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ICT: An emerging educational tool for undergraduate

students

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Abstract

In this era of technology, various techniques are adopted in teaching-learning process, which has resulted in a paradigm shift from conventional teaching to blended or flipped learning. The present study investigated the impact of Information and Communication Technology (ICT) in teaching-learning process at undergraduate level. The purpose of the study was to know certain facts and obtain opinion from the students regarding use of ICT tools in education system. An online survey was conducted utilizing Google forms. Chi-square test and Binomial Test were performed utilizing SPSS programming to analyze the data. The findings of the investigation show that the college undergraduates have promptly embraced the new techniques, and new e-assets for their learning interactions.

Key Words: cyber stalking, social media, Social Networks

Introduction

In the modern education system, e-learning has gained more importance. Modern e-learning has passed from the application of separate technologies (video, multimedia, e-mail, etc.) to system decisions, among which are the Learning Management System (LMS) and social networks (SN). Today's students can be described as digital natives or members of net generation. They have been using digital technology from their early age. While teachers are digital immigrants (Mozhaeva, Feshchenko, & Proedia, 2014). Various integrated and complex ICT tools such as computers, laptops, smartphones and i-pads, etc. have become organic parts of their everyday life. Incorporation of ICT tools by teachers in teaching-

learning process no longer remains new. As a result, the conventional method of teaching and learning is replaced by blended and flipped learning. Indian government also has realized the importance of integration of ICT tools in education. Ministry of Human resource development (MHRD), Government of India, has under taken the project, "National Mission on Education through ICT" to provide ICT enabled quality education to all the learners in India. MHRD, Government of India, has also launched ICT enabled learning platforms, in the form of MOOCs (Massive Open Online courses) such as SWAYAM, NPTEL and e-Pathshala etc. (Mozhaeva, 2014). At Universities and National Institutes, ICT has turned from being a technology of communication and information to a

curriculum creation and delivery system for teachers and learners. However, at college level, the usage of ICT in teaching and learning process has become more extraordinary during these days. Before the educators adopt various e-learning strategies, it is necessary to know whether the students are familiar with this new educational tool.

Hence, the present survey was undertaken to know whether the undergraduate students of science stream were familiar with various e-learning assets.

Objectives

The goal of the current investigation was to discover:

1. Which of the learning strategies conventional, blended or flipped, do the Learners like for learning?
2. Whether the Learners are familiar with different Open Education Resources (OERs)?
3. Which LMS are the Learners familiar with?
4. Whether the Learners are familiar with MOOC courses?
5. Whether the students are familiar with Virtual labs and Simulation Practical's?

Method

The research includes data collection, Statistical data processing and comparative data analysis.

Data collection: An online survey was conducted among the undergraduate students of science faculty, to collect the data about 'Access to and use

of ICT in Education'. A Self-designed questionnaire was prepared using Google forms (Sarkar, 2018) and was circulated among the target group by mail and through social media. Total 289 online responses were received, among which most of them were submitted by the students from different colleges in and around Nasik, Maharashtra, India.

Research Hypothesis

Twenty closed ended questions were framed. For each question, other than yes-no questions, minimum three options were given. The questions were grouped in three sections. First section included 06 questions that focused on Facts, related to access and use of ICT tools by teachers and students, the second section included 08 questions that asked the opinion of students regarding integration of ICT in education and the third section included 06 questions related to e-learning information. These questions enabled to reveal the facts and problems in e-learning process. The hypothesis framed for these questions were-

Ho = The options of each question were opted in equal probabilities by the respondents.

H1= The options of each question were not opted in equal probabilities by the respondents.

Data Processing and analysis

Data processing and statistical analysis was done using SPSS software (Back 2015 and Sidana, 2017). One sample-Chi-square test and one sample Binomial test was done to check hypothesis.

Results of Section One: Questions related to facts

Question 1. Which of the following is adopted by your teachers while teaching?

Options: Chalk-Board, Smart Boards, LCD, Both chalk-board and LCD.

Results of Figure 1 depict that more than 60 percent instructors make use of both, Chalk- Board and ICT tools while teaching. This shows that no longer has teaching remained confined to chalk and Talk. In this new era of ICT,

educators, too, have adopted the new techniques of conveying information to the students. But the conventional technique for instructing is as yet followed by the educators.

Chi square test analysis shows that at 0.5% level of significance, calculated χ^2 i.e $\chi^2_{cal} (3) = 288.204$, $p=0.00$ and expected χ^2 i.e. $\chi^2_e = 72.250$. Since $\chi^2_{cal} > \chi^2_e$, suggest that the options to the question are not opted in equal probabilities, hence, Null hypothesis is rejected.

One-Sample Chi-Square Test Summary

Total N	289
Test Statistic	188.204 ^a
Degree of Freedom	3
Asymptotic Sig. (2-sided test)	.000

a. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 72.250

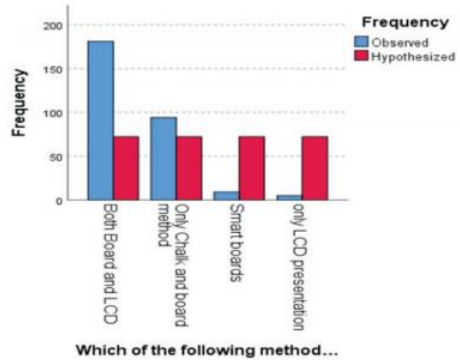


Figure-1: Frequency graph and one sample chi square test for, 'Which of the following is adopted by your teachers while teaching?'

Question 2. How do your educators interact with you?

Options: Personally, Through Google classroom, Social media, or through e-mail.

Results of figure 2 show that different methods are accessible for the educators to interface with their students. About 58 percent of the respondent's reacted that their instructors communicate with them, through all the accessible methods for example eye to eye during regular classes, through Google

classroom, Social media, and through email. This shows that different methods of correspondence are adopted by the instructors to speak with their students.

Chi square test analysis shows that at 0.5 percent level of significance, $\chi^2_{cal} (4) = 326.865$, $p=0.00$ and $\chi^2_e = 57.8$. $\chi^2_{cal} > \chi^2_e$ suggest that, the alternatives to the inquiry are not picked in equivalent probabilities, hence, Null hypothesis is rejected.

One-Sample Chi-Square Test Summary

Total N	289
Test Statistic	326.865 ^a
Degree of Freedom	4
Asymptotic Sig. (2-sided test)	.000

a. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 57.800

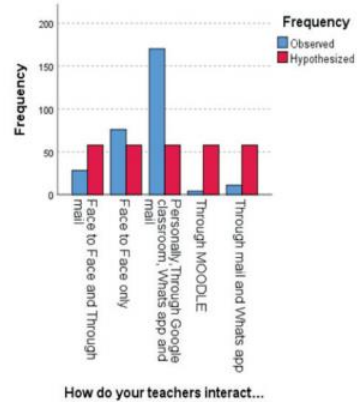


Figure- 2: Frequency Graph and one sample Chi square test for, 'How do your educators interact with you?'

Question 3. Which of following are accessible for you to utilize either at home or outside college, (e.g., in public library or web café)?

Options: Computer with web office, PC without web office, cell phones with web office, cell phone without web office or Laptop, I-pads or tablet.

Results of figure 3 show that over 70 percent of the students have cell phones with web office. Henceforth,

web based educating and sharing e-content with the students is possible for the instructors. Less than 10 percent students do not have web access.

Chi square test analysis shows that at 0.5% level of significance, $\chi^2_{cal}(4) = 524.685$, $p=0.00$ and $\chi^2_e = 57.8$. $\chi^2_{cal} > \chi^2_e$ suggest that, the alternatives to the inquiry are not picked in equivalent probabilities, hence, Null hypothesis is rejected.

One-Sample Chi-Square Test Summary

Total N	289
Test Statistic	524.685 ^a
Degree of Freedom	4
Asymptotic Sig. (2-sided test)	.000

a. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 57.800

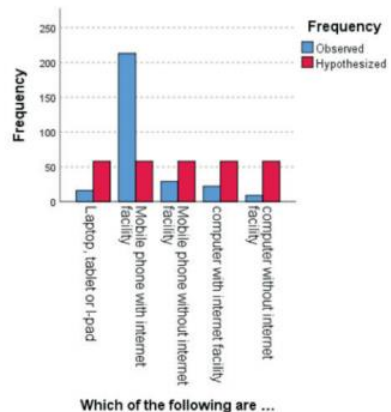


Figure- 3: Frequency Graph and one sample Chi square test for, 'Which of the following are accessible for you to utilize either at home or outside college?'

Question 4. How frequently do you use ICT gadgets for learning purpose?

Consequences of Figure 4 show that 40 percent of the undergraduates use ICT apparatuses consistently for learning reason, while practically 24 percent undergraduates use it once every week and 25 percent use it a few times each month. Practically 90 percent of the undergraduates are utilizing ICT devices for learning reason. Subsequently, web based instructing and sharing e-contents to students is doable for the instructors, which encourages better

educating learning measure.

Chi square test analysis shows that at 0.5 percent level of significance, calculated $\chi^2_{cal}(3) = 55.014$, $p = 0.00$ and expected $\chi^2_e = 72.250$. Calculated $\chi^2_{cal} < \chi^2_e$ suggest that, the alternatives to the inquiry are not picked in equivalent probabilities hence, Null hypothesis is rejected.

Since all the alternatives are not picked in equivalent probabilities by the respondents, Null Hypothesis is dismissed.

One-Sample Chi-Square Test Summary

Total N	289
Test Statistic	55.014 ^a
Degree of Freedom	3
Asymptotic Sig. (2-sided test)	.000

a. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 72.250

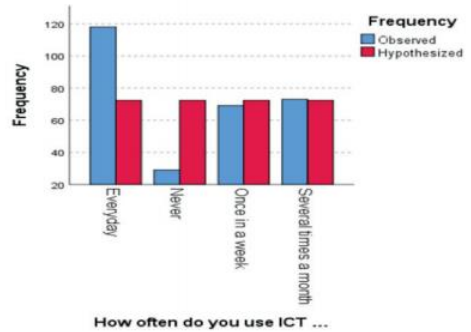


Figure- 4: Frequency graph and one sample Chi square test for, 'How frequently do you use ICT gadgets for learning purpose?'

Question 5. How would you think, ICT gadgets help you in learning?

Options: Sharing Study material and notes, searching pertinent data, acquiring new abilities, communicating with educators and classmates.

Results in Figure 5, show that for 70 percent respondents ICT gadgets are useful in sharing investigation Notes/ material, looking through applicable data, learning new abilities, and communicating with educators and classmates.

Chi square test analysis shows that at 0.5 percent level of significance, calculated $\chi^2_{cal}(4) = 477.799$, $p = 0.00$ and expected $\chi^2_e = 57.8$. Calculated $\chi^2_{cal} > \chi^2_e$ suggest that, the alternatives to the inquiry are not picked in equivalent probabilities hence, Null hypothesis is rejected.

One-Sample Chi-Square Test Summary

Total N	289
Test Statistic	477.799 ^a
Degree of Freedom	4
Asymptotic Sig. (2-sided test)	.000

a. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 57.800

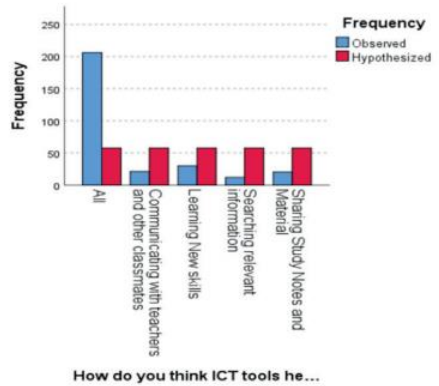


Figure- 5: Frequency graph and one sample Chi square test for, 'How would you think ICT devices help you in learning?'

Question 5. How would you think, ICT gadgets help you in learning?

Options: Sharing Study material and notes, searching pertinent data, acquiring new abilities, communicating with educators and classmates.

Results in Figure 5, show that for 70 percent respondents ICT gadgets are useful in sharing investigation Notes/material, looking through applicable

data, learning new abilities, and communicating with educators and classmates.

Chi square test analysis shows that at 0.5 percent level of significance, calculated $\chi^2_{cal}(4) = 477.799$, $p = 0.00$ and expected $\chi^2_e = 57.8$. Calculated $\chi^2_{cal} > \chi^2_e$ suggest that, the alternatives to the inquiry are not picked in equivalent proportion.

One-Sample Chi-Square Test Summary

Total N	289
Test Statistic	235.626 ^a
Degree of Freedom	2
Asymptotic Sig. (2-sided test)	.000

a. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 96.333

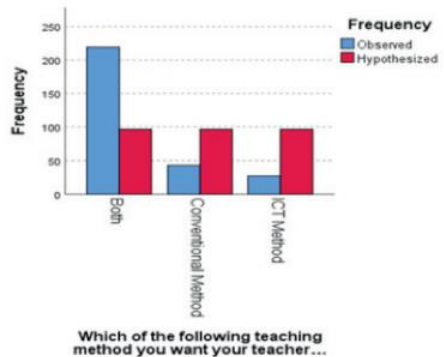


Figure- 6: Frequency graph and One sample Chi square test for, 'Which of the following technique do you need your instructor to follow?'

Results of Section Two: Opinion based Questions

Question1. Do you feel certain concepts are clarified only after visualizing audio/

video presentations?

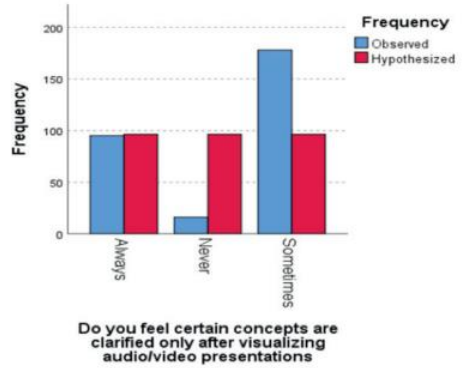
Results in Figure 7 depict that for practically 60 percent respondents just once in a while certain ideas are

explained by audio/video presentations. Chi square test analysis shows that at 0.5 percent level of significance, $\chi^2_{cal} (4) = 136.242$, $p=0.00$ and $\chi^2_e = 96.333$.

$\chi^2_{cal} > \chi^2_e$ suggest that, all the choices are not picked in equal probability by the respondents, Null hypothesis is dismissed.

One-Sample Chi-Square Test Summary

Total N	289
Test Statistic	236.242 ^a
Degree of Freedom	2
Asymptotic Sig. (2-sided test)	.000



a. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 96.333

Figure- 7: Frequency graph and one sample Chi square test for, 'DO you feel certain concepts are clarified only after visualizing audio/video presentations.'

Question 2. Which ICT way of learning do you like?

calculated $\chi^2_{cal} (2) = 2.415$, $p=0.299$ and expected $\chi^2_e = 96.333$. Calculated $\chi^2_{cal} < \chi^2_e$ suggest that, the alternatives to the inquiry are picked in equivalent probabilities hence, Null hypothesis is accepted.

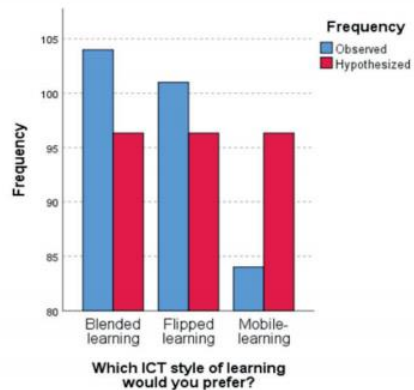
Result in Figure 8 Show that these outcomes are at standard with the consequences of Q6. Around 36 percent students lean towards blended learning, other 34 percent favor flipped learning while 30 percent incline towards versatile learning.

Since two of the three learning styles are chosen at almost same frequency by the respondents, Null hypothesis is accepted.

Chi square test analysis at 0.5 percent level of significance shows that,

One-Sample Chi-Square Test Summary

Total N	289
Test Statistic	2.415 ^a
Degree of Freedom	2
Asymptotic Sig. (2-sided test)	.299



a. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 96.333

Figure- 8: Frequency graph and one sample Chi square test for, 'Which ICT way of learning do you like?'

Table- 1: Percentage frequency of questions related to opinion of respondents for ICT teaching and then learning

Question No.	Questions	Option/Yes (%)
3	Is internet access permitted to you in your college library	86.15%
4	Do you think on-line teaching- learning is the most ideal choice in certain unavoidable conditions?	76.12%
5	Do you think test design which demands repetition learning ought to be changed to online tests, open book tests, research activities, or summer training?	76.47%
6	If the syllabus is provided to you and e-content related to it is transferred, do you think you are skilled to learn without the guide of instructor or anyone else?	54.67%

For all the mentioned questions (Table-1), to check the hypothesis, binomial test was performed, since the 'yes' option was opted, null hypothesis is rejected.

Results of Section Three: Information related to e-learning

Table- 2: Percentage frequency of the options opted in majority, for yes-no questions related to e-learning

Questions	Options opted in majority
1. Do you know what MOOC is?	Yes (50.17%)
2. Have you completed any MOOC?	No (79.58%)
3. Have you performed any simulation experiments or experiments using virtual labs?	No (60.53%)
4. Which search engine do you browse the most? Google, You tube, both or none	Both (60.55%)
5. What is your opinion about e-learning? Should be adopted, should be supplementary to traditional, should not replace conventional method? Should be supplementary?	(40.83%)
6. Which of the OERs are you familiar with?	NPTTEL (30.89%) NME-ICT (31.14%), NPTTEL, NME-ICT, NROER, KHAN Academy

The consequences of section three (Table 2), portray that about half of the respondents knew about MOOCs but most of them had not studied any MOOCs, the likely explanation might be that college students study in a closed frame of university designed curriculum. Advantageous learning through online courses is an arising idea for these students.

About 60 percent respondents didn't know about simulation experiments or experiments using virtual labs. In colleges, the student strength is high and principally, experiments are performed in laboratories, or in fields. To perform Simulation investigations or experiments utilizing virtual labs, every college needs to have grounded PC labs. Absence of these facilities in colleges restricts the learning process.

Over 60 percent students perused both Google and YouTube, for gathering data. This shows that library books are not by any means the only wellspring of data for the current students rather an instant source is accessible at the tip of their fingers, in the form of internet.

Barely 30 percent of the students knew about OERs like NPTEL and NME-ICT. This shows that the instructors ought to advise the students about OERs. Simply accessibility of web office isn't sufficient the students should have the information about its utilization for their advantage.

For all the above inquiries, to check the hypothesis, Binomial test was performed.

The results of table 2 show either more or less than 50 percent acceptance for a particular option, the null hypothesis is rejected.

Discussion and Conclusion

The results of the survey show that though ICT tools are being widely used in educational field, thousands of computers cannot take place of a single knowledgeable teacher. Teaching is an art. A good teacher knows how to make use of various ICT tools to make teaching more effective and learning more interesting. The results of this study show that technology-based teaching and learning is more effective in compare to traditional classroom. This is because, using ICT tools and equipment will prepare an active learning environment that is more interesting and effective for both teachers and students. The results are in line with a research finding by Macho (2005) that proved using ICT in education would enhance students' learning. The results of the present investigations are also at par with Kankan Sarkar (2018) that proved that ICT enhances teaching and learning practices at college level in Mathematics. Research Blended learning or flipped learning or mobile learning styles are learning styles adopted by the tech savvy students of this technological era. They are quick in adapting to new technological changes and are also acquainted with various ICT tools. Hence are willing to accept the paradigm shift from offline teaching to online teaching –learning process. But various technical problems such as irregularity in network availability and current supply may bring hurdles in online teaching. Findings of the present survey shows that simply access to ICT tools is not enough, teachers need to give their students an exposure to various e-learning techniques such as

virtual labs or simulations and also guide them in choosing various OERs and MOOC courses.

(Acknowledgement: The Author would like

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