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Effect Of E-Learning On Students' Satisfaction With Mediating Role Of Academic Performance: An Empirical Study On Private Schools In Egypt

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Abstract

The purpose of this research is to empirically investigate the relationship between E-Learning and student satisfaction with mediating Role of academic performance in private schools in Egypt. The objectives of This research are to determine how E-Learning affect student's satisfaction, to identify how E-Learning, affect academic performance, to examine how academic performance affect student's satisfaction, to investigate the mediation role of academic performance between E-Learning and student's satisfaction and to develop a framework for the relationship between E-Learning and student's satisfaction in Egyptian private schools using structural equation modelling. The methodology will be based on quantitative analysis by using a questionnaire tool to gather required data and structural equation model analyses (SEM) using AMOS software version 25. The main conclusions drawn from this study are the direct effect between E-learning and Students Satisfaction is statistically significant, the direct effect between E-learning and Academic Performance is statistically significant, the direct effect between Academic Performance and Students Satisfaction is statistically significant, Finally, the study found that the Academic Performance mediates the relationship between E-learning and Students Satisfaction.

Key words: E-Learning, Student Satisfaction, academic performance, Structural Equation Modeling.

I. INTRODUCTION

Most secondary schools in Egypt are the responsibility of the government. There are also schools which are managed by private individuals, universities and foreign communities. The majority of secondary schools in Egypt offer the junior and senior secondary program. Before the turn of the century, secondary school students lacked the knowledge of information and communication technologies and its numerous advantages that that we have now. The use of the chalk and board, pictorial charts, drawings and imaginations was used to buttress learning experiences in those days. There was no physical contact with technologies that have now come to improve our knowledge and experiences.

The integration of technological awareness and learning in junior secondary schools is today making significant strides towards use of more interactive e-learning strategies to effectively enhance overall performance of college students and their trained personnel. In many developed economies, several academic institutions make use of extremely interactive e-learning that directly enhances students' performance (Soleymanpour, et al, 2010). In the recent era, technologies have indeed become devices accustomed to get rid of physical obstacles and

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allow students to learn at anytime and anywhere without having physical interaction with the instructor. Against this background, e-Learning therefore improves easy access to effective teaching and learning, and thus enhancing students' academic efficiency.

According to Heeger (2010), e-learning enables numerous secondary school students to take similar programs concurrently. Nowadays, educational systems have grown to enjoy the reasonable instructions in addition to their learning. Research findings indicate that e-learning systems permit instruction method geared to improve top quality related to instruction and students' academic achievement. Soleymanpour, et al, (2010) further elaborate that those private secondary school that have demonstrated remarkable use of e-learning generally perform quite much better than student counterparts who much rely on use of face-to-face communications and physical interactions with their instructors.

Heeger (2010) report shows that secondary school students who generally participate in online or e-learning achieve far better amounts compared to secondary school students who examined traditional methods. Due to emergence of advancements in educational technology, e- learning is currently gaining substantial attention in education and for this reason; several educational institutions are now pursuing application of electronic learning programs. As such, e-learning is continuously becoming well-established in a number of both private and public education institutions in the world nowadays. Most of these education institutions have become aware of the impacts related to e-learning on students' academic achievement.

Distance learning is gaining wider acceptance and has become a viable alternative of conventionalclassroom teaching. As distance learning offers the benefits of low cost, wider access and sharedresources, institutions offering traditional classroom education have also opted for distance learning courses along with their traditional courses (Zaheer, 2013). Apart from the benefits that distancelearning offers, there are certain issues that students face, for example they don't have formal/regularclasses where they can go and discuss conceptual issues of different subjects and lack of social andemotional connectivity (Zaheer, 2013). The study was guided by the following objectives:

1- To determine how E-Learning affect student's satisfaction in Egyptian private schools
2- To identify how E-Learning, affect academic performance in Egyptian private schools
3- To examine how academic performance affect student's satisfaction in Egyptian private schools
4- To investigate the mediation role of academic performance between E-Learning and student's satisfaction in Egyptian private schools
5- To develop a framework for the relationship between E-Learning and student's satisfaction in Egyptian private schools using structural equation modelling.

II. LITERATURE REVIEW

E-Learning is considered as the independent variable, academic performance is considered as the mediator variable and student satisfaction is considered as the dependent variable

2.1 E-Learning

The concept 'e-learning,' according to Maltz et al (2005), is used in a variety of contexts, including dispersed learning, online-distance learning, and hybrid learning. According to the OECD (2005), e-learning is defined as the use of information and communication technologies in a variety of educational processes to support and enhance learning in institutions of higher education, and includes the use of ICT as a supplement to traditional classrooms, online learning, or a combination of the two modes.

E-learning, according to Wentling et al., (2000), refers to the acquisition and application of knowledge that is primarily facilitated and transmitted by electronic methods. To them, e-learning relies on computers and networks, but it's likely that it'll evolve into systems that

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include a range of channels, such as wireless and satellite, as well as technology like cellular phones (Wentling et al., 2000). Liu & Wang (2009) found that the features of the e-learning process are primarily centered on the internet; global sharing and learning resources; information broadcasts and knowledge flow via network courses, and finally, flexibility of learning as a computer-generated environment for learning is created to overcome issues of distance and time in their literature review on definitions for e-learning (Liu & Wang, 2009).
According to Gotschall (2000), the concept of e-learning is built on distance learning, which entails the transmission of lectures to remote locations via video presentations. However, according to Liu & Wang (2009), the advancement of communications technology, notably the internet, has transformed remote learning into e-learning.

2.2 Student Satisfaction

Student satisfaction is described as a person's attitude or feelings about a situation that is influenced by a variety of factors (Bailey & Pearson, 1983). Student satisfaction is more specifically defined as students' perceptions of the educational value and experience received at a particular educational institution (Astin, 1993). User pleasure is commonly thought to be the display of attachments gained through communication in the realm of human-computer interaction (Mahmood, et al., 2000). The concept of user satisfaction refers to the degree of alignment between the users' information systems and their needs (Cyert & March, 1963)
Because students would be more satisfied and motivated to complete their studies if the institution provides a learning environment, i.e., the institution has sufficient educational infrastructure accumulated with vital aspects of professional and academic development. Elliott and Shin (2002) defined student satisfaction "The favorability of a student's subjective judgement of the many outcomes and experiences linked with education"
While most student satisfaction research focused on the customer's perspective, researchers are having difficulty developing a standard definition for student satisfaction, necessitating the selection and modification of customer satisfaction theory to explain the meaning of student satisfaction (Hom, 2002). Although it is perilous to regard students as customers, in the current educational economy, there is a new moral prerogative that students have become "customers" and can, as fee payers, fairly demand that their opinions be addressed and acted upon (William, 2002).

2.3 Academic Performance

Achievement, according to Dewan (2005), refers to what has been accomplished or performed. Academics are also associated with the academy (educational institution) and are distinctive or contain knowledge (high or profound). In other words, academic achievement is more concerned with a student's mark on an occupational assessment. If a student gets a good grade, it means they did well in their academic field, and vice versa. This study looked at how Public Relations students at the Faculty of Communication and Media Studies chose their CGPA (Average Value Collection). This choice reflects how well they did in school. Pupils need to use the right learning styles to improve their academic performance (Chambers, 1991).
Chambers believes that students should use their learning styles as assets in the classroom. This is due to the fact that the learning features will encourage students at all levels, in addition to enhancing academic accomplishment. Furthermore, according to Dunn & Dunn (1979), when techniques, resources, and programs are matched to the features of student learning styles, academic achievement and student attitudes will improve. On the other side, if teaching and learning are not aligned, academic success and attitudes will suffer.
Previous study has focused on student academic performance measurement; it is one of the most difficult areas of academic literature, and scientific student performance is influenced by social, psychological, economic, environmental, and personal factors. These characteristics have a significant impact on student achievement, but

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they differ from person to person and country to country (Mushtaq & Nawaz Khan, 2012).

Various social, psychological, and environmental factors influence students' academic achievement in education (Hijazi & Naqvi, 2006). Measuring pupils' academic success is always in the best interests of instructors. This allows them to assess not just the knowledge levels of their pupils, but also the success of their own teaching methods, as well as provide a measure of student happiness (Martirosyan at el., (2014)

2.4 Impact of E-Learning on student' satisfaction

Powers & Rossman (1985) found that student satisfaction is highly influenced by peer interaction, student-faculty interaction, and a sense of academic inspiration of both the student and the students' peers. The studies of online courses at graduate as well as undergraduate level also revealed these features of students' satisfaction (Diekelmann & Mendias, 2005). Research studies conducted on online courses have also identified certain issues including prompt and helpful communication with the instructor; clear guidelines with respect to course expectations; support regarding enrollment; student assignments and requirements; and, data security. These issues may raise students' satisfaction if addressed properly (Choy, et al, 2002; Vonderwell & Turner, 2005). The said areas can be categorized into issues dealing mainly with program contents and delivery.

An instructor is the one who can best predict as far as course satisfaction is concerned (Williams & Ceci, 1997). That is why, performance of instructor is found highly correlated with students' satisfaction, particularly with his or her response time and availability (DeBourgh, 1999). Instructors must not only be available but also be flexible enough to address the students' questions most of the time (Moore & Kearsley, 1996). An instructor is supposed to act not only as a facilitator of learning but also a source of motivation for the student as his/her feedback is considered as one of the most important factors in satisfaction (Finaly-Neumann, 1994).

For successful completion of the course, online learners must be well acquainted with the technology being used (Belanger & Jordan, 2000). In distance learning, student satisfaction is mainly influenced by the availability of the access to the technology (Bower & Kamata, 2000). Generally, those students are not found satisfied who experience frustration while using technology in the course (Chong, 1998; Hara & Kling, 2000).

Gunawardena & Zittle (1998) inferred that, in virtual environment, collaborative learning tools are crucial in improving students' satisfaction. These tools help the students to work in groups and provide prompt feedback. In online learning environment, students have the edge to share their viewpoints and have discussion with one another. It allows them to gain insight on a particular topic that would not have been possible otherwise.

Another essential factor that influences satisfaction and learning effects in e-learning is quality (Piccoli et al., 2001). Cooperative or constructive learning model advocates that learner can establish conceptual knowledge and high-level thinking models by employing media presentations and interactive communication furnished by IT (Leidner & Jarvenpaa, 1995). The virtual features of elearning help learners motivating continuous online learning and formulating learning models effectively. These features include management of learning processes, online interactive brainstorming, and multimedia presentation for course contents (Piccoli et al., 2001). Hence, quality is also considered as an important factor in learner satisfaction.

Alongside, proper feedback techniques are also significant in e-learning environment. Thurmond et al. (2002) found a considerable influence of environmental variables such as perceived interaction with others and diversity in assessment on e-learning. Different evaluation techniques are employed in an e-learning system, which make the students believe that they are maintaining a regular connection with their instructors and their academic efforts are being assessed properly.

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Several researches have depicted that interactive instructional design in distance learning is a key element for students' success in learning (Hong, 2002). Interactive mechanisms must be designed effectively in e-learning environment in order to enhance learners' satisfaction in terms of quality, frequency and prompt interactions both academically and practically, e-learner satisfaction has been widely assessed in terms of its effectiveness in order to make successful learning environments (Wang, 2003). This study is an attempt to investigate the factors that influence students' satisfaction in an e-learning environment,

Ke and Kwak (2013) identified five elements of student satisfaction: learner relevance, active learning, authentic learning, learner autonomy, and technology competence. Kuo et al. (2013) determined that learner-instructor interaction and learner-content interaction combined with technology efficacy are valid indicators of students' positive perceptions. However, Battalio (2007), using a criterion approach, argued that a positive course rating requires effective learner-instructor interaction.

Keengwe, et al. (2012) argued that students' expectations influence the instructor's design of effective technology tools in online courses and are the key to understanding the satisfaction construct. The authors concluded that satisfaction was most impacted by learning convenience combined with the effectiveness of e-learning tools. Dziuban, et al. (2007) found six key elements that contribute to students' satisfaction: an enriched learning environment, well-defined rules of engagements, instructor commitment, reduced ambiguity, an engaging environment, and reduced ambivalence about the value of the course.

III.CONCEPTUAL FRAMEWORK

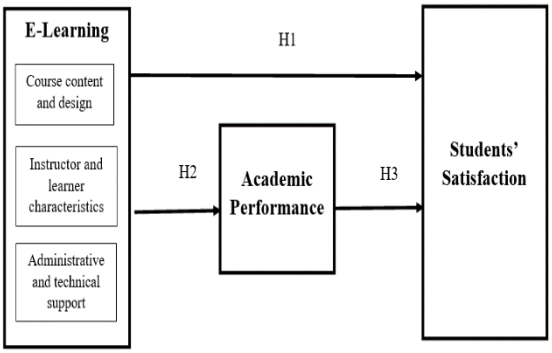

Figure 1*-Conceptual Framework*

IV. RESEARCH HYPOTHESES

Based on the conceptual framework, the hypothesized model and reviewing of the related studies and theories, the study hypotheses were formulated as below:

H1: E-Learning has an effect on Students' Satisfaction in Egyptian private schools

H2: E-Learning has an effect on Academic Performance in Egyptian private schools

H3: Academic Performance hasan effect on Students' Satisfaction in Egyptian private schools

H4: Academic Performance mediates the relationship between E-Learning and Students' Satisfaction in Egyptian private schools

Research questions could be stated as follows:

1- What is the impact of E-Learning on the student's satisfaction in Egyptian private schools?

2- What is the impact of academic performance on student's satisfaction in Egyptian private schools?

3- What is the impact of E-Learning on academic performance in Egyptian private schools?

4- What is the impact of E-Learning on student's satisfaction with academic performance as a mediating variable in in Egyptian private schools.?

5- Operational definition - Measurement of variables:

The operational definition of a variable is the specific way in which it is measured in the research. (Sekaran and Bougie, 2016)

Table 1:*Operational Definition -Variables Measurement*

Variables	No. of Questions	Source

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	Course content and design	6 Questions	J. Sankar, et al, (2020) Makokha & Mutisya, (2016)
	Administrative and technical support	6 Questions	J. Sankar, et al, (2020) Makokha & Mutisya, (2016) Aung & Khaing, 2016)
	Instructor and learner characteristics	6 Questions	J. Sankar, et al, (2020) Makokha & Mutisya, (2016)
Academic Performance		6 Questions	Dhaqane & Afrah ,(2016)
Students Satisfaction		6 Questions	Dhaqane & Afrah ,(2016) T. Chen, et. al., (2020)

V. RESEARCH METHODOLOGY

For the purpose of this research, the research population refers to Egyptian private schools' students. The research questionnaire was administered to eight hundred (800) respondents, 512 of them returned it, representing for 64 percent of the total. 32 questionnaires, representing for 4% of the total, were incomplete, ineligible, or refused, and 288 (36 percent) were not contacted. There were 480 approved responses, yielding a response rate of 60 percent, which is highly adequate for the nature of this study.In this Research Paper, the Amos 25.0 software package was used to perform the structural equation modelling (SEM) to investigate the inter-relationships between the constructs of the hypothesized model. Hypotheses TestingFollowing a confirmatoryfactor analysis, the valuation of the structural model through testing of the hypotheses underlying the research model is conducted.

VI. RESULTS AND FINDINGS

Composite reliability (CR) is used to measure the reliability of a construct in the measurement model. CR is a more presenting way of overall reliability and it determines the consistency of the construct itself (Hair et al., 2019). CR of Course Content = 0.824, Course Design =0.790, Administrative Support =0.778, Technical Support = 0.830, Instructor Characteristics = 0.807, Learner Characteristics = 0.874, Students Satisfaction = 0.930 and Academic Performance =0.942). So, it clearly identified that in measurement model all construct have good reliability.

The average variances extracted (AVE) should always above 0.50 (Hair et al., 2019). The results shows that average variances extracted (AVE) of the particular constructs (Course Content = 0.611, Course Design =0.560, Administrative Support =0.543, Technical Support = 0.629, Instructor Characteristics = 0.583, Learner Characteristics = 0.697, Students Satisfaction = 0.689 and Academic Performance =0.732) are more than 0.500. Overall, these measurement results are satisfactory and suggest that it is appropriate to proceed with the evaluation of the structural model.

Measurement model result: The 8 factor was subjected to CFA using the AMOS software. DF was 80 (it should be more than 0), χ^2/DF has a value of 1.719, that is less than 3.0 (it should be less than or equal 3.0). The RMSEA was .039 (it should be less than 0.08). The TLI index was .974 which is very close to 1.0 (a value of 1.0 indicates perfect fit). The CFI was .980. All indices are close to a value of 1.0 in CFA, indicating that the measurement models provide good support for the factor structure determined through the CFA

Table 2:*Measurement model result*

Goodness of Fit Measures	**Name of index**	**Model Result**	**Remark**

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Chi-Square	χ^2	137.530	accepted
Degrees of Freedom	DF	80	accepted
Chi-Square/ Degrees of Freedom	χ^2/DF	1.719	accepted
Comparative Fit' Index	CFI	.980	accepted
TuckerLewis Index	TLI	.974	accepted
Root Mean' Square Error of Approximation	RMSEA	.039	accepted

Structural model

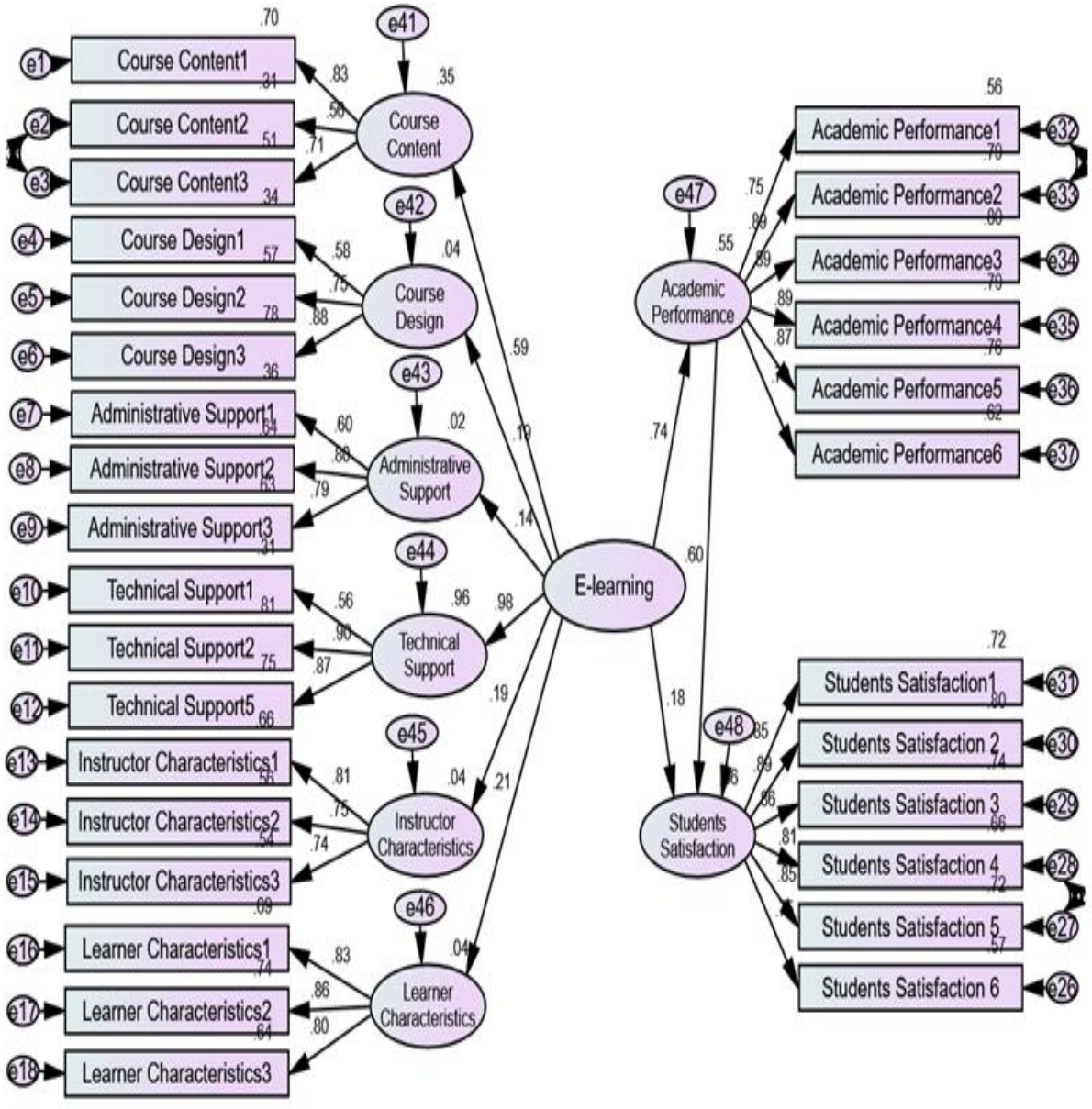

Figure (2) *Structural Model (Final Result)*

Table (3) provides a structural model (final Result)

The structural model validity - final Result:

Table 3:*Structural model - final Result*

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Goodness of Fit Measures	Name of index	Model Result	Remark
Chi-Square	$\square^2$	1025.229	Accepted
Degrees of Freedom	DF	395	Accepted
Chi-Square/ Degrees of Freedom	$\square^2$/DF	2.596	Accepted
Comparative Fit' Index	CFI	.931	Accepted
TuckerLewis Index	TLI	.924	Accepted
Root Mean' Square Error of Approximation	RMSEA	.058	Accepted

Structural model summary: The results of structural' model using the AMOS software, shows that DF was 395 (it should be more than 0), $\square^2$ /DF has a value of 2.596, that is less than 2.0 (it should be less than or equal 2.0). The RMSEA was .058 (it should be less than 0.08). The TLI index was .924 which is very close to 1.0 (a value of 1.0 indicates perfect fit). The CFI was .931. All indices are close to a value of 1.0 in CFA, indicating that the measurement models provide good support for the factor structure determined through the structural model

VII. FINDING DISCUSSIONS

The results and hypothesis testing showed that the independent'' variable (E-Learning) had a significant positive effect on student satisfaction (dependent'' variable student satisfaction), E-Learning has a positive effect on academic performance in Alexandria Water Co. , academic performance has a positive effect on student satisfaction in Alexandria Water Co. , Finally, academic performance mediates the relationship between E-Learning and student satisfaction in Alexandria Water Co. , in details as the follows:

1- First objective, to determine how E-Learning affect student's satisfaction in Egyptian private schools. and **H1:** E-Learning has an effect on Students' Satisfaction in Egyptian private schools

The results indicate that E-Learning has a significant direct relationship with Students' Satisfaction in Egyptian private schools. Previous studies by Mahmood et al., (2012); Zaheer (2013); Landrum et al., (2020); Wilert & Suchart (2021) who stated that E-Learning has an effect on Students' Satisfaction in Egyptian private schools.

2- Second objective, to identify how E-Learning, affect academic performance in Egyptian private schools and **H2:** E-Learning has an effect on Academic Performance in Egyptian private schools

The results indicate that E-Learning positively influences academic performance in Egyptian private schools, this finding was supported by previous literature (Kearsley (2000); Emerson & Taylor, (2004).; Johnson, (2005); Yusuf (2005); Nworgu (2007). who stated that E-Learning has an effect on Academic Performance in Egyptian private schools.

3- Third objective, to examine how academic performance affect student's satisfaction in Egyptian private schoolsand **H3:** Academic Performance has an effect on Students' Satisfaction in Egyptian private schools

The results indicate that academic performance has a significant direct relationship with student's satisfaction in Egyptian private schools, that result is consistent with Mushtaq et.al, (2012); Martirosyan et al., (2014); Benjamin and S. Alija (2017); Ridzuan et al., (2018); Adly et al., (2020). who stated that Academic Performance has an effect on Students' Satisfaction in Egyptian private schools

4- Fourth objective, to investigate the mediation role of academic performance between E-Learning and student's satisfaction in Egyptian private schoolsand **H4:** Academic Performance mediates the relationship between E-Learning and Students' Satisfaction in Egyptian private schools.

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5- Fifth objective, to develop a framework for the relationship between E-Learning and student's satisfaction in Egyptian private schools using structural equation modelling.

Based on the outcome of the measurement model analysis and the structural model analysis, the research model was re-arranged to conform to the outcome of the two analyses, the final model of research has sought to examine and understand the effects of E-Learning on student's satisfaction with mediation role of academic performancein the Egyptian setting in private schools, in particular.

The results indicate that academic performance mediates the relationship between E-Learning and student's satisfaction in in Egyptian private schools

VIII. RESEARCH CONCLUSION

The purpose of this research is to empirically investigate the relationship between E-Learning and student's satisfaction with mediating Role of academic performance in Egyptian private schools. The study was based on a quantitative correlational design where primary sample data were collected from 480in Egyptian private schools' students. The results of the regression analysis show that:

1- The direct effect between E-learning and Students Satisfaction is statistically significant.
2- The direct effect between E-learning and Academic Performance is statistically significant.
3- The direct effect between Academic Performance and Students Satisfaction is statistically significant.
4- The indirect effect E-learning and Students Satisfaction through Academic Performance,

All are indicated significant at 5% significance level. According to the analysis, the estimated structural model corroborated the four hypotheses, as E-learning construct explained 54.8 % of Academic Performance variance (R^2 = 0.548), Besides, E-learning through Academic Performance explained 56.1 % of Students Satisfaction variance (R^2 = 0. .561).

IX. RESEARCH LIMITATIONS

External validity can be defined as referring to the degree to which the results can be generalized to the wider population, cases or situations. (Saunders et al.,2019). Therefore, the researcher cannot assume that research findings generalize to other settings, so the research does not consider:

First, the sample in this study is restricted to one country (Egypt) and only private schools; consequently, the findings need to be interpreted with caution. Although the research context is quite specific, it is believed that the findings are of relevance to other sectors and other countries.

Second, this research was used cross-sectional data to test the association of E-Learning and student's satisfactionwith mediation role of academic performance in Egyptian private schools. Therefor the study provides only a snapshot picture at a single point in time, which means that the research is valid only if external environment variables such as government regulations, economic cycle, competitive environment, etc., are unaffected.

According to O'Neill (2001), there is a need for longitudinal measures for the relationship between E-Learning and student's satisfaction, since existing measures for the relationship between E-Learning and student's satisfaction with this research is flawed because they do not consider the effects of time on perceptions of stakeholders.

Third, limitation resulted from the collection of data from respondents over a specified time frame using a convenience sampling strategy. The limited time frame for data collection placed a constraint on the variety of respondents who would participate. The use of a convenience sampling approach to gather responses also contributed to possible limits in the variety of respondents who would participate, since responses are gathered by virtue of accessibility of respondents and may not provide a representative sample (Sumaedi et al., 2012).

X. SUGGESTIONS FOR FUTURE RESEARCH

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Based on the findings from this study, the recommended areas for further research include the following:

First, a study should be conducted using qualitative approach or the mixed approach involving both qualitative and quantitative approaches so as to be able to capture perceptions and expectations of E-Learning on student's satisfaction.

Second, a longitudinal study should be conducted in order to take care of long-term relationship between E-Learning on student's satisfaction with mediation role of academic performance in Egyptian private schools.

Third,since the sample was limited to only privateschools, in future a sample drawn from private and public schools would improve generalizability of the conclusions. This would also help compare relationship between E-Learning and student's satisfaction with mediation role of academic performance between private and public schools.

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