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Factors Affecting General and Online Academic Achievement of University Students: Online Self-Regulated Learning, Online Self-Efficacy, and Motivation Scores [*]

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Abstract

This study aims to determine whether university students' levels of online self-regulated learning, online technologies self-efficacy, and motivated strategies for learning predict their general academic achievement and online academic achievement. In this study, the scanning design and the prediction research design were used. The participants of this research consisted of 55 undergraduate students studying in different departments of a university in Western Canada. The data were collected with "Online Technologies Self-Efficacy Scale (OTSES)" developed by Barnard et al., (2009); "Motivated Strategies for Learning Questionnaire (MSLQ)" developed by Pintrich et al., (1991); "Online Self-regulated Learning Questionnaire (OSLQ)" developed by Miltiadou and Yu (2000); and "demographic form". This study did not determine a significant relationship between university students' total scores of OSLQ, OTSES, MSLQ, and their GPAs. Instead, the study found that university students' total scores of OSLQ, OTSES, MSLQ did not significantly predict their GPAs and online GPAs.

Keywords: Online Self-Regulated Learning, Online Self-Efficacy, Motivation, GPA, Online Academic Achievement, University Students

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Introduction

There are many variables in the related literature that affect students' learning processes. The main ones are intelligence, learning styles, self-efficacy, study habits, and socio-economic variables. In this study, the effects of university students' scores of online self-regulated learning, online technologies self-efficacy, and motivation on GPAs and online GPAs (grade point average) were investigated.

Online Self-Regulated Learning

Zimmerman (2000) "defines self-regulated learning as self-generated thoughts, feelings, and actions that are planned and cyclically adapted to achieve personal goals" (p.14). Self-regulated learning is defined as a dynamic process in which students personally activate and maintain cognitions, effects, and behaviors that are systematically directed towards achieving personal goals (Zimmerman & Schunk, 2011). Self-regulated learning is the process in which one's thoughts, feelings, and actions are organized systematically in order to achieve one's goals (Usher & Schunk, 2018). Boekaerts et al. (2005) defined the concept of self-regulated learning as a repetitive, multi-component, and self-directed process that targets the individual's own cognition and emotions in harmony with the environment.

Self-regulated learning includes the knowledge, skills, and dispositions that students rely on in order to manage and regulate various components of their learning (Hattie & Donoghue, 2016). Self-regulated learners set, organize, self-monitor, and self-evaluate various points, plans, and goals during the process of acquiring self-regulated learning (Zimmerman, 1990). Pintrich and DeGroot (1990) point out that there are three fundamental components of self-regulated learning: (1) metacognitive strategies (planning, monitoring, and changing cognition), (2) task management and control, and (3) actual cognitive strategies for learning the material.

Self-regulated learning is an active and constructive process that puts students in charge of their own learning (Van den Boom et al., 2007). Students can be taught or encouraged to be self-regulated learners by acquiring effective strategies and developing their sense of self-efficacy (Zimmerman, 1989). According to Bothma and Monteith (2004), self-regulated learning is considered "a prerequisite for successful distance education" (p.141). Students with self-regulation skills try their learning strategically and make detailed arrangements over time and between tasks (Winne & Hadwin, 2012).

Online learning has been defined as learning where all instructions are given through online multimedia without meeting the teacher and students (Dixson, 2012, as cited in Dhungana, 2015). The terms e-learning and online learning are generally used interchangeably; however, while e-learning

can cover all kinds of telecommunications and computer-based learning, online learning especially means using the Internet and the Web. In online learning, a computer and internet access are required to teach, and students can take classes without having to attend any face-to-face classes (Bates, 2005). Online learning application refers to training courses in which internet or Web-based teaching applications are used synchronously or asynchronously. Online learning has been accepted as a more cost-effective and appropriate learning method with opportunities for lifelong learning (Saba, 2011, as cited in Dhungana, 2015). Since the 19th century, distance education has evolved in several phases involving both synchronous and asynchronous audio/video transmissions as well as asynchronous text-based communication (Croxton, 2014, as cited in Theriault, 2020).

The roots of online learning can be found in distance education (Hartnett, 2016). Online learning includes a variety of computer-based learning platforms and delivery methods, genres, formats and media, and mobile platforms in all disciplines. These include multimedia, educational programming, simulations, games, and stationary use of new environments (Keengwe & Kidd, 2010). Online learning means the use of online communication networks for educational applications such as sharing lessons and supporting educational projects, research, accessing resources, and group collaboration (Harism, 2017).

Online learning has developed in various ways such as asynchronous and synchronous communication, web-based learning environments, and commercial course platforms (Marsteller, 2017). Online learning requires a detailed design of the course to increase learning performance and provide a positive experience (Schultz & DeMers, 2020). Online learning provides students with more convenience and flexibility (Cui et al., 2013). Wijekumar et al., (2006) determined that self-regulation was important for students' online success due to the independent nature of online learning environments.

Online students have more intrinsic motivation than students who receive face-to-face education (Wighting et al., 2008). In online learning environments, it is important for students to have self-regulated learning skills (Jonassen et al., 1995). Students in online education need to have self-efficacy in controlling, managing and planning their learning behaviors, and this learning process is self-regulated learning (Zimmerman, 2008).

Online Technologies Self-Efficacy

Bandura (1977) defined self-efficacy as a person's ability to organize and execute the necessary actions to reach the predetermined learning outcome level. Self-efficacy refers to beliefs about one's ability to organize and implement the necessary actions to achieve the skill performance specified for certain tasks (Zimmerman, 2000).

Numerous studies in the literature have found a relationship between students' academic achievement and self-efficacy beliefs (Komarraju & Nadler, 2013; Pajares & Graham, 1999; Zimmerman & Kitsantas, 2005). Self-efficacy influences student's behaviours and helps with their motivation. Self-efficacy affects an individual's task choice, effort, patience, and success. Sources of information about self-efficacy are personal achievements, representative experiences, verbal persuasion, and physical and emotional states (Schunk, 1984). Self-efficacy strongly affects learning motivation (Bandura, 1997; Schunk & Ertmer, 2000; Eryaman, et all. 2013, Cho & Heron, 2015).

Online self-efficacy considers at least three areas: technology, learning, and social interaction (Shen et al., 2013). Technology self-efficacy plays an important role in the preparation of educators who can use educational technology successfully to improve student learning (Holcomb et al., 2010). According to Wang et al. (2013), students' self-efficacy concerning technology and their use of technology in online learning is a critical element in measuring whether students are prepared for online learning. Torkzadeh & Van Dyke (2002) determined that it was possible to increase the self-efficacy level of online technologies through educational processes.

Motivated Strategies for Learning

Motivation is “the initiation of learned or habitual patterns of movement or behavior” (Hull, 1943, p.226). Motivation has been defined as a need or desire that activates behaviors and directs them to a goal (Myers, 2010). The term motivation is derived from a Latin verb. Motivation is the process by which goal-directed activity is encouraged and sustained. Motivation includes targets that give momentum and direction to the movement (Pintrich & Schunk, 2002).

Motivation requires physical or mental activity, whereas physical activity requires diligence, persistence, and other overt actions. Mental activity consists of cognitive actions and evaluating progress (Pintrich & Schunk, 2002). Motivation is about what drives us, why we engage in certain activities, our commitment, our effort, and whether we are committed to a task (Hartnett, 2019). The concept of student motivation is employed to describe the extent to which students put their attention and effort into what their teachers want or do not want. Student motivation is based on students' personal experiences, especially their willingness to participate in learning activities and their reasons (Brophy, 2010). Motivation plays a crucial role in learning, affects what, when and how we learn, and is an important factor in performance (Schunk, 1991; Schunk & Usher, 2012). Student motivation is considered to be a significant factor for success in online learning environments (Artino, 2008).

The Current Study

Many factors affect the academic success of university students. Some of these factors are intelligence, academic self-efficacy, socio-economic factors, online self-regulated learning, online

technologies self-efficacy, and motivation. It is thought that university students' high level of online self-regulated learning, online technologies self-efficacy, and motivation will contribute to their better learning of their own fields and positively affect their GPAs and online GPAs.

Providing students with self-regulated learning skills is one of the main aims of education (Boekaerts, 1997). Self-regulated learning has a significant impact on the realization of lifelong learning (Zimmerman, 1990; Boekaerts, 1997; Schunk & Zimmerman, 1998; Zimmerman, 2002; Dent & Koenka, 2016). Self-regulated learning skills should be seen as a vital issue not only to guide students' own learning during school education, but also to improve themselves and their current knowledge after leaving school (Boekaerts, 1999).

Self-regulated learning is effective and functional for acquiring metacognitive knowledge and skills, and consequently creates lifelong learners both at university and in career (White & DiBenedetto, 2018). The increase in the ease of access to information with the development of technology necessitates the acquisition of lifelong learning and self-regulated learning skills for university students. For this reason, university students need to gain these skills.

It is thought that self-regulated learning affects the academic success of university students. Self-regulated learning is especially important in higher education because university students need to self-organize their education (Broadbent, 2017; Broadbent & Poon, 2015). Theobald (2021) determined that education programs related to self-regulated learning increased the academic performance, self-regulated learning strategies, and motivation of university students. Students with self-regulated learning skills are associated with various motivational characteristics such as high self-efficacy beliefs (Zimmerman, 2015). Self-regulated learning is linked to academic performance, academic motivation, and learning (Pintrich, 2000; Pintrich & De Groot, 1990; Zimmerman, 2000; Zimmerman & Bandura, 1994).

Many studies have investigated self-efficacy in online learning and its effect on self-regulation (Schwam et al., 2021). Since there is no research in the related literature that examines whether university students' total scores of OSLQ, OTSES and MSLQ could predict their general academic achievement and online course success, this study was conducted. The results of this study are important because they will fill this gap in the literature. In addition, it is thought that the results of this study will contribute to researchers working on this subject.

The fundamental objective of this study is to determine whether the OSLQ, OTSES and MSLQ levels of university students predict their general academic and online academic success. The research questions are as follows:

1.Is there a relationship between university students' total scores of OSLQ, OTSES and MSLQ, and their in-person course GPA and one's online course GPA?

2.Do university students' total scores of OSLQ, OTSES and MSLQ predict their in-person course GPA and one's online course GPA?

Method

In this study, the cross-sectional survey design was used to define the relationships between university students' total scores of OSLQ, OTSES and MSLQ, and their GPAs and online course success (Creswell, 2012). In addition, the predictive design, which is one of the correlational designs, was used to determine the predictive relationship between university students' total scores of OSLQ, OTSES and MSLQ, and their GPAs and online course success.

Participants

The participants of this study consisted of 30 students (23 women and 7 men; between 19-24 years old), who attended the first, second, third and fourth years of various programs of Faculty of Education, Faculty of Arts and Social Sciences, and Other Faculties at a university in Western Canada, and 55 (43 women and 12 men; between 19-33 years old) volunteer students who took online courses.

Table 1. Descriptive Statistics of the Participants

Variables		N
Gender	Female	43
	Man	12
	Freshman	9
	Sophomore	6
Grade level	Junior	8
	Senior	32
	Faculty of Education	41
Faculty	Faculty of Arts and Social Sciences	11
	Other Faculties	3

Data Collection and Measure

The Online Self-Regulated Learning Questionnaire (OSLQ)

This 5-point Likert-type scale, developed by Barnard et al, (2009), consists of 24 items. This scale consists of six sub-dimensions: goal setting, environment structuring, task strategies, time management, help seeking, and self-evaluation (Barnard et al., 2009). Barnard et al. (2009) determined that the original Cronbach alpha values for the sub-factors of the OSLQ scale were between 0.87 and 0.95.

The Online Technologies Self-Efficacy Scale (OTSES)

This scale was developed by Miltiadou and Yu (2000) specifically to assess students' technological readiness for an online classroom and to address their competencies related to distance education. This 4-point Likert-type scale consists of 29 items ranging from strongly disagree to strongly agree. This scale is a 4-point Likert-type scale and consists of 29 items. This scale consists of four sub-dimensions: internet competencies, synchronous interaction, asynchronous interaction I, and asynchronous interaction II. The answers given by the students for each item in this scale show their self-efficacy levels. The Cronbach's alpha coefficient for the overall total scores of the scale is 0.95 (Miltiadou & Yu, 2000).

Motivated Strategies for Learning Questionnaire (MSLQ)

This scale was developed by Pintrich et al., (1991) to evaluate the motivational orientation and learning strategies of university students. Students' self-regulated learning level was measured with 19 items selected from the original 81-item Likert-scale questionnaire. In this study, the Cronbach alpha coefficient of the items between 1 and 7 in the "Self-efficacy for learning and performance" sub-dimension is 0.93; the Cronbach alpha coefficient of the items between 8 and 12 in the "Test Anxiety" sub-dimension is 0.80; and the Cronbach alpha coefficient of the items between 13 and 19 in the "Metacognitive Self-regulation" sub-dimension is 0.69. The scale has a median value (4) labeled as neutral. The Cronbach's alpha coefficient for the overall total scores of the scale is 0.79 (Pintrich et. al., 1991).

Data Analysis

The data of the study were collected with OTSES developed by Barnard et al., (2009); MSLQ developed by Pintrich et al., (1991); OSLQ developed by Miltiadou and Yu (2000); and "demographic form", and they were applied face to face to volunteer students by the researcher.

In this study, the arithmetic average sum of the total scores obtained from OSLQ, OTSES, MSLQ was analyzed with the Kolmogorov-Smirnov technique using, (Mertler ve Reinhart, 2017) the SPSS 26.00 program. Since the distribution was normal as a result of the analysis, the Pearson Product-Moments Correlation Coefficient and Multiple Regression analysis (Fraenkel & Wallen, 2006) parametric techniques were used.

In this study, whether there was a relationship between OSLQ, OTSES, MSLQ, and university students' GPAs and online GPAs was examined using the Pearson product-moment correlation analysis technique. Multiple regression analysis was used to determine whether the total scores from OSLQ, OTSES, and MSLQ predicted the participants' GPAs and online GPAs.

***Grade point average (GPA) and* Online GPA)**

GPA was calculated using the average of students' self-reported grades for all courses up to the first and seventh semesters in a university located in Western Canada. GPA corresponds to the overall average of all course grades.

Online *grade point average* (Online GPA)

GPA was calculated using the average of self-reported online course grades taken in any semester of the first and seventh semesters of a university in Western Canada.

Results

In this section, total scores of OSLQ, OTSES, MSLQ; and arithmetic mean scores, standard deviation results, correlation analysis results, and multiple regression analyzes related to GPA and Online GPA are included.

First Sub-Problem: Correlation results of the relationship between the OSLQ, OTSES and MSLQ total scores of university students and their overall grade point averages

Table 2. Means, Standard Deviations and Correlations for Study Variables

Variables	M	SD	1	2	3	4	5
GPA	3.4046	.42968	1	,489**	,036	-,202	,118
Online GPA	3.4165	.60813	,489**	1	-,103	-,321	,018
OSLQ total scores	2.7288	.45190	,036	-,103	1	-,078	-,285*
OTSES total scores	1.6387	.38155	-,202	-,321	-,078	1	,247
MSLQ total scores	3,4503	.50118	,118	,018	-,285*	,247	1

As can be seen in Table 2, there was no significant correlation [r=.036, p>.05)] between the students' GPAs and online self-regulated learning total scores. No significant correlation was determined between the students' overall grade point averages and online self-efficacy total scores [r= -202, p .05) . There was no significant correlation between the students' general grade point averages and motivated strategies for learning total scores [r= .118, p>.05)].

There was no significant relationship [r= -.103, p>.05] between the students' online GPAs and online self-regulated learning total scores. No significant relationship was determined between the students' online GPAs and total online self-efficacy scores [r= -,321, p>.05]. No significant relationship was found between the students' online GPAs and motivated strategies for learning total scores [r= ,018, p>.05].

A negative significant relationship was determined between the students' total scores of OSLQ and, MSLQ [r=-.285, p<.05]. A positive significant relationship [r= 489, p<.01] was determined between the students' online GPAs and overall grade point averages.

Second sub-problem: Predicting university students' GPAs and online GPAs through their total scores of OSLQ, OTSES and MSLQ.

Table 3. Multiple Regression Analysis for GPA

	B	Std. Error	Beta	t	p	Zero order	Partial	Part
(Constant)	3.203	.711		4.503	.000			
MSLQ total scores	.166	.129	.201	1.289	.204	.118	.193	.189
OTSES total scores	-.288	.177	-.253	-1.623	.112	-.202	-.240	-.238
OSLQ total scores	.034	.152	.034	.223	.824	.046	.034	.033

R= .277, R^2=. 077

$F_{(3-46)=}$ 1.188, $p > .05$)

According to Table 3, multiple regression analysis was performed in order to investigate whether the students' total scores of OSLQ, OTSES and MSLQ predicted their GPAs. The students' total scores of OSLQ, OTSES and MSLQ did not significantly predict their GPAs [$F_{(3-46)=}$ 1.188, $p > .05$)].

The students' total scores of OSLQ, OTSES and MSLQ explain 0.077% of the variance in their GPAs. The students' total scores of OSLQ, OTSES and MSLQ did not significantly predict their GPAs.

Table 4. Multiple Regression Analysis for Online GPA

	B	Std. Error	Beta	t	p	Zero-order	Partial	Partial
(Constant)	4.342	1.220		3.558	.001			
MSLQ total scores	.033	.243	.027	.138	.892	.051	.027	.026
OTSES total scores	-.120	.338	-.070	-.355	.726	-.035	-.069	-.068
OSLQ total scores	-.284	.240	-.230	-1.183	.248	-.226	-.226	-.225

R= .236, R^2=. 056

$F_{(3-29)=}$ .512, $p > .05$)

According to Table 4, the students' total scores of OSLQ, OTSES and MSLQ did not predict their online GPAs [$F_{(3-29)=}$ .512, p .05) . The students' total scores of OSLQ, OTSES and MSLQ explain 0.056 % of the variance in their online GPAs. The students' total scores of OSLQ, OTSES and MSLQ were found to have no significant effect on the estimation of their online GPAs.

Discussion, Conclusion and Recommendations

In this study, it was investigated to what extent university students' total scores of OSLQ, OTSES and MSLQ predicted their GPAs and Online GPAs.

No significant correlation was determined between the university students' total scores of OSLQ, OTSES and MSLQ for learning, and their GPAs. According to this result obtained in this

study, it can be said that total scores of OSLQ, OTSES and MSLQ do not positively affect university students' academic success.

The results of this research support the following research results. Puzziferro (2008) did not find a correlation between the online technologies self-efficacy scores of undergraduate students and their online course success. Zimmerman and Kulikowich (2016) determined that there was no statistically significant relationship between the scores obtained from the learning, time, and technology scales, which are the sub-dimensions of the online learning self-efficacy scale, and the overall GPA. The results obtained in this study do not support the following research results. Basila (2016) determined that self-regulated learning, motivation, and academic self-efficacy scores were associated with students' academic performance in their online courses. Hector McGhee (2010) found that there was a significant relationship between online technologies self-efficacy and academic achievement of undergraduate students at university and determined a low relationship between self-regulated learning and academic achievement. Wang et al., (2013) found that students with a higher level of technology self-efficacy for their online course received higher final grades. Bates and Khasawneh (2004) determined that students' online learning technologies self-efficacy scores were positively related to their motivation to use online learning technologies. Zheng et al., (2018) identified a negative correlation between previous online learning experiences of second language learners and their online self-regulation efforts and found that students with positive online learning experiences had a tendency to be more flexible and independent in the self-regulated learning process. Contrary to the results obtained in this study, Tsai et al. (2020) found that students' self-efficacy in online learning was moderately related to their general self-efficacy and learning outcomes. Schwam et al. (2021) determined a significant relationship between self-regulated learning profiles and online learning, online comfort, age, and gender.

Based on the findings of the current study, it cannot be said that there was a concept that was significantly related to the total scores that the university students got from OSLQ, OTSES, MSLQ, and their GPAs and online GPAs. In other words, it is not expected that the students with high total scores from OSLQ, OTSES, MSLQ have a higher academic achievement.

In this study, it was determined that the students' total scores of OSLQ, OTSES and MSLQ did not significantly predict their GPAs. In addition, through the consideration of the results obtained from the study, it was shown that the students' total scores of OSLQ, OTSES and MSLQ did not have a significant share in the prediction of their GPAs. Considering the data obtained from this study, it was determined that the university students' total scores of OSLQ, OTSES and MSLQ were not the variables that had the power to predict their GPAs. It can be said that the independent variables considered in this study could not explain the GPAs of the university students. The results obtained in this study are not similar to the results of the following research. Basila (2016) determined that self-

regulated learning, motivation and academic self-efficacy explained 43% of the variance in students' grades. Bruso and Stefaniak (2016) reported that university students' GPAs explained 30% of the variance in their scores obtained from all sub-dimensions in MSLQ. Uzun et al., (2013) stated that university students' online self-regulated learning strategies scores and their attitude scores towards distance education explained 15% of their academic success. Cho and Yoo (2017) determined that university students' self-regulated learning scores had a low level of influence in terms of predicting their academic achievement. Greene et al., (2014) reported that university students' self-regulated learning knowledge and skills significantly predicted their success when learning online. Wang et al, (2013) determined that university students' motivation and online technologies self-efficacy scores explained a large amount of variance in online course achievement. Bruso and Stefaniak (2016) determined that university students' GPAs explained 41% of the variance in the scores obtained from all sub-dimensions of OSLQ.

Xie (2013) found that university students' intrinsic motivation scores and peer feedback, total number of responses received, total number of ratings received, and average rating score received significantly predicted online discussion participation, and that motivation had significant effects on the frequency of students' participation in asynchronous online learning.

In this study, the university students' total scores of OSLQ, OTSES and MSLQ did not significantly predict their online GPAs. The results obtained in this study are similar to the results of the following studies. DeTure (2003) determined that the online technologies self-efficacy scale scores of the students studying at Community College did not significantly predict their online course success. Contrary to the finding found in this study, Cho and Heron (2015) determined that self-efficacy scores for learning were the only variable that significantly predicted online mathematics final grades.

Shen et al. (2013) determined that online learning self-efficacy predicted students' online learning satisfaction. Dikbas Torun (2020) found out that self-regulated learning is the strongest predictor of academic success.

The results of the multiple regression analyzes conducted in this study reveal that the university students' OSLQ, OTSES, MSLQ total scores did not have a statistically significant share in the prediction of their GPAs and online GPAs. The independent variables examined in this study could not adequately explain the university students' GPAs and online GPAs. In other words, it was concluded that the variables examined in this study did not have the power to predict the GPAs and online GPAs of the university students.

Based on the findings of this study, the following recommendations can be made.

1)Different studies can be conducted in different sample groups on whether there exists a relationship between university students' total scores of OSLQ, MSLQ, OTSES, and their GPAs and online GPAs.

2) Different studies can be performed in different sample groups on whether university students' general total scores of OSLQ, MSLQ, OTSES can predict their GPAs and online GPAs.

3) Research on university students' OSLQ, which is based on online measurement methods, OTSES, and MSLQ can be planned.

4) OSLQ, MSLQ, and OTSES can be applied to university students multiple times during an academic semester.

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Conflict of Interest

No potential conflict of interest was declared by the author.

Ethical Statement

Ethics committee approval within the scope of the research is given. It has been taken from Simon Fraser University ethics committee of scientific research with the decision numbered 2016s0006 on 2017 March 3.

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