

Factors Influencing Student Achievement During the COVID-19 Pandemic

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ABSTRACT

For this study, we are looking into how COVID 19 pandemic affected student learning outcomes. Several factors are believed to have an impact on the competences that students must attain. Learner models and preexisting skills have an impact on cognitive ability and learning outcomes. 40 students were surveyed for this quantitative study. Data analysis employs Path Analysis, which examines the causal link between multiple regression and its outcomes. The findings of the SPSS Amos program analysis, Chi-Square = 0.236, Df = 1 with a probability level (p) of 0.627 were obtained. There is no statistical difference between the findings of the model analysis and the data if p 0.05. (model fit according to the data). A very good correlation is estimated between the starting ability characteristics and learning achievement with a value of 0.912. That is to say, with a value of = 0.912, an individual's beginning competence has a direct bearing on their subsequent learning. In the study, it was discovered that the analytical model given was appropriate to reflect each variable's relationship to one another. In addition, the estimated value demonstrates that the beginning ability factors have a fairly large direct effect on learning accomplishment, whereas the other variables have a weaker influence.

Keywords: Learning model, Initial ability, Cognitive ability, Learning achievement.

1. INTRODUCTION

In higher education, the effectiveness of education is determined by numerous aspects, one of which is the ability of students to learn effectively. All relevant aspects must be taken into account in order to ensure that the intended aim, which is good learning accomplishment, is met. There is a wide range of student learning outcomes that may be attributed to a variety of circumstances. Changes in learning patterns and models in each institution will have a significant impact on student learning during the COVID-19 pandemic. For both professors and students, the availability of COVID-19 necessitates further training in the use of the software. Time management, tools (media), communication fluency and seriousness, and the usage of supporting technologies are all important considerations in implementing these ideas. Students and professors alike are sure to feel the effects of these developments. Why do students fail to learn during the present COVID-19 pandemic? This question emerges from the explanation of the problem's context.

1.1. Learning Achievement

It is necessary to first understand the concept of learning, meaning the belief that learning is an adaptation or process of behavior adjustment [1]. Learning is a process in which a person undergoes a transformation. When it comes to learning, an individual's intellectual capacity has a significant impact on how well he or she does. If you want to know whether or not a person's learning process has been a success, you need to perform an evaluation. There can be no separation between learning activities and the results of such activities, because it is impossible to separate these two aspects of education. Learning is a product of practice, experience, and awareness, and it can only be done if these factors are present. Changes in the learning process, then, have an impact on student accomplishment [3]. This conclusion may be drawn from some of the views expressed in the preceding paragraphs. An evaluation is used to determine whether or not a student has achieved a high degree of learning success.

1.2. COVID-19

A recently identified coronavirus, COVID-19, causes an infectious illness. In December 2019, Wuhan, China, was struck by an epidemic of a hitherto undiscovered virus. The most prevalent symptoms of COVID-19 are fever, exhaustion, and a dry cough, according to WHO (2020). The most common side effects include headache, nausea, vomiting, and diarrhoea, however not everyone will have any of these symptoms. It is common for the symptoms to be minor and to develop over time. Most infected individuals recover on their own within a few weeks or months. Approximately one in six patients infected with COVID-19 have significant discomfort and difficulties inhaling. Elderly people with comorbidities (pre-existing medical diseases) like high blood pressure, heart disease, or diabetes are at greater risk of developing more severe illnesses. A fever, cough, and trouble in breathing should prompt a visit to the doctor. Other persons who have COVID-19 can spread the virus to others. Droplets from the nose or mouth that come out when a person with COVID-19 coughs or exhales might transmit the disease. Maintaining more than one-meter distance from those who are unwell is therefore essential. COVID-19 can spread if people touch their eyes, nose, or mouth, so it's important to keep a distance of at least one meter between yourself and other people; avoid crowds; don't touch your eyes, nose, or mouth; and, if symptoms of a cough, headache, and low-grade fever appear, stay at home and self-isolate until you've recovered.

1.3. Learning Media and ICT Course

In view of the COVID-19 information above, using suitable learning techniques or models can help prevent a broader spread for students and instructors. Online learning has been used from elementary school to college level for more than a year already (using online media). As a result, teachers must employ certain strategies to make learning more engaging while also ensuring that students achieve their goals. Students will learn about learning media, how to use learning media to teach and learn, how to organize a classroom full of learning media, how to use learning media effectively, and how to choose which learning media are best for teachers. Transparency and instructional posters are good examples of traditional media. Autoplay Media Studio and e-learning, on the other hand, are digital media. The evaluation of the results of media creation in line with the educational objectives and demands of the school. Students should be able to explain the meaning, function, and usage of learning media, as well as its features and criteria. Besides this, students must be able to describe and analyze visual, audiovisual, and computer based media, as well as the consequences of media development. At the conclusion, the level of learning will be assessed, and if it falls short of expectations, researchers will investigate the circumstances surrounding its omission.

1.4. Factors Influencing Learning Achievement in Learning Media and ICT courses

There are two aspects that affect learning success: 1) internal factors, which include physical and psychological issues (such as health and disability), as well as the tiredness factor; and 2) external factors, which include the external environment (such as the weather). Factors outside the individual's control include family, school, and community factors (student activities in society, social life), as well as the individual's own abilities and interests. Several elements, particularly in the area of learning media and ICT, will be investigated in this study in order to see if they influence student learning outcomes. The first aspect to consider is the shift in learning methods that has occurred with the introduction of the online system. Another component is the pupils' beginning ability, which is the expectation of their skills. Learning and cognitive capacities will be influenced by both internal and external variables in this way. The fast development of cognitive abilities is linked to complex cognitive learning, in which pupils are frequently overwhelmed by the numerous bits of information that need to be processed concurrently before core learning occurs [5]. [5] Long Term Memory (LTM) and Working Memory (WM) are two of the most important components of a person's cognitive abilities [6]. To meet the learning aims of this course, students must not only grasp the subject but also be able to design and construct instructional media (psychomotor aspects).

2. METHODS

2.1. Data Collection Procedure

Afterwards, the findings are presented in the form of a research report [7]. To conduct this study, we surveyed 40 students in the Electrical Engineering Department's 2019A PTE program who are enrolled in the Learning Media and ICT courses. We used data collecting methods that yielded X1 (the learning technique) as one of four variables, X2 (the beginning ability of students) as another, Y1 (the cognitive capacity) as a third, and Y2 (the learning outcomes, such as student abilities in developing learning media and ICT).

2.2. Data Analysis Technique

If an independent variable influences a dependent variable directly and indirectly, then path analysis is the analytical tool utilized in this study to determine the causal link [8]. Following are the stages that must be followed in route analysis: In order to draw a path diagram according to the theory, perform a regression analysis, and compare the regression estimate (β) with the theoretical assumptions of other studies, it is necessary to modify the model by adding or subtracting paths that

connect variables that are intended to see the effect of each independent variable on the dependent variable [9]. The SPSS AMOS program will be used for data analysis in this project.

Table 1 Results of data collection 4 variables.

Number of Student	X1	X2	Y1	Y2
1	80.00	85.00	65.00	65.00
2	75.00	80.00	80.00	75.00
3	80.00	80.00	90.00	80.00
4	75.00	80.00	75.00	85.00
5	85.00	90.00	75.00	80.00
6	80.00	80.00	80.00	75.00
7	90.00	90.00	75.00	80.00
8	75.00	75.00	85.00	85.00
9	82.00	70.00	75.00	65.00
10	74.00	35.00	60.00	70.00
11	84.00	65.00	85.00	80.00
12	70.00	80.00	45.00	85.00
13	75.00	65.00	95.00	75.00
14	79.00	65.00	55.00	70.00
15	75.00	65.00	65.00	75.00
16	77.00	55.00	70.00	80.00
17	79.00	85.00	45.00	85.00
18	69.00	75.00	45.00	75.00
19	85.00	80.00	90.00	75.00
20	72.00	75.00	50.00	75.00
21	66.00	65.00	60.00	84.00
22	71.00	85.00	40.00	73.00
23	72.00	90.00	85.00	81.00
24	67.00	75.00	85.00	70.00
25	69.00	75.00	45.00	80.00
26	90.00	80.00	50.00	71.00
27	70.00	80.00	60.00	66.00
28	73.00	85.00	70.00	77.00
29	84.00	80.00	55.00	75.00
30	94.00	75.00	75.00	75.00
31	69.00	75.00	65.00	70.00
32	72.00	80.00	60.00	75.00
33	70.00	80.00	80.00	75.00
34	73.00	80.00	65.00	80.00
35	62.00	65.00	65.00	65.00
36	70.00	90.00	70.00	90.00
37	77.00	90.00	90.00	90.00

Number of Student	X1	X2	Y1	Y2
38	84.00	80.00	60.00	80.00
39	65.00	90.00	65.00	80.00
40	75.00	80.00	75.00	85.00

3. RESULTS AND DISCUSSION

3.1. Model Analysis Results

By using SPSS Amos Program, this study used the following model for data analysis.

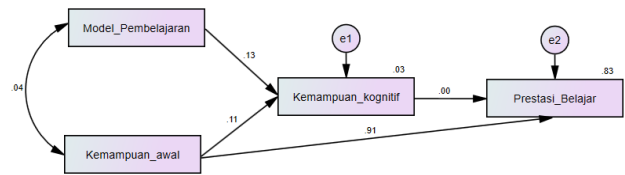


Figure 1 Model Analysis Results from SPSS AMOS Standardized Estimates.

With the model in Figure 1 above, the results are as follows:

Notes for Model (Default model)

Computation of degrees of freedom (Default model)

Number of distinct sample moments: 10

Number of distinct parameters to be estimated: 9

Degrees of freedom (10 - 9): 1

Result (Default model)

Minimum was achieved

Chi-square = .236

Degrees of freedom = 1

Probability level = .627

Chi-Square = 0.236 (the smaller the better), Degrees of Freedom = 1 which meant insignificance with p value = 0.627. Because $p > 0.05$ the analysis model was not significantly different from the data or, in other words, the fit model agreed the data.

3.2. Parameter Estimation

The next step was the analysis of parameter estimation using Maximum Likelihood Estimates with Regression Weights. The following figure shows the analysis results.

Table 2 Parameter estimation results with maximum likelihood estimates.

			Estimate	S.E.	C.R.	P
Cognitive Ability	←	Learning model	.258	.325	.795	.427
Cognitive Ability	←	Initial Ability	.247	.354	.696	.486
Learning achievement	←	Cognitive Ability	-.001	.030	-.039	.969
Learning achievement	←	Initial Ability	.909	.067	13.549	***

The P value is 0.427, which indicates that the learning model has no effect on cognitive ability. Similarly, the P value that reveals the effect of the starting ability variable on cognitive ability and the cognitive ability variable on learning accomplishment both exhibit the P value > 0.05. From the estimate and standard error, the critical ratio (C.R.) is calculated as (estimated value/standard error) (S.E). The greater the C.R. value, the more important it is. It is significant at the 5% level if the C.R. is more than 1.96, and it is significant at the 1% level if it is greater than 2.56. 3 is shown in the following table, which is the standardized estimate.

Table 3 Standardized regression weights.

			Estimate
Cognitive Ability	←	Learning model	.127
Cognitive Ability	←	Initial Ability	.111
Learning achievement	←	Cognitive Ability	-.003
Learning achievement	←	Initial Ability	.912

Table 3 shows the value of the estimation results on the relationship between variables, the bigger the stronger. So, between the four variables, it can be seen that the initial ability variable with learning achievement is 0.912, so the relationship between the two variables is very strong compared to the other variables.

Table 4 Standardized direct effects.

	Initial Ability	Learning model	Cognitive Ability
Cognitive Ability	.111	.127	.000
Learning achievement	.912	.000	-.003

Table 5 Standardized indirect effects.

	Initial Ability	Learning model	Cognitive Ability
Cognitive Ability	.000	.000	.000
Learning achievement	.000	.000	.000

From table 4 it can be seen that the direct role of initial ability on learning achievement is = 0.912, while the indirect role of table 5 is = 0.000. The direct role is greater than the indirect role.

3.3. Index of Accuracy Model

Table 6 Model fit summary, cmin.

Model	NPAR	CMI N	DF	P	CMIN/DF
Default model	9	.236	1	.627	.236
Saturated model	10	.000	0		
Independence model	4	68.844	6	.000	11.474

It's shown in Table 6 (p > 0.05) that CMIN is 0.236. If the p value is greater than 0.05, then the data used for analysis and the model created are same. This means that data is represented by an equation in the model. Analysis results show that the GFI (Goodness of Fit Index) is projected to have an index value over 0.9. The greater the GFI, the closer it is to 1. Using the data, it may be inferred that the model constructed is a good fit.

Table 7 Model fit summary, rmr, gfi.

Model	RMR	GFI	AGFI	PGFI
Default model	.468	.997	.969	.100
Saturated model	.000	1.000		
Independence model	13.729	.695	.492	.417

4. CONCLUSION

The analytical model is not substantially different from the data when using the SPSS AMOS tool, indicating that the model fits the data with a p-value of less than 0.05. The model may be seen as a representation of the relationship between the various variables. According to an estimate of the link between factors, the variables of students' beginning skills have a large and direct impact on the learning achievement variables. According to the estimated link between the two variables (0.912), there is a fairly strong association between the two variables compared to the relationship between other variables.

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