COVID-19 PANDEMIC AND THE DIGITAL REVOLUTION IN ACADEMIA AND HIGHER EDUCATION: AN EMPIRICAL STUDY

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ABSTRACT

While learning online during the pandemic students faced so many problems difficulties and challenges with respect to the stress worry anxiety technology adaptability course content delivery and explanation in the digital transformation from a physical classroom learning to an online mode amidst pandemic. This research aims to explore challenges facing students using a student online survey and data was analyzed using SPSS for student’s online learning experiences amidst the pandemic which was handled adequately. Extraction of common factor variances from measure sets for getting prominent factors to measure the transformational shift from offline to online digital learning was done using Exploratory Factor Analysis. Sampling Adequacy Measure test of KMO a correlation matrix which indicates whether the variables are unrelated in the Bartlett’s Sphericity test in which the level of significance gives the test result showed in the present study that significant relationships exists among variables and there is high correlation. Principle Component Analysis (PCA) with Varimax rotation used for challenges showed inter-correlation and a significant relationship of students challenges faced in digital mode with significant P value at 5% level of significance. Regression analysis testing H0 variable relationship with one or more variables revealed significant constant value with psychological, technological and personal opinion as three representative factors found to be significant so the H0 stands rejected.

How to cite: S. Mahabub Basha, M. Kethan. (2022). Covid-19 Pandemic and the Digital Revolution in Academia and Higher Education: an Empirical Study. Journal Eduvest. Vol 2(8): 1.648-1.656
E-ISSN: 2775-3727
Published by: https://greenpublisher.id/
INTRODUCTION

As stated by (Sáiz-Manzanares et al., 2019) and (Leszczyński et al., 2018) digital transformation in higher education is not new, and as a relevant subject, education stakeholders must be concerned about and training professionals to tackle obstacles. (Bond et al., 2018) and (Sandkuhl & Lehmann, 2017). This transition aids in the adjustment to new technology (Abad-Segura et al., 2020) and Covid-19 modifications. The sum of all digital procedures require to achieve a transformation that enables educational institutions to use digital technology in an optimal and beneficial manner is referred to as digital transformation (Sáiz-Manzanares et al., 2019). It's a process that necessitates strategic planning, building trust, merging ideas, and strengthening the parties involved, as well as collaboration and knowledge separation inside the business (Cameron & Green, 2019). Digital transformation has transferred physical teaching to online hybrid learning, stated by (Hitz & Turnoff, 2005), with digital technology labelling this process of replacement as a disruptive process. The start of the digital transformation by the Covid 19 pandemic resulted in several legislation being silently introduced within a few days (Strielkowski, 2020), giving the online learning brand a messiah status from a disruptive process. (Bozkurt & Sharma, 2020) says that online education comprises of online teaching and learning.

Careful preparation for design and instruction, as well as the use of a model well-organized at the design instruction level is a must for online learning to be effective. (Branch & Dousay, 2015), and instead of online education, emergency remote teaching was used (Vlachopoulos, 2011) and (Bozkurt & Sharma, 2020). Many people in society and the educational community have expressed concerns regarding the quality of online learning (Carnaghan & Webb, 2007), (Akdemir & Koszalka, 2008). In the context of satisfaction, a student's perception of their experience acts as a substitute for learning engagement. (Swan, 2002) (Arbaugh, 2001); (Richardson, 2001). Most students regard information like a commodity that is traded freely within the learning community and is critical to educational outcomes range (Dziuban & Moskal, 2011). Modern technologies are responsible for traditional classroom boundary resolving (Shirky 2008). Norberg, (Dziuban & Moskal, 2011) created a learning model that was time-based blended that changed the role of instructor while (Liu & Hwang, 2010) based preferences of students in the learning environment. As indicated by students, they live in a highly engaged world and have similar expectations of their lectures (Dziuban et al., 2013). Students evaluate online learning on the important role of teachers presence and (Kuo et al., 2013) stated that the online both face to face online learning plays an important role. While learning online, (Francisco et al., 2012) found that demographic and culture had an impact on interaction strategies design.

Covid 19 pandemic caused logistical challenges in the instructors and learners attitude modification noted by Riderro (2020) and research identifying the factors influencing the student’s satisfaction was needed. According to (Appleton-Knapp & Krentler, 2006). Evaluation of student’s needs and expectations would improve their satisfaction (Kara & DeShields, 2004). Smart and Cappel (2006) indicated that variable identification affecting student’s satisfaction in online learning. Kopp et al., (2019) while
evaluating assumption of digital transformation as obstacles related to changes, pace, technology competency and finance. The educational use of technological tools devices, internet is called online learning stated by Neans et al., (2009) and the increasing innovation technology access to internet has motivated learning online as added by (Tang & Byrne, 2007). Learning online cause’s absence of face to face learning instructional achievement is debatable as (Aminger et al., 2021) Many critical challenges affecting online learning were the instructor’s evaluation academic integrity of learners (Muhammad et al., 2020), (Algahtani et al., 2020). Cyber bullying or stalking Yusri B.K. (2020) No internet access, low quality instructional Delivery Stein (2020), Profession training in technology access, Lacune Bonafin (2017) and Whelan (2018) in accessible tools and technology issues challenges related to customizing lectures and online assessment tools. Cochrant (2016) Online instruction skills which the foundation of an online environment interaction as added by David (2016), Brame (2016) Ahn (2018) that many learners prefer custom or personalized video lectures that helped them learn. There was a destructive impact on students learning activities because of Covid 19 Sintema (2020) examine the impact of student’s performance due to Covid 19 by the learning achievement their learning efficiency and approach to learning developed. Arbaugh (2007) included factoring methods and retrieved primary constructs exhibiting excellent reliability. Stewart Hong (2004) used the Principal Component Analysis and dimension complexity was found defining student’s satisfaction in online learning. Elements related to online evaluation like interaction learning actively, task time, cooperation of students were found by Bangert (2006) who by using exploratory and Confirmatory factor Methods validated his previous findings classification and repression trees were used by Wang Dzu urban Cooli and Moskal (2009). Like facilitation, information and concept communication, and student concern and respect. Guttman (1954) using image analysis where one general component was constant across all modalities students perception of online learning were investigated by Fedicks Bradley and Bradley (2015) and challenges linked to campus resources for learner’s support different designs instructions and delivery to encourage students learning desires were identified. In Armstrong (2011) research on online learning students preserved the positive attributes of technology. Students were more comfortable when learning was face to face Zhang Peris (2004). Factors contributing to online students satisfaction included clear and relevant assignment and communication, campus based resource access, technical support availability and course equipment and technology orientation (Johnston et al., 2005). Availability of students and faculty support and appreciate preparation is needed in an online situation (Hollis and Madil 2006). Factors related to perceived assessment fairness personal cognitions impact, were reported by Chui et al., (2006). Learner with computer anxiety, ease of use course quality E-learning assessment diversity was given by Son et al. (2007).

While learning online during the pandemic students faced so many problems difficulties and challenges with respect to the stress worry anxiety technology adaptability course content delivery and explanation in the digital transformation from online mode to face to face classroom learning. This study aims at finding out the problems, difficulties and challenges the students faced while in online mode of education. Respondents in the study are limited to only Goa who participated in this study. It’s not fully representative of the general population throughout India.
**RESEARCH METHOD**

The sample frame will be limited to Goans students in the age categories of 13-15 (28%), 16-18 (27%), 19-21 (27%), 22 and above (18%). The classes in which studying were 8-10th STD (29%), XII (27%), UG (27%), PG (18%). The sample size includes a total of 300 usable responses from students of different age categories and level of education. Research Design used Descriptive research design. Selection of respondents will be done by purposive sampling (non-probability). Source of Data: Primary data is collected using an E-form through online survey. The form sought data on problems, difficulties and challenges the students face in online mode of education following the preliminary data search from secondary data which was collected through internet-based resources. Secondary data: The source of secondary data is taken from research papers articles, journals, online sites and sources available on online or offline platform. The Form was whatsapped / e-mailed out to a cross section of the general student population selected randomly. The survey was restricted to respondents in Goa only. The valid responses received to the online form totaled 300 usable. The survey data was then coded and tabulated for ease of analysis using SPSS software. Descriptive statistical Analysis was carried out and on the basis of solutions obtained, observations and insights were developed. Finally to represent the analysis in an understandable manner tables were prepared.

**RESULT AND DISCUSSION**

**Data Analysis**

Internal consistency of the research instrument used to collect data reliability test (Cronbach, 1951) has been undertaken and the Cronbach’s alpha is 0.918 for 17 items which means the data is reliable to the extent of 91.8% the way the challenges faced by students while online learning. Extraction of common factor variances from measure sets is called Exploratory Factor Analysis which the present study uses to obtain factors prominent in measuring the transformational shift from offline to online digital learning. Sampling Adequacy Measure test of K-M-O (Kaiser-Meyer-Olkin) value while doing the factor analysis to confirm whether the sample size selected for the study is sufficient is 0.907. Any value above 0.70 is a good value and confirms the adequate sample size according to Kaiser and Rice (1974) and 0.907 obtained is sufficient for a factor analysis. The table shows three factors are derived from 17 variables used and three representative factors are given suitable names as per the group components. The appropriateness of the Factor Analysis is confirmed with KMO measuring at 0.907. A correlation matrix which indicates whether the variables are unrelated in the Bartlett’s Sphericity test of in which the significance level gives the result of the test, shows in the present study the significance level has a very small value that is 0.00 which is less than 0.05 suggesting that there exists significant variables relationship and also that variables are highly correlated.

**Table No. 1**
KMO Bartlett Test

| Kaiser Meyer Olkin Measure of Adequacy Sampling. | 0.907 |

| Bartlett's Sphericity Test | Chi-Square Approx. | df | Sig. |
|---------------------------|-------------------|----|------|
|                           | 2739.709          | 136 | 0.000 |

Source: Primary Data

Table No. 2

| Component        | Total | % of Variance | Cumulative % |
|------------------|-------|---------------|--------------|
| 1 Psychological  | 4.223 | 24.843        | 24.843       |
| 2 Technology     | 3.171 | 18.654        | 43.497       |
| 3 Personal Opinion | 3.067 | 18.041        | 61.538       |

Source: Primary Data

Table No. 3

| Rotated Component Matrixa | Component |
|---------------------------|-----------|
| 1) I experience fear in virtual learning | 0.778 |
| 2) I get worried during online learning | 0.743 |
| 3) I experience anxiety during online learning | 0.742 |
| 4) I experience hopelessness during online learning | 0.699 |
| 5) The learning effectiveness is less online compared to face-to-face | 0.671 |
| 6) I experience anger during online learning | 0.654 |
| 7) Comprehension of material becomes a challenge in online | 0.558 |
| 8) I struggle in handling the electronic gadgets during online learning | 0.743 |
9) I face problem with the computer 0.731
10) Planning of study schedule becomes difficult in online learning 0.678
11) The relative learning becomes difficult in online learning 0.677
12) I face difficulties with the video during online learning
13) I see a problem in teacher and students interaction 0.747
14) I face problems, difficulties and challenges in online mode 0.694
15) I am being challenged with the delivery of material 0.670
16) There is no clarity of explanation in online learning content 0.647
17) I feel isolated during online classes 0.642

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 8 iterations.

Source: Primary Data

In the present study Principle Component Analysis (PCA) Varimax rotation was used for challenges. Bartlett’s Sphericity test (chi-square value 2739.709, p < 0.05) showed inter-correlation between variables for PCA. PCA application for issues and challenges confronted by students while in digital online learning. Results showed three factors having EV > 1 which indicates three-component solution. A total of seventeen statements and the statement I face difficulties with the video during online learning this didn’t get a loading so was omitted. Psychological factor as the first factor explained a 24.843% variance with seven variables, second factor namely technology factor comprised of four variables and delineated 18.654% of the variance, third factor namely personal opinion of online learning had five variables, i.e. and the third factor described 18.041% of total variance that is illustrated in Table 2. From this table three factors have been obtained namely psychological, technology factor and online learning personal opinion with the total variance explained by the variables at 61.538%.

A Statistical tool is used to test H0 relationship between a variable with one or more than one variables using Regression analysis.

**Table No. 4**

| Summary Model | Model | R    | R Square | Adjusted R Square | Std. Error of the Estimate |
|---------------|-------|------|----------|-------------------|---------------------------|
|               | 1     | 0.763a | 0.583    | 0.579             | 0.624                     |

a. Predictors: (Constant), REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1
Table No. 5

| Model    | Sum of Squares | df | Mean Square | F     | Sig.  |
|----------|----------------|----|-------------|-------|-------|
| Regression | 160.304        | 3  | 53.435      | 137.438 | 0.000 |
| Residual  | 114.693        | 295| 0.389       |        |       |
| Total     | 274.997        | 298|             |        |       |

a. Dependent Variable: Challenges faced while learning in online mode of education
b. Predictors: (Constant), REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1

Table No. 6

H0: Challenges faced does not have a significant relationship with student’s online learning during pandemic.

| Sr No | Independent Variable | Beta Value | T value | Sig. |
|-------|-----------------------|------------|---------|------|
| 1     | Psychological Factor  | -.152      | -4.039  | 0.000|
| 2     | Technology Factor     | 0.281      | 7.460   | 0.000|
| 3     | Personal Opinion Factor | 0.694   | 18.448  | 0.000|

Source: Primary Data

The above Table No. 5 shows that there exists a significant relationship of the Challenges faced by students in digital learning mode with the P value found quite significant at 5% significance level. The R Square obtained was 0.583 indicating that the existing model is explained to the extent of 58.3% with an F value of 137.438. With a significant constant value psychological technological and personal opinion factors is found to be significant at 5% level of significance so the H0 stands rejected.

CONCLUSION

Instructional technology has played a prominent role as a cushion effect in this pandemic on education with regard to online learning in this digital transformation where a shift is from physical to online mode. With hardly any prior planning and design instruction the education system witnessed a rude shock due to the sudden pandemic and the methods adopted in teaching and learning was a crisis response. Online learning tested the digital competency with elements technology driven and internet dependency with absence of uniformity in learning models and technological tools application. The digital transformation shift provided challenges which if factors properly identified could transform into opportunities at the psychological technological and personal growth level. The challenges identified could be sustained with proper internet connection and literacy and tools compatibility and to make the high-tech change.
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