

STUDENTS' AND TEACHERS' PERCEPTION TOWARDS ONLINE EDUCATION: A CONFIRMATORY STUDY

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**ONLINE
EDUCATION**

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ABSTRACT

Transitioning from in-person classroom and campus experiences to virtual ones was a necessity during COVID-19 Pandemic to ensure the continuity in the education of students. The need of the hour is to rethink the traditional model of learning and the shift towards blended learning. Prior studies on online learning during the epidemic mostly aimed to comprehend either students' or teachers' experiences. We, therefore, aim to bridge the gap by comprehending teachers' and students' perspectives pertaining to online education. This research will provide valuable information to educational institutions and management for making e-education a part of the "new normal" by identifying and understanding first-hand experiences of teachers and students. Two separate structured questionnaires consisting of 27 and 38 study questions were circulated to both the groups. A sample of 360 and 127 was accumulated from both the populations respectively. Thereafter, exploratory, and confirmatory factor analysis have been used to identify the perceptions of both teachers and students. Students' Efficacy (SE), Student Readiness (SR) and Students' Learning Ability (SLA) were identified for students' perception. A positive and significant impact of Students Efficacy (SE) & Student Readiness (SR) was identified on student's learning ability. Student Engagement (SE), Teachers' Training & Development (TAD), Teachers' Efforts (TE) and Teachers' Adaptability (TA) were discovered for understanding teachers' perceptions. Second order two factor model revealed Teachers' Involvement (TI) and Teachers' Skill (TS) as distinct factors of teachers' perception.

Key Terms: Online Education, Students' Perception, Teachers' Perception, Blended Learning, Factor Analysis.

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INTRODUCTION

– Elliot Masie, Masie Center

Online education is a form of distance education that uses ICT as the delivery mechanism, with at least 80% of the course content delivered online (Allen & Seaman, 2008; Shelton & Saltsman, 2005). The idea of online education is not new. It represents the Fifth generation of distance Education (Taylor, 2001). The use of computers to educate arose during the 1980s to train new employees through computer-based programmes (Rudestam & Schoenholtz - Read, 2002). The first ambitious attempt at the same was from the University of Toronto in 1986 (Bates, 2016) which tested online conferencing as a tool for collaborative learning with significant success. The online teaching in India has also got a long history. It started with recorded educational programmes telecasted by AIR & Doordarshan. With a paradigm shift made by ISRO –teleconferencing facility was provided at IGNOU headquarter. This had one way video and two-way audio for live interaction. In 2005, Edusat Satellite was launched which was designed by Late APJ Abdul Kalam, during his tenure at ISRO (Indian Space Research Organisation) and MHRD (Ministry of Human Resource Development). Unfortunately, the effort could not fulfil the need for communication technology. (Times of India, 2020). The NEP (National Education Policy) of 2016 highlighted the use of Information and Communication Technology a higher education levels and skill development. The policy also mentioned the need for MOOCs (Massive Open Online Courses), to provide cutting-edge education and to cater to the need to continuously update knowledge. (Varyani & M.S., 2020).

Online education is no longer a trend, it has become standard due to the witnessed effect of virus in past few years. The COVID-19 impact has affected nearly 1.6 billion learners in more than 190 countries and all continents causing the largest disruption of education systems in history. (Policy Brief: Education During Covid-19 And Beyond) The online education market in India was valued at INR 39 billion in 2018 and is expected to reach INR 360.3 billion by 2024, expanding at a Compound Annual Growth (CAGR) of ~43.85% during the 2019-2024 period. (Markets, 2020). The shift towards Online teaching and learning, the government has mainstreamed open & distance learning, (Upadhyay, 2021). According to NEP 2020 Report issued by MHRD the institutions will have the option to provide online and open distance learning (ODL) programmes if they fulfil the necessary prerequisites of the statutory bodies. The disastrous effect of COVID 19 has passed but NEP is here to stay. This research is focussed on understanding the perceptions of two important stakeholders (Teachers & Students) towards online education.



LITERATURE REVIEW

(Harasim, 2006), The advent of Network Revolution started with invention of packet-switched networks in 1969. The further development of e-mail and computer conferencing in 1971 (Hafner & Lyon, 1996; Hiltz & Turoff, 1978) has brought multifold shifts in education System globally. India has also progressed well in this area. (Mishra &

Ramesh, 2005) The report from National Taskforce on IT & Software Development constituted by the Prime Minister of India in 1998, acted as a catalyst for E-Learning in India. The recommendations from the task force resulted in various initiatives VCI (Virtual Campus Initiatives) by IGNOU (Indira Gandhi National Open University), Net varsity, Tamil Virtual University, etc. One of the major events organized by the National Centre for software technology discussed the issues addressed by the Information Technology & Academic Community such as competencies of online tutors, assessment methods, etc. The dialogue organized by UGC in 2003 in New Delhi uncovered some areas for review in the Indian context (Standard, hardware & Software, connectivity, user studies, content-related, etc.) Guru-Shishya Tradition, embraced in earlier times, changed to classroom teaching followed by teaching with using ICT Devices and now it's through E-Learning portals or Web Based E-Learning (WBEL) (Joshi & Dewangan, 2021).

Online Learning is not just verbal lecture that faculty delivers on the computer/laptop/mobile phone and students listen at the other end. It is a methodology that poses many challenges in different manners (Wang et al., 2020). Covid has provided the main impetus for growth of this idea leading to different responsiveness among students and teachers towards online learning. The recent series (Yang & Cornelius (2004); Bali & Liu (2018); Toti & Alipour, (2021); Kulal, & Nayak (2020); Aditya & Jha (2020); Bast (2021); Almahasees et.al (2021) of studies focus on knowing the perceptions of both faculty and learners in this direction.

Both groups found online education beneficial during pandemic, yet they felt that its effectiveness is less than in-person learning and teaching. There are challenges such as lack of interaction and motivation, technical and internet issues, adaptation by students with hearing problem, data privacy, and security accompanied by the benefits such as self-learning, low costs, convenience, and flexibility (Almahasees et al., 2021). Even though the students are well equipped with use of computers, the transition from in-person learning to online learning seemed very challenging for them specially in terms of interaction with instructors and asking questions. One of the major challenges among all this is faculty readiness in terms of professionalism required and pedagogical content knowledge (PCK) in designing better experience for the learners (Rapanta et al., 2020). According to Yang et al. (2020), negative experiences of students towards E- learning include delayed feedback from instructors, unavailable technical support, lack of self-regulation and self-motivation, the sense of isolation, monotonous instructional methods, and poorly designed course content. The challenges being faced by marginalised sections of Indian society in rural areas is creating more divide in an already divided society based on gender and caste (Goswami et al. 2021). There are various factors contributing towards digital divide concerning online education such as more technology usage by privileged (Male) Gender, receptiveness of online learning among urban and rural settlements (Bast, 2021).

Online learning has become one of the seven key trends, according to Global Learner Survey, 2020. The report also suggests that Universities need to provide short courses for adult learning with a better learning experience. Globally, 78%

believe online learning will give people more access to quality education. In a survey conducted by Pearson, Educators from all over the world feel that Challenges and Positives of online learning and teaching are just like two sides of Coins. Yang et al. (2020), also throws light upon the positives including flexibility, cost-effectiveness, electronic research availability, ease of connection to the Internet, and well-designed class interface. 64 % of people surveyed by Pearson feel that online education has led to improvement of students' digital skills. 35% of educators said students' independent learning improved during online learning throughout lockdowns. The improvement is not confined to students but digital skills and creative skills among teaching staff has also developed.

Indian students also find online classes attractive because of the flexibility and convenience. Most of Indian students became accustomed to online classes in short time. Like any other Country, there were Good, Bad, and ugly associated with the idea of online education in India during pandemic. The good part came with the option of the amount of flexibility and restful environment provided by Online learning. But a sudden shift, specially towards the use of ICT, adapting for both students and teachers was a challenge. Teachers opined that they were not able to gather continual feedback which they could get in face-to-face classes easily. The Ugly part indicates much discussed socio-economic divide, mentioned above as Digital Divide. Broken power supply, weak or no internet connectivity, and unaffordability to buy necessary devices as major concerns. It is pertinent to note that online education is becoming an all-inclusive system in India (Prashanthi& Sarita, 2020). Therefore, it is important to keep abreast with strengths and opportunities that can overcome weaknesses and threats associated with implementation of online education. Dhawan, (2020) outlined this using SWOC analysis of E- learning. Amidst problems like distraction, learner's capability, technical difficulties, etc., E-Learning enjoys the benefits of flexibility, wide reach, and increased number of courses. There is a great scope for innovation and digital development to overcome the threat of digital and infrastructural disparity. (Muthuprasad, et al., 2021) Moreover, education community needs to keep in mind, the challenges while crafting the online courses. All these can aid the community in redesigning and reimagining the higher education system in hybrid mode.

According to Global Learning Survey (2020) 66 % of Indian people surveyed feel that the education system in country has done a good job adapting to the needs of students during the COVID-19 pandemic. However, people have mixed reviews regarding the Higher education system in country particularly compared to other countries. More people in Countries like China, India and Brazil still value the traditional degree as opposed to the views of people in US and UK. Online education necessitates the transition from spoon fed approach to learner centred approach where, students need to be self-determined, and teachers need to be trained enough to bring this change in outlook of students (Kulal et al. 2020). (Gopal et al., 2020) focused on studying the impact of online teaching/ Learning on students' performance. They use four important factors which are required for measuring the satisfaction and performance with respect to online Teaching/ Learning. Among, these four factors (Quality of Instructor,

Course Design, Instructor's Prompt Feedback, Student's expectations) instructor's quality comes out as the most noticeable factor followed by student's Expectations. These factors have a significant impact on the student's performance and satisfaction during online learning practice. Study dimensions identified through comprehensive analysis of existing body of knowledge is given in table 1. The present study aims to bridge the gap by investigating students and teachers, perceptions of online learning.



CONCEPTUAL & THEORITICAL FRAMEWORK

The crisis has enthused innovation within the education sector. Some of the innovative approaches and advanced technologies have helped the educational institutes and universities to push the limits and let the show go on. This catastrophe has reminded us about the crucial role teachers and other key partners play in education community. Somewhere, the crisis became blessing in disguise for both learners and instructors. With the Increased use of ICT, there was stimulated innovation within the education sector. Flexibility and accessibility were the two most reviewed benefits of online education. According to Global Learners survey by Pearson, 77% of parents and 80% of college students are optimistic that the pandemic has made this generation more resilient.

On one hand online learning was beneficial and on other hand it brought an unchartered set of challenges along, for both instructors and learners. One of the major problems was the environment of uncertainty and confusion. (Darius, et al. 2021) talks about three vertices in the teaching-learning process viz., teaching, communication technology through digital tools, and innovative practices in teaching. The non-readiness of both teachers and students to adopt and adapt themselves from Chalk and board classrooms to e-class became a challenge. As far as Communication Technology is concerned, this disruption paved the way for an increase in already existing digital divide in many developing countries like India. The divide was not only among the rural and urban learners but between genders. Engaging the students online by using innovative methods was a major task for the faculty. The outburst of challenges around online education affected the mental health and wellness of students in the last two and a half years of the pandemic. The global learners Survey by Pearson reveals that 63% of parents and 69% of college students agree that the disruption of education contributed to anxiety, stress levels, or mental health issues.

The blended opinions on the efficiency of Face-to face instruction and online classes makes interesting to investigate how faculty and students at various Indian colleges and universities felt about practice of online classes in India. Educational Community (Institutions and Management) need to understand the perception of both the groups to adopt innovative approaches which suit to the needs of both faculty and students. The present study aims to bridge the gap by investigating students and teachers, perceptions of online learning.

Table 1: Study Dimensions

Study Dimensions		
Students' Perception	<p>Q1. I have a good access to online materials in online learning</p> <p>Q2. Learning at my own pace helpful in online learning is effective</p> <p>Q3. Ability to stay at home helpful in online learning</p> <p>Q4. Interactivity in online learning is effective</p> <p>Q5. Facing more of technical problems in online classes</p> <p>Q6. Learning at home affects studies adversely</p> <p>Q7. If not in school/college, you often talk about classes with your friends</p> <p>Q8. I am extremely active in my online classes</p> <p>Q9. I was extremely active in traditional classes</p> <p>Q10. After my class I revise the work done</p> <p>Q11. After my class I discuss the work done with my classmates</p> <p>Q12. When I am not able to solve correctly, I try to understand the mistakes.</p>	<p>Muthuprasad et al. (2021), Bai & Liu (2018), Martin (2020), Almahasees et al. (2021), Kulal & Nayak (2020), Yang (2004)</p> <p>Q13. I eagerly wait for the next class</p> <p>Q14. I try to solve my problems on my own</p> <p>Q15. I try to help others in understanding the concept in the online classes</p> <p>Q16. Social isolation has increased in online classes</p> <p>Q17. Online classes have affected Self-efficacy</p> <p>Q18. Online classes have affected my sociability</p> <p>Q19. Online learning increase capability to learn more</p> <p>Q20. Online classes have affected my adaptability</p> <p>Q21. Online classes have affected my leadership skills</p> <p>Q22. Online classes have affected my self-competence</p> <p>Q23. Online classes have affected my social initiative</p> <p>Q24. Quiz of 5–10 min during each class is necessary to achieve better?</p> <p>Q25. Assignments at end of every class are necessary to achieve effective learning?</p> <p>Q26. Easy for me to shift from offline classes to online classes</p> <p>Q27. I prefer traditional class over online classes</p>
Teachers' Perception	<p>Q1. The technology involved in online teaching is confusing.</p> <p>Q2. You believe that online classes enhance the quality of institution's reputation</p> <p>Q3. You believe that the absence of face-to-face interaction with students is a disadvantage</p> <p>Q4. There is adequate technical support for online classes</p> <p>Q5. Students have adequate access to participate effectively in online classes</p> <p>Q6. Your colleagues help you to resolve issues (if any) during online classes</p> <p>Q7. The campus administration recognizes the effort required to teach online</p> <p>Q8. Online classes take more time than classroom teaching.</p> <p>Q9. There is sufficient opportunity to experiment with the technology for teaching online prior to committing to teach online</p> <p>Q10. The technology support is provided by the college/institute</p> <p>Q11. There are many technical problems faced by you while delivering online lecture</p> <p>Q12. You are satisfied with device provided by the college/institute</p> <p>Q13. Developing an online exam/assignment is complicated</p> <p>Q14. There is adequate time to learn about online teaching</p> <p>Q15. You face greater difficulty in tackling disobedient students in online classes</p> <p>Q16. There is sufficient opportunity to observe other faculty using technology for online teaching prior to committing to teach</p>	<p>Almahasees et al. (2021), Martin (2020), Kulal & Nayak (2020)</p> <p>online.</p> <p>Q17. Students lack adequate access to participate effectively in online classes.</p> <p>Q18. Your colleagues talk negatively about online classes</p> <p>Q19. You have easily accessible devices at home to conduct online classes effectively</p> <p>Q20. Preparation of online classes require more time than offline classes</p> <p>Q21. You experience stress because of online classes</p> <p>Q22. Less control over the class</p> <p>Q23. Difficult to connect with students</p> <p>Q24. Weak emotional connect between students and teachers</p> <p>Q25. Difficult to engage students.</p> <p>Q26. More time required to solve students' queries.</p> <p>Q27. Teaching practical subject online is a challenge</p> <p>Q28. Students are less responsive during online classes</p> <p>Q29. Difficult to evaluate students.</p> <p>Q30. Continuous assessment of student is difficult</p> <p>Q31. Controlling the usage of unfair means during examination is a challenge</p> <p>Q32. Face technical issues while taking online examination</p> <p>Q33. Stress level increases as to constantly learn new technology</p> <p>Q34. Stress level increases in-order to adapt new platforms</p> <p>Q35. You are willing to continue with online classes post pandemic too</p> <p>Q36. Acquired new technological gadgets to support your online teaching</p> <p>Q37. Transition from offline classes to online classes was smooth</p> <p>Q38. Online teaching reduces student's ability to concentrate</p>



OBJECTIVES

- To identify dimensions of students' and teachers' perception towards Online teaching.
- To confirm dimensions of students' and teachers' perception towards Online teaching.
- To identify the relationship between the confirmed dimensions of students' and teachers' perception towards Online teaching.



RESEARCH METHODOLOGY

Primary and secondary data was collected to fulfil the objectives of the study. Secondary data was obtained through journals, government, and industry reports, etc. whereas primary data was collected through structured questionnaire circulated to respondents through google form using convenience sampling. Two separate structured online surveys were created and circulated through Google forms. Each questionnaire consisted of two parts. Part I collected information pertaining to demographic profile. The Part 2 collected information pertaining to perception of both students and teachers which was obtained through 27 and 38 study questions (to be rated from 1 Strongly disagree to 5 strongly agree, table 1) respectively. A sample of 360 and 127 was collected from both the populations respectively. Exploratory and confirmatory factor analysis are used to identify and confirm dimensions of perception of students and teachers towards online classes.

Demographic Profile

Student: Out of 360 students 292 (81.11%) belong to Delhi and NCR whereas 68 (18.88%) belong to other parts of the country. 167 (46.4%) and 193 (53.6%) are the percentage of female and male students. Majorly (82.8%) of the total respondents belong

to the age group of 18-22 years.

Teachers: Out of 127 teachers 91(71.7%) are assistant professor(s), 18 (14.2%) each for both are associate professor(s) and professor(s) respectively. 89 (70.1%) are female and the rest 38 (29.9%) are male with 60 (47.29%) in the age group of less than 35 years and 67 (52.8%), between 35 to 50 years

Factor Analysis

Factor analysis is an interdependence method with the objective to identify the underlying structure among the observed variables. Factor analysis can be classified as exploratory and confirmatory factor analysis. Exploratory factor analysis (EFA) classifies observed variables into factors based upon the collinearity between variables. Further confirmatory factor analysis (CFA) considers underlying theory as input and tests hypothesis whether the variables under study based upon theoretical support conform the factor structure or not. In this paper both EFA and CFA have been used for student and teachers' population.

Exploratory Factor Analysis (EFA):

Students' Perception: Measure of sampling adequacy i.e., Kaiser- Meyer-Olkin (KMO) is 0.859 which is above .65 (threshold limit) for various identified constructs of students' perception. Thus, items of students' perception are appropriate to conduct exploratory factor analysis. Bartlett's Test of Sphericity was found to be significant with chi square = 1679.648, p = 0.000. The EFA identifies three constructs for perception of students w.r.t. online classes whose eigenvalue is greater than 1. These three constructs explain a total of 62.837 % of variance The Varimax rotation refines factor structure of students' perception. Three factors were identified through EFA and labelled based on the characteristics of the items clubbed under each factor based on factor loadings. They were named as Students' Efficacy (SE), Students Readiness (SR), Students' Learning Ability (SLA). Also, Cronbach's Alpha values of these factors are given in Table 2.

Table 2: EFA Students' Perception

Factor	Items	Factor Loading	Cronbach Alpha
Students' Efficacy (SE)	Q18 Online classes have affected my sociability	.824	0.91
	Q22 Online classes have affected my self-competence	.817	
	Q23 Online classes have affected my social initiative	.814	
	Q17 Online classes have affected my self-efficacy	.802	
	Q20 Online classes have affected my adaptability	.794	
	Q21 Online classes have affected my leadership skills	.794	
	Q6 Learning at home affects studies adversely	.655	
	Q16 Social isolation has increased in online classes	.635	
Students Readiness (SR)	Q10 After my class I revise the work done	.801	0.837
	Q11 After my class I discuss the work done with my classmates	.737	
	Q13 I eagerly wait for the next class	.704	
	Q12 When I am not able to solve correctly, I try to understand the mistakes	.690	
	Q8 I am extremely active in my online classes	.686	
Students' Learning Ability (SLA)	Q3 Ability to stay at home helpful in online learning	.760	0.819
	Q2 Learning at my own pace in online learning is effective	.759	
	Q1 I have a good access to online materials in online learning	.730	
	Q4 Interactivity in online learning is effective	.678	

Table 3: EFA for Teachers' Perception

Factor	Items	Factor Loading	Cronbach Alpha
Student Engagement (SE)	Q28 Students are less responsive during online classes	.863	
	Q24 Weak emotional connect between students and teachers	.801	
	Q30 Continuous assessment of student is difficult	.790	
	Q29 Difficult to evaluate students.	.785	
	Q31 Controlling the usage of unfair means during examination is a challenge	.769	
	Q23 Difficult to connect with students	.769	0.936
	Q25 Difficult to engage students.	.723	
	Q27 Teaching practical subject online is a challenge	.720	
	Q38 Online teaching reduces student's ability to concentrate	.697	
	Q32 Face technical issues while taking online examination	.692	
	Q22 Less control over the class	.681	
Teachers' Training & Development (TAD)	Q12 You are satisfied with device provided by the college/institute	.761	
	Q7 The campus administration recognizes the effort required to teach online	.760	
	Q6 Your colleagues help you to resolve issues (if any) during online classes	.760	0.791
	Q10 The technology support is provided by the college/institute	.733	
	Q4 There is adequate technical support for online classes	.617	
Teachers' Efforts (TE)	Q20 Preparation of online classes require more time than offline classes	.749	
	Q8 Online classes take more time than classroom teaching.	.748	
	Q11 There are many technical problems faced by you while delivering online lecture	.740	0.766
	Q13 Developing an online exam/assignment is complicated	.641	
Teachers Adaptability (TA)	Q37 Transition from offline classes to online classes was smooth	.858	
	Q35 You are willing to continue with online classes post pandemic too	.838	0.718

Teachers' Perception (Tper): Measure of sampling adequacy i.e., Kaiser- Meyer-Olkin (KMO) is 0.844 which is above .65 (threshold limit) for various identified constructs of teachers' perception. Thus, items of teachers' perception are appropriate for conducting exploratory factor analysis. Bartlett's Test of Sphericity used for EFA here was found to be significant with chi square =1520.544, $p = 0.000$ The EFA identifies four constructs for perception of teachers w.r.t. online classes whose eigenvalue is greater than 1. These four constructs explain a total of 62.536 % of variance The Varimax rotation refines factor structure of teachers' perception. Four factors were identified through EFA and labelled based on the characteristics of the items clubbed under each factor based on factor loadings. They were named as Student Engagement (SE), Teachers' Training & Development (TAD), Teachers' Efforts (TE), Teachers Adaptability (TA). Also, Cronbach's Alpha values of these factors are given in Table 3.

Confirmatory Factor Analysis (CFA)

Students' Perception (SP): Initial CFA consists of three factor structure (Figure1) identified through EFA of students' perception. The goodness of fit (GOF) of the three-factor model was matched with single factor model of SP and regression model of SP to assess whether three factor model serves as an acceptable baseline model. Both the models were expressed as:

Single factor model for SP (Figure 2): This model identifies single factor to which all the variables load, suggesting the students' perception is a single construct. In comparison with three factor model goodness of fit indices for single factor is relatively better and baseline model fits data significantly as compared to three factor model. Fit indices of single order factor model are approximately identical to those of three factor correlated model because mathematically both the models are identical to each other, and both the models are

viable to be baseline model. Thus, single factor model is finally considered as baseline model for student perception.

Regression model for SP (Figure 3): This model is a higher order regression model for students' perception. This model helps predict the relation between identified factors. Results of the regression model provided that $\beta = .155$, $t = 2.845$, $p < .00$, indicating that when students' efficacy (SE) goes up by 1 standard deviation, students' learning ability (SLA) goes up by 0.15 standard deviations. Thus, there exists a positive relationship between SE and SLA. Again $\beta = .711$, $t = 9.998$, $p < .001$, indicating that when students' readiness (SR) goes up by

Teachers' Perception (TPer): Initial CFA consists of four factor structure (Figure 4) identified through EFA of teachers' perception. The goodness of fit (GOF) of the four-factor model was matched with single factor model of TP

Single factor model for TPer (Figure 5): This model identifies single factor to which all the variables load, suggesting the TP is a single construct.

GOF of both evaluated models are given in table 5. Both the models moderately fulfil the benchmark conditions of GOF indices, but the unstandardized loading is not significant. The

Table 4: GOF indices for Student's Perception

Models	Chi Square	DF	CMIN/DF	CFI	NFI	GFI	RMSEA
Three factor model	160.191	86	1.863	0.973	0.945	0.942	0.049
Single Factor Model	160.191	86	1.863	0.973	0.945	0.942	0.049
Regression Model	186.461	87	2.143	0.964	0.935	0.934	0.056

1 standard deviation, students' learning ability (SLA) goes up by 0.71 standard deviations. Thus, there exists a positive relationship between SR and SLA.

GOF of all the three evaluated models are given in table 4. It can be observed that GOF indices of the evaluated models belong to good fit category w.r.t to each parameter.

Thus, various models were tested, and the fit indices of these models are given in Table 4. Three factor and single factor model share the same values for fit. The fit indices of these models are interpretable. Further between all the three models' regression model is preferred because the model explains the predicative relation between student's efficacy (SE), student readiness (SR) and student learning ability (SLA). Thus, the regression model is selected as the final model that best represents the structure amongst all the evaluated models.

All the factor loadings in regression model ranging from 0.64 for Q17 to 0.89 for Q22 were extremely significant and surpassed the threshold limit of 0.5 which is meaningful in

regression weight for TP, TAD, TE in the prediction of TA, is not significantly different from zero at the 0.05 level (two-tailed) with p values 0.193, 0.067 and 0.040 respectively. Thus, single factor model for TPer is rejected.

Second order two factor model for TPer (Figure 6): CFA second order involves two constructs Teachers' Involvement (TI) and Teachers' Skill (TS), a pooled CFA of second order which is carried out by combining first order constructs that is student's engagement (SE) and teacher's effort (TE) as Teachers' Involvement (TI) and training & development (TAD) along with Teacher's adaptability (TA) as Teachers' Skill (TS).

GOF of all the three evaluated models are given in table 5. It can be observed that GOF indices of the evaluated models belong to good fit category w.r.t to each parameter. Thus, various models were tested, and the fit indices of these models are given in Table 5. Four factor and single factor model share the similar values for fit. The fit indices of these models are interpretable. Second order two factor model for TPer has the better fit indices as compared to other two considered models. Thus, the second order two factor model for TPer is selected as

Table 5: GOF indices for Teacher's Perception

Models	Chi Square	DF	CMIN/DF	CFI	NFI	GFI	RMSEA
Four factor model	220.391	113	1.950	0.903	0.823	0.833	0.087
Single Factor Model	228.760	115	1.989	0.898	0.817	0.831	0.089
Second order two factor model for Tper	273.856	147	1.863	0.895	0.802	0.821	0.083

factor analysis approach. The R^2 Statistic for Q22 (Online classes have affected my self-competence) was found to be highest (0.792) for student's efficacy (SE), R^2 Statistic for Q10 (After my class I revise the work done) was found to be highest (0.656) for student readiness (SR), R^2 Statistic for Q1 (I have a good access to online materials in online learning) was found to be highest (0.58) for students' learning ability (SLA).

the final model that best represents the structure amongst all the evaluated models.

All the factor loadings in Second order two factor model for TPer ranging from 0.63 for Q31 to 0.86 for Q24 were extremely significant and surpassed the threshold limit of 0.5 which is meaningful in factor analysis approach. For the first order model R^2 Statistic for Q24 (Weak emotional connect

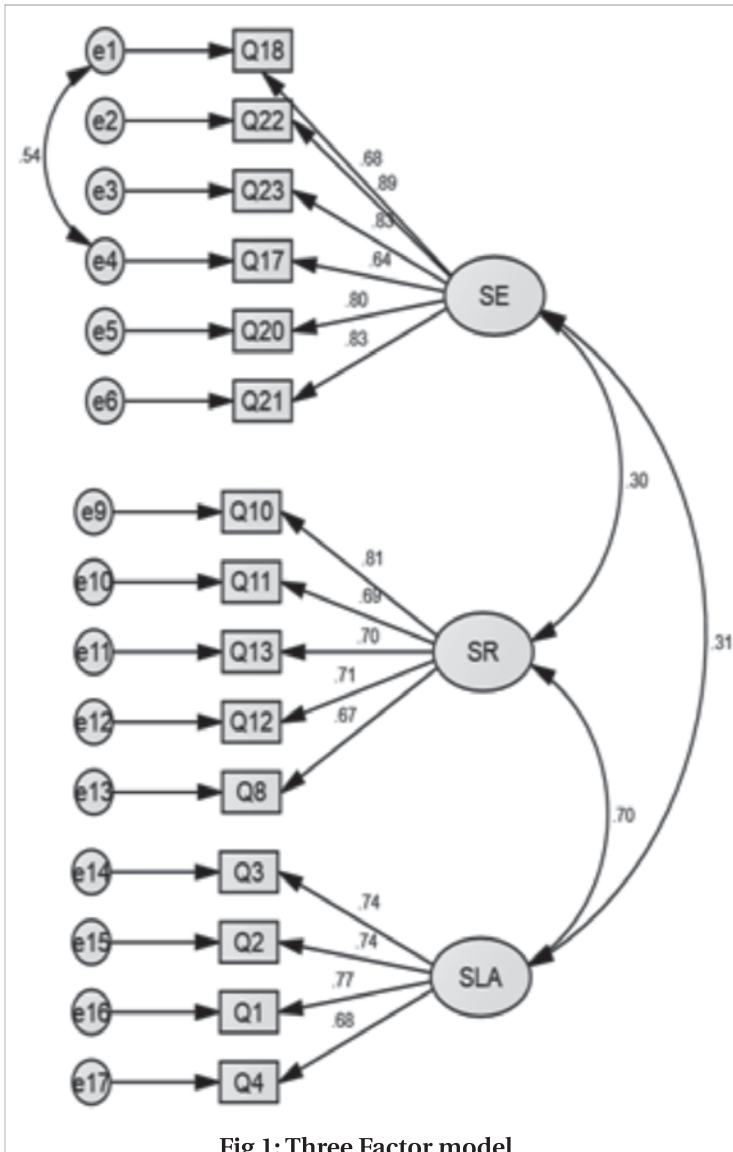


Fig 1: Three Factor model

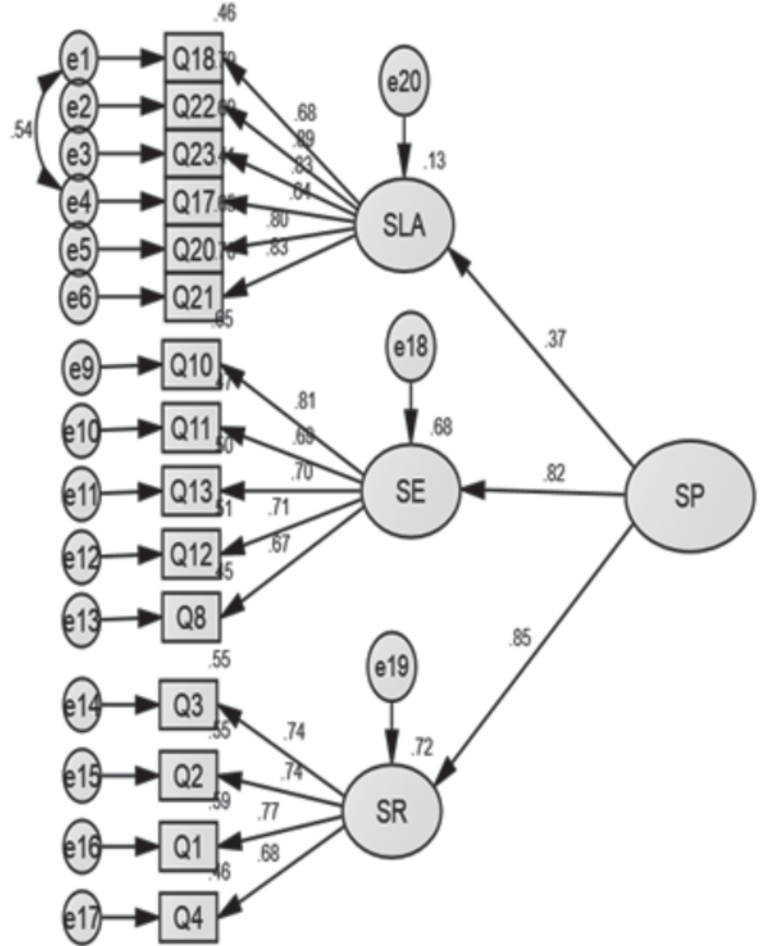


Fig 2: Single factor model for SP

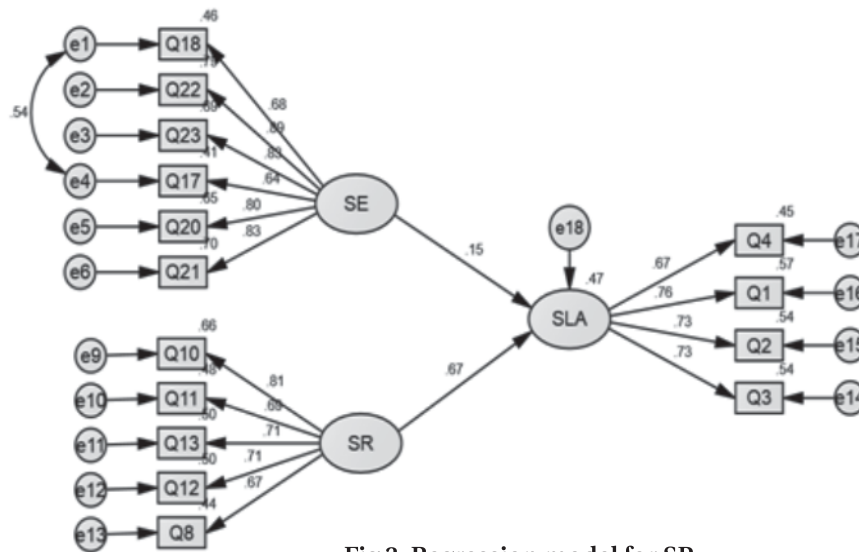


Fig 3: Regression model for SP

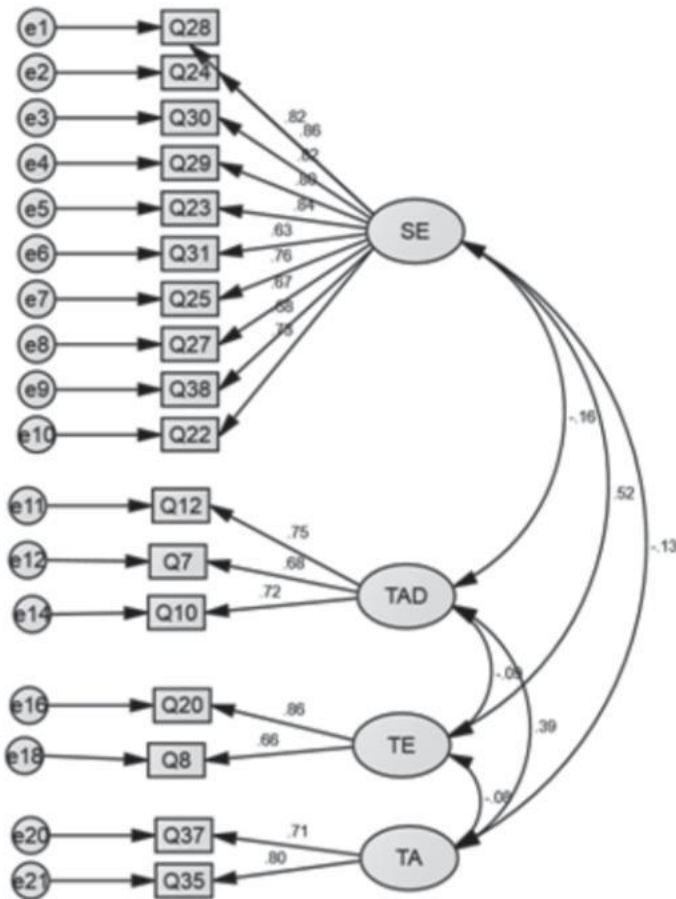


Figure 4: Four factor model

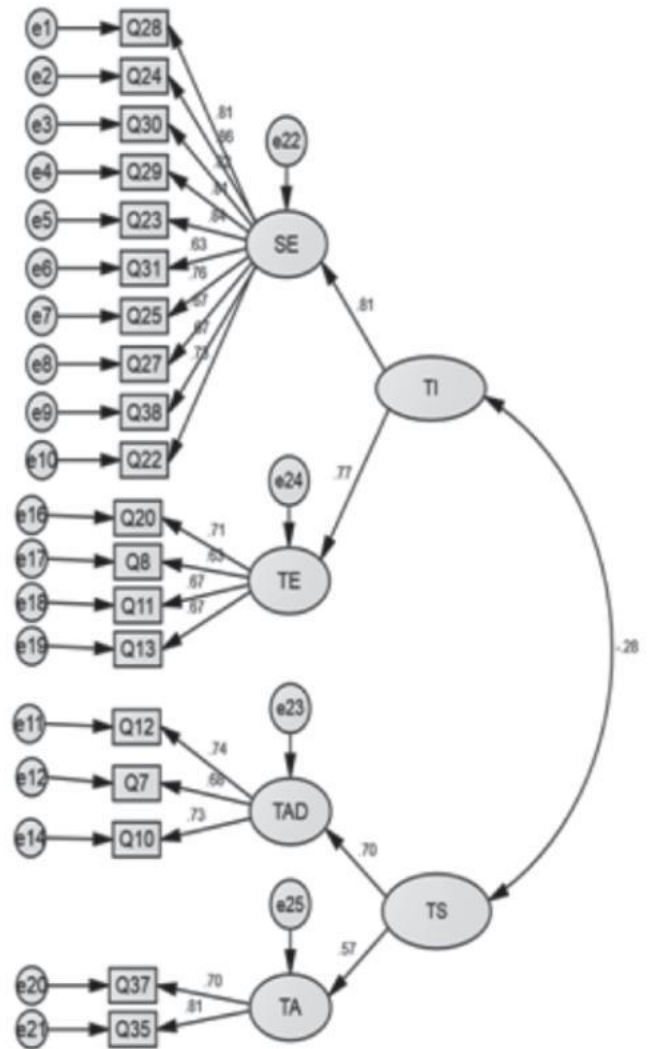


Figure 6: Second order two factor model for TPer



Figure 5: Single factor model for TPer

between students and teachers) was found to be highest (0.74) for Student Engagement (SE), R^2 Statistic for Q20 (Preparation of online classes require more time than offline classes) was found to be highest (0.504) for Teachers' Efforts (TE), R^2 Statistic for Q12 (You are satisfied with device provided by the college/institute) was found to be highest (0.55) for Teachers' Training & Development (TAD), R^2 Statistic for Q35 (You are willing to continue with online classes post pandemic too) was found to be highest (0.656) for Teachers Adaptability (TA). For the second order model R^2 Statistic for Student Engagement (SE) was found to be highest (0.656) for Teachers' Involvement (TI) and R^2 Statistic for Teachers' Training & Development (TAD) was found to be highest (0.49) for Teachers' Skill (TS). The covariance between Teachers' Involvement (TI) and Teachers' Skill (TS) is not significantly different from zero at 0.05 level of significance ($p=0.137$).

CONCLUSION

The study scrutinized the perception of student and teacher on online education. Through exploratory and confirmatory factor analysis the factors influencing the student's and

teachers' perception were identified. Three constructs for students' perception were identified, they are Students' Efficacy (SE), Student Readiness (SR) and Students' Learning Ability (SLA). The study also revealed a positive relation between SE and SLA and between SR and SLA. The results of the current analysis of students' perceptions can significantly affect different aspects of online learning and teaching. Firstly, teachers can contribute towards favourable relationship between student efficacy and student learning capacity that has been proven. New virtual pursuits should be considered to heighten the motivation, thereby improving self-efficacy. Different Synchronous learning methodologies should be further explored as teaching through real-time online broadcasting is growing in popularity. (Santero et. Al, 2020) The association between student readiness and student learning ability is one that seems favourable. This exemplifies the concept of self-directed learning. College students should take on more responsibility for their own learning experiences such as figuring out the division of time. The students should be encouraged to get assistance from instructors, teachers, or other academic advisors, with or without assistance during virtual sessions. (Altert, et.al, 2003).

The constructs for Teachers' perception are Student Engagement (SE), Teachers' Training & Development (TAD), Teachers' Efforts (TE) and Teachers Adaptability (TA). Teachers' Perception provides evidence for the presence of two factor second order model consisting of teachers' involvement (TI) and teachers' skill (TS) formed by combining first order constructs of four factor CFA model. Student's engagement (SE) and teacher's effort (TE) formed Teachers'

Involvement (TI) and training & development (TAD) along with Teacher's adaptability (TA) formed Teachers' Skill (TS). Almahasees et al. (2021) emphasized the online classes require more time and efforts by the teachers' and they require to enhance both their skill and time devoted for preparation.

Though the benefits of online education are manifold but lack of social interaction, social presence and synchrony in communication are some of the limitations. But these can be overcome through enhanced collaborative activities and increased teachers training and development. Online and Blended education are here to stay, adapting oneself to the techniques will be the need of hour. The NEP 2020 has also given adequate weightage to online learning. MOOC Courses through SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds) platforms have been blended with conventional course curriculum. Organizations are also using online education for career advancement of their employees. Hence, the preparedness of all the stakeholders needs to be enhanced and the dimensions identified in the paper will enable the academic community augment teaching & learning experience.

Limitations and Further Scope of study: In the Indian context, challenges pertaining to adoption of online education are huge due to the prevailing digital divide and diverse socio-economic backgrounds of the populace. With the changes on account of NEP 2020, online learning will be mandatory and part of the curriculum. Future studies can be conducted to measure the effectiveness of the same.

BIBLIOGRAPHY

- i. Aditya, K. S., & Jha, G. K. (2020). Students' perception and preference for online education in India during COVID-19 pandemic.
- ii. Allen, I. E., & Seaman, J. (2008). Staying the course: Online education in the United States. The Online Learning Consortium. Retrieved from http://www.sloanc.org/publications/survey/pdf/staying_the_course.pdf
- iii. Almahasees, Z., Mohsen, K., & Amin, M. O. (2021, May). Faculty's and students' perceptions of online learning during COVID-19. In *Frontiers in Education* (Vol. 6). Frontiers Media SA.
- iv. Almaiah, M. A., Al-Khasawneh, A., & Althunibat, A. (2020). Exploring the critical challenges and factors influencing the E-learning system usage during COVID-19 pandemic. *Education and Information Technologies*, 25(6), 5261-5280. <https://doi.org/10.1007/s10639-020-10219-y>
- v. Bali, S., & Liu, M. C. (2018, November). Students' perceptions toward online learning and face-to-face learning courses. In *Journal of Physics: Conference Series* (Vol. 1108, No. 1, p. 012094). IOP Publishing.
- vi. Bates, T. (2016, February 15). Celebrating the 30th anniversary of the first fully online course. Tony Bates.
- vii. Bast, F. (2021). Perception of Online Learning Among Students From India Set Against the Pandemic. *Frontiers in Education*, 6. <https://doi.org/10.3389/educ.2021.705013>
- viii. Darius, P. S. H., Gundabattini, E., & Solomon, D. G. (2021). A Survey on the Effectiveness of Online Teaching-Learning Methods for University and College Students. *Journal of The Institution of Engineers (India): Series B*, 102(6), 1325-1334. <https://doi.org/10.1007/s40031-021-00581-x>
- ix. Dhawan, S. (2020). Online Learning: A Panacea in the Time of COVID-19 Crisis. *Journal of Educational Technology Systems*, 49(1), 5-22. <https://doi.org/10.1177/0047239520934018>
- x. Gopal, R., Singh, V., & Aggarwal, A. (2021). Impact of online classes on the satisfaction and performance of students during the pandemic period of COVID 19. *Education and Information Technologies*, 26(6), 6923-6947. <https://doi.org/10.1007/s10639-021-10523-1>
- xi. Goswami, M. P., Thanvi, J., & Padhi, S. R. (2021). Impact of Online Learning in India: A Survey of University Students During the COVID-19 Crisis. *Asian Journal for Public Opinion Research*, 9(4), 331-351.
- xii. Harasim, L. (2006). A history of e-learning: Shift happened. In *The international handbook of virtual learning environments* (pp. 59-94). Springer, Dordrecht.
- xiii. Hiltz, R., & Turoff, M. (1978). *The network nation: human communication via computer*. Reading, MA: Addison Wesley Advanced Book Program.
- xiv. Hafner, K., & Lyon, M. (1996). *Where wizards stay up late: the origins of the Internet*. New York: Simon & Shuster.
- xv. Hockemeyer, C., Conlan, O., Wade, V. P., & Albert, D. (2003). Applying Competence Prerequisite Structures for eLearning and Skill Management. *J. Univers. Comput. Sci.*, 9(12), 1428-1436.

- xvi. Joshi, P., & Dewangan, S. (2021). Impact And Development of Online Education (E- Learning) In India. *Journal of Contemporary Issues in Business and Government*, 27(1), 3450-3458.
- xvii. Karyala, P., & Kamat, S. (2020, September 22). Online education in India - the good, the bad and the ugly! *IndiaBioscience*. <https://indiabioscience.org/columns/education/online-education-in-india-the-good-the-bad-and-the-ugly>
- xviii. Kentnor, H. (2015). Distance Education and the Evolution of Online Learning in the United States. *Curriculum and Teaching Dialogue*, 17(1 & 2), 21-000.
- xix. Kulal, A., & Nayak, A. (2020). A study on perception of teachers and students toward online classes in Dakshina Kannada and Udupi District. *Asian Association of Open Universities Journal*, 15(3), 285-296. <https://doi.org/10.1108/aaouj-07-2020-0047>
- xx. Markets, R. A. (2020, April 16). Indian Online Education Market Outlook to 2024: Online Primary& Secondary Supplemental Education, Test Preparation, Reskilling & Certification, Higher Education,
- xxi. Martin, F., Sun, T., & Westine, C. D. (2020). A systematic review of research on online teaching and learning from 2009 to 2018. *Computers & education*, 159, 104009.
- xxii. Ministry of Human Resource Development. (2020). National Education Policy 2020. Government of India. https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf
- xxiii. Mridul Mazumdar @Mridul Mazumdar May 27, 2020, 18:51 IST. (2020, May 27). The history and usefulness of online teaching in India. *Times of India Blog*. <https://timesofindia.indiatimes.com/readersblog/mridul-mazumdar/the-history-and-usefulness-of-online-teaching-in-india-20481>
- xxiv. Pearson. (2020, August). The Global Learner survey. <https://plc.pearson.com/en-US/future-of-learning/global-learner-survey/>
- xxv. Rapanta, C., Botturi, L., Goodyear, P., Guàrdia, L., & Koole, M. (2020). Online University Teaching During and After the Covid-19 Crisis: Refocusing Teacher Presence and Learning Activity. *Postdigital Science and Education*, 2(3), 923-945. <https://doi.org/10.1007/s42438-020-00155-y>
- xxvi. Rodríguez-Santero, J., Torres-Gordillo, J. J., & Gil-Flores, J. (2020). Confirmatory factor analysis of a questionnaire for evaluating online training in the workplace. *Sustainability*, 12(11), 4629.
- xxvii. Rudestam, K. E., & Schoenholtz-Read, J. (2002). Overview: The coming of age of adult online education. In K. Rudestam & J. Schoenholtz-Read (Eds.), *Handbook of online learning: Innovations in higher education and corporate training* (pp. 3-28). London, UK: Sage Publications.
- xxviii. Shelton, K., & Saltsman, G. (2005). *An administrator's guide to online education*. Greenwich, CT: Information Age Publishing.
- xxix. Sun, A., & Chen, X. (2016). Online Education and Its Effective Practice: A Research Review. *Journal of Information Technology Education: Research*, 15, 157-190. <https://doi.org/10.28945/3502>
- xxx. Tang, Y. M., Chen, P. C., Law, K. M., Wu, C., Lau, Y. Y., Guan, J., He, D., & Ho, G. (2021). Comparative analysis of Student's live online learning readiness during the coronavirus (COVID-19) pandemic in the higher education sector. *Computers & Education*, 168, 104211. <https://doi.org/10.1016/j.compedu.2021.104211>
- xxxi. Taylor, J. C. (2001, June). Fifth Generation Distance Education (No. 40). Higher education Division.)
- xxxii. T, M., S, A., Aditya, K., & Jha, G. K. (2020). Students' Perception and Preference for Online Education in India During COVID -19 Pandemic. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3596056>
- xxxiii. Toti, G., & Alipour, M. A. (2021). Computer Science Students' Perceptions of Emergency Remote Teaching: An Experience Report. *SN Computer Science*, 2(5). <https://doi.org/10.1007/s42979-021-00733-2>
- xxxiv. Upadhyay, A. (2021). Open and Distance Learning for Meeting Access Challenges in Implementation of National Education Policy-2020. In *National Education Policy - 2020 Transforming Higher Education in India* (pp. 1-12). Association of Indian Universities, New Delhi (India).
- xxxv. Varyani, H., & M S, N. (2020). The Past, Present and Future of E-Learning: In India. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3696122>
- xxxvi. Policy Brief: Education during COVID-19 and beyond. (2020, August 1). *UNSDG.ORG*. <https://unsdg.un.org/resources/policy-brief-education-during-covid-19-and-beyond>
- xxxvii. Yang, Y., & Cornelius, L. F. (2004). Students' perceptions towards the quality of online education: A qualitative approach. *Association for Educational Communications and Technology*.