Impact of Online Learning on the Performance of School Students during the Pandemic Period of Covid

(Special Reference to A/L Students in Kolonnawa Educational Division)

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ABSTRACT

The COVID-19 impacted the educational system in Sri Lanka as it has in many other nations worldwide. As a result, educational system has transitioned from traditional face-to-face classes to online classes. The primary goal of this research is to provide a comprehensive review of the impact of online learning on A/L students' performance in the Kolonnawa educational division. Quantitative descriptive analysis, chi-square test and binary regression analysis were applied to the data acquired via structured questionnaire from A/L students in the Kolonnawa educational division to address the research questions. As the sample, 269 A/L students were selected. According to the findings, students' participation, technology, expectations, ease of use, internet facility and stress are significantly associated with student's performance. According to the results of the chi-square statistics, Students' participation, instructor quality, course design, students' expectations, technology, ease of use, and examination procedure had a significant association with the student's performance. Moreover, students need help with online classes. The biggest problem they faced was the power cuts during the online courses. To improve Sri Lanka's new standard education system, the study's overall recommendations include organising seminars, training on new technologies, and awareness activities for educational stakeholders, providing incentives to purchase digital devices, and enhancing internet access. In addition, the results of the binary model demonstrate that when all variables are considered concurrently, the predictor variables identified as students' participation, technology, expectations, ease of use, internet facility and stress are significantly associated with student's performance.

Keywords: COVID-19; online learning; students' performance

INTRODUCTION

Due to the global health crisis caused by the spreading of COVID-19 all over the world, measures such as the shutdown of the non-essential workforce, suspension of physical education or face-to-face learning in schools and different educational institutions, and various kinds of restrictions on human interactions have been enforced to prevent the circulation of COVID-19.The first COVID-19 case was detected in Sri Lanka in January 2020. The Sri Lankan government immediately closed all countrywide schools and universities in March 2020 and suspended all academic activities (Rameez et al., 2020).

Online education is delivered over the internet (Adebo, 2018). A range of technologies, including the internet, email, audio conferencing, and video conferencing delivered over computer networks, are used in online learning, and it allows the student to go to their preferred place at their convenience (Shea, 2022)

Due to the pandemic's fast spread, rigorous measures were adopted to close schools and educational institutions across Sri Lanka (Shea, 2022). In Sri Lanka's higher education system, adopting online learning as a substitute for the traditional academic paradigm is viewed as a structural reform (Rameez et al.,

2020). Liyanage (2014) states that the Sri Lankan education system is more traditional. Because of this, it is

considered difficult to break with tradition and conduct instructional activities in a cutting-edge online environment.

Though many studies on traditional physical learning are currently available in Sri Lanka, there has yet to be much research on online education in the Sri Lankan educational system since it was introduced recently. COVID-19 mandated Sri Lanka deliver all courses online for the first time exclusively (Daumiller et al., 2021). According to Ilangarathna et al., (2022), this novel experience impacted the education system in Sri Lanka. This study aims to expand the frontier of knowledge about the foundations of online learning to improve the academic performance of online learners.

LITERATURE REVIEW

Academic Performance of the Students

Students' academic performance is an objective measure of a student's knowledge. Poor academic performance and incomplete college studies are problems that universities have around the world (Adewale & Adhuze, 2014). According to some, teaching approaches and different learning styles significantly impact student academic achievement (Kvan & Yunyan, 2005). Oluwatayo et al. (2015) established that enhancing the quality of learning surroundings improves scholars' academic performance. One indicator of students' learning outcomes is their academic success. Exam results, test results, and grade point average (GPA) are some of the indicators used to assess a student's academic progress (Caro et al., 2014). In any case, some studies claim that an understudy's school grade or score does not necessarily mirror their degree of knowledge and understanding, since certain people might perform inadequately in class however well on a clever remainder test. Furthermore, Levy and Murray (2005) stated that tertiary admission exam marks do not indicate academic performance. Regardless of the literature, GPA is the most widely accepted number for assessing students' achievement (Christiana, 2014).

Online Learning during the Pandemic Period of COVID

As a preventative measure, COVID-19 pandemic has forced many schools worldwide to start urgent remote learning. The various phases of lockdown and restrictive measures taken represented a disruption in the traditional educational model, which led to the adoption of technology-supported, remote training methods, as a result of which online learning became prevalent at various levels of the educational system (Cuevas Monzonís et al., 2021).

According to a study, academic institutes in practically all nations must be prepared to convert on-campus courses and classes into online courses during the pandemic phase (Basilaia & Kvavadze, 2020), which helps to decrease the source of COVID-19 propagation and preserve social distance. Online teaching-learning causes social distancing, which is already known to reduce virus transmission during an influenza pandemic (Uscher-Pines et al., 2018). As a result, online learning is becoming increasingly popular throughout the pandemic. However, social separation causes worry, physical discomfort, loneliness, anxiety, and stress (Xiang et al., 2020), all of which hurt the teaching-learning process at university.

Students' Performance during the Pandemic Period of COVID

Performance is a process-based concept that can be measured regarding how well one develops their capacity for critical thought and problem-solving after taking a course (Law et al., 2019). However, some research has examined performance as an outcome-based concept and quantified student performance using assessment marks (Clark et al., 2020; Gibson, 2011; Wei & Chou, 2020). Students' learning performance will improve once they adapt to a learning environment that suits their preferences (Bachari et al., 2011). Furthermore, learning performance improves when students intend to use e-learning (Lee, 2010;

Teo et al., 2009). Vo et al., (2020) also observed that clear goals and expectations in the classroom, material quality and collaborative learning, significantly improve students' learning performance.

Clark et al., (2020) concluded that online education increased students' performance during the COVID-19 lockdown by 0.22 standard deviations compared to the students who did not receive learning support from their school. Surprisingly, it was also discovered that low performers gained the most from online education, whereas better performers had no meaningful impact.

Factors Affecting Online Learning on the Performance of the Students

Course design

Online learning course design includes structure, course design interface, testing and assessment methodologies, and teacher-student exchange forums. The technological design of the work influences the students' performance through expectations (Gopal et al., 2021). When creating an online course, it is essential to remember that teachers deliver an experience for students with various learning styles.

Quality of the instructor

Instructor quality with high satisfaction has a good impact on student performance. So, this can be the most critical factor for the student's performance. Assume the teacher successfully conducts the course and motivates the students to improve their grades. This technique aids student performance and enhances learning (Gopal et al., 2021).

Ease of use

The purpose of online learning platforms is to make sharing and studying information easier. Using technology to gain knowledge, collect information, and learn is a daily necessity in today's globalised society. These materials are easy to use and find, facilitating knowledge exchange. Several studies have found that the ease of use, accessibility and transmission speed of online media and mobile devices are essential to learning. Online learning flexibility has improved due to the ease of access, resulting in positive outcomes (Pham et al., 2021).

Students' expectations

Expectations are a critical component that directly impacts on a student's performance. Many online learning classes adopt a positive approach that has been proven to raise learners' expectations and lead to effective outcomes (Gopal et al., 2021).

Internet facilities

If new education methods are to succeed, teachers must focus on designing new learning activities and assisting students in acquiring specific knowledge by accepting and integrating distance learning tools and methods and figuring out the best way to support and inspire students to be more actively engaged in the teaching process and more engaged in the knowledge acquisition process. This strategy requires teachers to have specific pedagogical knowledge and abilities, as well as the willingness to adjust their teaching methods in response to changes in learning methodology. To engage in online classes, students must have the necessary technical abilities and equipment (Duraku & Hoxha, 2021). Because of limited internet access and a need for more technical expertise in these technological devices, e-learning platforms were not only problematic for most students (Duraku & Hoxha, 2021). However, working with remote learning platforms took more work for teachers (Basuony et al., 2020).

Stress

School closures that occur unexpectedly can cause considerable problems for children, teachers, parents,and society. It can potentially harm students' academic work performance (Basuony et al., 2020). Furthermore, students have been shown to display behavioural changes, be afraid, and show signs of fear, stress, worry, anxiety, and inactivity during the pandemic. Increased stress and worry, anxiety, and pressure, as well as changes in sleep patterns and the lack of personal space, have all been noted within the family (Basuony et al., 2020).

Examination method

Many options for assessment techniques were available for teachers to choose from. According to their statements, the most typical technique for teachers to measure student performance is via homework or quizzes. The quiz questions were randomized to reduce the possibility of cooperation further (Basuony et al., 2020). According to case studies, students are also under more stress because they are dealing with the unexpected situation of being expected to do their best in class while everything between them has changed. Certain studies say online exams boost student satisfaction (George, 2020). Others have discovered that traditional and online tests had the same level of student satisfaction (Topal, 2016).

Technology

According to (Lopez and Nagelhout, 1995) Reliability, quality, and medium richness are important technological considerations. Students should have convenient access to technology. Technology's perceived value should also impact the efficiency of online delivery (Volery & Lord, 2000).

Students' participation

In the online learning environment, interaction and involvement have become continually changing emerging topics. Many students would prefer to attend a virtual classroom where they are not seen or heard, claiming that being seen by their peers and teacher is "too uncomfortable." Some educators believe that to have a relevant class, they must constantly watch students' reactions (Basuony et al., 2020).

Impact of Online Learning on the Performance of the Students during the Pandemic Period of COVID

Numerous studies have been conducted on the effects of using online learning models on students' academic performance during the pandemic.

In terms of learning motivation, learning achievement, and learning engagement, online learning has a beneficial impact on students' academic performance. Furthermore, students demonstrated that conducting online learning is essential during a pandemic.

Additionally, the advantages of online learning include flexibility, accessibility, learning autonomy, and increased student accomplishment. However, economic issues and poor internet connectivity impede online learning (Mandasari & Aminatun, 2019).

The educational institution faced various hurdles regarding online distribution, practical test problems via online mode, evaluation, examination, and thesis supervision (Rameez et al., 2020).

Hashemi, (2021)investigated the considerable difference in the academic performance of students as well as their degree of satisfaction with online teaching. The study's findings suggested that COVID-19 had a detrimental impact on Afghan students' academic achievement, and the students were highly unsatisfied with online education during this pandemic period. Furthermore, the study found substantial disparities in

student academic performance and satisfaction with online education across genders (Hashemi, 2021).

The findings suggest that four independent elements included in the study, namely teacher quality, course design, fast feedback, and student expectations, significantly impact students' happiness, which in turn positively impacts students' performance. These four variables are critical for educational management to achieve high levels of satisfaction and performance for e-learning. This study is being undertaken during the COVID-19 pandemic to assess online education's effect on student achievement (Gopal et al., 2021).
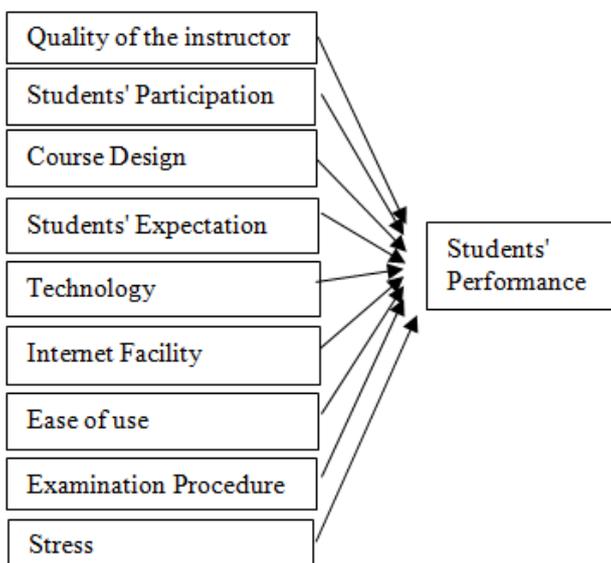
RESEARCH METHODOLOGY

Operationalisation

Based on previous literature, the variables employed in the study were operationalised. The present study is based on the independent variables namely students' participation, instructor quality, course design, expectations, technology, internet facility, ease of use, exam procedure and stress. The dependent variable has been created as the student performance. Questions taken from the literature used in developing the questionnaire as they are in line with the study context.

Research design

The study used a quantitative research design to explore the impact of online learning on the performance of school students during the pandemic of Covid-19. The primary analysis technique used in this study was the Binary Logistic Regression Model because the dependent variable can be classified whether online learning impacts the students' performance. To examine the relationship between the explanatory variables and the dependent variable, Pearson's chi-squared Test is used to examine the relationship between categorical variables and the dependent variable.

The selected population of this study was the total number of A/L students in the Kolonnawa educational division. The population of students includes 893 students. In this study, according to (Krejcie and Morgan, 1970), 269 students were selected for the sample using stratified random sampling. The study used both primary and secondary data. A self-administered questionnaire with closed-ended questions was used to gather primary information. The Secondary data was collected from the Kollonnawa divisional education department.

Conceptual Framework

RESULTS AND ANALYSIS

The Person's chi-squared Test examines the relationship between individual explanatory variables and the dependent variable.

Hypotheses

H_0: No relationship exists between students' performance and the explanatory variables.

H_{1a}: There is a relationship between performance and students' participation.

H_{1b}: There is a relationship between the students' performance and the instructor's quality.

H_{1c}: There is a relationship between the performance of the students and the course design.

H_{1d}: There is a relationship between the students' performance and the students' expectations.

H_{1e}: There is a relationship between the students' performance and the technology.

H_{1f}: There is a relationship between students' performance and the internet facility.

H_{1g}: There is a relationship between students' performance and ease of use.

H_{1h}: There is a relationship between the performance of the students and the examination procedure.

H_{1i}: There is a relationship between the students' performance and stress.

Table 4.5. Results of the Persons chi-squared

Hypothesis	Sig. value	Decision	Conclusion
H_{1a}	.000	Reject	There is a relationship between students' performance and the students' participation.
H_{1b}	.000	Reject	There is a relationship between the performance of the students and the quality of the instructor.
H_{1c}	0.003	H_3: Reject	There is a relationship between the performance of the students and the course design.
H_{1d}	0.002	H_4: Reject	There is a relationship between the performance of the students and expectations of students.
H_{1e}	.000	H_5: Reject	There is a relationship between the performance of the students and the technology.
H_{1f}	0.138	H_6: Accept	There is no relationship between the performance of the students and internet facility.
H_{1g}	.000	H_6: Reject	There is a relationship between the performance of the students and ease of use.
H_{1h}	0.001	H_7: Reject	There is a relationship between the performance of the students and the examination procedure.
H_{1i}	0.090	H_9: Accept	There is no relationship between the performance of the students and students' stress.

Source: Authors based on survey results

According to the findings of the Person's chi-square, students' participation, instructor quality, course design, students' expectations, technology, ease of use, and examination procedure were significant as significant values were less than 0.05. However, internet facility and student stress were not significantly influential for the student performance, when considered individually.

Modelling Overall Impact on the Performance of the Students

Moreover, the impact on the students' performance cannot be explored when distinct models are included. As a result, researchers built a binary logistic model while taking into account all variables at the same time.

Since the sample size is relatively high, the model was trained with 2/3 of the data and verified with the remaining 1/3.

Table 2: Statistically Significant Variables in 2/3 of the Data

Variable	P-value
Technology	**0.002**
T1	0.017
T2	0.407
T3	0.168
T4	0.193
T5	0.091
Ease of use	**.000**
EU1	0.763
EU2	0.001
EU3	0.211
EU4	0.997
EU5	0.005
Internet Facility	**0.047**
IF1	0.08
IF2	0.634
IF3	0.26
IF4	0.286
Students' Participation	**.030**
SP1	0.047
SP2	0.084
SP3	0.856
SP4	0.486
SP5	0.31
SP7	0.26
Students' Expectation	**0.015**
SE1	0.993
SE2	0.142
SE3	0.093
SE4	0.183
SE5	0.164

Course Design	0.016
CD1	0.021
CD2	0.978
CD3	0.395
CD4	0.012

Source: Authors based on survey results

Table 3: Statistically Significant Variables in 1/3 of the Data

Variable	P-value
Stress	**0.038**
S1	0.136
S2	0.407
S3	0.166
S4	0.21
S5	0.003
S6	0.161
Students' Expectation	**0.043**
SE1	0.009
SE2	0.027
SE3	0.273
SE4	0.12
SE5	0.884
Internet Facility	**0.038**
IF1	0.319
IF2	0.008
IF3	0.652
IF4	0.848

Source: Authors based on survey results

Overall predictive power of variables in 2/3 of data was 91.6% while overall predictive power of variables in 1/3 of data was 84.4%. According to the results, the same variables were not deemed to be significant in both the training and validation data sets. As a result, it was determined to run the model using the entire data set.

The final fitted Binary model is statistically significant at 5% confidence level (p=0.644), according to the Hosmer-Lemeshow test results. The results demonstrates that when all variables are considered concurrently, the predictor variables identified as students' participation, technology, students' expectation, ease of use, internet facility and stress are significantly associated with performance of the students.

Table 4: Classification Table of the Final Model

Observed	Predicted		
	Students' performance		Percentage Correct
	No	Yes	
Students' performance No Yes	134	27	83.2
	28	80	74.1
Overall percentage			79.6

Source: Authors based on survey results

Table 4 shows that the overall predictive power of the model fitted for the entire data set is 79.6%.

The explained variation in the dependent variable based on the final model ranges from 43.4% to 58.7%, according to the results of Cox and Snell R square and Negelkerke R square. As a result, the final fitted model described the percentage of variance concerning the dependent variable (Table 5).

Table 5: Model Summary

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
209.156[a]	.434	.587

Source: Authors based on survey results

Interpretation of the Model

According to the odds ratios, the final model derived from the logistic regression analysis demonstrates that, the odd value in students' participation, the probability of students who met the expectations in the exam is 5.123 times higher than those who did not meet their expectations in the exam when compared to the students who completed their expectations in the exam.

The odd value in technology is that the probability of students who met the expectations in the exam is 4.087 times higher than those who did not meet their expectations in the exam compared to those who met their expectations in the exam.

The odd value in students' expectations, the probability of students who met the expectations in the exam is .487 times higher than those who did not meet their expectations in the exam compared to those who met their expectations in the exam.

The odd value in ease of use, the probability of students who met the expectations in the exam is 6.787 times higher than those who did not meet their expectations in the exam when compared to those who met their expectations in the exam.

The odd value in internet facility, the probability of students who met the expectations in the exam is 4.958 times higher than those who did not meet their expectations in the exam when compared to those who met their expectations in the exam.

The odd value in stress, the probability of students who met the expectations in the exam is .413 times higher than those who did not meet their expectations in the exam compared to those who met their expectations in the exam.

The same variables were not recognised as necessary when the model was trained with 2/3 of the data and verified with 1/3. When all variables are considered concurrently using the entire data set, students' participation, technology, expectations, ease of use, internet facility and stress are significantly associated with student's performance. The final model has an overall predictive power of 79.6%. However, when the model's significant variables are compared to the entire data set and model with 2/3 of the data, it is clear that all of the same variables are significant in both models, except stress, which does not appear to be substantial in 2/3 of the data set and course design did not appear as important in the complete data set.

DISCUSSION

The key objective of conducting this research was to identify the impact of online learning on the performance of school students during the pandemic period of Covid 19in the context of Sri Lankan school students. Therefore, the study was carried out to identify the significantly influential factors on the student's performance.

Among the A/L students, 53% of respondents used their smartphones to login to the online classes. At the same time 36% and 10% of the respondents used laptops and mobile phones to login to online classes respectively. Most respondents (49%) used mobile data as their internet connection while only 30% used fixed broadband connections.

According to the survey results, 51% of the respondents spent 11 to 15 hours a week on online learning while least number of students (7%) only spent more than 20 hours on online learning during a week. Moreover, 25% and 11% of respondents spent less than 5 hours and 5 to 10 hours a week on their online education. According to the responses, respondents' most significant problem in online learning was power failures during online class time. Moreover, many respondents faced some problems because of the slow internet connection.

Most respondents suggested providing discounted laptops/smartsphones for students to increase the availability of technology. Also, they suggested that internet service providers can offer concession internet bundles ideal for enrolling online classes.

When all the variables are considered simultaneously using a binary logistic regression model, students' participation, technology, expectations, ease of use, internet facility and stress are identified as significantly associated with the performance of the students. The overall predictive power of the final model is 79.6%.

CONCLUSION

According to the research findings, students' participation, technology, expectations, ease of use, internet facility and stress has a major impact on the performance of the students during the pandemic period. Moreover, the study provides some recommendations for the development of the educational performance ofstudents based on the research findings.

RECOMMENDATIONS

1. Internet Service providers can develop concession internet plans suitable for the students.
2. The Government can provide students loans for laptops/smartphones or discounted laptops/smartphones.

3. Developing a blended education system based on suitable curriculum investigation to prepare for future pandemics while enhancing digital literacy.

4. According to the study findings students' stress has an impact on the performance of the students. Given the current circumstances, awareness programs for students about internet resources to improve their extracurricular activities at home, and workshops to emphasize the value of participatory activities and social interactions, would benefit their mental health and development.

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