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The relationship between self-regulation learning and online learning adoption

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Abstract

As the online learning environment continues to proliferate and dominate higher education learning systems, more investigation is required to explicate the adoption rate of these systems and the factors influencing students' adoption. Previous research has demonstrated the learning environment role in self-regulation learning and the association between self-regulation learning and the dropout rate (Kim et al., 2017). But yet there is rare research addressing whether self-regulation learning skills are associated with online learning adoption. This study explicates how self-regulation learning skills associate with the online learning adoption level of university students. A sample of 688 students enrolled in Saudi Electronic University answered a self-administrated questionnaire distributed via their students' emails. The questionnaire consists of two parts: self-regulation skills and online learning adoption. Chi-square analysis reveals statistically significant positive associations between the overall score of self-regulation skills, goal setting, environment structuring, time management, help-seeking, use of self-regulation strategies, self-evolution and online learning adoption. The results accommodate with the literature that a higher level of self-regulation skills fosters openness to experience. The study recommends fostering students' self-regulation skills to increase their readiness for online learning environments.

Keywords: Learning environment, online learning adoption, self-regulation learning, time management.

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1. Introduction

The rapid change and development of technologies in learning systems, particularly higher education, not to mention the emerged global health conditions of the COVID-19 crisis, obligate a shift towards online learning systems, be it a paradigm shift or a spontaneous shift (Dhawan, 2020; Negi & Pare, 2020). Admitting to the great benefits and advantages of online learning on enhancing teaching, learning, engaging of students, facing face-to-face learning determinants and coping with the global trends in education are regarded by many authors and scholars (Gray & DiLoreto, 2016; Khan et al., 2017; Kim et al., 2017; Phirangee, 2016; Verawardina et al., 2020), but there are challenges driven through online environments, such as higher dropout rates, lack of interaction, lack of motivation, lack of prior knowledge, lack of students readiness, unacceptance of online learning, lack of surrounding environments and limited communication. Most studies imputed these challenges to student's efficiency, skills and traits. Various studies have identified self-regulating learning as a prerequisite for online learning success and reducing dropout rates. Barak et al. (2016) found that self-regulating skills among online learning have to be higher than those learned through direct learning settings, and Lee et al. (2013) found that there is a significant difference in self-regulation skills among completers of online learning and dropout students. Rostaminezhad et al. (2013) coincidently argued that there is a relationship between self-regulation and students' dropout in online learning. Further studies conducted on the massive open online courses platforms found that the self-regulation skills of online learners are sufficient predictive variables of the dropout rates (Moreno-Marcos et al., 2020). Thus, it is necessary for students to have self-regulated learning skills since they have to handle the responsibility of their learning independently from their teachers or instructors, taking advantage of open online resources (Chen & Hwang, 2019; Rasheed et al., 2020).

However, the study contributes to assessing the relationship between the self-regulating skills of students and their adoption of online learning.

2. Related research

The social cognitive theory is one of the theories that negotiates the self-regulation concept. According to the social cognitive theory, self-regulation is a process of identifying and pursuing objectives that encompass all personal efforts to achieve or sustain pursuing objectives, changing adoption and accommodating with circumstances to achieve goals (Tabak & Nguyen, 2013). Self-regulation learning is the engagement ability of students motivationally, metacognitively, and cognitively in the learning process (Pardo et al., 2016). In education, self-regulation skills are a set of skills that helps learners to become independent in their learning. It involves personal cognitive, metacognitive, motivation, perception and environment to obtain accomplishments (Fawait et al., 2020). According to Zimmerman, as cited by (Vattøy, 2020), self-regulation is a regulation way of learners' learning that translates into their behaviour, metacognition and motivation. Despite the self-regulation learning SRL, including motivation, cognition, behaviour and context, in the current study, we explore the level of utilising specific self-regulation skills, namely goal setting, environment structuring, time management, help-seeking, use of self-regulation strategies and self-evolution.

However, Fawait et al. (2020) and Nietfeld et al. (2014) discussed self-regulation skills as a dynamic entity affected indirectly by various factors, like maturity, gender and knowledge levels. Pardo et al. (2016) interpret the dynamic characteristic of self-regulation wherein students may change their motivation, behaviour and learning strategy according to the nature of learning materials, structure and environment. Thus, Vattøy (2020), Andrade and Brookhart (2019) and Nietfeld et al. (2014) established that self-regulation is relevant to the source of regulation with learning environments. Hence, it is supposed to relate the adopted learning environment (online learning) and the self-regulated learning skills of students attending through these environments. This is in agreement with Winne's (2011) recommendation to get a wider view to self-regulation learning, in particular of using

the technology for learning, since learners have the management deciding the learning tools and the way of utilising it in the learning process.

Based on the growing consensus regarding the potential of self-regulating skills and strategies in learning sustainability, a large amount of interest is paid to teachers' efforts in fostering and developing self-regulated learning of students either by strategies or adjusting environments (Vattøy, 2020). For example, Pardo et al. (2016) suggested that teachers can redesign the learning material through online activities to foster a higher rate of self-regulation adoption by students.

Self-regulation behaviour provides students the confidence to invest in self-regulation skills in the online learning environment (Landrum, 2020). The role of self-regulation is a personal trait facilitating the ease of use, openness to experience and perceived usefulness of online learning. But, in their study, they measured online learning through students' performance in an online learning class (Tabak & Nguyen, 2013). There is a lack of studies that correlates self-regulation learning and the adoption of the learning environment. For example, a study found a positive relationship between the learning environment and the self-regulation learning of students at the undergraduate level in Jordan, but the study measured self-regulation learning in the game-based learning environment and through only one dimension developed by Velayutham et al. (2011), i.e., the Adaptive Learning Engagement Scale (AlZubaidi et al., 2016). Furthermore, an investigation deliberating the effect of differences of online learning and learning environment on students' learning was conducted according to their self-regulation level; students with low self-regulation are significantly affected by the environment compared to their peers with high self-regulation skills (Lin & Tsai, 2016). Pardo et al. (2016) also revealed that students with negative self-regulation learning showed a negative correlation with academic performance, while students with positive self-regulation learning do not; students with a high self-regulation interact more frequently with online activities compared to their peers with low self-regulation. Furthermore, Pardo et al. (2016) interpret that online activities' features have the capability to promote students' self-regulation learning and acquire a higher level of metacognitive awareness of learning activities. Supporting that, students with lower self-regulation skills are more likely to drop out of online courses (Lee et al., 2013) because of lower engagement levels in online learning (Sun & Rueda, 2012). A consensus is shown with the significant positive between the satisfaction with both online learning platform and learning and both of self-regulation learning strategies and time management regulation (r = 0.62***; 0.57***; 0.48***; 0.52***, respectively). Also, self-regulation learning strategies are good predictors of satisfaction with the online platform (Landrum, 2020).

Surprisingly, Barnard-Brak et al. (2010) found that American university students' learning through an online learning environment for the first time did not change their self-regulatory skills across the time during one academic semester. This result disproves the effect of online learning environments on fostering the self-regulatory skills of learners, which is against the scholars addressing self-regulation learning, who negotiated with empirical evidence that self-regulation is an interaction between three elements, namely person, behaviour and environment (see the triadic view model of SRL: Schunk & Zimmerman, 2012). However, Barnard-Brak et al. (2010) conducted studies on first-generation students (i.e., 'refer to those learners whose parents and preceding generations did not learn via the Internet') in one semester. According to Williams and Hellman (2004), first-generation students have a significantly lower level of self-regulation compared to their second-generation peers, which may attribute to friction encountering and time required to adapt to the online learning environment by first-generation students compared to their second-generation peers. Thus, the study duration (one semester) and the targeted sample were insufficient in Barnard-Brak et al.'s (2010) study to tackle the change in self-regulation skills due to online learning. Hence, the results were unexpected.

Despite that, the literature does not go so far in the relationship between self-regulation and online learning environment adoption. It is noted that majority of the studies tackled the one-direction relationship between learning environment and self-regulation skills and adjusted the learning

environment to foster self-regulation skills of the learner. So far, there is no relationship explicating the difference – if existing – in the self-regulation level of students and their adoption of online learning.

3. Materials and methods

This section clarifies the research design, participant profile, instrument design validity, reliability and data analysis techniques adopted in this study.

3.1. Method

The current study adopted a quantitative descriptive analytical approach, and the study adhered to the correlational research design since the study collected data on two variables to determine the relationship between both (Ray et al., 2014). The current study used an online directly administrated questionnaire as the main tool for data collection according to the quantitative research method.

3.2. Instrument

The study adopted an online survey to collect data from students enrolled in Saudi Electronic University. The study adopted the scale of self-regulating skills developed by Barnard et al. (2009), which consisted of 24 items divided on 6 facets, namely environment structuring, goal setting, time management, help-seeking, task strategies and self-evaluation. Furthermore, the study developed a questionnaire for the online learning adoption from the literature (such as Alwaheeb, 2020; Jan et al., 2012; Ma & Lee, 2018).

3.2.1. Validity and reliability of the Instrument

This section provides an explanation of the questionnaire outcomes obtained after collecting and analysing the responses. The system calculated the reliability of the survey by calculating the internal consistency using Cronbach's alpha values.

Table 1. The results of reliability for the teachers' sample

No.	Variables	Cronbach's alpha (*n* = 688)	Item no.
1	Self-regulating skills	0.923	24
2	Online learning adoption	0.886	7
The relationship between self-regulation learning and online learning adoption		0.934	31

Table 1 shows that the reliability for the self-regulating skills and online learning adoption is equal to 0.92 and 0.89, respectively. The total alpha values for the relationship between self-regulation learning and online learning adoption reached 0.934; this indicates reliability. To test the reliability and consistency of the instrument, the Pearson correlation test was applied. The results for the four variables are shown in Table 2, showing that the correlation coefficients of the self-regulating skills ranged from 0.396 to 0.70, indicating a strong correlation coefficient; these values are appropriate for the purpose of conducting this research study.

Table 1. Correlation results for self-regulating skills

Items	Pearson's correlation	Items	Pearson's correlation	Items	Pearson's correlation
1	0.566**	9	0.662**	17	0.530**
2	0.637**	10	0.600**	18	0.577**
3	0.596**	11	0.422**	19	0.541**
4	0.683**	12	0.678**	20	0.596**
5	0.396**	13	0.672**	21	0.656**
6	0.526**	14	0.683**	22	0.675**
7	0.627**	15	0.700**	23	0.613**
8	0.618**	16	0.700**	24	0.641**

**Correlation is significant at the 0.01 level (two-tailed).

Table 3. Correlation results for online learning adoption

Items	Pearson correlation
1	0.749**
2	0.764**
3	0.781**
4	0.830**
5	0.792**
6	0.764**
70	0.738**

**Correlation is significant at the 0.01 level (two-tailed).

Table 3 shows that the correlation coefficients of online learning adoption ranged from 0.738 to 0.830, indicating a strong correlation coefficient; these values are appropriate for the purpose of conducting this research study.

3.3. Demographic profile of the participants

The study sample comprised 688 students enrolled in Saudi Electronic University. The participants were selected randomly. According to the gender category, the high percentage of participant was female, with a total of 54.2%, while the male participants represented only 45.8%. The educational level of participants showed that most of them held a bachelors' degree (90.7%), while 9.3% of the participants had diplomas. The majority of college participants were from the administration and financial sciences departments, with a total of 54.2%, while the science and theoretical sciences departments were represented by only 17.4% of the participants and the college of computing and informatics department was represented by 11.8% of the participants. The majority of participants' years were within the first year and second year, with 78.2% and 11.3%, respectively. The fourth and fifth years represented only 5.5% and the third year represented only 4.9%.

3.4. Data analysis

This section presents the findings of the study that aim to determine the relationship between self-regulated learning and online learning adoption. A cross-sectional survey was utilised to obtain results by distributing them to a sample of 688 participants. Thus, the Statistical Package for the Social Sciences was utilised to analyse the collected data in tabular and graphical forms in order to conduct an illustrative analysis. A set of descriptive statistical coefficients was used to illustrate participants' overall responses. Furthermore, the study used chi-square analysis to test the correlation and association between the study variables.

4. Results

This section presents the data analysis results. First, the study reveals the descriptive analysis of participants' responses to determine the level of self-regulation learning and adoption of online learning. Then, the analysis investigates the statistical relationship between self-regulated learning and online learning adoptions.

4.1. Descriptive statistics

In this section, the means and standard deviations for the relationship between self-regulation learning and online learning adoption are extracted, as shown in the succeeding tables. Table 4 presents a sample of students enrolled in Saudi Electronic University, showing that the highest means reached 4.14 out of 5 for the 'Environment structuring' domain, followed by a mean of 3.80 for the 'Goal setting' domain. The lowest mean was 3.54 for the 'Time management' domain. The total means for 'Self-regulating skills and Online learning adoption' were 3.76 and 3.97, respectively.

Table 4. The means and standard deviations (*n* = 688).

acets	Mean	Std. Deviation
Goal setting	3.80	0.658
Environment structuring	4.14	0.710
Time management	3.54	0.785
Help seeking	3.72	0.761
Task strategies	3.62	0.751
Self-evaluation	3.70	0.768
Self-regulating skills	**3.76**	**0.579**
Online learning adoption	**3.97**	**0.741**

4.3. The relationship between the self-regulation learning and online learning adoption

The relationship between self-regulation learning and online learning adoption was accomplished by using the bivariate analysis, in which a parametric test, such as chi-square correlation, was engaged through analysis. The results of the correlation test are presented in Table 5. Accordingly, there is a relationship between self-regulation learning and online learning adoption; there is a strong positive correlation since chi-square is equal to 872.6. According to the results shown in the table of the correlation test, online learning adoption has a correlation with the dimension of self-regulation learning since the significance value is p-value ≤ 0.01.

Table 5. Correlation between Self-regulation learning and online learning adoption

Variables	Test	Online learning adoption
Goal setting	Chi-square	3415.713
	Sig. (2-tailed)	0.00
	N	688
Environment structuring	Chi-square	1180.810
	Sig. (2-tailed)	0.00
	N	688
Time management	Chi-square	1225.058
	Sig. (2-tailed)	0.00
	N	688
Help seeking	Chi-square	677.666
	Sig. (2-tailed)	0.00
	N	688
Task strategies	Chi-square	935.880

	Sig. (2-tailed)	0.00
	N	688
Self-evaluation	Chi-square	941.525
	Sig. (2-tailed)	0.00
	N	688
Self-regulating skills	Chi-square	872.607
	Sig. (2-tailed)	0.00
	N	688

**. Correlation is significant at the 0.01 level (2-tailed).

5. Discussion and conclusion

The study sought to reveal the association between self-regulation learning skills and online learning adoption by tertiary students. The statistical correlation analyses substantially illustrate a positive association between self-regulation learning skills (goal setting, environment structuring, time management, help-seeking, use of self-regulation strategies and self-evolution) and online learning adoption. The results deliberate that the higher self-regulated students are more likely to adopt online learning systems. Also, the current results agree with the self-regulation learning literature. Because self-regulation involves personal cognitive, metacognitive, motivation, perception and environment to obtain accomplishments of learning (Fawait et al., 2020), it, thus, helps learners to become independent in their learning. It also corresponds to those who posited the necessity of self-regulating learning skills for students since they have to handle the responsibility of their learning independently from their teachers or instructors and take advantage of open online resources (Chen & Hwang, 2019; Rasheed et al., 2020). Taking all this together, the students who have higher self-regulation skills have at least adequate levels of setting learning goals, structuring a convenient environment of their learning, considerably manage their time, tolerably use strategies, cognitively evaluate their own production and easily seek help. Thus, they are ready to adopt online learning to accomplish their learning goals, which they value.

Furthermore, the results are plausible with the positive correlation between online learning satisfaction and self-regulation learning strategies and time management regulation, as Landrum (2020) found. Also, the positive association between self-regulation skills and adoption rate explains the lower dropout rate among students with higher self-regulation skills (Barak et al., 2016; Kim et al., 2017; Lee et al., 2013; Moreno-Marcos et al., 2020; Rostaminezhad et al., 2013). The positive association between online learning and self-regulation level can be attributed to the efficiency of online learning features as gauged by Pardo et al. (2016) that online activities' features have the capability to promote students' self-regulation learning and acquire a higher level of metacognitive awareness of learning activities.

It is worth mentioning that the positive association found in the study between self-regulation and adoption of online learning is against the non-significant change in self-regulation during the online learning of first-generation learners in Barnard-Brak et al.'s (2010) study. But, as aforementioned, the short study duration and the targeted sample were insufficient to tackle the change in self-regulation skills due to online learning. Hence, the results were unexpected.

These results indicate the relationship between self-regulation learning and online learning adoption among learners, so there is a need for interventions that enhance self-regulation skills in the online learning environment, where the online learning environment can provide opportunities for online learners to develop self-regulatory skills, thus improving academic results. These opportunities are limitless as technologies evolve, and could include, for example, providing students with a blog where students can access resources and discuss the course with other students; a troubleshooting web page to assist students with frequently asked questions; and tools that educators can provide to online

learners to enhance their self-regulating behaviours. As educators, they must intentionally develop students' self-regulation skills by designing the online learning environment.

According to the foregoing analysis, we affirm that distance education is not just a process of transferring information and knowledge from the professor to the learner by technological means only, but rather it is an education based on the pillars of a current and future vision, aimed at activating new patterns of interaction with strategies that allow the possibility of employing technical applications in different ways that suit the types of learning and the learners' rhythms, multiple intelligences and individual differences, which call for the creation of appropriate electronic methods and means to achieve the effect of self-learning from a distance.

Self-learning has become a form of the modern learning process. Of course, this does not mean that it has replaced traditional learning, but it has nevertheless reinforced it, with really impressive results. Self-learning has proven to be effective and convenient, especially with the advent of the Internet. It is now possible to learn anything with a simple search on Google or by watching a video on YouTube.

5.1. Future directions

Accordingly, the various challenges, whether technical or human, showed that distance education needs intrusive field research, whose results are useful in reaching creative, innovative, renewable and appropriate solutions to the problems that were monitored in the two parts of distance education: synchronous and asynchronous, especially since many of the advantages that this type of education has achieved in many educational systems, necessarily calls us to open up to various global experiences, adopt effective pedagogical models and integrate technology and its developments as an integral part of the daily teaching practice in educational institutions.

Future research is recommended to investigate other variables that can affect the relationship between self-regulation learning and adoption of online learning, such as technical skills of students, motivations, instructors' qualifications and other demographic factors to serve developing a full model of successful adoption of online learning platforms among students in higher education institutes.

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