

Education policy: the impact of e-learning on academic performance

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Abstract. The high use of web systems in learning implies that e-learning is becoming a common successful learning method in wider academic contexts. In order to enhance and support schooling and literacy, e-learning includes leveraging information and communication technology (ICT). The purpose of the analysis was to determine the correlation between e-learning and the academic achievement of students in higher learning. A set of 150 author's observational studies, carried in Russian educational institutions (both in the period before and during the COVID-19 pandemic), was used to measure findings using Cohen's formula focused on a rigorous sampling method. The findings of the equation ($= 0.712$) reveal that ICT has a major statistically favourable effect on the academic success of students in e-learning. The results suggest that ICT has a substantial positive effect on the total success of students in universities.

1 Introduction

E-learning (EL) essentially encompasses ICT on websites, personal computers, portable PCs, mobile phones, learning management System (LMS), radio, and other forms of enhancing teaching and reading. In addition, it requires the application and usage of Information and communications technology (ICTs). E-learning is also a unifying term used to describe the areas of the Network and the technology directions [1].

E-learning in this regard, as shown by the massive growth of web technology, is being significantly the learning technique in terms of schooling, training and development and a lot of corporate functions. Nevertheless, more educational organizations and business schools now take crucial moves in utilizing increasingly immersive e-learning methods to improve university students and their staff efficiently.

Many developing economies are utilizing highly immersive e-learning from several education institutions that specifically increase student success [2]. Technologies in recent times are machines used to remove physical barriers, allowing the students to study anytime and anywhere without communicating with the teacher.

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E-Learning increases access to efficient teaching and learning and thereby improve efficiency for students against this backdrop. E-learning encourages multiple students in higher education to pursue related program simultaneously, Heeger [3] said, in addition to schooling and eventually college, education programs have now evolved to open systems for knowledge exchange.

The results of [4] suggest that electronic learning systems enable a method of education aimed at enhancing high quality in the teaching and higher education of students. The two students from the higher education institutions [2,5] further clarify that those who have shown the exceptional usage of e-learning usually have much better results than students who focus on personal and physical contacts with their professors.

In addition, [4] note that students from universities who typically engage digitally or in electronics hit much higher levels than students who investigate conventional approaches. Electronic learning is currently becoming a significant priority of education as advances are taking place in educational technologies, which is why many higher education entities are already introducing e-learning program.

As a consequence, e-learning has been rapidly emerging in a variety of higher education organizations worldwide, both private and public. Many higher schools are mindful of the effect of e-learning on the academic success of students. In general, three components are used in the widely recognized e-learning facilities: ease for individual reporting, automated compliance and conformity [6].

ICT offers modern curriculum and preparation resources by growing learning and teaching and promoting teamwork, growth and imagination for citizens and organisations [7]. Although mostly used as an extension to other instructional devices, usage of ICT is capable of ingenuity in learning and opening up doors for innovative ways of doing stuff.

In addition, ICT usage was found to be linked to imagination. ICT will also stimulate public policy formulation for reform in education, promoting imaginative and inventive atmosphere for schools and universities[8]. Earlier models suggest that good scientist preparation needs three elements: research (focus), technology and professional orientation [9].

The substance of research relies on discipline awareness while technologies and vocational guidance aim to develop the process skills of scientists. Higher education as a training ground for potential scholars can have a significant effect on the analytical method, mental capability, learning abilities and imagination of university students, so that they can take important and progressive action to provide answers to current problems [10].

A framework of education that suits evolving global demands and looks ahead to research will include different educational and learning opportunities that will promote the imagination and intellectual abilities of the learners. Indeed, such a method is best worthy of supplying students with a better view of the environment, since the system trains them for constructive developments.

As a social institution, higher education must be focused on the interests of the community; i.e. it must inspire citizens to educate with strong intellectual capacity to be innovative and reflective. The key teaching approaches (readings, etc.) may not have the necessary efficacy in order to achieve this objective but incorporation of e-learning may be means of achieving this objective [11]. E-learning is one of the most significant information-era learning environments.

The purpose of the current study is to investigate the impact of self-directed e-learning on undergraduate students' achievements in a science course and creativity.

2 Literature Review

In e-learning, we define the usage of ICT to enhance learning by instructional preparation. However, e-learning entails the usage and use of a broad spectrum of resources and methods including e-mails, web pages, journals, social and business networking, and links to programs supplied exclusively electronically [3]. Education channels may be numerous, but colleges of higher education deliver education services that utilize the Internet or the Network to enhance the academic success of students [9].

E-learning is essentially a form of guidance and learning through the internet, the device or the standalone personal computer, following [1]. Through a different angle [6] describes e-learning in an effectively teaching and learning format as a networking term. Web-based teaching, computer-based research, multimedia lessons and electronic enterprise are the basics of the E-learning programs [3].

The software offers channels for information material transmitted on web intranet or extranet, MP3s, satellite TVs and CD-ROMs for audio or even movie. In this way, e-learning was originally referred to as "internet-based learning," although nowadays it is referred to as "web-based learning." E-learning is theoretically not only about the teaching and coaching of the teacher, but rather about learning customized to different learner requirements.

E-learning and online learning are also known to have distinct significances [6]. Given that the effectiveness of e-learning in increasing the academic output of students depends on the consistency of ICT, it is difficult to separate e-learning from ICT's nature infrastructure in relation to academic performance [12]. In today's increasingly globalized environment, utilizing and implementing ICT in learning has achieved tremendous success in enhancing academic performance between students in several academic disciplines and faculties [13]. Najafi[14] confirmed further that the increased usage of innovative multimedia ICTs in education and learning strongly shows how powerful ICT in teaching and learning systems is.

According to [10,15] immersive usage of ICT-based teaching and learning strengthens the desires of the student to learn and to use the information gained to solve social and economic problems in real life. ICT is a holistic approach that improves the potential to perform activities with pace and precision, with the usage of desktop, personal computers (PCs), smartphones, internet and multi-media. These characteristics shift the position of instructor and pupil, promote learning and contribute to immersive learning, autonomy for learners and self-reliability [13].

ICT generates significant learning and academic success, by combining material and knowledge literacy, often in textual and visual ways. In other terms, integrating ICT into teaching practices has shifted teachers' position to track the training phase, through a centralized source of instructional materials. This improves self-reliance and faith in learning systems for students [13]. Today, ICT awareness is highlighted as a medium for learning and education [11].

Through the widespread usage of the Internet, the mass population of students is rendering information more available. The usage of ICT encourages the effective engagement of learners, enhancement of instruction, the easier use of teaching methods and resources in order to adapt to the interests and necessities of students, enabling students to monitor the timetable for learning and pace of execution of the learning plan [16]. However, access to technology is not the same in all countries. The study of tertiary schools carried out by Mahdinejad and Amoi[10] found that schools lack well-equipped computer labs. As a result, several colleges were unable to have the requisite ICT facility for the successful distribution of curricula.

This suggested that not all colleges in the education and learning process were able to obtain quality assurance. This will inevitably contribute to poor academic achievements for pupils. Therefore, the adequacy, usage and upgrade of ICT facilities requires to be evaluated further in order to provide advice to higher education stakeholders for better provision, optimization of capacities and maintenance of ICT facilities in schools[10].

Shekari[17] also considers comparatively low use in higher education institutions of the ICT facilities owing to the fact that teachers and students are limited by the shortage of teaching and learning facilities. This means that teachers and students have restricted resources and capacity to use ICT facility to improve their curriculum teaching awareness and skills. The standard of the preparation that is offered to the students will then be insufficient and represent a low performance.

On the other hand, with sufficient access to ICT, e-learning can serve as an effective means of knowledge transfer. According to [18] online forums are among the most effective and convenient tools for online learning; effective transfer of scientific knowledge and other information in context of the digital economy, as [19, 20] show, is also possible only with the use of ICT.

Teachers' main constraints on the efficient use of ICT facilities for teaching/learning institutions include insufficient provision of computer hardware and software, irregular power provision; poor education opportunities for teachers; low levels of institutional partnerships with technical support and business bodies; poor funding of ICT services [17]. The described problems are counter to successful teaching and learning processes; thus, most teachers neglect ICT expertise at colleges. An adequate supply of ICT facilities and improved administration of established ICT facilities were defined as ways of enhancing the usage of ICT facilities in tertiary schools in order to increase university success for students [10].

2.1 E-Learning

E-learning is described as a technology, organisation and governance-based framework that enable students to learn through the web and to learn easily. Education as acquisition of information disseminated by electro-devices is also characterized by [4]. E-learning is the use of interactive education platforms such as machines, the Internet, multimedia disks, electrical papers, simulated newscasts for the purposes of minimizing time and costs to develop, speed up and promote learning [11].

The usage of information and networking technology in instructional programs has created a modern style of education that does not involve physical attendance.

Any findings are next discussed in this sense. [21, 22] observed that e-learning has a beneficial influence on students' academic achievement. [13]concluded that the usage of e-Portfolio greatly enhanced the students' mood, enthusiasm and academic achievements during their studies at the e-learning centre.

[9]have observed that students trained in multimedia techniques gained and recollected more than students trained in the conventional techniques. The analysis and its impact on learning and imagination of the studies done in the field of the e-learning application show that the usage of this teaching approach will contribute to the success of the instruction.

The advent of modern teaching and learning theories has changed the curriculum from teaching to student-oriented. In addition, the creation and development of new communication technologies has allowed the modern human being to use modern methods of teaching & learning, to liberate themselves from barriers to space and time [4].

2.2 Creativity

The development of the basis for innovative thought and the activation of inclusive possible educational knowledge is one of the key techniques for the general training of education systems, since inclusive intelligence can generate its ideas dependent on the contact with the community. Such a perspective in the field of literacy of knowledge contributes to an efficient learning mechanism where educated compromises with the world are made feasible, and information is received and communicated. In order to obtain a noble education in the societies, holistic innovation and wisdom thrive; this would be the launch of the right movement in the education systems [8]. While teachers and instructional managers believe in creative thought, but they cannot really get access to it, since creative thinking stays written if the requisite requirements for creative thinking are not prepared.

Furthermore, it is important to remember that the materials of education are not only of significance in the education of students of universities, but that they impact the manner in which and the standard of education, the extent of progress, interests and experience.

Two key attributes of imaginative thought exist:

- Look for a new problem approach (novelty and originality or hypothesizing to solve the problem);

- Offer an odd, distinct explanation or idea from what most people agree.

3 Methodology

This section provides the analytical framework and statistical model applied in the analysis.

3.1 Statistical Model

This research employed a technique for the meta-analysis to offer fresh perspectives on the respective relationships in an attempt to resolve the discrepancy between e-learning and the student academic achievement. In order to create new connections that cannot be done otherwise, meta-analysis relies on integrating the findings of various researches.

Consequently, the analytical methodology engaged in this research determines the effect of e-learning on academic achievement and the magnitude of its impact on academic achievement. The statistical explanation for the use of a technique for meta-analysis was the average impact size [12]. Data were taken from 150 author's observational studies carried in Russian educational institutions on the effects of ICT dependent e-learning on academic accomplishment carried out. The results have been manually collected using a survey of distant and partly-distant students. Models for data interpretation were used for effect duration, fixed and random effects, and the Cohen model was applied to analyse the outcomes.

4 Results and Analysis

The effect sizes were first individually estimated in order to compute combined mixed and random effects presented in Table 1 and Table 2 below.

The mean effects of e-learning on academic success in the analyzed study were 0.712, based on the data presented in Table 1. Provided the projected effect of e-learning on academic achievement in higher education, it is below the trust interval. In the homogeneity measure, the impact of e-learning on academic achievement was also important. Table 2 below computed and presented the effects of the Cohen's model used to interpret impact size.

Table 1. The mean effects of e-learning on academic success (Source: results of authors' methodology applications).

	N	Fixed Effects	Random Effects	Explained Variance	Confidence Interval (95%)	Homogeneity Test	DF	Significance
E-Learning Students and Academic Performance	150	0.782	0.712	0.112	0.472	0.747	4	0.012

Table 2. Effects of the Cohen's model used to interpret impact size (Source: results of authors' methodology applications).

Effect Size	Correlations	Cohen's D	Explained Variance
Small	0.4	0.5	0.01
Medium	0.6	0.8	0.13
Large	0.7	0.9	0.48

The findings obtained in the Cohen model reveal that the measured impact size is above the Cohen model norm. It can also be argued from a methodological viewpoint that e-learning has a significant beneficial impact on the academic success of students. ICT has been extremely influential in fostering communities, in particular in terms of schooling and literacy, in present information period. The metadata from this research suggests that e-learning has a substantial positive influence on the academic success of students with a mean effect of 0.712. On the basis of this study, the metadata in 150 studies results revealed. As the mean impact size comes below the trust interval, it can also be confirmed that e-learning has a major positive effect on the academic achievement.

Furthermore, the mean impact size (= 0.6) of the model Cohen is significantly larger than the norm. E-learning has therefore a statistically important modest positive influence on academic success of students. It can also be verified. The role of ICT in increasing the usage of e-learning from a realistic point of view remains an important aspect in higher education and learning as it encourages and enhances education. Given the impact size of 0.712, it can be statistically assumed that sufficient ICT facilities can contribute to better learning and student academic performance to a considerable degree. In comparison, e-learning helps students, by the usability and implementation of alternative learning approaches, to show their talents and capacities even quicker. Because ICT also combines textual and visual material and knowledge literacy, it facilitates more significant learning and academic success. Higher educational organizations should understand the value of e-learning as a way of teaching and learning.

5 Conclusion and Recommendations

Due to their speed, convenience and productivity in accessing and processing knowledge through web systems, e-learning has primarily been an important mechanism in both technical training and teaching and learning at tertiary level. This study centred mostly on the review of the connection between e-learning and the academic success of students.

The findings obtained from the meta-analysis suggest that the usage of knowledge and communication technologies to boost e-learning increases the academic success of the student. The findings suggest however that the successful usage of e-learning ICT resources

is an effective method for improving the overall academic success of students in the course of their learning.

The relevant point is certainly that the usage of e-learning has a major positive influence on e-learning and thus the academic results of students. For research purposes on this issue, potential research can also be directed at studying how the usage of ICT resources as e-learning is specifically affected in class set-ups, rather than focus on the specific topics, by students' overall academic achievement.

References

1. N.D. Oye et al., *J. of Computing* **2(11)**, 20-26 (2010)
2. J. Soleymannpour et al., *Iranian J. of Information and Communications Technology in Education Sciences* **1(2)**, 77-91 (2010)
3. A. Heeger, *Distance Learning Today* **1(2)**, 1-13 (2010)
4. D. Holley, *Education and Training* **44(3)**, 112-121 (2012)
5. D. Ushakov et al., *Actual Problems of Economics* **2(3)**, 38-46 (2013)
6. M. Cooke, *Clomedia: The evolution of e-learning* (2014)
7. M. Vinichenko et al., *Espacios* **40(19)** (2019)
8. S. Jamali et al., *Iranian J. of Contemporary Psychology* **7(1)**, 17-34 (2012)
9. M. Lorrain, *The J. of Educator Online* **2(3)**, 14-28 (2010)
10. V. Mahdinejad, M. Amooi, *Iranian J. of Higher Education* **16(4)**, 102-117 (2011)
11. F. Zamani, S. Kardan, *J. of Information and Communications Technology in Education Sciences* **1(1)**, 23-38 (2011)
12. N. Niyazazari, Z. Hosseini, *J. of Information and Communications Technology in Education Sciences* **3(1)**, 99-118 (2012)
13. F. Zamani et al., *J. of Information and Communications Technology in Education Sciences* **11(4)**, 99-118 (2011)
14. H. Najafi, *Iranian J. Curriculum Planning* **9(7)**, 32-41 (2012)
15. A. Shahbaz 2016 *TheEUrASEANs: J. on Global Socio-Economic Dynamics* **1(1)** 69-76
16. M. Qaznavi, *Impact of ICT on the academic achievement of high school students in Khash City, Master's Thesis* (Sari Branch of Azad University, 2010)
17. A. Shekari, *J. of Higher Education Curriculum* **1(2)**, 57-89 (2010)
18. Z. Liu et al., *International J. of Emerging Technologies in Learning* **15(13)**, 22-33 (2020)
19. E. Dudukalov et al., *Contemporary Economics* **10(4)**, 299-310 (2016)
20. E. Dudukalov et al., *Entrepreneurship and Sustainability Issues* **8(2)**, 972-983 (2020)
21. A. Khalkhali et al., *J. of Information and Communications Technology in Education Sciences* **1(3)**, 164-182 (2011)
22. A. Gadakhyanet al., *E3S Web of Conferences* **210**, 18015 (2020)