

Challenging Technologies and the Technologically Challenged: Assessing the User Acceptance of ODL Technologies in Geographical Spaces

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Abstract

The challenges of the ODL systems in contemporary world remains to extend its outreach to the hither to unreached geographically, economically, socially and also technologically. In countries like India, with a comparatively young population base and rich demographic dividends to be reaped for the next few decades, the ODL system has a significant role to play in building up the human capital, uniformly across geographical spaces. This study will focus to assess, from the end user perspective, the success and efficiency of the technological interventions of IGNOU through its Regional Centres and pan India coverage during the period of Pandemic. It will also focus on the challenges in digital inclusion of the masses, as we adopt and incorporate technologies for education. The Technology Accessibility Model (TAM) of Davis, which studies the user acceptance of information systems will be the basis to assess the 'user acceptability' of online counselling methods and other facilities used during the period of pandemic at two of the Regional Centres each of Delhi and Bihar to understand the impact of online initiatives and challenges for digital inclusion across geographical spaces. The study will be based on primary data and information collected through Google form questionnaire from students of some Post Graduate Programmes in the Regional Centres of Delhi and Bihar.

Key words: TAM, Google Classroom, ODL

Introduction

The challenges of the ODL systems in contemporary world remains to extend its outreach to the hither to unreached geographically, economically, socially and also technologically. In countries like India, with a comparatively young population base and rich demographic dividends to be reaped for the next few decades, the ODL system has a significant role to play in building up the human capital, uniformly across geographical spaces.

The ODL system has since its inception, undergone a paradigm shift however, the prime focus has remained to democratize higher educational opportunities, widen scope and avenues, strengthen networks and provide effective student support through its delivery aspects.

Technology has been a facilitator with new inventions and at a faster pace in the recent past. However, for the initiatives to be successful in achieving ends, it is significant to ensure that technology is available to all and technical know-how is not a delimiting factor.

This study will focus to assess, from the end user perspective, the success and efficiency of the technological interventions of IGNOU through its Regional Centres and pan India coverage during the period of Pandemic. It will also focus on the challenges in digital inclusion of the masses, as we adopt and incorporate technologies for education.

The study has the following objectives.

1. To study the preference and choice of students for online counselling sessions
2. To analyze the technology acceptability of ODL students for Google classroom and Google meet and understand the spatial differences between regional centres.
3. To analyze the technology acceptability of ODL students for Google classroom and Google meet and understand the difference (if any) between computer science and psychology students)

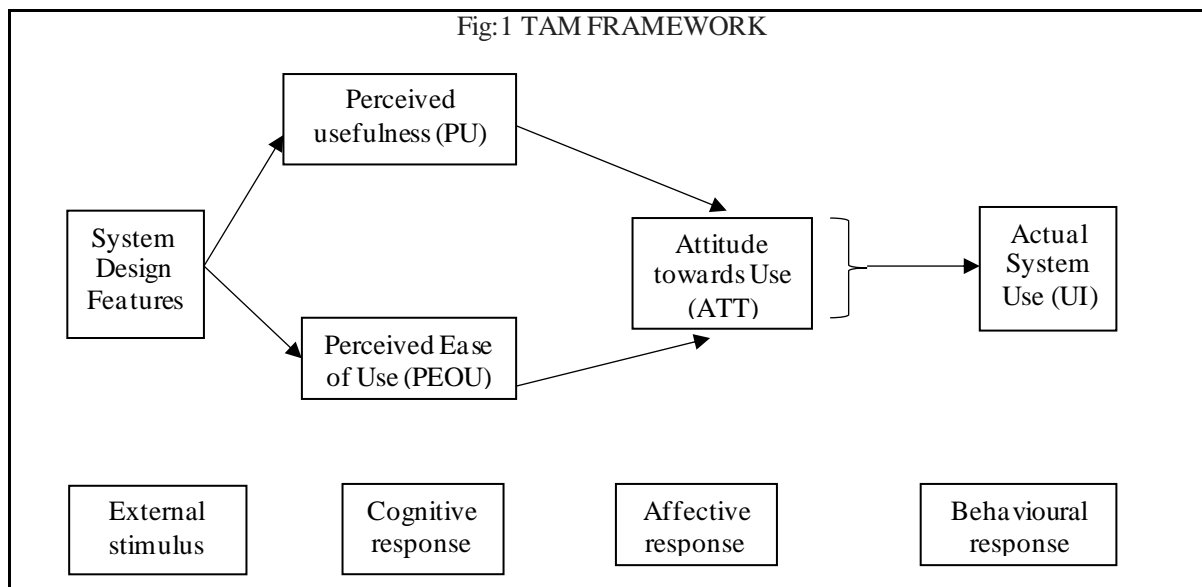
Database

The study is based on primary data, collected through Google form questionnaire. Items of the questionnaire basically related to 5 point likert scale questions (from strongly disagree to strongly agree), formulated to seek

responses, reflecting on their perception of ease of use, usefulness, intention and attitude to the use of Google Classroom. Feature. The secondary data source has been taken from Regional Centres of IGNOU at Patna and Darbhanga in Bihar and Delhi -2 in Delhi and the Telecom Regulatory Authority of India (TRAI) Annual Report (2020)

Methodology

The TAM framework has been used to have constructs of user acceptability of the online facility of Google Classroom for online academic counselling. The Technological Acceptability Model given by Davis (1987) specifies the causal interrelationships between system design features, Perceived Usefulness (PU), Perceived Ease Of Use (PEOU) Attitude Towards Use (UI) and Actual Usage Behavior. (ATT) The MIS attitude research, MIS lab research and human computer interface research formed the background of TAM formulation, with some inputs from psychology to define the behavioral intentions. On the basis of the model, if one understands as to why a system is unacceptable to a particular user class, one can device as to ' how 'to address the issue of acceptability particularly if it is related to behavioral limitations. The attitude to use a technical system leads to actual use and is a major determinant which is a function of two major beliefs, perceived usefulness of the system and perceived ease of use, which are influenced by system design features. The Graphical representation of the TAM framework is as below.



The use of technology for learning and even for other practical purposes is dependent on two factors.

1. First is the access to the technological related equipments, which is partially dependent on the socio-economic profile, (mainly affordability and individual rating of the usefulness of equipments) of the user.
2. And second relates to user acceptance which is governed by user choice, preferences, requirements and other such parameters related to the user's mental framework.

Structured questionnaire was used to collect Likert scale responses for items related to the constructs. Multiple linear regression analysis has been done to analyse how attitude and intention to use are impacted by the usefulness and ease of use features of the Google Classroom. Graphical representation has been done as and where required.

Background

The use of technology for learning and even for other practical purposes, is largely dependent on two factors. First is the access to technology related equipments which is partially determined by the socio-economic profile and affordability of users. And second relates to user acceptance, which is governed by user choice, preference, requirement and other such parameters related to the user's mental framework.

Access is a physical requirement and a lot can be read and understood from the facts and figures available with respect to any geographical space. The following facts explain the aspects of access with respect to India, which has the world's second largest internet population of over 749 million users in 2020. According to the Telecom Regulator Authority of India (TRAI) report (2020-21), the subscriber base of India was 1173 million in 2020 and the average tele density was 86.38. The rural subscriber base (525.92) and tele density (59.05) is way behind that of urban areas (647.91 and 138.34 respectively). Both the subscriber base and tele density have large spatial variations.

Brief History

In the ODL system, the recent technological developments synchronize and mark the generational shift of the distance education paradigm. Technology, which determines the delivery aspect is though, not the only one, but it is one of the prime determinants of the shift. The five generations of DE with the technological and delivery aspect, as most recently proposed by Moor and Kearsley (2005) is as under.

1. First Generation – Single medium (print) – correspondence.
2. Second Generation – Radio and television broadcasting
3. Third Generation – Combined approach of correspondence with broadcasting
4. Fourth Generation – Tele-learning with interactive audio-video
5. Fifth Generation – Online delivery – multimedia interactive content with online communication support.

Though, it is apparently clear that the use of ICT for the ODL system is just an extension of the wider societal transformation where ICT is being applied to enhance efficiency of products and services. The enablers are the electronic devices with individuals through which they stay connected with the network.

Brief Overview of Literature on Online Academic Support

Andri Wijaya (2016) applied the TAM model to study the factors that affect the use of Google classrooms. He concluded that the perceived ease of use and perceived usefulness have a positive effect on the use of Google classroom by some college students of STT Musi.

Raju et. al. (2021) in their study, compared the acceptance of digital tools among computer science and non-computer science students by using the TAM framework. By using quantitative methods of analysis on the sample data collected from three campuses, they concluded that the intention of computer science students to use digital tools has a positive relationship with the utility of the digital tools to complete tasks. The same also was true for non-computer science students and all other relationships in TAM were true for both background of students. In fact, non-computer science students had a more positive attitude than their computer counterparts. Thus, the acceptance of digital tools in ODL are justified.

Nurhanis and Zulkifli (2021) studied the satisfaction of Physical and health education students towards blended learning. With the student satisfaction survey form and descriptive statistical analysis they evaluated the gender wise satisfaction levels, to conclude that male students have greater mean changes than females towards Google Classroom but both participants had a positive attitude towards blended learning.

Kassim (2020) studied to conclude that the Google Classroom has a very positive response worldwide due to its ease of use, usefulness and helpfulness. The sample population for the study was drawn from Malaysian learners from a public university in Terengganu, Malaysia. Quantitative, descriptive method of analysis was employed to study the responses sought on likert scale items explaining the constructs of ease of use and usefulness

Data Analysis

Out of the many Programmes being offered by the University, the MCA and MAPC Programmes were chosen for the study. Reason for the choice was comparatively higher enrolment in these Programmes at both Regional Centres, and expectation of more responsiveness from the sample, since both Programmes require at least some hands-on computer for various components of these Programmes.

Data was collected through the Google form questionnaire, circulated through email to the students of MCA and the MAPC Programmes, being offered through the Regional Centres of Delhi -2, Patna and Darbhanga. The target group of students were those, who enrolled from July session of 2019 to July session of 2021 of admission and were exposed to online counselling sessions prominently through Google Classroom and other virtual platforms.

The reason for selection of two regional centres from Bihar was the apprehension of low enrolments (compared to Delhi) and consequently lesser response rate. The statistics of receipts of responses and response rates is shown in the table below. However, the apprehension was countered by facts as the response rate of students was better from the Regional Centres of Bihar as compared to Delhi -2 for both the Programmes despite the fact that enrolment was comparatively lower in the regional centres of Bihar. The reason could be attributed to some of the factors like comparatively younger age group of sample population in Bihar and education being their only prime time activity. Whereas, in Delhi, majority of the respondents might be having other priorities of being in job, some business etc., due to which the response has been comparatively less. Reminder emails were sent to all students of the sample for genuine responses.

Table-1: Response profile of students

Sl. No.	RC Delhi -2	RC Patna and Darbhanga
MCA Programme		
Total emails sent	1126	438
Total responses received	66	78
Response rate	5.86	17.80
MAPC Programme		
Total emails sent	2362	271
Total responses received	106	33
Response rate	4.48	12.17

The demographic profile of students reflects that more than 72% of the students of Delhi -2 are within the age of thirty and more than 90% of students of Bihar were less than 30 years of age. 65% of the respondents from Delhi-2 were females and nearly 46% of the respondents were females from Bihar Regional Centres. Almost 98% of the students owned smart phones and 84% owned a laptop or a desktop from Delhi -2 whereas nearly 96% of students owned smart phones with internet connection and 77% owned a desktop or a laptop with internet connection in Bihar regional centres.

Data Analysis of responses on online facilities, Choice and Preferences of Students

There does not seem to be much of a difference as far as availability of electronic devices is concerned across the geographical space. Minor variations however, do exist. The question of concern therefore, is their acceptability of the new technological introductions with the system for strengthening of support services and delivery of academic content.

The general perception about the use of online services and facilities was captured through Likert scale questions on a five-point scale to assess the preferences. Three online facilities were discussed in the questionnaire, they were

- Facilities related to academic counselling through Google Classroom
- Online submission of tutor marked assignments (TMAs) at respective regional centres through Google form links and
- Centralized online submission of practicum files, projects, and internship reports etc. through a designed software on university's website.

They were also asked to express their preference about online activities or if they wished that simultaneously face to face activities must continue. The responses are graphically represented hereunder.

It is apparent from the graphs that there exist some differences in the opinions expressed by the respondents of Delhi and Bihar.

- i. First of all, nearly 82% of the respondents of RC Delhi -2 have stated that they have very frequently attended the online academic counselling sessions and 13% have occasionally attended, but in Bihar only 58% have stated about being very frequent with online sessions and 22% attended occasionally.
- ii. More than 70% of the respondents in Bihar either strongly agreed or agreed that Google classroom was a very good online service and helped them tremendously in the learning process. Nearly 70% of the respondents from RC Delhi -2 also expressed the same opinion.

- iii. Similarly, 76% of RC Delhi -2 and 68% respondents of RCs of Bihar have either strongly agreed or agreed that assignment submission through Google form links by respective regional centres highly facilitated them in a assignment submission.
- iv. And the same was true for reports submission, where above 80% of the respondents from both places have agreed or strongly agreed for submission through the software link.
- v. Close to 65% of the respondents of both places however feel that though online services have been very facilitative during the pandemic induced situation, the face-to-face activities must continue simultaneously and must not completely done away with. This is a strong indication irrespective of the geographical location, students have the urge to continue in the face-to-face mode.

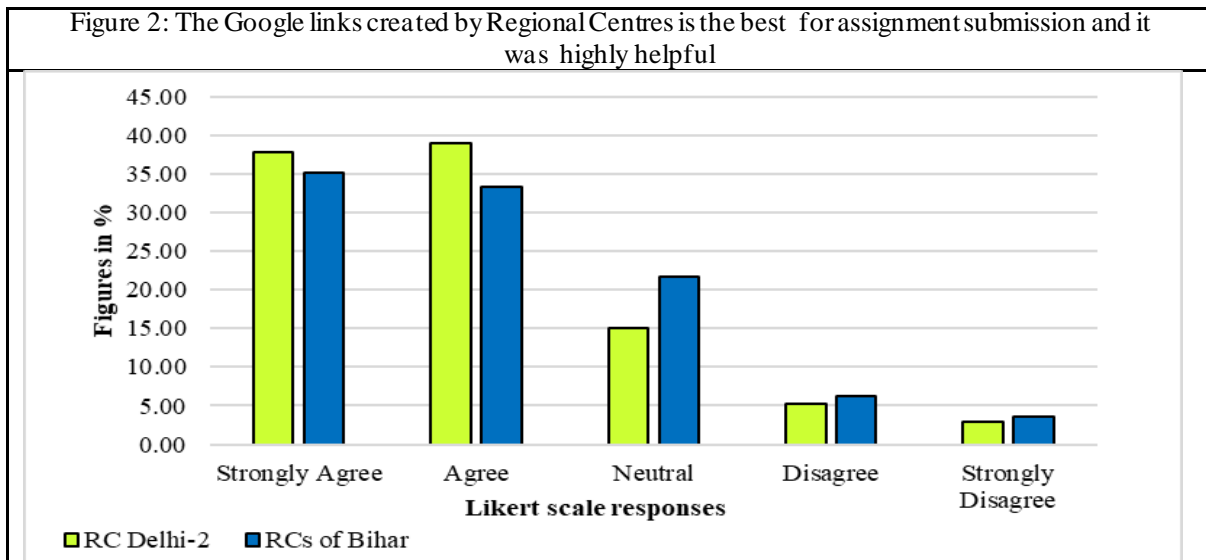
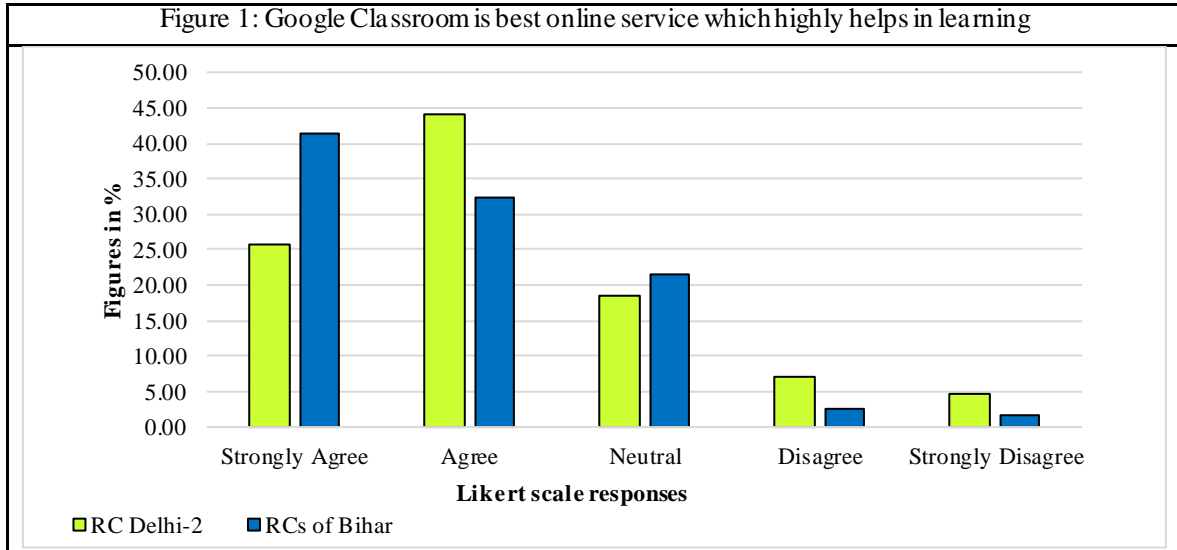


Figure 3 : The Project submission link was the best option for submission of all reports

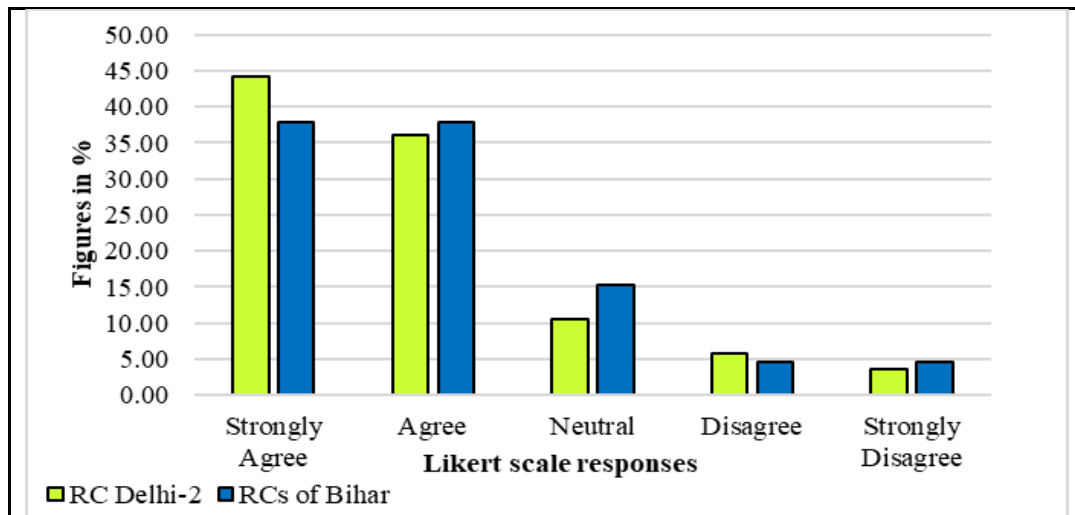
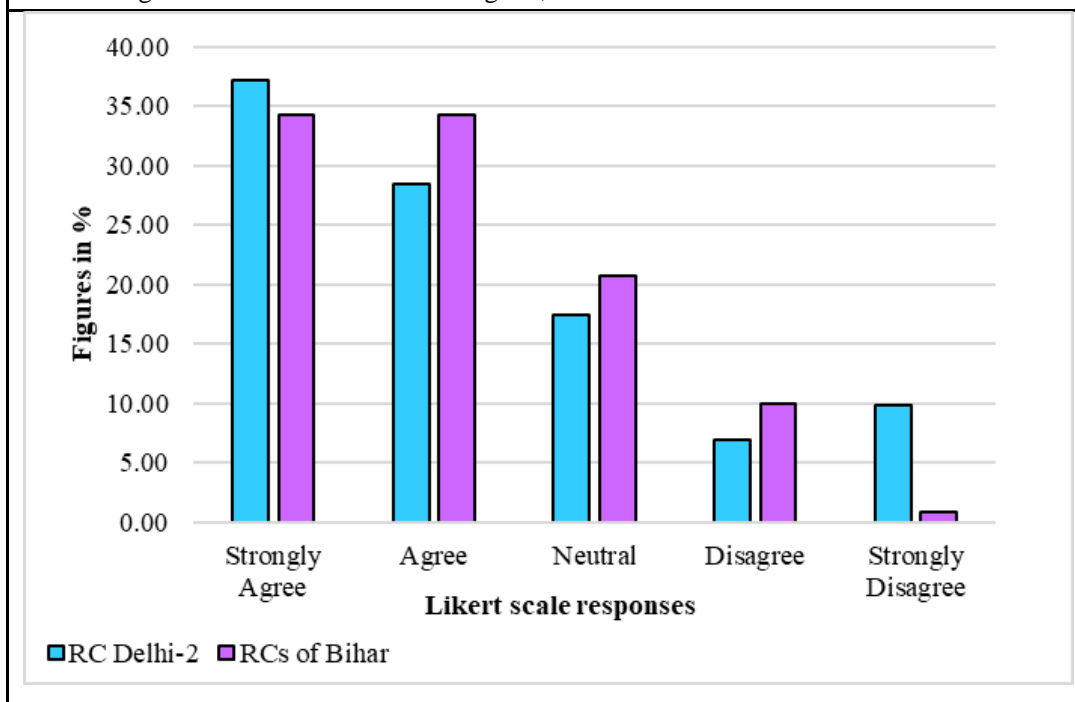


Figure 4 : The online facilities are good, but face to face activities must continue



Data Analysis on the TAM Framework

The Technology Accessibility Model (TAM) of Davis, which studies the user acceptance of information systems will be the basis to assess the 'user acceptability' of online counselling methods and other facilities used during the period of pandemic at the Regional Centres of Delhi and Bihar to understand the impact of online initiatives and challenges for digital inclusion across geographical spaces. The study is based on primary data and information was collected through questionnaire designed on Google form, from students of two Graduate Programmes in the Regional Centres of Delhi and two from Bihar. These Programmes are MCA (Masters of Computer Applications) and MAPC (Masters in Psychology).

The following number of items were included for each of the constructs defined in TAM, Perceived Usefulness (PU) – 4 items, Perceived Ease of Use (PEOU) – 6 items, Intention of Use (UI) – 3 items and the Attitude of use (ATT) – 4 items. The reliability of the constructs were tested using the Chronbach's Alpha which determines the level of closeness of items, as a construct. A value of more than .7 is considered to be good, more than .8 is better

and more than .9 is considered to be excellent. The Chronbach alpha values for the MAPC students (non computer science background) shows good internal consistency for both places of Delhi -2 and RCs of Bihar. But for MCA students, the internal consistency is near to excellent for RC Delhi -2. The results indicate towards the reliability of the constructs.

Table – 2: Chronbach’s Alpha to Ascertain the Levels of Closeness of Items in Constructs

Programmes	Constructs	Number of Items	Chronbach’s Alpha	
			RC Delhi -2	RCs of Bihar
MAPC	PU	6	.85	.83
	ATT	4	.76	.89
	UI	3	.84	.80
	PEOU	4	.82	.87
MCA	PU	6	.94	.88
	ATT	4	.88	.81
	UI	3	.83	.80
	PEOU	4	.90	.81

Multiple Linear Regression Analysis for Understanding Spatial and Programme wise Differences

The linear regression studies the linear relationship between one dependent variable and one or more independent or the explanatory variables. A liner regression analysis has been done considering attitude (ATT) and intention (UI) as dependent variables and usefulness (PU) and ease of use (PEOU) as explanatory variables for each of the two dependent variables (ATT and UI). Since the study aims to study the spatial differences (if any) in the attitude and intention of students and also the difference in attitude and intention of computer science (MCA) and non-computer science (MAPC) students, separate regressions have been run in the XLSTAT to obtain the coefficients. The following hypothesis were formulated.

1. The null hypothesis related to **spatial differences** (Total sample size : Delhi 2 – 172, Bihar – 111) are stipulated as under.
 - i. PU and PEOU have no influence on the Intension of use (UI) of students of Bihar regional Centres
 - ii. PU and PEOU have no influence on the attitude (ATT) of students of Delhi -2 Regional Centre.

The following Regression tables explain the results with respect to the null hypothesis.

Table – 3: Regression analysis of Intension of Use with Perceived Usefulness and Perceived Ease of Use (Spatial)

RCs	Correlation of UI		R ²	F Value	Test
	PU	PEOU			
RCs of Bihar	0.76	0.82	0.74	150.66	<0.0001
RC Delhi -2	0.69	0.77	0.65	151.56	<0.0001

In the case of Regional Centres of Bihar, the value of R² explains that 74% of the variability of the dependent variable, IU. The p-value of the F statistic and given the significance level of 5%, it can be said that the information brought by the explanatory variables (PU and PEOU) is significantly better. Among the explanatory variables, the variable PEOU is the most influential.

In the case of RC Delhi -2 the value of R² explains that 65% of the variability of the dependent variable, IU by the 2 explanatory variables PU and PEOU. The p-value of the F statistic and given the significance level of 5%, it can be said that the information brought by the explanatory variables is significantly better among the explanatory variables. The variable PEOU however is more influential.

Therefore, the null hypothesis no.1, that PU and PEOU have no influence on the Intension of use (UI) of students of Bihar regional Centres and Delhi Regional Centre gets rejected.

Table – 4 : Regression analysis of Attitude towards Use with Perceived Usefulness and Perceived Ease of Use (Spatial)

RCs	Correlation of ATT		R ²	F Value	Test
	PU	PEOU			

RCs of Bihar	0.70	0.78	0.65	103.22	<0.0001
RC Delhi -2	0.79	0.70	0.68	179.78	<0.0001

For RCs of Bihar the R^2 value of 0.65 states that 65% of the variability of the dependent variable ATT is explained by the 2 explanatory variables (PU and PEOU). Given the p-value of the F statistic and given the significance level of 5%, the information brought by the explanatory variables is significantly better among the explanatory variables. The variable PEOU is more influential than PU.

For RC Delhi-2 the R^2 value of .68 states that 68% of the variability of the dependent variable ATT is explained by the 2 explanatory variables (PU and PEOU). Given the p-value of the F statistic and given the significance level of 5%, the information brought by the explanatory variables is significantly. Among the explanatory variables PU is more influential.

Therefore, the null hypothesis no.2 that PU and PEOU have no influence on the attitude (ATT) of students of Delhi -2 Regional Centre gets rejected.

2. The null hypothesis related to **Programmes (computer science and psychology)** (Total sample size : MCA – 144 , MAPC – 139) are stipulated hereunder.
 - i. PU and PEOU have no influence on the Intension of Use (UI) of students computer science programme (MCA)
 - ii. PU and PEOU have no influence on the attitude (ATT) of students of non -computer science programme

Table – 5 : Regression analysis of Intension of Use with Perceived Usefulness and Perceived Ease of Use (Computer science and Psychology students)

RCs	Correlation of UI		R^2	F Value	Test
	PU	PEOU			
MCA	0.75	0.81	0.71	179.79	<0.0001
MAPC	0.69	0.75	0.64	120.77	<0.0001

For the MCA Programme , R^2 explains 72% of the variability of the dependent variable IU is explained by the 2 explanatory variables (PU and PEOU). Given the p-value of the F statistic computed and given the significance level of 5%, the information brought by the explanatory variables is significantly better among the explanatory variables. The variable PEOU is the most influential.

For the MAPC Programme , the R^2 explains 64% of the variability of the dependent variable IU is explained by the 2 explanatory variables (PU and PEOU). Given the p-value of the F statistic computed and given the significance level of 5%, the information brought by the explanatory variables is significantly better among the explanatory variables, The variable PEOU is comparatively more influential.

The null hypothesis no. 1 that PU and PEOU have no influence on the Intension of Use (UI) of students computer science programme (MCA) gets rejected

Table – 6: Regression analysis of Attitude towards Use with Perceived Usefulness and Perceived Ease of Use (Computer science and Psychology students)

RCs	Correlation of ATT		R^2	F Value	Test
	PU	PEOU			
MCA	0.81	0.75	0.71	174.29	<0.0001
MAPC	0.72	0.72	0.63	119.04	<0.0001

For the MCA Programme R^2 explains 71% of the variability of the dependent variable ATT is explained by the 2 explanatory variables (PU and PEOU). Given the p-value of the F statistic and given the significance level of 5%, the information brought by the explanatory variables is significantly better. Among the explanatory variables, PU is the most influential.

For the MAPC Programme the R^2 value explains 63% of the variability of the dependent variable Mean_ATT is explained by the 2 explanatory variables. Given the p-value of the F statistic and given the significance level of 5%, the information brought by the explanatory variables is significantly better. Among the explanatory variables, PEOU is the most influential.

Therefore, the null hypothesis no. 4 that PU and PEOU have no influence on the attitude (ATT) of students of non-computer science programme also gets rejected

Discussion on the Findings

It can be concluded with some surety that, the digital means of communication and facilitation have been well accepted by the student community, for the case in context. As students of both regions, irrespective of the geographical, social, economic and development distances, have agreed that the online classroom and other services created by the University, were facilitative, the reasons for rating the services as facilitative, could be attributed to their access to the devices, usefulness in the time of pandemic induced distress and also to their competence in operating those devices.

The TAM analysis of the responses indicated that the 'perceived ease of use' (PEOU) has been the most important factor in determining the 'attitude' and 'intension of use' for students of Bihar and Delhi. And also, for students of MCA and MAPC, irrespective of region to which they belonged. The 'perceived usefulness' is the secondary explanatory variable. With the given amount of exposure to technology, new features, apps and artificial intelligence (AI) making things and life easier, it is quite comprehensible that the generation today, is comfortable with technology and competent enough, to use it. Hence 'ease of use' (PEOU) has more explanatory power in context.

The 'utility' (PU) factor is important for MCA students, as for them, technology is embedded in course itself, apart from life and surroundings.

The results corroborate the studies in literature, that 'ease of use' and usefulness' determine the actual use of technology and the intension to keep continuing to do so. Gender, place, programme of study, socio-economic backgrounds may have a bearing on the results and the degree of variation will depend on the samples chosen for study. The samples may vary in geographical location, access and affordability, competencies to use the technology and perceptions about understanding the utility for a actual use.

Conclusion and Way forward for Practitioners

Technology is a 'resource' as long as it has the capability to serve the purposes of humanity. Its usage for mass education and training is a groundbreaking thought and is not only confined to the ODL system. Even the conventional systems have joined the online platforms for class activities and other works, especially during the pandemic.

However, it is also apparent from the study above, that technology can have only a supplementary roleplay but it cannot substitute the conventional practice of face-to-face interaction. Around two thirds of the sample from both regions, have agreed or strongly agreed that technology mediated activities must continue as a supplement to face to face interactions. What could be the reasons that makes them to think about the significance of face-to-face interaction, when they have technological compatibility and device availability? Certainly, the human connect is important and empathy matters, which a device may not be able to provide. Teacher cannot be substituted with technology.

Teaching happens only when learning occurs. It needs to be ensured, that at every node or user end, learning is happening. In addition, learner requirements may be different within a region, the pace of learning may vary, socio-economic backgrounds may be different, purpose of learning may be different as well. And all their requirements need different approaches. For this, customized interventions may be necessary.

The components of a programme may also require different approaches. All hands-on components, practicals, contact programmes, workshops etc. must mandatorily be in the face to face mode in any region. This will facilitate better learning and the human connect will also be thriving. It will also promote the blended mode of learning

The spatial factors are also very important in country with huge geographical spread and also with areas of remote and challenging access. Under such a condition, one yardstick may not fit all situations.

Limitations of the study

The limitations emerge from the discussions above. Probably, the findings of the study would considerably change if the sample is taken from a geographically difficult area, with limited network, a tribal remote area etc. Society and gender-based contrasts may also be there. Further studies can be undertaken, with such sections and pockets if inclusion is the mandate of the institutions of learning.

The sample size of the study was dependent on the responses received and the scope of the study would have widened with more numbers of students and also across other programmes. Aspects of technology acceptability other than ease of use and usefulness could also be measured like competence of individuals to receive and reflect and respond.

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