



A STATISTICAL APPROACH TO ONLINE AND TRADITIONAL LEARNING

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Abstract

Because of the Covid-19 pandemic, educational institutions were forced to adopt online instruction in order to ensure that students did not miss out on the academic year. The purpose of this study is to determine how each individual in the society feels about the choice between online and traditional education methodologies. In this study, we used chi-square test for independence of attributes and Logistic regression techniques through Python. The study reveals that 77% of the respondents are showing interest to offline and 23% respondents online mode of education, only 16.66% respondents have revealed that online education students will gain more skills than traditional education whereas 83.34% respondents have revealed that traditional education students will gain more skills than online education.

1. Introduction

Almost from Vedic period in India, many gurukuls were established where teachers and students interacted directly for many years. In this traditional teaching methodology, the teacher is the only source of information and hence it was a teacher centric method.

It is only in the last 20 years that internet usage has expanded to the point that people cannot live without it, and this internet facility has come to the rescue in the shape of online instructions for students. Online education is the learning which takes place using internet, anywhere from the globe. Distance schooling is not new in India. Radio and Doordarshan used to

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broadcast educational programmes for primary and secondary school students. In the current circumstances, students and teachers are pushed to use online teaching methods.

Globally, traditional teaching methods and online teaching methods are now being compared extensively. Traditional teaching offers a safe environment because society is used to it. Direct connection with pupils also allowed teachers to have better control on student conduct, induce human values and improve their skills and communication abilities. The disadvantage of traditional teaching is that students and teachers do not use and promote e-content resources. Conversely, online education emerged to maintain social distance. This online teaching has resulted in increased student and faculty use of e-content resources. Online teaching is hampered by technological and network concerns. It is also being hampered by non-technical faculty updating themselves.

Difference between online and offline teaching is the location of the learning process. With online teaching, students can learn the concepts at their own pace and at their convenient time as the information is available 24×7 and hence it has become student centric method.

When compared with the situations before pandemic, people are more aware of online teaching now a days. But the students community and parents community need to have more awareness towards the positive side of online teaching, so that they can adapt it. On the contradictory the lack of physical education, face to face interaction with the faculty is clearly evident with the online teaching.

Yun, et al. [9]. The study polled professors and students in classrooms both on and offline. It was found that teachers were evaluated on the basis of pre-class preparation, in-class teaching experience, and post-class evaluation, while students were evaluated based on class experience, learning effect, post-class evaluation of the papers, and course content.

Jasmine and Jefferson [13]. They conducted survey with 548 students: 401 traditional and 147 online students, in the study of environmental science, to determine which method of teaching gave better student performance. They also concluded that teaching modality had no significant impact on students, with respect to gender or with respect to class ranks.

Singh et al. [14]. They conducted survey on 3rd year MBBS students of Adesh Medical College and Hospital. Many students agreed that online teaching as compared to offline teaching was more handy, economic, time-consuming, exhausting, prone to distractions and provide more learning while a higher proportion of students disagreed that online teaching as compared to offline teaching was more interesting, motivating, satisfying and provides for more understanding.

Singh et al. [15]. They contrasted online and offline students' efficiency. Efficiency outcomes were specified in terms of (1) final course scores, (2) student perceptions of how much they learned, and (3) satisfaction with the course. The sample was from a semester-long course taught online and offline by the same speaker.

Farrah et al. [16]. They surveyed 82 students from two distinct intense English courses. They had to complete a 5-point Likert scale and four open-ended questions. The survey globe app was used to distribute and gather data. The results showed that students disliked online classes and preferred offline classes. Less motivation, involvement, and understanding are the most common online learning obstacles. They also found that online lectures were convenient, easy to access, and helped them prepare for tests.

Zhanguo and Shan [12]. This article discusses the teaching process and results of the three teaching modes through examples, and analyzes and compares the teaching effects under different teaching modes. The traditional teaching mode has the characteristics of strong classroom control ability and good teaching effect. However, the traditional teaching model may have the problem of being teacher-centered, students' lack of initiative in learning, and insufficient use of network resources. The online and offline teaching hybrid model can make full use of online and offline teaching resources, but if the management of the student's online teaching process is not in place, the problem of poor teaching effect will easily occur. In the actual implementation process, we found some problems: because online courses are mainly self-study by students, online learning cannot be managed uniformly, and there may be a phenomenon of brushing online courses. This teaching mode can save teaching classroom resources and teachers' teaching workload. The online teaching mode can realize remote online teaching and management, and use network teaching resources for remote decentralized teaching when centralized teaching is impossible.

Claudiu, et al. [4]. A semi-structured questionnaire survey was conducted with 762 students from two Romanian universities to provide data. The research revealed that higher educational institutions were not ready for online learning. Lack of technical capabilities and instructional style made online teaching less customizable. Online teaching was less flexible for students due to absence of interaction with teachers.

Anderson et al. [2]. The participants in a Principles of Macroeconomics class were randomly assigned to two different venues: online and face-to-face. Both portions were taught by the same professor, with the same course objectives and assessments. The course environment, the student's SAT math score (or ACT equivalent), the student's GPA prior to taking the course, the student's gender, and the student's overall credit hours prior to taking the course are all factors in determining the change in student scores from pre-test to post-test and the student's exam average. There were both standardised and instructor-specific questions on the pre- and post-test. Students in the face-to-face session scored considerably higher on the exam and improved significantly more on the post-test teacher questions. There are no statistics available.

Hole et al. [3]. This paper tries to contemplate the nature of scholarly conveyance through online mode when contrasted with conventional actual study hall mode. Studies have exhibited that course association and structure, learning responsibility, understudy commitment, and instructor vicinity have spoken to huge difference in understudy fulfillment and insights in web based learning climate. Viewpoints on different instruments of understudy commitment that are established in exemplary dynamic learning teaching methods and improved with new advancements are loathed in this paper. No investigation to date has tried the mediational relationship distinguished. This examination developed the current writing about E-learning and the similar investigation of customary to internet learning and encouraging dependent on SERVQUAL model. The scientist explored the relationship among course structure/association, correspondence, responsibility, and instructor nearness on understudies' fulfillment and discernment. This examination likewise uncovers the hole in nature of a comparative study of online and offline mode of management education learning and educating through on the web and disconnected mode. The

consequences of this examination were proposed to recommend understudies' maintenance and improving the nature of web based teaching and learning.

Ann-Britt [8]. The information was gathered from a class of 11 student teachers. Written online talks were preserved as word files, while oral discussions were video recorded. Clinchy's levels of knowing were utilised to determine the depth of the reflections, and Harasim's qualitative evaluations were employed as a supplement. The results show that on a group level, performance was consistent across levels of reflective thinking. Both modes have advantages and disadvantages, but it is evident that a range of modes should be available to provide individual student teachers more opportunities to improve their thoughts.

2. Preliminaries

Objectives

1. Association between Demographic factors and Preference of mode of education.
2. Association between Demographic factors and online education is an effective way of learning.
3. Association between Demographic factors and online education will gain more skills than traditional education.
4. Impact of mode of education on factors effecting online and traditional education.

Research Methodology

A questionnaire was circulated as Google form to various people of city and a total number of 174 participants have responded to the questionnaire. The responses were analyzed by using statistical tools like Chi-square test, descriptive statistics and logistic regression through Python.

3. Results

Table 1. Demographic factors on perception of students on mode of education, effective way of learning using chi-square test for independent of attributes.

| Table 1.1. Demographic factors on preference of mode of education. | | | |
|---|------------|----------|-------------------------|
| | Test | p-value | Conclusion |
| Gender Vs preference of mode of Education | Chi-square | 0.85013 | There is no association |
| Age Vs preference of mode of Education | Chi-square | 0.04942* | There is an association |
| Occupation Vs preference of mode of Education | Chi-square | 0.58526 | There is no association |
| Qualification Vs preference of mode of Education | Chi-square | 0.45301 | There is no association |

* Significant

The table 1.1 reveals that there is a significant association between age and preference of mode of education and no association between gender Vs preference of mode of education, occupation Vs preference of mode of education and qualification Vs preference of mode of education.

| 1.2. Demographic factors on online education is an effective way of learning | | | |
|--|------------|----------|-------------------------|
| | Test | p-value | Conclusion |
| Gender Vs Online Education is an effective way of learning | Chi-square | 0.03014* | There is an association |
| Age Vs Online Education is an | Chi-square | 0.04702* | There is an association |

| | | | |
|--|------------|--------|-------------------------|
| effective way of learning | | | |
| Occupation Vs Online Education is an effective way of learning | Chi-square | 0.2632 | There is no association |

* Significant

Table 1.2 shows that there is a significant association between gender Vs online education is an effective way of learning, age Vs online education is an effective way of learning and there is no association between occupation Vs online education is an effective way of learning.

| | | | |
|--|------------|---------|-------------------------|
| 1.3: Demographic factors on Online Education is an effective way of learning | | | |
| | Test | p-value | Conclusion |
| Education Vs Online Education is an effective way of learning | Chi-square | 0.4496 | There is no association |
| Education Vs online education students will gain more skills than traditional education | Chi-square | 0.3743 | There is no association |
| Occupation Vs online education students will gain more skills than traditional education | Chi-square | 0.0478* | There is an association |

* Significant

Table 1.3 shows that there is no association between education Vs online education is an effective way of learning, there is no association between education Vs online education students will gain more skills than traditional education and there is an association between occupation Vs online education students will gain more skills than traditional education.

Table 2. Impact of mode of education on factors effecting online and traditional education using logistic regression.

| | Coef. | Std. Err. | z | P> z | [0.025 | 0.975] |
|--|---------|--------------|---------|---------|---------|---------|
| Are you satisfied with online education | 1.9894 | 0.4046 | 4.917 | 0.7284 | 1.1964 | 2.7824 |
| More Expensive than traditional education | -0.6323 | 0.1978 | -3.197 | 0.0014* | -1.0199 | -0.2446 |
| Students can Participate in Extracurricular activities | -0.9321 | 0.4137 | -2.2529 | 0.0243* | -1.743 | -0.1212 |
| Course on easy to navigate | -0.5153 | 0.3895 | -1.3231 | 0.1858 | -1.2788 | 0.2481 |
| Ease of access of information related to the course | -0.399 | 0.3189 | -1.2512 | 0.2109 | -1.024 | 0.226 |
| Students may have the opportunity to mix what they learn with practical work | -0.2127 | 0.3365 | -0.6321 | 0.0527* | -0.8723 | 0.4469 |
| Offers interactive mode of education | 0.1936 | 0.3263 | 0.5931 | 0.5531 | -0.446 | 0.8331 |

| | | | | | | |
|---|---------|--------|---------|---------|---------|--------|
| Students can learn at their own pace | 0.2147 | 0.3621 | 0.593 | 0.5532 | -0.4949 | 0.9243 |
| Students can attend the practical Classes | 0.1988 | 0.343 | 0.5798 | 0.0521* | -0.4734 | 0.8711 |
| Helps in developing learning skills | -0.2081 | 0.3872 | -0.5375 | 0.5909 | -0.9669 | 0.5507 |
| Students can learn how to serve the society | -0.1117 | 0.3792 | -0.2946 | 0.7683 | -0.8549 | 0.6315 |
| Students can participate in Sports | 0.0858 | 0.3112 | 0.2756 | 0.0028* | -0.5241 | 0.6957 |
| Students need to feel connected to their school | 0.093 | 0.3376 | 0.2754 | 0.783 | -0.5687 | 0.7547 |
| Students need to feel connected to their school | 0.409 | 0.4063 | 1.0067 | 0.0314 | -0.3873 | 1.2052 |
| Are you satisfied with offline Education | 0.8357 | 0.2927 | 2.855 | 0.0043 | 0.262 | 1.4093 |

* Significant.

4. Conclusion

Table 1 reveals that age and preference of mode of education are significant and other demographic factors are not significant. Gender and online education is an effective way of learning, age and online education is an effective way of learning are significant and other demographic factors like occupation and qualification are not significant. Occupation and online education students will gain more skills than traditional education students are significant and qualification is not significant.

Table 2 reveals that online education is more expensive than traditional education. Students can participate in extracurricular activities with traditional learning where as they have the opportunity to mix what they learn in class with practical work in online learning. Students can attend the practical classes physically, participate in sports, feel connected and are more satisfied with traditional learning.

While online education is the sole viable option during the shutdown, stakeholders are adapting them and India has learned that the education system will not halt. This lockdown taught us that we can overcome obstacles and still grow. With ongoing attempts, despite the effort of teachers and students, there are still disparities in student advancement. Existing research say that these disparities can be covered by analyzing students' inputs instead of focusing on the effectiveness of E-learning.

The study believes that there is no better option in this terrible pandemic. We can probably overcome most of the negative consequences of online education by further modifying it while considering the health of the stakeholders (teachers and students).

References

- [1] R. Agarwal and E. Karahanna, Time flies when you're having fun: cognitive absorption and beliefs about information technology usage, *MIS Quarterly* 24(4) (2000), 665-694.
- [2] J. J. Arias, John Swinton and Kay Anderson, Online vs. face-to-face: A comparison of student outcomes with random assignment, *E-Journal of Business Education and Scholarship of Teaching* 12(2) (2018), 1-23.
- [3] B. Bapat Harish and Snehal Y. Hole, A comparative study of online and offline mode of management education, *PalArch's Journal of Archaeology of Egypt/Egyptology* 17(7) (2020), 12706-12719.

- [4] Coman Claudiu, et al., Online teaching and learning in higher education during the coronavirus pandemic: students' perspective, *Sustainability* 12(24) (2020), 10367.
- [5] Darlington, R.B. 2004, *Factor Analysis*,
Website:<http://comp9.psych.cornell.edu/Darlington/factor>.
- [6] F. D. Davis, Perceived usefulness, perceived ease of use, and user acceptance of information technology, *MIS Quarterly* 13 (1989), 319-340.
- [7] E. L. Deci and R. M. Ryan, *Intrinsic Motivation and Self-determination in Human Behavior*, Plenum, New York, 1985.
- [8] Ann-Britt Enochsson, Reflective discussions in teacher training: A comparison between online and offline discussions of course literature in a class of pre-service teachers, *Education and Information Technologies* 23(1) (2018), 303-319.
- [9] Hong Yun, et al., A comparative study of online education and traditional offline education during COVID-19, (2020).
- [10] D. Kira and R. Saade, Factors affecting online learning, In *IADIS International Conference Cognition and Exploratory Learning in Digital Age* (2006), 277-282.
- [11] L. C. Kum, A study into students' perceptions of web-based learning environment, *HERDSA Annual International Conference*, Melbourne (1999), pp. 12-15.
- [12] Li, Zhanguo and Donghong Shan, Analysis of teaching cases from offline to online mode, *Teacher Education and Curriculum Studies* 5(4) (2020), 156.
- [13] Paul Jasmine and Felicia Jefferson, A comparative analysis of student performance in an online vs. face-to-face environmental science course from 2009 to 2016 *Frontiers in Computer Science* 1 (2019).
- [14] Rawat Ranu and Parmal Singh, A comparative study between traditional and online Teaching-Learning: medical students' perspective in the wake of Corona pandemic, *National Journal of Community Medicine* 11(9) (2020).
- [15] Shweta Singh, David H. Rylander and Tina C. Mims, Efficiency of online vs. offline learning: A comparison of inputs and outcomes, *International Journal of Business, Humanities and Technology* 2(1) (2012), 93-98.
- [16] Zboun, S. Jomana and Mohammed Farrah, Students' perspectives of online language learning during corona pandemic: benefits and challenges, *Indonesian EFL Journal* 7(1) (2021), 13-20.