Original Research article

Effectiveness of Information, Communication and Technology Integration on Teachers of Health Science Colleges Affiliated to MUHS Nashik

Nitin S. Kavede[1], Yogesh G Raut[2], Vishakha Patil[3], Vinay Kumar Singh[4]

Abstract:

This study investigates and explores the adoption and impact of information and communication technology by college, teachers and students of Medical, Dental, Ayurved & Unani, Homoeopathy and Allied Health Sciences Colleges affiliated to Maharashtra University of Health Sciences Nashik. ICT adoption and online application of examination management system will enhance the effective and active participation in the examination related work. By using a qualitative research approach, a sample size of 400 teachers was used, data were collected through pretested questionnaire and with the help of online module responses for designed questionnaire of the participants has been recorded. This study evaluated the effectiveness of ICT in examination management system. A discussion of findings, limitations and suggestions for future research has been provided in the

[1]Deputy Registrar, Maharashtra University of Health Sciences, Nashik, Maharashtra; [2]Statistical Assistant, Maharashtra University of Health Sciences, Nashik, Maharashtra; [3]Asst. Professor, School of Physiotherapy, LTMMC, Mumbai, Maharashtra; [4]Associate Professor, JES's Matoshree Ayurved College, Yeola, Nashik, Maharashtra;

Corresponding author: Dr Nitin S Kavede, Deputy Registrar, Maharashtra University of Health Sciences, Nashik, Maharashtra, India. Email: knitin_sk@rediffmail.com Mobile: +91-9881734839.

For future research has been provided in the study. Mean, standard deviation with descriptive statistics were applied through SPSS for data analysis. Based on statistical analysis, it came to light that information and communication technology positively improve the accuracy and efficiency in examination system.

Keywords: ICT, online, application, examination, teachers, effectiveness.

Introduction:

Information and communication technology (ICT) has become an important source of innovation and improvement of efficiency for many sectors across the globe. Information and technology has a major role to play in forming the new worldwide economy to deliver fast changes in the society.[1] The examination is an essential instrument which has no substitute. The performance of student can be judged on the declaration of the result.[2] The whole career of a student is based on the timely processing of results and which also reflects how fast and accurately the university/ institute declare the result. Examinations have been referred to as **'the central nervous system of education'.**[3]

Information and Communication Technology (ICT) has become an important, valuable and critical resource for the university. ICT usage has become very common but its full potential is yet to be discovered. It is a helpful tool for creating good governance in the working of any organization.[4] Developing countries have now understood the importance of ICT and have started adapting to it as a basic tool for good governance. The ICT mediated governance is also known as "e-governance".[5] In India at large, University examination systems are managed manually. The manual examination system faces problems of accuracy and cause delay in timely declaration of results.[6]

ICT in shape of Campus Management System (CMS) is an effective tool for integrating and automating the activities of examination system to bring reliable, efficient, transparent and robust e-governance solutions for universities.[6]

The researcher seeks to meet the following research objectives in this study:
(a) To study perception of teachers toward ICT integration in Examination System of MUHS.
(b) To find out the impact of ICT adoption on teachers and University.

Methodology:

Research Design:

In this research, descriptive survey method was used to collect and analyze the data obtained from all the respondents. The researchers developed the questionnaire and finalized it before being distributed to the targeted group of respondents. Few sections on the questionnaire were designed specifically to address research objectives in regard with the effectiveness of ICT integration for teachers in handling and effective elements of ICT integration in examination system. Therefore, the questionnaire was distributed to obtain the data from the respondents.

Population and Sampling:

The overall total number of respondents for this research was 400 teachers from various Medical, Dental, Ayurved & Unani, Homoeopathy and Allied Health Sciences Colleges affiliated to Maharashtra University of Health Sciences Nashik. The questionnaire was distributed online to the respondents by online module to the health professional teachers with teaching background regardless of gender, designation, age, area, faculty as well as type of college. There are no preferences set by the researchers as long as the respondents come with particular designation and colleges from government, aided and private. Since the targeted respondents for this research are meant for individuals with teaching background, the researchers tried to get especially teachers from various Medical, Dental, Ayurveda & Unani, Homoeopathy and Allied Health Sciences Colleges affiliated to Maharashtra University of Health Sciences Nashik to be part of this research. Hence, the questionnaires distributed are not equal in numbers where teachers from Medical and Dental colleges dominate the overall population as compared to teachers from Ayurveda & Unani, Homoeopathy and Allied Health Sciences Colleges.

Instrument:

A survey questionnaire with a total of 25 items was used as the main instrument in this study to analyze the effectiveness of ICT integration in online examination management system of MUHS Nashik.[7] A total of 400 questionnaires were distributed where all respondents were asked to read the statements given and choose their answers based on 5-Likert scale ranged from 1 = Strongly Disagree, 2 = Disagree, 3 = Uncertain, 4= Agree and 5= Strongly Agree. The questionnaires consisted of 2 sections. Section A is about the demographic background of the respondents comprising of 7 tools that includes gender, age, designation, college area, faculty, type of college and MSCIT qualification. Section B comprising 18 tools that looks into the perception and effectiveness of ICT integration in online examination management system. The pretested questionnaire used for this qualitative study was designed and developed by the researchers accordingly with the title chosen so that the items developed are able to provide the answers needed for research questions.

Data Collection Procedure:

The questions and their responses online module were developed with the help of programmer based on pretested designed questionnaire.[8] The online questionnaire module was sent via link to all health professional teachers of health science colleges affiliated to MUHS Nashik. The data was collected within 02 months through random distribution and some of the questionnaires were sent to respondents through email. The respondents were given 02 month to complete the questionnaire and send it back to the researcher for data analysis. Adequate time was given to the respondents as per their convenience to complete the questionnaire because all the respondents are health professional teachers from clinical and non-clinical specialty so maximum time, they have to utilize to attend the patients (OPD) and in Operation Theater (OT) or in many emergency cases. It took around 02 months' time period to completely fill-up questionnaires and thereafter process of further data analysis done by the researcher to get desired output and findings for the research.

Data Analysis Process:

All data received via online from the respondents were analyzed using Statistical Package for the Social Sciences (SPSS) version 17.0. The analysis includes both descriptive and inferential analysis. The researchers used descriptive analysis to analyze the frequency and

percentage of the overall population in the demographic background.[9] Besides, it is also used to determine the mean, standard deviation, frequency and percentage to identify the effectiveness of ICT integration for teachers through online examination management system as well as the effective elements of ICT integration [10] in Maharashtra University of Health Sciences, Nashik.

Results & Discussion:

The findings of this research have given the output needed by the researchers to answer the research questions. The findings are done according to the questionnaire and some inferential analysis that includes descriptive statistics and reliability testing is also conducted towards the overall data.[11]

From the overall population (n=400) based on gender, there are 249 male respondents with a percentage of 62.2% as compared to only 151 female respondents with 37.8%. From the overall population based on age of respondents, most of the respondents have age between 31 – 40 years of age 175 (43.8%) followed by age between 41 – 50 years of age 122 (30.5%), then number of respondents with 51 – 60 years of age 57 (14.3%), with less than 30 years of age 39 (9.7%) and 07 (1.7%) respondents with age greater than 60 years of age. From the overall population based on designation, there are 135 (33.8%) respondents who are working as Assistant Professor, 116 (29.0%) & 115 (28.8%) respondents working as Associate Professor and Professor while only 34 (8.4%) respondents who are working as Principal in their respective colleges. From the overall population based on residential area, there are more respondents who are teaching in urban college area with 256 (64.0%) as compared to respondents who are teaching in rural college area with 144 (36.0%). From the overall population based on type of college, there are 339 private colleges respondents with a percentage of 84.8% as compared to only 34 & 27 aided and government college respondents with 8.5% and 6.8% respectively. From the overall population based on faculty of college, there are 122 respondents from Ayurveda college with 30.5% followed by 99 respondents from Dental college with 24.8%. Whereas 77 (19.3%), 66 (16.5%), 32 (8.0%) and 04 (1.0%) of respondents are from Allied college, Homoeopathy college, Medical college and Unani college respectively. From the overall population based on MSCIT qualified, there are 272 respondents with 68.0% who are MSCIT qualified as compared to 128 respondents who are not MSCIT qualified with 32.0%.

From the data provided in Table No. 2 about teacher's perception of ICT in online examination management system, it shows that most teachers are aware of the goodness and usefulness of ICT in handling various services provided online examination tools by the University. Most teachers realized that the online declaration of results helps the colleges, teachers & students to view status of student results that shown the highest mean of 4.81 with standard deviation 0.58. Most teachers believe that the use of ICT benefits online publication of Time Table, Theory Centers, issuance of appointments of teachers as Centre In-charge/Centre Observer/IVS/CAP Custodian/ Practical Examiners helps the college, teachers and students to access it from anywhere which was shown that more than 82.0% (331), 79.5% (318) and 80.3% (321) of the respondents were Strongly Agree to use of these ICT tools respectively.

It was observed that out of 400 respondents, 81.5% (326) and 82.5% (330) respondents were Strongly Agree that online entries of Internal Assessment Marks and online submission of marks with the help of ICT helped to reduce malpractices of change of marks in Theory Examination, Practical Examination and Internal Assessment Examination of the University respectively. Overall perception of teachers toward the ICT that helps and user-friendly to the college, teachers and students towards online tools developed by the University in the examination managements system. The results obtained from Table No. 3 that would want to examine the effectiveness of ICT integration for college, teachers and students in the use of ICT in examination system. Out of 400, 70.3% (281) teachers were strongly agreed with mean of 4.63 that online updating of Teacher Database helps respective teachers to update their credentials from any place without any difficulty and without any correspondence whereas only 2.0% (08) respondents were strongly disagree for it. The use of ICT also helps online Question Paper Setting System helps teachers to set better question paper with minimum errors such as spelling errors, grammatical errors, stem construction of question, duplication of questions and options, etc. with mean of 4.63 having standard deviation 0.73.

ICT helps to provide online submission of Dissertation by the student to the college has increased efficiency, accountability, transparency, printing and handling of multiple copies and it is eco-friendly system that has minimized printing cost of five copies where students

can easily access it and integrate it into their learning   process with a mean of 4.69.

Table No. 1: Demographic background of respondents

Factors	Particulars	Frequency	Percentage (%)
Gender	Male	249	62.2
	Female	151	37.8
Age	≤ 30	39	9.7
	31 – 40	175	43.8
	41 – 50	122	30.5
	51 – 60	57	14.3
	> 60	7	1.7
Designation	Assistant Professor	135	33.8
	Associate Professor	116	29.0
	Professor	115	28.8
	Principal	34	8.4
College Area	Urban	256	64.0
	Rural	144	36.0
Type of College	Govt.	27	6.8
	Aided	34	8.5
	Private	339	84.8
Faculty of College	Medical	32	8.0
	Dental	99	24.8
	Ayurveda	122	30.5
	Unani	04	1.0
	Homoeopathy	66	16.5
	Allied	77	19.3
MSCIT Qualified	Yes	272	68.0
	No	128	32.0

Table No. 2: Teacher's perception of ICT integration in Examination System

Sr. No	Items	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree	Mean	S.D.
		Frequency and Percentages (%)						
1.	Online publication of Time Table of University Examinations helps the students and the colleges to access it from any place	6 (1.5%)	0 (0.0%)	0 (0.0%)	63 (15.8%)	331 (82.8%)	4.78	0.59
2.	Online Publication of Theory Centers of University Examinations helps the students / colleges to view it from any place and it helps them to measure convenience of the Theory Centre	6 (1.5%)	1 (0.3%)	5 (1.3%)	70 (17.5%)	318 (79.5%)	4.73	0.65
3.	Online issuance of appointments of Centre In-charge / Centre Observer / IVS / CAP Custodian / Practical Examiners helps to their appointment from any place without carrying physical copy of	6 (1.5%)	0 (0.0%)	1 (0.3%)	72 (18.0%)	321 (80.3%)	4.76	0.61

Sr. No	Items	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree	Mean	S.D.
	appointment with quick and easy access in their logins							
4.	Online CCTV monitoring system facilitates to have access to keep watch on Examinees in the Examination Hall that helps to curb down malpractices at Theory Centre Level	7 (1.8%)	3 (0.8%)	4 (1.0%)	75 (18.8%)	311 (77.8%)	4.70	0.70
5.	Online forwarding of Dissertation copy for evaluation by the Subject Expert / Evaluator has eliminated postal delay and has increased efficiency of delivery, accountability, improvement in assessment quality as well as it facilitates submission of evaluation report on a single click	7 (1.8%)	5 (1.3%)	12 (3.0%)	66 (16.5%)	310 (77.5%)	4.67	0.75
6.	Online Internal Assessment Marks Entries module has increased efficiency, accuracy and accountability in submission of Internal Assessment Marks by the College	5 (1.3%)	1 (0.3%)	0 (0.0%)	68 (17.0%)	326 (81.5%)	4.77	0.58
7.	With the help of ICT online submission of marks is adopted and as such it has helped to reduce malpractices of change in marks in Theory Examination, Practical Examination and Internal Assessment Examination from the system	6 (1.5%)	3 (0.8%)	6 (1.5%)	55 (13.8%)	330 (82.5%)	4.75	0.67
8.	Online Declaration of University Results helps the students and colleges to view the status of their results	6 (1.5%)	0 (0.0%)	1 (0.3%)	49 (12.3%)	344 (86.0%)	4.81	0.58
9.	Online disbursement of advances of Theory, Practical and Central Assessment Programme (CAP) helps Colleges to instantly utilize the funds for smooth conduct of examination and it eliminates loss of Demand Draft in transit and postal delay	5 (1.3%)	1 (0.3%)	9 (2.3%)	65 (16.3%)	320 (80.0%)	4.74	0.64
10.	Optimum use of ICT has helped paperless work at College / University Level and has drastically brought down wastage of paper	6 (1.5%)	6 (1.5%)	8 (2.0%)	58 (14.5%)	322 (80.5%)	4.71	0.72

Table No. 3: Effectiveness of ICT integration for Teachers in Examination System

Sr. No	Items	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree	Mean	S.D.
		Frequency and Percentages (%)						
1.	Online updating of Teacher Database helps respective teachers to update their credentials from any place without any difficulty and without any correspondence	8 (2.0%)	1 (0.3%)	4 (1.0%)	106 (26.5%)	281 (70.3%)	4.63	0.71
2.	Online Question Paper Setting System helps to set better question paper with minimum errors such as spelling errors, grammatical errors, stem construction of question, duplication of questions and options, etc.	7 (1.8%)	3 (0.8%)	8 (2.0%)	95 (23.8%)	287 (71.8%)	4.63	0.73
3.	Online availability of Hall Tickets and Seat Summary eliminates postal delay and has increased efficiency in distribution process to the respective students	6 (1.5%)	1 (0.3%)	1 (0.3%)	67 (16.8%)	325 (81.3%)	4.76	0.62
4.	Online issuance of Hall Tickets and various Appointments (Centre In-charge / Centre Observer / IVS / CAP Custodian / Practical Examiners) has reduced printing cost of the University	6 (1.5%)	1 (0.3)	3 (0.8%)	70 (17.5%)	320 (80.0%)	4.74	0.63

5.	Online submission of Dissertation by the student to the college has increased efficiency, accountability, transparency, printing and handling of multiple copies and it is eco-friendly system that has minimized printing cost of five copies	7 (1.8%)	0 (0.0%)	8 (2.0%)	79 (19.8%)	306 (76.5%)	4.69	0.68
6.	Online submission of Dissertation by the college to the University has increased efficiency, accountability and handling of multiple copies as compared to submission of five physical copies	6 (1.5%)	2 (0.5%)	8 (2.0%)	72 (18.0%)	312 (78.0%)	4.71	0.68
7.	Online Entries of Practical Examination Marks has increased efficiency in submission of Practical Marks and has eliminated manual errors of the Examiners	6 (1.5%)	1 (0.3%)	4 (1.0%)	65 (16.3%)	324 (81.0%)	4.75	0.64
8.	Online Entries of Theory Marks at Central Assessment Programme (CAP) has increased efficiency, accountability as well as has eliminated manual errors of the examiners	6 (1.5%)	2 (0.5%)	10 (2.5%)	54 (13.5%)	328 (82.0%)	4.74	0.67

Table No. 4: The reliability test for teacher's perception and effectiveness of ICT integration in Examination System

Sr. No.	Items	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
1.	Teacher's Perception on ICT	0.960	0.962	10
2.	Effectiveness of ICT	0.947	0.949	8

Besides, ICT helps students by online availability of Hall Tickets and Seat Summary eliminates postal delay and has increased efficiency in distribution process to the respective students with mean of 4.76.

In Table No. 4, the reliability shows the result of alpha value are more than 0.7 which it shows good and satisfactory reliability of the items and accepted as research instruments to the respondents. It was found that for the 10 items designed for Teachers Perception on ICT has passed the test of reliability with value of Cronbach's alpha as 0.96. Effectiveness of ICT with 08 items shows satisfactory reliability with value of Cronbach's alpha as 0.947. Overall, the instrument designed for the research passes the reliability test.

Conclusion:

In order to fully benefit from the current information era, everyone should be equipped with knowledge and skills related to ICT. In this regard, capacity building and ICT literacy are essential to be considered by the authorities especially in health science universities.

This paper highlighted ICT applications roles in various aspects of examination system which can facilitate college, teachers and students regarding use online activities at different levels. Overall use of ICT application in examination management system with various online applications results in efficient, transparent, error free and effective examination system of the university which is beneficial for colleges, teachers, students and university also.

Recommendation:

This study suggests that teachers and staff need a comparative understanding of ICT integration and must be willing to use their knowledge and resources to prompt technology in their online examination management system. This literature review can be useful for future comparative purpose of online ICT application in examination management system on various universities.

Acknowledgement:

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