Faculty acceptance of virtual teaching platforms for online teaching: Moderating role of resistance to change

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Under this “new normal” world scenario, online teaching has been essential rather than a choice in continuing learning activities. During the COVID-19 period, virtual teaching platforms played an important role in the success of online teaching in various higher educational institutions. Thus, the current study attempted to predict faculty adoption of online platforms by introducing a set of essential drivers for engaging in online teaching. Following the theory of reasoned action, the study broadened the technology acceptance model variables and security and trust as extrinsic determinants and included resistance to change as moderators to invigorate the research model. Data were collected through an online survey with a sample size of 418 Indian respondents. Our results posit that perceived ease of use, usefulness, security and trust positively influence the faculty's intentions to adopt online platforms. In addition, the study also reported that positive intention leads to the actual use of virtual platforms. Furthermore, the research found the moderating role of the resistance to change dimension in the association of intention and actual use of virtual teaching platforms. The findings provide both theoretical and practical applications of educational technology.

Implications for practice or policy

- The first step for accepting virtual teaching platforms is to help faculty to reduce their resistance for effective online teaching.
- Higher education institutions should have a policy promising faculty that online teaching using virtual teaching platforms will offer a safer and more trustworthy environment.
- Higher education institutions should undertake intense organisational renewal and implement bottom-up processes for synchronous learning.
- Regulators could frame a policy including virtual teaching platforms to provide interactive professional development opportunities.

Keywords: COVID-19, online teaching, synchronous learning, videoconferencing, technology acceptance model

Introduction

The pandemic has altered the education sector as it propelled optimisation in teaching, particularly delivery methods. Until March 2020, the classic teaching scenario in educational institutions was characterised by students summoned to classrooms in accordance with their timetables. Teachers covered the required syllabus through a formal face-to-face lecture system. However, the lockdown scenario confronted educators, students and parents with an exclusively neoteric situation (Huber & Helm, 2020). All educational institutions have been forced to quickly adopt online teaching. Advanced approaches to teaching have emerged, and most academicians have altered the methods to enable learning outcomes (Bryson & Andres, 2020). Under this “new normal” world scenario, online teaching has been essential rather than a choice to continue teaching activities. Thus, most faculty adopted the online teaching approach for students during this period (Bryson & Andres, 2020).

In the current scenario, online teaching has two main designations: synchronous and asynchronous (Nieuwoudt, 2020). Asynchronous instruction allows the faculty to use technology-driven tools to instruct students (Chen et al., 2020). On the other hand, synchronous teaching allows them to interact with students, similar to face-to-face teaching (Nelson, 2017). Synchronous instruction did not become widespread compared to asynchronous instruction due to demand, reach, cost, insufficient tools and timing issues (Alshurafat et al., 2021). However, the COVID-19 outbreak provided the opportunity for faculty around the globe to utilise synchronous teaching, and it became a didactic transformation from the classic approach to the contemporary approach of teachings, for instance, physical classroom to Zoom, from personal to virtual, and seminars to webinars (Mishra et al., 2020). Educators all over the globe make use of a wide array of virtual teaching platforms (VTPs), namely Zoom, Google Meet, WebEx, Blackboard Learn, WeVideo and many more as synchronous ways of teaching for the continuance of face-to-face learning. Hence, VTPs have been broadly viewed as a novelty that has revolutionised higher education learning during this pandemic (Mishra et al., 2020) because they contain immediate feedback, interactive clarification and a greater sense of presence and commitment (Nieuwoudt, 2020). These platforms are seen as a positive model in higher education during the pandemic, allowing faculty and students to use a virtual environment to interact online (Khan, 2022). As a result, increasing usage of VTPs in higher educational institutions motivated us to explore the adoption of these platforms among faculty in higher educational institutions.

Although studies have focused on utilising technology for online teaching, mainly for the asynchronous form of teaching (Al-Adwan, 2020; Al-Azawei et al., 2017; Huang et al., 2014), there is limited literature focused on the intention and actual usage of VTPS for synchronous teaching approach. Correia et al. (2020) have evaluated various videoconferencing platforms in terms of their usability and support and reported a number of issues educators face in utilising these platforms for learning and teaching. Similarly, Bozarth (2022) has highlighted the teacher's experiences and difficulties in virtual classroom interactions. However, there are no explicit references to faculty perceptions of adopting these platforms for enhancing learning and teaching. Thus, the present paper fills a specific gap in education technology literature by analysing higher education faculty's intentions to use VTPs for synchronous teaching.

Even though research has presented a general introduction to online teaching platforms, their usage in online teaching and the benefits and challenges of using these platforms, there is a dearth of information about the perspectives of faculty utilising VTPS for teaching. This study aims to add to the existing educational literature by examining faculty perceptions of VTPs in India. Therefore, the study used an extended technology acceptance model (TAM) as the theoretical framework for developing a research model to analyse distinct determinants affecting teachers' behavioural intention to adopt VTPs (E. W. Cheng, 2019). This paper also tries to shed a light on teachers' outlook on the impact, comfortability and sustenance of VTPs, along with assessing VTPs' security, trust and resistance to change (RTC). RTC among users opposing the adoption of innovative technology is a demanding obstruction to its execution (Venkatesh et al., 2000). RTC has a two-fold effect: on one hand, it resists the adoption and implementation method; and on the other, it also impacts the overall outcome (Al-Adwan, 2020). Conversely, it affects users seeking to adopt automation (Bartos et al., 2011). Hence, it is imperative to examine the role of RTC in adopting VTPs in higher education institutions.

Review of literature and theoretical foundation

Review of literature

E-learning is a relatively new concept in higher education; it started in 2000 and saw a varying research output from 2000 to 2019 (López-Belmonte et al., 2021). Researchers have discussed e-learning systems over the past 2 decades, but no particular area of focus has been identified (López-Belmonte et al., 2021). After the COVID-19 outbreak, the literature on technology-based education likely saw an increase at both university and non-university levels (Xie et al., 2021). Numerous efforts have been made by researchers worldwide to empirically explore technology in education across universities, colleges and school levels (Zhang et al., 2022), such as the promotion of learning engagement (Anthony & Noel, 2021), relevant

policies for online learning (Dhawan, 2020) and TAM (Zhang et al., 2022). There is a discussion on TAM related to online educational tools, for instance, massive open online courses (MOOCs) (Wu & Chen, 2017), learning management systems (Revythi & Tselios, 2019) and e-learning as a whole (Salloum et al., 2019). However, no research has been conducted regarding faculty perspectives on VTPs for synchronous teaching (Gurung & Goswami, 2022).

During the COVID-19 period, VTPs provided a viable option for teachers and students to enhance teaching and learning (Zayapragassarazan, 2020). Countries around the world adopted different ways to provide teaching: in China, lectures were commenced via television broadcast or online platforms (Anthony & Noel, 2021). The majority of nations started synchronous ways of teaching using different modes of online platforms such as Microsoft, Google and Zoom (Reimers & Schleicher, 2020). Given that companies started providing free subscriptions to teachers and students to continue learning, including G Suite and Microsoft Teams (Basilaia & Kvavadze, 2020), teachers started deploying curriculum-based modules through online lectures using online platforms (Zayapragassarazan, 2020). With the discussion mentioned above, it is evident that faculty began using online platforms to respond to COVID-19. However, researchers from the field missed the chance to gauge how staff were utilising VTPs for synchronous teaching. Thus, research conducted worldwide has clarified the pertinent factors influencing the intention and acceptance of online teaching platforms, offered guidance for developing an online teaching model and provided the theoretical foundations for understanding the online teaching process.

TAM, TRA and resistance to change

Integrating technology into education is recognised as an essential driver for improving teaching and learning (E. W. Cheng, 2019). To provide a robust theoretical base for choosing relevant determinants, the current study amalgamated three critical flows of research under the framework of TRA (a) the TAM (Davis, 1989), (b) the literature on trust and security (Hartono et al., 2014) and (c) the literature in RTC (Oreg et al., 2005). The study adopted TAM because it was found to be the most influential, highly predictive and commonly adopted model of information technology usage (Granić & Marangunić, 2019). Likewise, employing trust and security perceptions in the hesitant circumstances of the online environment is also reasonable (Hartono et al., 2014; J. B. Kim, 2012). Likewise, RTC is a vital personality trait in adopting technology (Venkatesh et al., 2000). Admittedly, all research has used similar characteristics to assess automation adoption because researchers can reconstruct and transform TAM based on the technology and context being examined (Sharp, 2006). Figure 1 depicts the study model for ascertaining the determinants that might affect the faculty adoption of VTPs. The dependent variables are the intention to use (IU) and actual use (AU) of VTPs. Considering the applicability of TRA to an information system, the TAM attributes – perceived ease of use (PEOU) and perceived usefulness (PU) – are significant drivers in VTPs adoption. Observing that the online teaching environment is uncertain, under the auspices of TRA, the present study proposed perceived trust (PT) and perceived security (PS) as additional drivers of VTP adoption. Meanwhile, the research assimilated RTC as a moderator to statistically examine their influence on the actual adoption of VTPs.

Nevertheless, studies have mainly focused on asynchronous teaching tools, and perhaps this is the first study that applied TAM in the synchronous online teaching system, particularly VTPs. Thus, it suggests that TAM will enhance the understanding of VTP adoption, as it is still in its early stage. The following sections briefly present the hypothesis related to the different factors as antecedents of the usage of the VTPs.

Hypothesis development

IU and AU of VTPs

IU is an individual's attitude to the use of any technology. The faculty's positive or negative feelings on using VTPs in online teaching are described as IU in this study. IU is the first step towards putting any technology into practice (Pavlou, 2003), and it is already one of the robust primary predictors of AU (Sheppard et al., 1988). IU has been found to be a critical mediator in the association between variables and specific technology adoption (Venkatesh & Davis, 2000). As a result, our research hypothesised that faculty with positive IU VTPs will actually use VTPs:

Hypothesis 1: IU positively influences teachers' perceptions of the AU of VTPs.

PU

PU is the degree to which a person believes using the information system would improve their job performance (Davis, 1989). It is also the most common variable as the key driver of technology adoption (Sharp, 2006). As a result, it is projected to be the key motivator for using VTPs in online teaching. We define PU of online teaching as teachers' belief that VTPs will enhance their effectiveness in delivering online lectures. In this context, it could be because of the suitable options of video meetings, online discussion and selection of contents like sharing files, audio, video, with such functions as tracking and assessing students' learning activities, cloud storage or breakout rooms. Due to the lack of focus on VTPs in the online education environment, we predicted that PU has a significant positive impact on teacher IU, based on the essence of TAM:

Hypothesis 2: PU positively influences teachers' intention to adopt VTPs.

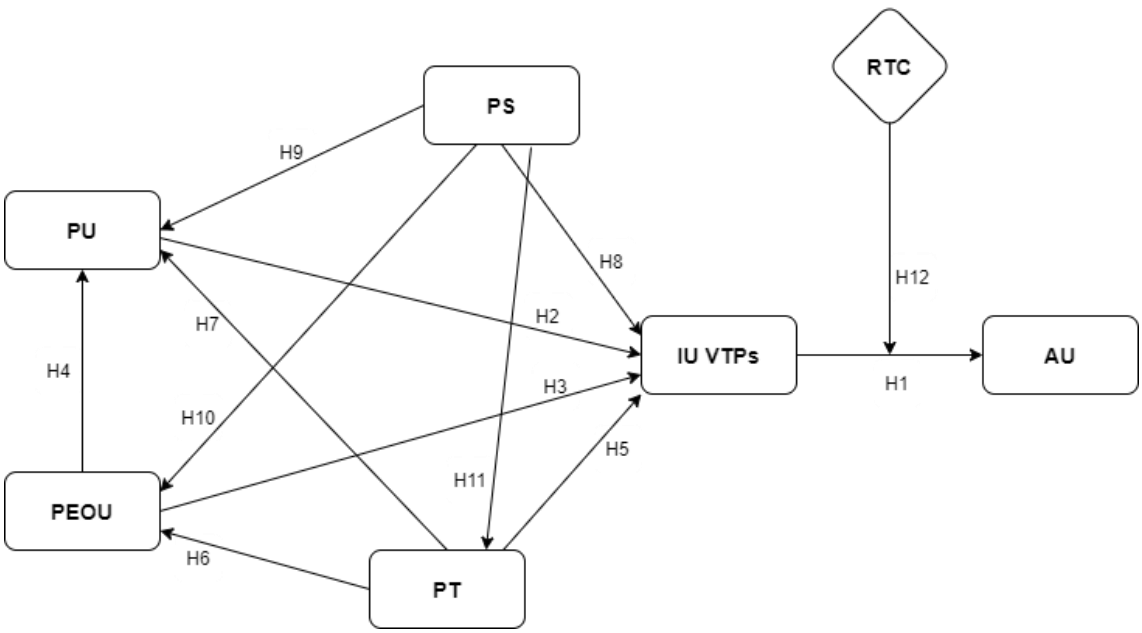

Figure 1. Research model

PEOU

PEOU refers to whether a person believes using the system will be easy (Davis, 1989). PEOU, when used for online teaching, refers to a faculty member's belief that using digital tools will be pleasant. Applied to VTPs, PEOU for faculty could entail interface design, such as different chat panels for organisers and participants, screen sharing, speaker view and the recording of meetings. Additionally, it could be

navigation tools, such as mute and unmute all, start and stop video and online teaching features such as notepad, highlighter and annotations, included in the platforms. PEOU has been shown to have a direct influence on both IU and PU in various technology systems (J. B. Kim, 2012), including massive open online courses (Wu & Chen, 2017) and digital libraries (Nov & Ye, 2009). Based on TAM literature, the study also proposed that PEOU positively affects PU and IU:

Hypothesis 3: PEOU positively influences teachers' intentions to adopt VTPs.

Hypothesis 4: PEOU positively influences teachers' perceptions of the PU of VTPs.

PT

PT is a psychological state in which a person has gained confidence and assurance in the information the system gives (Gefen et al., 2003). Practically, all relationships, especially those undertaken in an uncertain environment of the Internet, necessarily require trust (J. B. Kim, 2012). When someone lacks experience in and knowledge of innovative technological systems, trust in technology usage is typically employed to lessen the risk (Liao et al., 2011). The main barriers for online teaching methods are reliability and insecurity. Therefore, PT is particularly vital in utilising VTPs for online teaching, as Asiati et al. (2019) mentioned that the espousal in the adoption of techniques, the trust factor performs an essential role as it can influence the users' satisfaction level for using the particular platform. Many studies have shown that PT is a key factor in whether technology adoption succeeds or fails, including online purchasing (Pavlou, 2003) and Internet banking (K. K. Kim et al., 2009). As a result of the research mentioned above, we believe that trust is a significant element in predicting teachers' IU VTPs for online teaching:

Hypothesis 5: PT in VTPs positively influences teachers' intention to adopt online teaching.

PT and TAM

TAM has its origin in TRA. In fact, TAM can be regarded as a subset of the theory because it contains two salient beliefs (Pavlou, 2003). Prior studies integrate trust with two TAM constructs, namely PEOU and PU, with respect to Internet commerce (Gefen et al., 2003). Trust has been identified as a factor of PU, and theoretical evidence for incorporating PT with PU exists (J. B. Kim, 2012). Similarly, suppose VTPs can be trusted to function as expected by the faculty. In that case, the possibility of obtaining the expected advantages from employing the VTPs in online teaching will exist in the faculty's mind. In the online teaching context, the trust would lessen the faculty's need to cross-check every detail of sending data and sharing content and files while delivering online lectures. On the contrary, when trust is low, faculty would be forced to devote extra time and effort to all elements of online teaching, intensifying the time and effort required. The following propositions are proposed based on the above discussion:

Hypothesis 6: PT is positively related to the PEOU of VTPs.

Hypothesis 7: PT is positively related to the PU of VTPs.

PS

According to Fang et al. (2005), PS is the degree to which a user believes that utilising a particular application would not expose their private information to unauthorised parties. Much of the research on PS is based on TAM, which anticipates how users react to new technology (Salisbury et al., 2001). According to Hartono et al. (2014), PS impacts how and when people use new technology. Studies have commonly found the positive impact of PS in the successful adoption of a technology (i.e., e-commerce) (Chellappa & Pavlou, 2002) and Internet banking (K. K. Kim et al., 2009). PS was defined in our study as the extent to which an individual believed that utilising a specific technology platform would not entail security risks. The following hypothesis was proposed based on the facts mentioned above:

Hypothesis 8: PS has a positive impact on the IU of VTPs.

PS and TAM

Salisbury et al. (2001) were the first to integrate PS with TAM; they developed a perceived web security scale and tested its impact on user online purchase intention. T. C. E. Cheng et al. (2006) incorporated perceived web security, PEOU and PU in accessing banking websites. Hence, theoretical and empirical support exists for integrating PS and TAM variables (Hartono et al., 2014). Studies have proven a positive relationship between PS and PEOU (Lu et al., 2007) and PS and PU (Hartono et al., 2014). In this research context, faculty with high PS feel more comfortable with VTPs, allowing long-term use. The preceding facts support the hypothesis that PS and TAM variables are related:

Hypothesis 9: PS is positively related to the PEOU of VTPs.

Hypothesis 10: PS is positively related to the PU of VTPs.

PS and PT

Ratnasingham (1998) stated that when a customer develops favourable security perceptions, the relationship's trust and confidence will increase, promoting open, meaningful and influential information exchange. Studies have linked PS to PT in business to consumer e-commerce, such as Flavián and Guinalíu (2006) and Cheung and Lee (2006). Cheung and Lee showed that PS significantly impacts consumer trust in online buying. Flavián and Guinalíu (2006) reported that positive customer perception of e-commerce website security increases trust in the website. Similarly, we considered that faculty tend to have a better trust in VTPs if a higher level of security is believed to exist. Therefore, the proposition was:

Hypothesis 11: PS positively influences PT.

The moderating role of RTC

RTC is defined as an individual's behaviour that protects them from the effects of change (Zander, 1950). RTC has recently become a substantial personality trait for technology adoption (Venkatesh et al., 2000). RTC has been shown to demotivate and negatively influence technology acceptance, and it is one of the aspects that contribute to the non-adoption and failure of new information systems (Nov & Ye, 2009).

Gratz and Looney (2020) argued that it is up to the educator to decide whether or not to employ technology for instruction, which is generally seen as problematic and unnecessary by faculty. Similarly, Tagg (2012) argued that faculty RTC is a widespread issue. Moreover, higher education administrators have acknowledged that certain faculty members resist the need to move courses online (Allen & Seaman, 2012). Studies have found that RTC is a significant obstacle to implementing innovative systems in teaching (Gratz & Looney, 2020) and e-learning (Al-Adwan, 2020). In this study, we emphasised RTC because we also examined the early adoption of VTPs. We anticipated that RTC moderates between intended behaviours and AU of the online platform for teaching, based on the proposition tested in previous studies (Nejati et al., 2017).

Hypothesis 12: RTC moderates the relationship between IU and AU of VTPs.

Methodology

Data collection and procedure

The data was collected into two phases: pilot test and final survey. To evaluate the validity of the proposed model (Figure 1), we used judgemental sampling to conduct a pilot test with 80 faculty participants from various national institutional ranking framework (NIRF)-ranked universities in northern India. The Government of India, under the Ministry of Human Resource Development, developed the NIRF in 2015 to address concerns about the selection and monitoring of higher education institutions. Evaluating the data collected during the pilot study showed that no item had low reliability. Furthermore, based on the

pilot survey results, four online teaching platforms were identified as having the highest level of familiarity and choice among respondents: Zoom, Google Meet, Microsoft Team and Webex. The utilisation of multiple online teaching platforms in the study adds to the generalizability of the results.

To collect data from the participants, we randomly obtained faculty email addresses from a large number of NIRF-ranked university websites all over India for creating the respondent database. We extracted approximately 4000 email IDs of faculty members. The final survey data were collected via an online questionnaire, which was communicated to the participants via the collected emails. The instrument included demographics such as gender, age, marital status and experience on the job and seven constructs, namely PU, PEOU, IU of VTPs, AU of VTPs for online teaching, PS, PT and RTC in respondents (please see Appendix).

Data was collected over 2 months, from October 2020 to November 2020, resulting in 418 respondents completing the survey, a response rate of about 11%. The low response rate was anticipated because email communication was the only way to reach the respondents during the pandemic, as many email filters block mass emails from being delivered or classify them as low-priority communications. The data contained no missing values because the survey was developed using a forced-response option. All data were deidentified and represented with codes to indicate "FAC" for faculty. The respondents were also informed that the findings would be released in the aggregate to protect their identities. Institutional ethics approval was obtained for the study. Table 1 presents the respondent profiles.

Table 1
Respondent demographic profile

Variable	Frequency	Percentage
Gender		
Male	225	53.8%
Female	193	46.2%
Marital status		
Single	148	35.4%
Married	270	64.6%
Age		
18–29	161	30.1%
30–44	225	53.8%
> 45	32	16%
Experience (teaching)		
0–5	167	40%
5–20	175	41.9%
> 20	75	18.2%

Development of measures

All of the constructs in this study were measured using multi-item scales. We used the measures from earlier studies in the same technology acceptance context to maintain content validity. All constructs were measured on a 5-point Likert scale, ranging from *strongly agree* (5) to *strongly disagree* (1). The four-item scales for PU and PEOU were adapted from Venkatesh and Davis (2000). Similarly, the three-item PT scale was adapted from Pavlou (2003), and the two-item PS scale was adapted from Hartono et al. (2014). The two-item scale for IU was adapted from Venkatesh and Davis (2000), and the three-item scale for AU was adapted from Venkatesh et al. (2000). The four-item scale for RTC was adapted from Huang et al. (2014).

Results

The variables were tested using Anderson and Gerbing's (1988) dyad-staged procedure in the structural equation modelling (SEM) approach. Using IBM AMOS software, a covariance-based SEM technique was used.

Measurement model assessment

Before proceeding to the structural model, it is essential to consider the proposed research model's performance using goodness-of-fit indices as a first step. Based on Hu and Bentler (1999), the initial confirmatory factor analysis suggested an acceptable fit with all latent constructs modelled simultaneously as correlated first-order factors, as shown in Table 2, with χ2 = 356.96, df = 188, χ2 /df = 1.896, $p < 0.001$, GFI = 0.929, CFI = 0.973, TLI = 0.967, RMSEA = 0.046, and SRMR = 0.0346. The threshold limit of 0.5 was surpassed by all factor loadings of all items (Hair et al., 2014). The *t* values ($p < 0.01$) were significant for all factor loadings.

Table 2
Fit indices

Index	Recommended value	Actual value
Standardised root mean square residual (SRMR)	< 0.08	0.034
Goodness-of-fit index (GFI)	> 0.90	0.929
Comparative fit index (CFI)	> 0.90	0.973
Tucker-Lewis index (TLI)	> 0.90	0.967
Root mean square error of approximation (RMSEA)	< 0.08	0.046
Chi square (χ2)	χ2/df < 3	1.896

$\chi^2 = 356.96$, $df = 188$, $\chi^2/df = 1.896$, $p < 0.001$.

As per the suggestion of Hair et al. (2014), a number of tests were conducted to assess the reliability and validity of all constructs from the perspective of measurement analysis. Convergent and discriminant validity were calculated to test the validity of latent constructs. Composite reliability (CR) and average variance-covariance (AVE) were used to measure the convergent validity of each construct. As indicated in Table 3, all seven factors met the suggested construct reliability threshold of 0.70 (Hair et al., 2014), with CR values ranging from 0.84 to 0.93. Further, the AVE of all constructs are significantly above Bagozzi and Yi's (2012) proposed cut-off of 0.50, demonstrating strong indicator reliability (Table 3). As illustrated in Table 4, the condition of the square roots of each AVE is greater than the off-diagonal elements. As a result of this finding, it should be clear that the measurement model has discriminant validity (Fornell & Larcker, 1981).

Results of SEM

The results demonstrated the model's good fitness, and the data were extremely reliable and valid. A validated measurement model estimated the covariance and casual association between exogenous and endogenous latent variables. The structural model, standardised estimates and *t* value were used to examine the study hypotheses, as shown in Table 5. The model indicated a good fit, χ2 = 299.11, df = 124, χ2/df = 2.412, $p < 0.001$, GFI = 0.929, CFI = 0.964, TLI = 0.956, RMSEA = 0.58. The structural model's indices were within the threshold limit based on Hu and Bentler (1999).

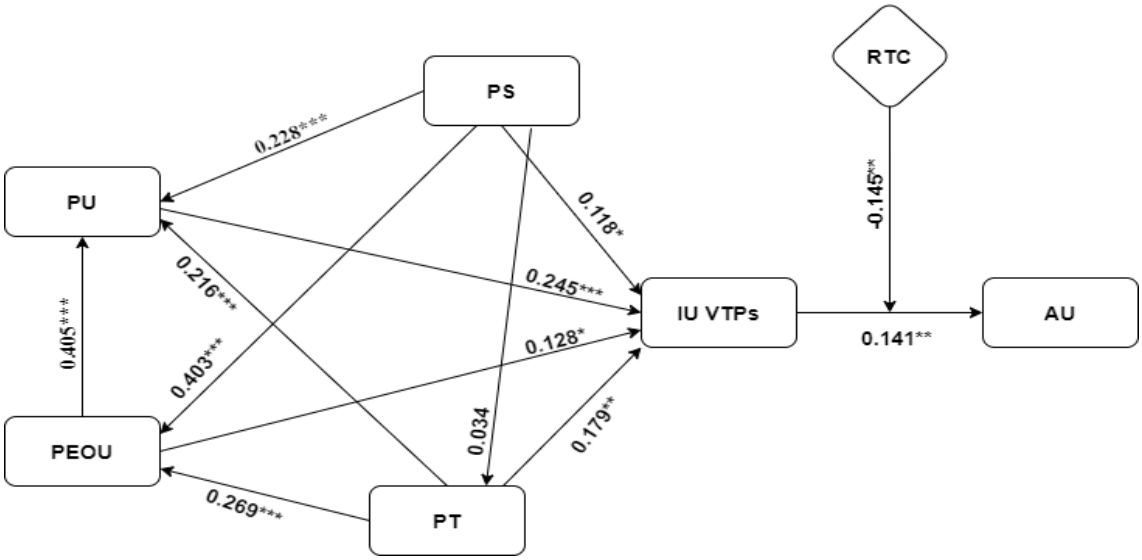

Figure 2. Path analysis

The results shown in Table 5 and Figure 2 reveal that PEOU (β = 0.128, $p < 0.05$), PU (β = 0.245, $p < 0.001$), PS (β = 0.118, $p < 0.05$) and PT (β = 0.179, $p < 0.01$) are identified as IU enablers because they all have a positive impact on IU VTPs. This suggests that as the number of PEOU, PU, PS and PT increases, so will the IU VTPs for online education. Hence, H2, H3, H5 and H8 are supported. Additionally, PS and PT also have a positive impact on PEOU (β = 0.403, $p < 0.001$; β = 0.269, $p < 0.001$, respectively) and PU (β = 0.228, $p < 0.001$; β = 0.216, $p < 0.001$ respectively). This suggests that increasing PT and PS will improve the faculty PEOU and PU perceptions of VTPs, supporting H6, H7, H9 and H10.

Similarly, PEOU is identified as a positive predictor of PU (β = 0.405, $p < 0.001$). An increase in faculty PEOU increases their PU of VTPs, thus supporting H4. Additionally, the IU of VTPs (β = 0.141, $p < 0.01$) has a strong positive association with the AU of VTPs; consequently, H1 is validated. However, the study found no relationship between PT and PS; thus, H11 was ruled out.

Table 3
Results for the measurement model

Constructs	Loadings	Cronbach's alpha	CR	AVE
PU		0.886	0.887	0.663
PU1	0.808			
PU2	0.834			
PU3	0.834			
PU4	0.781			
PEOU		0.901	0.903	0.699
PEOU1	0.816			
PEOU2	0.852			
PEOU3	0.841			
PEOU4	0.835			
PT		0.851	0.853	0.660
PT1	0.782			
PT2	0.794			
PT3	0.859			
PS		0.896	0.896	0.812
PS1	0.892			
PS2	0.910			
IU		0.847	0.848	0.736
IU1	0.883			

IU2	0.832			
AU		0.932	0.934	0.827
AU1	0.948			
AU2	0.963			
AU3	0.809			
RTC		0.909	0.911	0.719
RTC1	0.848			
RTC2	0.805			
RTC3	0.895			
RTC4	0.841			

Table 4
Results for the measurement model: Discriminant validity

Constructs	IU	PS	AU	PU	RTC	PEOU	PT
IU	0.858						
PS	0.260	0.901					
AU	0.111	0.261	0.909				
PU	0.412	0.400	0.303	0.815			
RTC	0.339	0.459	0.261	0.697	0.848		
PEOU	0.353	0.411	0.358	0.561	0.505	0.836	
PT	0.299	0.024	0.109	0.340	0.296	0.283	0.812

Moderating the effect of RTC

The study findings show that RTC moderates the association between VTP IU and AU. The interaction term (IU × RTC) (β = −0.145, $p < 0.05$) had a significant and inverse impact on the IU of VTPs. As a result, a higher RTC depleted the relationship between the IU of VTPs, which accepted H12. Table 5 attests that all the hypotheses are significantly supported except H11.

Table 5
Summarised path analysis statistics

Path relationship	B	*t* values	Results
PEOU→PU	0.405	7.132***	Supported
PEOU→IU	0.128	1.900*	Supported
PU→IU	0.245	3.431***	Supported
PT→PEOU	0.269	5.229***	Supported
PT→PU	0.216	4.328***	Supported
PT→IU	0.179	3.081**	Supported
PS→PEOU	0.403	7.552***	Supported
PS→PU	0.228	4.355***	Supported
PS→IU	0.118	1.970*	Supported
PS→PT	0.034	0.536	Not supported
IU→AU	0.141	2.601**	Supported
IU*RTC→AU	-0.145	-2.217*	Supported

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

Discussion

The findings indicate that PU and PEOU considerably influence the IU VTPs. The results are consistent with those of studies in the field (Al-Adwan, 2020; Al-Azawei et al., 2017; Alshurafat et al., 2021). The more these platforms are seen as easy to use and effective, the more faculty will intend to use them. These findings show that faculties want to employ and choose new technology, such as online platforms, for online teaching because they believe they can achieve a greater level of performance in their teaching

with less effort. In addition, faculty should accept these VTPs as students perceive them as tremendously efficient for delivering lectures, communicate and share materials (Marković et al., 2021). For instance, students believe that Zoom and Google Meet's intuitive interface of group formation allows teachers to facilitate group work effectively (Marković et al., 2021). Further, Abuhassna et al. (2020) stated that academia should be more aware of the online learning platforms' usefulness and ease of use, otherwise, the quality of education imparted to students will be jeopardised. Thus, the stakeholders of VTPs, such as developers, system designers and institutional users, can reasonably consider the usefulness and ease of use from faculty and students' demands and needs for effective learning.

The research also revealed that PU is considerably higher than PEOU, demonstrating that the flexibility of teaching activities significantly affects faculty IU of VTPs more than technical usability. Ahmad et al.'s (2010) advice that online teaching platforms provide critical features indicates that faculties might have been more willing to accept some use difficulties highlights that most faculty members are comfortable with digital technology and have frequent Internet access. Furthermore, empirical evidence reveals that PEOU significantly impacts the usefulness of VTPs, as shown in our study. These findings confirm the theoretical evidence on the integrated theoretical framework of TRA and TAM (Davis, 1993; Sharp, 2006; Venkatesh et al., 2000). We recommend that the more VTPs are regarded as easy to utilise and require less effort than traditional approaches, the more faculty will see these platforms as beneficial and as a strategy that will result in more teaching experience.

PS has been proven to significantly impact the PEOU, PU and IU. This is similar to adopting other information systems (Hartono et al., 2014; Lu et al., 2007). These findings suggest that an increase in the online teaching platform's security would increase faculty's belief in using these platforms, which would enable them to reap long-term benefits from using platforms. Similarly, using a high level of security in online platforms could make faculty feel more comfortable to use them for online teaching. Furthermore, the security features of VTPs can expedite secure and threat-free communication between faculty and students. These attributes positively influence the faculty's PU. Similarly, based on our findings, PT has a positive impact on PEOU, PU and IU. Pavlou (2003), for example, found similar results on e-commerce systems. The findings suggest that reducing uncertainty is a significant constituent in faculty acceptance of VTPs for online teaching. The result exhibits that when faculty consider online platforms trustworthy, they are more likely to view them as easier to use and useful.

The study uncovers an intriguing finding: RTC has a significant negative moderating impact on the relationship between the IU and AU of VTPs. It indicates that in spite of faculty's PEOU and PU in these platforms, their resistance is a significant hindrance in the convergence of intention to AU, which agrees with Lunenburg (2010), who highlighted that educational change is often met with faculty resistance due to impending uncertainties. Similarly, in line with Nov and Ye (2008), users might think it is challenging to use due to the changes, regardless of the usefulness of new technology, like digital libraries.

Thus, the findings make sense because faculty might see these online platforms as a long-term benefit, but at the same time, the short-term deficit is causing concern. Faculty may require time to learn new skills, build experience in their online teaching abilities and time away from other obligations throughout the process, all of which could stymie their willingness to teach online using VTPs. These findings align with research that showed that people with a short-term focus take longer to try out or accept new technology (Oreg, 2003). Overall, the result emphasises the significance of understanding and addressing RTC in the educational context when implementing new technologies such as VTPs or blended teaching. It may be beneficial to provide training and support to individuals to help them overcome their RTC and increase their comfort level with new technology (Aldosemani et al., 2018).

Theoretical contributions and practical implications

Theoretical contributions

Our research deployed an extended TAM to investigate factors that affect faculty intentions to use VTPs. The study adds three ways to the expanding body of knowledge on online teaching and learning. Firstly, most researchers have highlighted only the significance, obstacles and opportunities of synchronous online teaching as it is still in its early stages of adoption and is a comparatively new topic. Thus, this investigation of using digital platforms for synchronous online teaching can be utilised as a reference for future research and help future researchers better understand online teaching.

Secondly, the inclusion of trust and security as an extrinsic antecedent in the research model regarding predicting the ease of use and usefulness has resulted in a new theoretical contribution to the online teaching and learning environment, as the findings show that these parameters operate as drivers of intentions to use VTPs. By determining the effect of these extraneous determinants on faculty IU, this change extends the scope of research into the factors that drive faculty's IU online teaching platforms. Specifically, the impact of trust and security suggests that uncertainty is becoming an imperative component of online teaching system use. The assimilation of these parameters captures the ambiguity in existing TAMs and opens novel avenues for future hybrid teaching research like utilising big data, artificial intelligence and other technologies for pedagogy in the online environment.

Lastly, the integration of RTC in our research model has given rise to new theoretical contributions. RTC is well established in psychology and innovation (Nov & Ye, 2008; Oreg et al., 2005). Including this concept enhances our comprehension of the factors influencing the real-world use of online teaching platforms, which has been explored in the context of online education. Thus, this study provides novel insights into faculty beliefs regarding online teaching, which is crucial for their decision-making process regarding adoption. As a result, future research in educational technology acceptance, like the adoption of blended teaching, using artificial intelligence tools for learning, may benefit from further investigation in this area.

Practical implications

The findings of this study have far-reaching repercussions for the use of digital platforms in online education. To optimise the impact of PEOU, PU and IU, online teaching platform developers and providers must strengthen usability attributes, such as ensuring that online teaching platforms have intuitive interfaces for smooth content handling; for example, a clean dashboard upon logging, apparent accessibility for recording and transcription, smart or virtual backgrounds, and a control panel providing intuitive icons for mute/unmute, turn on/off camera and managing participants. Further, the VTPs should have friendly interfaces and functions, for instance, one-click buttons for sharing online content and materials, mobile app integration for touch-friendly interfaces and accessible chat functions for real-time text and communication. Researchers such as dos Santos et al. (2022) have mentioned that university professors complain about the issue of usability and technical support in digital platforms while teaching. Thus, by means of study results, emerging educational technology venture entrepreneurs could pay special attention to the ease of use and usefulness of VTPs. Moreover, a collaborative approach between universities and digital platform entrepreneurs may be beneficial in promoting online teaching platforms as a novel teaching approach. With the growing need for innovation in online teaching, specifically related to the current situation, VTPs will mature into more comprehensive systems with faculty experience at the core of their functionality, such as usefulness and ease. Higher education institutions could undertake organisational renewal and implement bottom-up processes.

Another practical implication for influencing faculty online teaching behaviour is based on security and trust regarding VTPs. Correia et al. (2020) highlighted that safety, including security and privacy, is a significant concern when using videoconferencing systems for online teaching. Results of our study show the impact of security and trust on the adoption of VTPs. Therefore, higher education institutions should establish a policy that assures faculty that online systems will provide a safer and more trustworthy online

teaching environment. Improving security will increase faculty autonomy and motivation to use online teaching platforms.

Based on the significant negative moderating impact of RTC between IU and AU, our study also makes a significant practical contribution to higher educational institutions, to provide interactive professional development opportunities with these platforms. Faculty will be less resistant to change towards these platforms if they better understand that they are helpful in skill development, instant demonstration and interactive sessions (Lunenburg, 2010).

Conclusion, limitations and future research directions

Our findings empirically support understanding the mechanism through which faculty intend to use VTPs for online teaching. The results reveal the positive impact of extended TAM factors on faculty IU VTPs. In addition, the study also reported that positive intention leads to the AU of VTPs. Furthermore, the RTC dimension was discovered to play a moderating role in the association between IU and AU; in fact, variable resistance dampens the association between IU and AU. The findings add to the scholarly understanding of how these determinants are perceived by faculty in terms of their future intention to adopt VTPs. Specifically, they provide developers of VTPs and higher education administrators with practical and actionable insights.

Despite the implications mentioned earlier, the research has some limitations that future researchers should consider. First, the study was conducted in a single direction, that is, self-search, whether faculty were utilising VTPs or not to continue teaching during a period. However, the results may be impacted if, at the university level, there should be compulsion or recommendation to use platforms. Therefore, future research is possible by analysing the psychological impact on adoption based on whether the platforms are imposed, recommended or self-searched. Second, the findings are context-specific, as the participants were restricted to India only. This limits the findings' generalizability to other contexts in other countries. We urge researchers to collect data from various countries and compare it to our findings to see if there are any inconsistencies. Finally, the study validated faculty perceptions in relation to VTPs; future research may be possible from students' perceptions of how the utilisation of VTPs by professors could improve their academic achievement and satisfaction.

Author contributions

Author 1: Conceptualisation, Investigation, Formal analysis, Software, Supervision, Writing – review and editing; Author 2: Data curation, Writing – original draft, Writing – review and editing; Author 3: Data curation, Methodology, Writing – original draft, Writing – review and editing.

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Appendix

The Online Questionnaire Survey

Demographics

Please select only one answer for the following questions.

Gender □ Male □ Female
Marital status □ Single □ Married
Age □ 18–29 □ 30–44 □ > 45
Experience (teaching) □ 0–5 □ 5–20 □ > 20

Using the following scales, (5 = Strongly agree (SA), 4 = Agree (A), 3 = Neither agree nor disagree (NAND), 2 = Disagree (D), 1 = Strongly disagree (SD)), please select the one that indicates your level of agreement with the following statements.

	SA	A	NAND	D	SD
My interaction with the system is clear and understandable.					
Interacting with the system does not require a lot of my mental effort.					
I find the system to be easy to use.					
I find it easy to get the system to do what I want it to do.					
Using the system improves my performance in my job.					
Using the system improves my performance in my job.					
Using the system improves my performance in my job.					
find the system to be useful in my job.					
Assuming I have access to the system, I intend to use it.					
Given that I have access to the system, I predict that I would use it.					
I often use VTPs to manage my online teaching related activities					
I often use VTPs to make strategies regarding online teaching activities					
I often use VTPs to manage online teaching					
My personal information is securely managed in this VTPs					
The VTPs is safe for my personal information					
This VTPs is trustworthy.					
This VTPs is one that keeps promises and commitments.					
It is likely that I will teach with this VTPs in the near future.					
I am not interested in VTPs.					
I feel uncomfortable in changing my current working methods and start using VTPs.					
I am not interested in using VTPs to perform my job-related activities.					
I am not used to using VTPs to perform my job-related activities.					