether form the core elements of higher-order thinking skills.

In an ever changing global economy that's becoming increasingly complex, current jobs are disappearing due to automation and new jobs are emerging every day as a result of technological advances. A major goal of higher education is to create lifelong learners— intentional, independent, self-directed learners— who can acquire, retain, and retrieve new knowledge on their own (American Association of Colleges and Universities, 2007; Wirth and Perkins, 2008). The continual advances in technology are changing the way students learn, connect and interact every day, where success is driven not only by knowledge attained, but by application in real life situations. It's more important than ever preparing the young professionals for global competitiveness adequately equipped with the appropriate knowledge and skills needed to solve tough problems, gather and evaluate evidence, and make sense of information. Moreover, rapidly changing workplaces accentuate the momentousness of self-regulatory processes at the workplace (Lourenco & Ferreira 2019). Only lifelong learners will be able to keep up with the explosive growth of knowledge and skills in their career and to retool into a new career after their previous one runs its course. There is however, a consistent demand for professional students to have life-long learning skills that enable learners to continually upgrade their skills and knowledge through their own self-motivation and learning skills (Australian National Training Authority, 1998; Bennett, Dunne & Carre, 1999). Skills developed by professional students through professional courses provide them with the foundation to succeed at universities and workplaces (Caratozzolo, Delgado, and Hosseini, 2019). In other words, professional students will need these higher-order thinking skills in order to succeed in their personal and professional lives.

Students who engage in higher-order thinking go beyond the basic levels of comprehension and can analyze, synthesize, evaluate, and interpret the concept they are learning at deeper levels, draw relevant and insightful conclusions, and can apply their previous knowledge in new situations. Students with higher-order thinking skills are able to create and understand analogies, their own thoughts and opinions, compare and contrast similar or dissimilar events, and use their creativity to extend and develop concepts and must also know how to monitor and regulate his own thought process besides thinking and learning which in turn is helpful in deciding how to best accomplish a task by employing specific skills effectively. In particular, students can use self regulation skills and strategies to plan and work effectively. They can also use self-regulation to reflect on the outcomes of their work, both positive and negative, and to use their conclusions to shape future plans and strategies (Zimmerman, 2002). When students self-regulate, they plan and strategize to amplify their achievement. Self-regulated students also reflect on their outcomes, successes, and challenges, and adjust future planning based on their conclusions (Jantz, 2010, Khaled, Riyad, & Omar, 2017).

In general terms, self-regulated learning is a process that assists students in managing their thoughts, behaviours, and emotions in order to successfully navigate their learning experiences and helpful in predicting later achievements. A large body of research indicates that students' experience of the context in which their teaching and learning occur may have as much influence on development of higher order cognitive skills as do their more formal; classroom based instructional experiences (Pascarella & Terenzini, 1998). In the literature on learning in higher education, the term 'course experience' is used to describe students' perception regarding the quality of their teaching and learning experience over the whole programme of study. Thus, course experiences cover virtually every aspect of a students' university experience. Salient areas of course experience may include: effective teaching, aim and objectives of the institutions, assessment procedures, appropriate workload, learning climate and intellectual environment, social dimensions of learning, provision and utilization of resources, and analysis of higher order graduate outcomes beyond generic skills (Wilson, Lizzio and Ramsden, 1997; Byrne & Flood 2003; Diseth *et al.* 2006; Diseth, 2007; Nausheen and Richardson, 2010; Ning and Downing, 2011; Dorman, 2012; Ning and Downing, 2014). Sternberg (2007) is of the view that successful people consistently and interactively use analytical, creative, and practical thinking In other words, learning to synthesize, evaluate, and process information in new ways is the key to preparing students for the competent world outside of school. Therefore, it becomes the basic responsibility of

all teachers to model their thinking processes and "make the invisible visible" to students. Enabling students to think critically about content being taught in classrooms is quiet demanding on the part of teachers which requires them to develop habits of repeatedly demonstrating their own processes in class, and perhaps providing students with time to practice similar processes. It is the need of the hour that the curriculum must expand to include information and activities that explicitly support students in learning to think in terms of higher-order thinking skills, namely, critical thinking and self-regulation.

There is an extensive literature available indicating the essential role that students' higher-order thinking skills including critical thinking and self-regulation (Jantz, 2010; Lynch, 2010; Sardareh *et al.* 2012; Tran and Duong, 2013; Ning and Downing, 2014; Thapliyal, 2014; Berenji, 2015; Pitt, Powis, Levett-Jones and Hunter, 2015 and Olakanmia, and Gumboa, 2017) as well as their perceptions of learning environment i.e. course experience (Karagiannopoulou and Christodoulides, 2005; Webster and Chang, 2009; Nausheen, 2010; Ning and Downing, 2010, 2011; Thapliyal, 2014; and Cosnefroy, 2017) plays in their academic achievement. The findings of some studies reported that successful students employed more higher-order thinking skills namely, critical thinking and self-regulation than their unsuccessful counterparts (Kummin and Rahman, 2010; Simsek and Balaban, 2010). A variety of cognitive, meta-cognitive, motivational and behavioural strategies have been studied at a number of educational institutions throughout the world (Seifouri, 2010; Panadero, 2017; Werner, Milyavskaya, and Leduc-Cummings, 2017; Ahmed, Arja, Bala, Altahir, and Fateh, 2018; Meinguer, 2018; McClelland *et al.* 2018; Tarasova, 2018; Maan, 2019; Panlilio, Ferrara, and MacNeill, 2019; Rüütmann, 2019; Yarnall, Freed, and Malone, 2019). Mixed results have been reported as far as gender differences in critical thinking and self-regulation skills of students are concerned. The results of some studies indicated no significant gender differences in critical thinking and self-regulation of students (Singh, 2013; Balam, 2015; Kaur, 2016), on contrary, some studies reported significant gender differences in critical thinking and self-regulation among students (Kapoor, 2006; Simsek and Balaban, 2010; Thapliyal, 2014). The findings of some studies showed significant differences in critical thinking and self-regulation of students with respect to course experience (Rucks, 2002; Lampert, 2005; Tseng, 2008). Considerate research supports that course experience helps in fostering higher-order thinking among students (Diseth *et al.* 2008). Significant relationship was observed between critical thinking and self-regulation (Ghanizadeh, 2011). Students enrolled in a course, experience the same teaching and the same course, but they experience these in different ways, while some students actually learn and appreciate the course material whereas others not. This may be because there were many determinants of academic success. Becoming aware of those differences, and trying to understand them, is vital for improving students' experience of learning and their higher-order thinking skills. To find the gap between scholarly findings and their practical implications, it is very important to study higher order thinking, especially, critical thinking and self-regulation of professional students in relation to course experience. However studies, which incorporate these aspects (i.e. critical thinking, self-regulation and course experience), are scarcely conducted on professional students in Indian context. Moreover, no study directly reviews all the three factors (critical thinking, self-regulation and course experience) collaboratively. Since, the professional students of Punjab who are on threshold of their careers, it could be worthwhile to find out the relationship of critical thinking, self-regulation with course experience.

Objectives of the study

1. To study critical thinking among professional students in relation to gender and course experience.
2. To study self-regulation among professional students in relation to gender and course experience.

Hypotheses of the study

1. There will be no significant gender difference in critical thinking among professional students having low and high course experience.
2. There will be no significant gender difference in self-regulation among professional students having low and high course experience.

Design of the Study

The study was conducted with the help of descriptive survey method.

Sample

In the present study, a sample of 200 professional undergraduate students of Punjabi University Patiala (95 males and 105 females) enrolled in professional courses like B.Tech, MBA- 5 year, M.Com- 5 year and Law- 5 year was taken.

Research Tools Used

1. Critical Thinking Scale and Self-regulation Scale from Motivational Strategies of Learning Questionaire (MSLQ) by Pintrich *et al.* (1991) were used to assess critical thinking and self-regulation of professional students respectively.
2. Course Experience Questionaire (CEQ) by Thapliyal (2013) was used to assess course experience of professional students.

Statistical Techniques Used

Two-way ANOVA was used to study critical thinking and self-regulation among professional students of Punjab in relation to gender and course experience.

RESULTS AND FINDINGS

The ex-post facto research design was used to study main and interaction effects of independent variables of course experience and gender on critical thinking and self-regulation among professional students of Punjab. The low and high groups of professional students on course experience were formed on the basis of Q_1 and Q_3 cut points across gender groups. Hence, in order to find out the significance of main and interaction effects of gender, course experience, two- way analysis of variance were worked out in following combination:

The means and SDs of critical thinking and self-regulation scores of professional students in each cell of 2×2 factorial design are shown in Table 1.

It may be seen from the Table 1 that: the mean critical thinking scores of professional students across gender and course experience ranges from 20.7 to 22.8 on a scale of 5-35, showing moderate level of critical thinking. It may also be seen that self-regulation scores range from 48.72 to 51.63 on a scale of 12-60, indicating above average level of self-regulation.

Table 1: Means and SDs of Critical Thinking and Self-regulation Scores of Professional Students (N=200) in terms of Gender × Course Experience

		Course Experience			
		Low		High	
		Male (N=11)	Female (N=30)	Male (N=14)	Female (N=28)
Critical Thinking	M	22.8	22.5	22.7	20.7
	SD	11.94	4.05	6.32	6.34
Self-regulation	M	48.27	51.63	49.78	49.72
	SD	14.60	10.68	11.35	12.68

The summary of results of the ANOVA for critical thinking and self-regulation in 2x2 factorial design is shown in Table 2.

Table 2: Summary of ANOVA of Gender x Course Experience (2×2 Factorial Design): Critical Thinking and Self-regulation among professional students

Source of Variation	df	Critical Thinking			Self-regulation		
		SS	MS	F	SS	MS	F
Gender	1	1.32	1.32	0.45	2.72	2.72	0.29
Course Experience	1	0.90	0.90	0.30	0.04	0.04	0.004
Interaction	1	0.73	0.73	0.25	2.93	2.93	0.32
Within	79	3744.93	2.95	—	12040.09	9.14	—

Note: *None of the F-values is significant at .05 level.*

The ANOVA results in table 2 show that there is no statistically significant gender differences in critical thinking and self-regulation of professional students (F= 0.45, 0.29; p> .05). Also, the professional students having low and high level of course experience did not differ significantly in higher-order thinking i.e. critical thinking and self-regulation (F= 0.30, 0.004; p> 0.5). It can be depicted from the table 2 that the F-value for the interaction effect of gender and course experience also turned out to be not significant (F= 0.25, 0.32; p> 0.5). It, therefore, indicates that the non-significant main effects of gender and course experience are independent of each other to explain critical thinking and self-regulation among professional students of

Punjab. Thus, it may be concluded that gender and course experience, neither independently nor conjointly, explain critical thinking and self-regulation of professional students of Punjab. The mean performance of professional students being moderate on critical thinking and above average on self-regulation is an indication of a possession of higher-order thinking among professional students that needs further exploration and strategies for their enhancement.

Educational Implications

Critical thinking and self-regulated learning perspective on students' learning and achievement has profound implications for the ways teachers should interact with students and the manner in which the course content should be designed. Research shows that when students utilize higher order thinking skills, it indeed increases their understanding. As a result encourage students must be taught to find the information they need, judge its worth, and think at higher levels. In the present research, professional students were found to have moderate level of critical thinking and self-regulation. As students move from school level to higher stage of education, the complexity of thinking increases. Educators need to realize that there are many more ways to teach for understanding, creative thinking, critical thinking, reflective thinking, problem-solving, decision-making and social and coping with emotions and each of these skills constitutes higher-order thinking. The present courses require some form of opportunities for students to develop these higher-order thinking skills that are found in classrooms where active learning is an essential component. Meanwhile, some teaching strategies are recommended for teachers to enhance higher-order thinking skills in professional students. Firstly, teachers should help students understand the concept of higher-order thinking skills and its need. They should encompass in students certain traits that make them understand their own strengths and challenges by stimulating opportunities for self-monitoring and facilitating corrective feedback mechanism to attain future goals. A conducive classroom environment need to be created and structured encouraging students the habit of questioning by boosting their self-efficacy beliefs, volitional strategies and eliminating any negative consequences. They should lead students through the process of making connections whenever it is possible, which will help them gain even more understanding. Students should be helped to draw inferences by giving them "real-world" examples. Also, problem-solving ability of students needs to be developed by offering them different issues of concerns.

Moreover, the course experience was not able to explain critical thinking and self-regulation among professional students. The way students experience their teaching is a complex interaction between their previous experiences of teaching and learning, their present life experiences, and the way courses have been designed and taught. Nevertheless, curricular reforms within each of the different areas of curriculum are required in the light of advancements in society and future requites. Our present curriculum standards need to be examined to cull out the essential topics so that we can extend active learning with greater depth by favouring use of cognitive and meta-cognitive strategies. Content material should be designed that fosters deep levels of thinking and accolades higher-order thinking skills. Hands on experience in real life professional settings should be promoted. Activity based learning should be incorporated in syllabus that helps in activating higher-order thinking skills through activities that can drive inquiry and enable students process information at the highest levels of thought. The findings laid down practical implications for stakeholders to optimise and allocate the resources to improve university quality teaching. More focus should be given toward how to furnish the university teaching faculty to provide a high level of teaching quality that contributes to students' generic skills for their employment in future.

The present research was limited on key critical thinking and self-regulation skills professional students use to learn, think and achieve academically. Instead focus should be directed towards other parameters involved in student learning that increments higher-order thinking skills among professional students. The present study therefore provides educators insights into the process of student learning, thus, paving the way for future researchers.

REFERENCES

AAC&U. 2007. *College Learning for the New Global Century* (pp. 76). Washington, DC: American Association of Colleges and Universities.

Ahmed, T.F.A., Arja, S.B., Bala, S., Altahir, A.K.O. and Fateh, R. (2018). Critical thinking idea and concept. *International Journal of Scientific & Technology Research*, **2**(3): 96-99.

Australian National Training Authority. 1998. *The abc of vocational education and training / Australian National Training Authority.* Brisbane: Australian National Training Authority. Retrieved from http://hdl.voced.edu.au/10707/33765.

Balam, E.M. 2015. Learning strategies and motivation of graduate students: Is gender a factor? *Institute for Learning Styles Journal*, 1, 1-9. Retrieved from https://www.auburn.edu/academic/education/ilsrj/Journal%20Volumes/Spring%202015%20Vol%201%20PDFs/Learning%20Strategies%20and%20Motivation%20of%20Graduate%20Students%20Balam.pdf

Bennett, N., Dunne, E. and Carré, C. 1999. Patterns of core and generic skill provision in higher education. *Higher Education*, **37**: 71–93.

Berenji, S. 2015. Motivational components effect on self-regulated learning and how self-regulated learning affect Iranian EFL students' academic success in Tabriz-Iran Islamic Azad University. *Journal of Social Issues and Humanities*, **3**(3): 125-130.

Byrne, M. and Flood, B. 2003. Assessing the teaching quality of accounting programmes: An evaluation of the course experience questionnaire. *Assessment & Evaluation in Higher Education*, **28**(2): 135-145.

Caratozzolo, P., Delgado, A.A. and Hosseini, S. 2019. Strengthening critical thinking in engineering students. *International Journal for Interactive Design and Manufacturing*. doi: 10.1007/s12008-019-00559-6

Cosnefroy, L. 2017. *Academic achievement, Engagement and Course experience.* Paper presented at SRHE Annual Research Conference, Newport, South Wales, UK. Retrieved from https://www.researchgate.net/publication/328219568

Diseth, A. 2007. Students› evaluation of teaching, approaches to learning, and academic achievement. *Scandinavian Journal of Educational Research*, **51**(2): 185-204.

Diseth, A., Eikeland, O.J., Manger, T. and Hetland, H. 2008. Education of prison inmates: Course experience, motivation, and learning strategies as indicators of evaluation. *Educational Research and Evaluation*, **14**(3): 201-214.

Diseth, A., Pallesen, S., Hovland, A. and Larsen, S. 2006. Course experience, approaches to learning and academic achievement. *Education and Training,* **48**(3): 156-169.

Dorman, J.P. 2012. Classroom psychosocial environment and course experiences in pre-service teacher education courses at an Australian university. *Studies in Higher Education*, **39**(1): 34-47.

Ghanizadeh, A. 2011. An investigation into the relationship between self-regulation and critical thinking among Iranian EFL teachers. *The Journal of Technology of Education*, **5**(3): 213-221.

Jantz, C. 2010. Self-regulation and online developmental student success. *MERLOT Journal of Online Learning and Teaching*, **6**(4): 852.

Kapoor, S. 2006. *A study of critical thinkingand test anxiety of university students in relation to certain personal variables.* Unpublished M.Ed. Dissertation, Punjabi University, Patiala.

Karagiannopoulou, E. and Christodoulides, P. 2005. The impact of Greek university students perceptions of their learning environment on approaches to studying and academic outcomes. *International Journal of Educational Research*, **43**: 329-350.

Kaur, K. 2016. Cognitive and metacognitive learning strategies, motivational beliefs and academic achievement of university professional students: A correlational study. Unpublished Ph.D Thesis in Education, Punjabi University, Patiala.

Khaled A., Riyad T. and Omar, J. 2017. The relationship between self-regulated learning and academic achievement for a sample of community college students at King Saud University. *Education Journal*, **6**(1): 28-37.

Kummin, S. and Rahman, S. 2010. The relational between the use of metacognitivee strategies and achievement in English. *Procedia and Behavioural Sciences*, **7**(C): 145-150.

Lampert, N.A. 2005. A comparison of the critical thinking disposition of arts and non-arts undergraduates. *Dissertation Abstracts International*, **66**(1): 3949-A.

Lourenco, D. and Ferreira, A.I. 2019. Self-regulated learning and training effectiveness. *International Journal of Training and Development*, **23**(2): 117-134.

Lynch, D.J. 2010. Motivational beliefs and learning strategies as predictors of academic performance in college physics. *College Students Journal*, **44**(4): 928-929.

Maan, N.A. 2019. Critical thinking and the Moroccan educational context. Retrieved from https://www.researchgate.net/publication/331718698

McClelland, M., Geldhof, J., Morrison, F., Gestsdóttir, S., Cameron, C., Bowers, E., Duckworth, A., Little, T. and Grammer, J. 2018. Self-regulation. In N. Halfon *et al.* (eds.), *Handbook of Life Course Health Development*. doi: 10.1007/978-3-319-47143-3_12

Meinguer, J. 2018. The value of critical thinking in science education. *EUTOPIA*, 5-11. Retrieved from https://www.researchgate.net/publication/331275244

Nausheen, M. and Richardson, P.W. 2010. The relationships between the motivational beliefs, course experiences and achievement of postgraduate students. In M. Devlin, J. Nagy and A. Lichtenberg (Eds.), *Research and Development in Higher Education: Reshaping Higher Education*, **33**: 501–513.

Ning, H.K. and Downing, K. 2010. Connections between learning experience, study behaviour and academic performance: A Longitudinal Study. *Educational Research*, **52**(4): 457-468.

Ning, H.K. and Downing, K. 2011. The interrelationship between student learning experience and study behaviour. *Higher Education Research and Development,* **30**(6): 765-778.

Ning, K.H. and Downing, K. 2014. A latent profile analysis of university students' self regulated learning strategies. *Studies in Higher Education*. doi: 10.1080/03075079.2014.880832

Olakanmia, E.E. and Gumboa, M.T. 2017. The effects of self-regulated learning training on students' metacognition and achievement in chemistry. *International Journal of Innovation in Science and Mathematics Education*, **25**(2): 34–48.

Panadero, E. 2017. A review of self-regulated learning: Six models and four directions for research. *Frontiers in Psychology*, **8**(422): 1-28.

Panlilio, C.C., Ferrara, A. and MacNeill, L. 2019. Trauma, self-regulation, and learning. In C.C. Panlilio (ed.), *Trauma-Informed Schools*, Child Maltreatment Solutions Network. Retrieved from https://doi.org/10.1007/978-3-030-12811-1_4

Pascarella, E. and Terenzini, P. 1998. Studying college students in the 21st century: Meeting new challenges. *Review of Higher Education*, **21**: 151-165.

Pintrich, P.R., Smith, D.A.F., Garcia, T. and McKeachie, W.J. 1991. *A manual for the use of the motivated strategies questionnaire (MSLQ).* Ann Arbor, MI: University of Michigan, National Center for Research to Improve Postsecondary Teaching and Learning.

Pitt, V., Powis, D., Levett-Jones, T. and Hunter, S. 2015. The influence of critical thinking skills on performance and progression in a pre-registration nursing program. *Nurse Education Today*, **5**(1): 125-31.

Rucks, M.G. 2002. The effect of academic achievement on critical thinking skills of college students. *Dissertation Abstracts International*, **62**(1): 4048-A.

Rüütmann, T. 2019. Development of critical thinking and reflection. doi: 10.1007/978-3-030-11935-5_85

Sardareh, A.S., Saad, M. and Boroomand, R. 2012. Self-Regulated Learning Strategies (SRLS) and academic achievement in pre-university EFL learners. *California Linguistic Notes,* **37**: 1-35.

Seifouri, V. 2010. Towards learning critical thinking. *National Studies on Librarianship and Information Organization (NASTINFO)*, **21**(2): 38-55.

Simsek, A. and Balaban, J. 2010. Learning Strategies of successful and unsuccessful university students. *Contemporary Educational Technology*, **1**(1): 36-45.

Singh, H. 2013. *A study of learning strategies of university students in relation to academic achievement*. Unpublished M.Phil. Dissertation in Education, Punjabi University, Patiala.

Sternberg, R.J. 2007. *Wisdom, intelligence and creativity synthesized.* New York, NY: Cambridge University Press.

Tarasova, I.V. 2018. Critical thinking for architects. Paper presented at International Multi-Conference on Industrial Engineering and Modern technologies. *IOP Conf. Series: Materials Science and Engineering*, **463**.

Thapliyal, U. 2013. A study of course experience of university students pursuing professional course. *Rayat Bahra Journal of Education,* **1**(2): 69-79.

Thapliyal, U. 2014. *Learning strategies, motivational beliefs and course experiences as correlates of academic achievement among university students* (Unpublished Ph.D. thesis in Education). Punjab University, Chandigarh.

Tseng, M.H. 2008. Data-driven problem solving and students' critical thinking in a problem-based learning environment. *Dissertation Abstracts International*, **8**: 231.

Werner, K.M., Milyavskaya, M. and Leduc-Cummings, I. 2017. Self-Regulation. In Virgil Zeigler-Hill, Todd K. Shackelford (ed.), *Encyclopedia of Personality and Individual Differences*: Springer.

Wilson, K.L., Lizzio, A. and Ramsden, P. 1997. The development, validation and application of the course experience questionnaire. *Studies in Higher Education*, **22**: 33–53.

Wirth, K.R. and Perkins, D. 2008. Learning to Learn. Retrieved from http://web.archive.org/web/20180310005012/https://www.macalester.edu/academics/geology/wirth/learning.pdf, pp. 29.

Yarnall, L., Freed, M. and Malone, N. 2019. Self-regulated learning. In Walcutt, J.J., and Schatz, S. (ed.), *Modernizing learning: Building the future learning ecosystem* (pp. 285-297). U.S.: U.S. Department of Defense, Deputy Assistant Secretary of Defense for Force Education, Government Publishing Office. Retrieved from https://www.researchgate.net/publication/333601547

Zimmerman, B. 2002. Becoming a self-regulated learner: An overview. *Theory into Practice,* **41**(2): 64- 72.