POST COVID BEHAVIOURAL INTENTION OF STUDENTS TOWARDS BYOD (BRING YOUR OWN DEVICE) IN EDUCATIONAL INSTITUTIONS

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Abstract

Contemporary developments in education highlight the tools and services of ICT and their role in attainment of education objectives and enhancement of learning experience and results of students. One of the key changes in education and classrooms in the post-pandemic world is how educational institutions handle personal devices. Personal devices were often kept out of classrooms and quickly confiscated before the pandemic, but post-pandemic students may be encouraged to bring their own devices into the classroom. After a year of hybrid learning, students have become habitual of doing their academic work and attend classes using whatever devices were available. This has led to the promotion of BYOD (Bring your own Device) to school and college. Previous concerns about BYOD in the classroom included these devices as a distraction for students rather than a productivity boost. A major concern, however, was security and how to keep the school system secure when deploying external devices. BYOD also highlights disadvantages for students from low-income families. The benefits of BYOD in education outweigh the drawbacks. Even if only a few students can be BYOD enabled, the education budget will need to be significantly reduced, allowing educational institutions to focus on providing technology to students who need it. Document sharing and collaboration is easier when students work on their personal devices. Additionally, the BYOD strategy allows students to access course information, assignments and tests, calendars, and extracurricular information from their personal devices, whether at home or in the classroom. This information is stored in the cloud and accessible from any device.

In this paper, the authors have researched on students' behavioural intentions and challenges towards Bring Your Own Device (BYOD) strategy and the Impact of COVID-19 on the attitude of students towards the same. To conduct this research, data is collected from around 300 participants who were students of higher education institutions of Indian universities. A TAM model has been proposed taking into account the factors impacting the students' behavioural intention towards BYOD.

Keywords: BYOD, TAM, Education, Human computer interaction, eLearning, post pandemic

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Introduction

The coronavirus pandemic forced the educational institutions to rapidly transform and innovate teaching and learning methods and employ creative ways to continue operations in the times of disability to function physically [1]. In uncertain times, most universities adopted urgent distance learning teaching and assessment to save the 2020 academic year [2]. Avoiding crowd regulations have encouraged schools to provide learning material online and has thus provided opportunities for students to learn using mobile devices and other technologies.

Many higher education institutions implemented a bring-your-own-device strategy before the COVID-19 outbreak [4-6]. A BYOD strategy works well when students bring their own mobile devices to college and use them for learning. [7]. Almost every student entering college now has a mobile device [5]. Many studies point that more than 87% of higher education students use personal smartphones [8].

TAM application in BYOD

In recent years, a number of developments have taken place in education sector. The educational institutions have understood the importance of ICT and accepted that it is an integral part of education system. The ICT is facilitating various tasks involved in creating and delivering content and enables to carry out various other activities involved in the education industry in a much better way [11]. The technical advances in education make teaching and learning more effective and accessible. To retrieve the full advantage of technology enabled educational integration, students need uninterrupted computer access. Bring your own device (BYOD) in class means student bring their own devices such as laptops, tablets and smartphones to the class and use their own device instead of depending on equipment provided by schools/colleges. This allows students to access technology all the time. Performance of BYOD in the field of education cannot be generalized because there are specific problems related to government regulations and university systems in different countries and regions. There are infrastructure requirements that must be defined and implemented to effectively deploy BYOD. At times, the financial constraints exist that may hamper the implementation of the infrastructural requirements for BYOD. Today, computing devices are quite affordable and development of internet and mobile technology makes the use of these devices possible anywhere

and at any time. It works as an incentive for students to buy and take home their own device. Learning with the aid of technology is one area interest for educational researchers. They want to determine if BYOD will provide an additional advantage for the education industry by applying technology. TAM has been used in many fields to predict user acceptance of technology and this research paper proposes a TAM to understand the post Covid acceptance of BYOD for students of higher education institutions. The following TAM variables are used to predict BYOD adoption:

1) Perceived Usefulness (PU)

BYOD's perceived usefulness indicates easy access to learning resources for students if they use their own devices instead of university equipment. Personal devices enable students to access learning content anytime and anywhere and thus gives them personalized learning capabilities. Research [17] suggests that mobile devices are not only useful for better access to learning resources, but they also have a positive effect on overall educational outcomes. Personal devices are also useful for teachers and students as they allow them to use their free time more effectively on campus.

2) Perceived ease of use (PEOU)

The second variable for TAM is the perceived ease of use (PEOU). Owned equipment by students is easier to use because they are used to these devices. The students can customize the screen and can select and download apps and resources according to their individual requirements and preferences. Using personal devices also allows the students to download content from internet whenever needed and they can also receive and share content with other students and teachers.

3) Attitude of Use (ATU)

A user will actually start using the technology if he/she has an attitude towards the use of this particular technology. Therefore, it is important to predict the attitude of users when using TAM to predict of technology adoption. Attitude influences the behavioural intention of Use (BIU) technology and finally predicts the actual usage.

Research model and hypothesis

TAM is used to predict user perception and the intention to accept a new technology [5]. Technology Acceptance Model (TAM) is designed to understand and derive the influencing factors that lead to the adoption and use of a technology. The model can be derived before adopting a new technology to understand the role of different

factors that may impact the use technology. The theoretical model of TAM is built on the assumption that when the user is presented with a new technology, the key elements influencing their decision to accept it are Perceived usefulness, Perceived ease of use and attitude towards the use of technology.

The Bring Your Own Device (BYOD) policy is that the students and staff are allowed to bring their own devices such as tablets, laptops and smartphone for use in class for learning activities.

In this paper we have considered some external factors that affect the adoption of the BYOD educational model.

Hypothesis is formed after testing the following external variables:

Fear of infection from shared devices (E1)
Probability of restart of online classes (E2)
Modern teaching pedagogy (E3)

Perceived comfort of use (PEOU), Perception Utility (PU), Attitude towards use (ATU) and behavioural intention to use (BTU) for the BYOD education model is assuming the following:

 Behavioural intent is a measure of a person's likelihood of using an application [10].

In the technology acceptance model, behavioural intentions are determined by both attitudes and perceived usefulness [11].

In this Research we have considered student behavioural intentions to use mobile devices to perform tasks during and after the pandemic. This process is successful [1] but some studies have shown that the digital divide poses problems for people with lack of access to technology, lack of network, and Wi-Fi and lack of devices [1] [2].

As the BYOD strategy has been deployed many times in higher education, it has experienced various challenges. Some students are not comfortable bringing devices to class on a regular basis and sharing their devices with their classmates [12]. Lack of support from educational institutions was also reported [13]. Furthermore, the primary security concern was not with devices and information within the organization, but about controlling user and device access and elevation to organizational information Corporate network malware exposure due to lack of control and visibility of mobile devices [14].

The purpose of this study was to examine student behavioural intentions and challenges when using BYOD during COVID-19 Pandemic in Higher Education. First, the behavioural intention structure of technology acceptance model (TAM) questionnaire was used to determine a student's behavioural intentions to use her BYOD during class. Next, challenges related to use of BYOD in the post-pandemic classroom were identified.

Method

A pragmatic approach is used for this research. A central assumption in using this approach is that both the quantitative data as well as the qualitative data such as personal experience, comments from surveys, etc. are used to derive results. Interviews provide researchers with much richer material for drawing correct conclusions than data alone. [16].

Demographics of participants:

Total participants in the study	300
Male Participants	210
Female Participants	90
Participants Between Ages of 18-20	120
Participants Between Ages of 21-25	180
Students Owning Smartphone	300
Number Of Students Owning Laptops	280
Number Of Students Owning Tablets/IPad	180

While on campus, students were able to access not only Wi-Fi inside the classroom, but also hotspot areas outside the classroom [1].

First step was to determine the external factors that impact the adoption of BYOD post pandemic. For this purpose, interviews were conducted with 20 students and 10 faculty members.

To create a TAM for BYOD adoption, we conducted a study where a questionnaire was developed keeping the PU, PEOU & ATU along with the external factors in mind. The questionnaire was distributed for data collection to post graduate level college students. The responses were collected to study the impact of TAM variables on behavioural intention to use the BYOD.

Table 1: Questionnaire

Attitude Towards Using (ATU)
1) It is a good idea to bring my own devices to college ATU1
2) My learning will be more enjoyable if I use my own devices in classroom ATU2
3) Using my own devices will have a positive impact on my education. ATU3
Perceived Ease of use (PEOU)
4) It is easier to use my own devices PEOU1
5) It is easy to complete my projects and assignments on my own devices. PEOU2
6) I will have flexibility of working at my own pace if I bring my own devices to college. PEOU3
Perceived Usefulness (PU)
7) Using my own devices helps me get better grades. PU1
8) Using my own devices makes me accomplish tasks quickly PU2
9) Using my own devices makes my work easier. PU3
Behavioural Intention to Use (BTU)
10) I plan to bring my own devices to college BTU1
11) If I am allowed to use my own devices in class, I will bring my own devices. BTU2
External Factors (E)
I have a fear of infection from shared devices (E1)
I feel online classes will restart soon (E2)
Modern teaching pedagogy is digitally inclined (E3)

The research is conducted to derive the behavioural intention of students and attitude of students towards BYOD post Covid pandemic. We have added a factor of fear of infection by sharing devices and also the probability of colleges getting closed and restart of online classes.

Also after the pandemic, the teaching pedagogy has changed to include many tasks such as assignments and tests being conducted online. This may also be a factor to encourage students to bring their own devices to college.

These factors are included in external factors for the TAM model.

TAM is used to predict users' perception and intention to adopt new technology (Hassan 2011). The Technology Acceptance Model (TAM) is designed to demonstrate the factors that influence the adoption and use of technology. TAM can be applied prior to the adoption of a new technology so that the use of that technology can be made better. The theoretical model of TAM is based on the assumption that when users are introduced to a new technology, the main factors influencing their adoption decisions are perceived usefulness, perceived ease of use and attitudes towards the use of technology. The bring your own device (BYOD) policy means that students and staff are allowed to bring their own devices such as tablets, laptops, and smartphones for classroom use. Learning activities and assist teachers in preparing for their lessons. Several external factors also influence the acceptance of the BYOD educational

model. The hypothesis is formed after taking into account the following external variables:
Fear of infection from shared devices (E1)
Probability of restart of online classes (E2)
Modern teaching pedagogy (E3)

The Perceived Ease of use (PEOU), Perceived Usefulness (PU) and External Factors impact the Attitude towards Using (ATU) and Behavioural Intention to Use (BTU) for the BYOD model of education and are hypothesized as following:

H1: Perceived Ease of use (PEOU) has a positive impact on the Perceived Usefulness (PU) of BYOD.

H2: Perceived Ease of use (PEOU) has a positive impact on the Attitude towards Using (ATU) BYOD.

H3: Perceived Usefulness (PU) has a positive impact on the Behavioural Intention to Use (BTU) BYOD.

H4: Perceived Usefulness (PU) has a positive impact on the Attitude towards Using (ATU) BYOD.

H5: Fear of infection from shared devices (E1) positively impacts the Behavioural Intention to Use (BTU) BYOD

H6: Probability of restart of online classes (E2) has a positive impact on the Behavioural Intention to Use (BTU) BYOD.

H7: Modern teaching pedagogy (E3) has a positive impact on the Behavioural Intention to Use (BTU) BYOD.

Hypothesis Testing

The hypothesis are tested using the correlation analysis in R. The results are used to find the impact of the TAM variables on behavioural intention to use BYOD. The analysis is used to accept or reject the hypotheses.

The results are interpreted as follows:

| Hypothesis	VARIABLE 1	VARIABLE 2	Correlation	Result
H1	Perceived Ease of use (PEOU)	Perceived Usefulness (PU)	0.37	Accept
H2	Perceived Ease of use (PEOU)	Attitude Towards Using (ATU)	0.65	Accept
H3	Perceived Usefulness (PU)	Behavioural Intention to Use (BTU)	0.34	Accept
H4	Perceived Usefulness (PU)	Attitude Towards Using (ATU)	0.58	Accept
H5	Fear of infection from shared devices (E1)	Behavioural Intention to Use (BTU)	0.54	Accept
H6	Probability of restart of online classes (E2)	Behavioural Intention to Use (BTU)	0.01	Reject
H7	Modern teaching pedagogy (E3)	Behavioural Intention to Use (BTU)	0.70	Accept
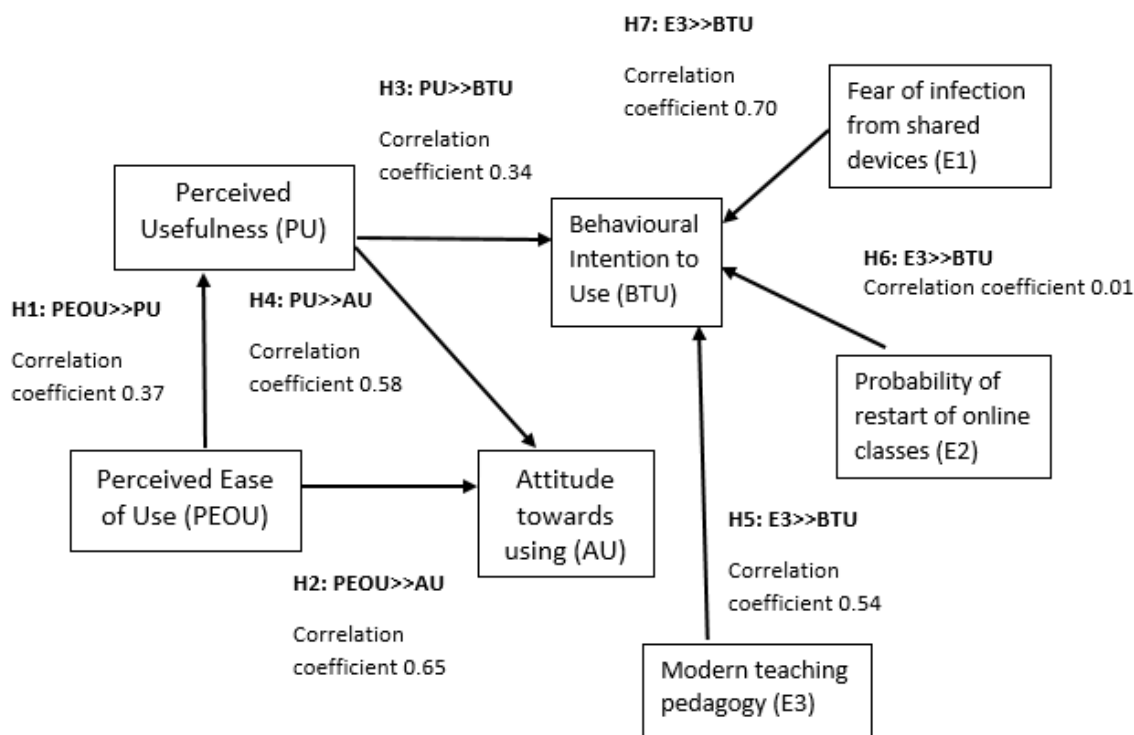
Figure 1: The proposed TAM Model for BYOD

Conclusion

The COVID-19 pandemic has motivated various schools and colleges to transform their teaching methodology to adopt online teaching and learning. During the lockdown phase in Covid time, most of the higher education institutions adopted remote learning, teaching and assessment. To continue using the ICT for education, BYOD can be effectively used in most higher education institutions for both on campus and off campus teaching.

It is a known fact that most students entering higher education own laptops and personal smartphones.

It can be concluded that in this study, the behavioural intention of students using BYOD to participate in school work is positive.

The students have positive intentions about BYOD and plan to continue using it in the future. This implies that students would love to use their devices even after the pandemic.

In spite of all the remote learning and use of personal devices, the pandemic has exposed some challenges and problems such as the digital divide, lack of access to technology, lack of networking and Wi-Fi at the institutions, and therefore not all students can take advantage of the BYOD concept.

However, institutions are working towards addressing these issues.

Recommendations

Students' behavioural intentions to use BYOD should be considered to ensure providing appropriate learning materials. BYOD policy should be in place for success carried out in higher education institutions. When students return to school after the pandemic, Wi-Fi provisioning and access is enhanced to avoid barriers to BYOD teaching and learning strategies. There should be terms and conditions between the student and the institution regarding the use of mobile device management tools to remotely wipe or wipe some data partitions on BYOD users' devices for security purposes. Load and store trolleys in the classroom the technology seems easy to implement in schools, as most students provide the technology themselves, but if schools require students to bring their own devices, the classroom must be able to store devices. Device securely and provide room for the device. Payload. Classes are not designed to allow 30 students to plug in and charge their devices at the same time; there are not enough sockets, or not enough electricity. In addition, most classrooms are arranged so that students face the classroom, so as not to facilitate charging from a wall outlet.

While bringing technology into the classroom seems easy on paper, one hurdle we need to overcome is what do we do when schools invite more people back into the classroom? Primary school teachers and students may not mind going back to pencil and paper; however, higher and higher education have seen the benefits of working on a laptop and don't want to go backwards. Record videos and lectures in every class

Capture and share the best lessons; Use them for teachers to observe and develop or share them with students to capture lessons and reinforce their learning. Lecture recording and video recording is rapidly becoming the norm, especially for blended learning environments where some parts of the classroom are inside the classroom and some parts are far away.

More video collaboration in schools: While classes are now video-enabled, for full-time distance learning students (or short distance learning students) they should still be engaged and have the same experience as students in school. This means councils must facilitate video and pave the way for the recording and streaming of graduations and school performances.

Early in the pandemic, schools upgraded their physical classrooms by installing video and audio capabilities to enable blended learning. These upgrades have increased classroom capacity tenfold, but current video capabilities require that anyone who wants to join the class be invited to video chat on the school's chosen collaboration software.

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