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Abstract: The present study explores the role of teachers' personal dispositional factors in determining their willingness to adopt virtual reality (VR) applications in teaching. Premised in the Indian context, the study focuses on the perceptions of B-school teachers regarding the adoption of VR technology in the 'management' discipline of higher education. The proposed model was empirically tested using cross sectional design. The primary data was gathered through a survey of 508 teachers at 50 B-schools in the NCR of Delhi, India. Exploratory factor analysis and multiple regression analysis were used to statistically analyse the data. The findings of the study suggest that the technology-related personal characteristics of teachers such as, computer expertise, computer self-efficacy, and personal innovativeness; personality traits such as, extraversion, conscientiousness and openness to experience; and demographic characteristic such as age, significantly predict the intention of teachers regarding adoption of VR technology in management education.

Keywords: virtual reality; management education; teachers; personality traits; personal characteristics.

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1 Introduction

Emerging technologies in teaching and instructional methods have revolutionised the way teachers interact and share knowledge with their students. Higher education institutions (HEIs) are increasingly adopting innovative educational technologies such as learning analytics, virtual learning environments, 3D virtual learning, game-based learning activities, augmented reality and artificial intelligence-based simulations for teaching and learning purposes (Arici et al., 2019; Boulton et al., 2018; Pizarro et al., 2013; Wilson et al., 2011; Wan et al., 2011; Bhaskar et al., 2020; Joshi et al., 2020). Recently, virtual reality (VR) technology has started pushing its way in various disciplines of higher education such as science (Arici et al., 2019), medicine (Labovitz and Hubbard, 2020), engineering (Salah et al., 2019), mathematics (Crutchley et al., 2019), and law (Jian et al., 2019). According to Resnick (2017), 60% of HEIs worldwide are using VR technology to create simulations and put students into immersive environments. The VR educational users are expected to increase to around 15 million by 2025 (Sachs, 2016).

VR technology has endless opportunities and inspiration for both teachers as well as students. Some of the benefits of this educational technology include global teleportation, the time machine effect, multi-sensory experiences, teleportation locomotion mechanics, virtual rehearsal, empathy agent, and immersion. Along with the HEIs of science, engineering and medical disciplines, management institutions and business schools (B-schools) have also started exploring the applications of VR in business and management education (Hernandez-Pozas and Carreon-Flores, 2019). For example, MIT Sloan School of Management has experimented with Google's Cardboard and Samsung's Gear; Stockholm School of Economics has taught two groups of executives using Gear in a VR initiative sponsored by Samsung; Swiss business school has explored VR and 'virtual faculty' through holographs; and Stanford's Graduate School of Business used virtual interactions for uploading avatars to an online world (Murray, 2016).

Integrating VR in management education brings a lot of advantages for the students. For example, students can practice public speaking through VR with simulated audience

reaction. Depending on the reaction, students can learn to improvise their communication style. Students can also be taken to virtual tours to places that are inaccessible due to cost or security concerns. Through virtual/digital tours, students can learn about various operations of the companies. Similarly, through VR case studies, students can have 360-degree view and learn about financial and marketing strategies (Murray, 2018).

In developed countries, a large number of B-schools have integrated different VR tools into their curricula. For example, in California, Rady School of Management is using the VirBELA (VR) platform to provide an interactive forum where students share ideas on various topics related to finance, marketing, and leadership. Similarly, Gabelli School of Business in New York uses VR tools to teach team dynamics, record presentations in front of green screens, and 3D VR cameras to generate mixed-reality unique educational experiences (Childers, 2019). In France, NEOMA Business School is using VR in its management program for continuous learning and development of management skills (Dominique, 2018). ESMT Berlin business school, Germany has created a virtual environment where students lead, collaborate and solve problems with each other; they experience how challenging it is to lead in a digital, volatile, uncertain, complex and ambiguous situation (Wylie, 2018).

Though VR technology is being widely used in the developed countries, however the implementation of VR in the higher education especially in the context of management education, is still at a nascent stage in developing nations such as India. One of the biggest challenges in the adoption of VR in Indian education system, is lack of knowledge among the teachers about VR enabled teaching methods. The existing teaching methods have proven records of their efficacy, whereas teaching methods integrated with VR are still in exploratory phase. Hence, teachers are generally resistant to change their traditional style of teaching. Therefore, despite the interest of B-schools and other stakeholders in implementing VR applications, this technology will not be fully exploited unless it is appreciated and accepted by teachers. Although teachers realise that integrating educational technologies such as VR can enhance educational outcomes, most of them feel reluctant to apply such technological innovations in their teaching methods (Blume, 2020; Zarafshani et al., 2020; Gupta and Bhaskar, 2020). Many teachers do not want to come out of their comfort zones of traditional teaching styles and oppose the adoption of new technologies (Alsheibani et al., 2018). Some teachers may have positive attitudes towards innovative educational technologies, but refrain from doing so because of low self-efficacy (Alsheibani et al., 2018; Holden and Rada, 2011; Joshi and Bhaskar, 2020).

It is therefore important to understand how individual differences of teachers impact their willingness to adopt VR in education. In an educational system, the role of teachers is pivotal in influencing educational outcomes through adopting innovative methodologies of teaching. Thus, the purpose of the present study is to examine the major individual factors of teachers that influence the adoption of VR technology in higher education in Indian B-schools. Considering the significance of personal factors in predicting the acceptance and use of technology (McElroy et al., 2007), it is worthwhile to investigate the role of teachers' personal dispositional factors in determining their intention towards adopting VR technology.

2 Theoretical background

2.1 VR and its use in educational contexts

VR refers to non-physical computer-generated 3D simulation that creates the effect of reality (Kelly, 1989). There are two distinct perspectives of VR – technological perspective through which VR can be seen as a complex set of different technologies; and psychological perspective that shows VR as a technology that offers sensory and immersive experiences (Coelho et al., 2006). As summarised by Burdea and Coiffet (2003), the three key features of VR are interactivity, immersion and imagination.

Most of the prior research on the applications of VR technology in educational contexts have been centred around the application aspects of VR in various educational disciplines and students' attitudes towards VR driven teaching and learning systems. For example, Abulrub et al. (2011) discussed the applications and challenges of VR in engineering education and concluded that cost is the main challenge faced while implementing VR technology in education. An exploratory study by Aczel (2017) introduced the research trends of educational VR, highlighting the methodological connection between educational VR, its design aspects and challenges. Radianti et al. (2020) in their systematic review of immersive VR applications for higher education, highlighted three key areas for successful VR-based learning – domain structure, VR design elements and learning theories. Through an empirical investigation on students' perceptions on VR adoption in higher education, Baxter and Hainey (2019) highlighted the potential benefits and drawbacks of using VR in educational context. Orel and Daniela (2019) explored various possibilities of VR for entrepreneurship education and concluded that VR can provide required skills and functional knowledge to future entrepreneurs. Hernandez-Pozas and Carreon-Flores (2019) discussed several ideas of applying VR in teaching International Business to students. The authors concluded that VR can be an effective way of teaching negotiation and intercultural communication skills to international business students. Shah and Cragin (2015) also explored the educational utilities of VR and computer gaming technology for enhancing the development of international business skills in students. McGovern et al. (2020) demonstrated that VR technology has a great potential in enhancing business education.

2.2 Adoption of educational technologies by teachers

Several studies in the recent past have reviewed teachers' use behaviour of general ICT and related factors (Ahmad and Ibrahim, 2017). Among the reported studies on technology adoption by teachers, majority have focused on the barriers such as lack of institutional support (Al-Azawei et al., 2017), lack of training and technical support (Rakhyoot, 2017) and teachers' negative attitudes towards technology (Alsheibani et al., 2018). The other studies focus on factors that encourage teachers to adopt technological innovations such as recognition, promotion (Baylor and Ritchie, 2002) and relative advantages of using educational technologies such as professional development opportunities (Kearney et al., 2018) and improved teaching quality (Ahmad and Ibrahim, 2017).

The studies concerning teachers' perceptions on VR technology have also started gaining attention of researchers. For example, Alalwan et al. (2020) have studied the challenges of VR utilisation among the primary school teachers. The authors suggest that

teachers' limited capabilities for designing VR enabled instructional content is the major problem in adopting VR for teaching purposes. Sipilä (2020) pointed out that VR applications are still uncommon among teachers and they do not find them suitable for classroom teaching. Teachers find it difficult to align the curricula, syllabi and learning outcomes with VR technology (Alalwan et al., 2020; Fransson et al., 2020). Teachers need to be creative with their instructional content to teach through VR (Sobel and Jhee, 2020). They also need time and training to familiarise themselves with VR technology (Alfalah, 2018; Fernandez, 2017; Serin, 2020). Hence, they require institutional support in terms of time, training and technical support to be able to use VR in classrooms (Geng et al., 2019; Alalwan et al., 2020; Fransson et al., 2020).

Though many of the previous studies have focused on the technological and contextual factors that influence teachers to integrate technology into teaching, there has been little research that includes the individual characteristics and personality traits of teachers to understand the technology use behaviour of teachers. Few studies have focussed on the teachers' technical knowledge and skills (Rene'Moses, 2006), computer expertise (CEX) (Drent and Meelissen, 2008), beliefs and attitudes towards technology (Blume, 2020; Burston, 2014) in examining the teachers' motivation or reluctance towards using educational technologies. Nonetheless, there is a dearth of studies relating the individual differences and deep-level personality traits of teachers with their technology adoption behaviour especially in the context of VR applications in education.

Personal attributes have a long-lasting effect on a broad range of responses including intentions and behaviours, hence they are considered to be more stable across usage settings than innovation/technological characteristics or contextual factors (Ajzen and Fishbein, 2005). Personal factors have received increased scholarly attention in the recent past within various technological contexts such as online social networking, video game playing, use of VR (Venkatesh and Windeler, 2012), online shopping (Brun et al., 2013), blogging and instant messaging (Wang et al., 2012), e-government adoption (Venkatesh et al., 2012), and Internet services (Hamburger and Ben-Artzi, 2000). However, in educational contexts, studies concerning personality traits have majorly been student-centric (Watjatrakul, 2016, 2020). Despite a historical background of interest in the personality characteristics of teachers (Dodge, 1943), little attention has been paid to understand their influence on adoption of innovative educational technologies (Camadan et al., 2018).

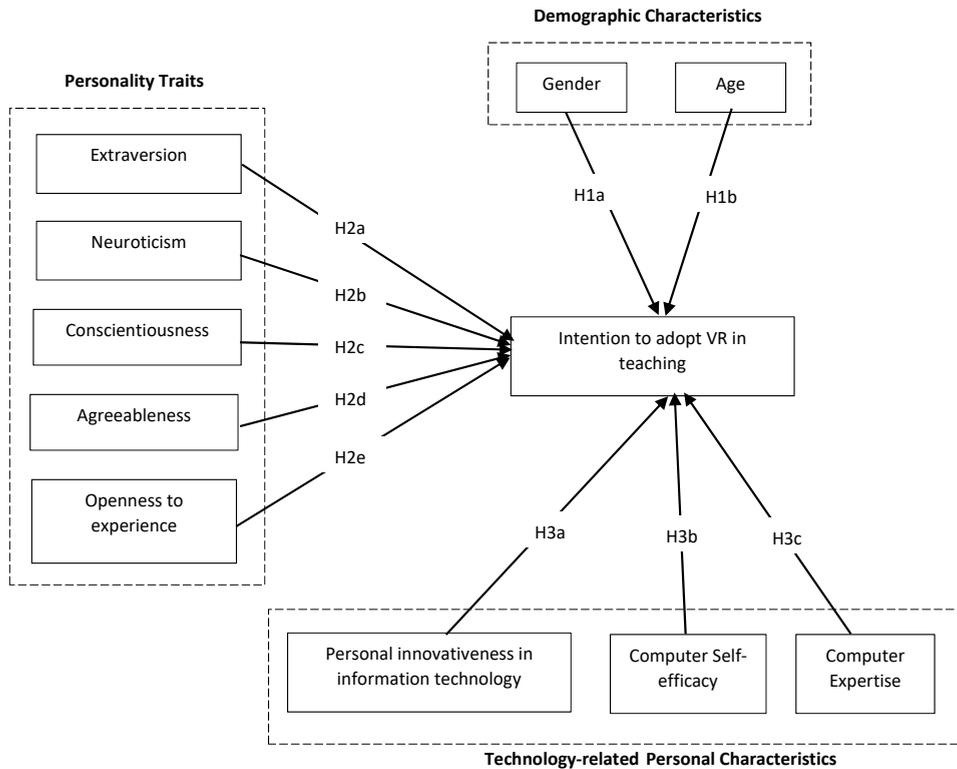
Hence, the present study attempts to address the above-mentioned gaps by considering both surface-level and deep-level factors of teachers to predict their intention to adopt VR in management education. Specifically, we examine various dispositional personal factors of teachers such as demographic characteristics, personality traits, and technology-related personal characteristics as predictors of VR adoption in management education.

3 Conceptual framework

The study proposes a model comprising of three categories of personal factors – demographic characteristics, personality traits, and individual characteristics. The demographic characteristics namely, age and gender are the two surface-level factors that are proposed to predict VR adoption by teachers. The Big Five personality traits (Costa and McCrae, 1992) namely-extraversion, neuroticism, conscientiousness, agreeableness

and openness to experience; along-with three technology-related personal characteristics – i.e., personal innovativeness in information technology, computer self-efficacy (CSE) and CEX are the eight deep-level traits that are proposed to influence VR adoption by teachers. Figure 1 depicts the conceptual model of the study.

Figure 1 Conceptual model



3.1 Demographic characteristics

Gender has been shown to be an important determinant of the acceptance and use of technologies (Assaker, 2020; Venkatesh and Morris, 2000). Men and women can have different perceptions of technology attributes (Özgür, 2020; Venkatesh et al., 2003). Generally, men tend to learn to use a technology faster than women and hence are more likely to adopt a new technology as compared to women (Anaza, 2017; Venkatesh et al., 2003). Gender differences have been considered in educational contexts as well (Soetan et al., 2020; Palos-Sanchez et al., 2018). Zhou and Xu (2007) showed that female teachers were more likely to use student-centred educational technologies in teaching than male teachers noted the gender differences in the technology use and reported that male accept technology and females need t

Age differences have also been observed in prior technology adoption research (Holzmann et al., 2020; Assaker, 2020; Morris and Venkatesh, 2000). Previous research shows that older people have negative perceptions about computers because of their limited knowledge (Ben Yishay et al., 2020; Morris and Venkatesh, 2000). The ability to

learn and handle complex information technologies decline with age (Özgür, 2020). Hence, older people become resistant to adopt new technologies, as they do not want any changes in their work styles and environments (Syvänen, et al., 2016; Sharit and Czaja, 1994). Academic literature suggests that age can be negatively correlated with teachers' use of technology. Older teachers perceive technologies as a cause of anxiety, and hence do not want to adopt technological innovations in education (Waugh, 2004; Goodwyn et al., 2000).

Thus, we propose the following hypotheses:

H1a Male teachers are more likely to adopt VR technology in teaching, than female teachers.

H1b Age negatively influences teachers' intention to adopt VR technology in teaching.

3.2 *Personality traits*

Personality can be understood through a variety of lenses amongst which the Big Five personality inventory (Terracciano and McCrae, 2006) is most widely used by researchers. The five broad traits that together represent personality include extraversion, neuroticism, conscientiousness, agreeableness and openness to experience (Costa and McCrae, 1992).

According to Rossberger (2014), extraversion (EXT) is “an individual's propensity to get engaged with the external world and seek stimulation and other positive emotions such as assertiveness, sociability and so on”. The engagement of extraverts with their social communities, provides them opportunities to explore and exploit knowledge that are vital to innovativeness. Prior studies have found that extraverted individuals have stronger innovation capabilities (Ali, 2019) and their action-oriented nature encourage them to try exciting opportunities (McElroy et al., 2007), such as using VR technologies. Within the educational context, Camadan et al. (2018) found significant indirect effects of extraversion on teachers' intention to use tablet PCs.

Neuroticism (NEU) is “an individual's proclivity to emotionally overreact and experience negative or unpleasant emotions such as depression, anxiety, and withdrawal from society” (Rossberger, 2014). The negative characteristics of neurotic individuals make them vulnerable and less confident, due to which they find it difficult to work on innovative ideas (Eastman et al., 2001). Neurotic individuals are not likely to have positive perceptions of technology use (Wang et al., 2010; Venkatesh et al., 2014). Watjatrakul (2016) found that students with neurotic behaviour are not likely to adopt online learning. Camadan et al. (2018) found negative indirect effect of neuroticism on teachers' intention to use tablet PCs.

Conscientiousness (CON) is “the extent to which an individual is well organized, self-disciplined, achievement-oriented and exhibits planned behaviour rather than being spontaneous”. Conscientious people are more likely to use the technology for productive work-related activities, rather than unproductive and leisurely activities (McElroy et al., 2007). Researchers have argued for a positive influence of conscientiousness on innovativeness (Ali, 2019) and technology use (Venkatesh et al., 2014). Within the educational context, Barnett et al. (2015) found support for students' conscientious behaviour in influencing their use of technology.

Agreeableness (AGR) is “an individual's tendency to believe in social harmony, cooperation, and honesty” (Rossberger, 2014). Agreeable individuals are optimistic and

are compassionate toward others rather than being antagonistic. Agreeableness has a positive influence on innovativeness of an individual due to the characteristics such as flexibility and cooperativeness (Steel et al., 2011). Hence, individuals with traits of agreeableness are more likely to use innovative information technologies (Venkatesh et al., 2014), such as VR.

Openness to experience (OPN) refers to “the degree to which an individual is self-aware, intellectually curious and prefers novelty and uniqueness in cognitive exploration” (Rossberger, 2014). Few researchers use ‘intellect/imagination’ in place of ‘openness to experience’ (Donnellan et al., 2006). The characteristics of this personality trait encourage individuals to challenge existing views and seek new ideas (Rossberger, 2014). Individuals high on this personality trait are open to innovations and eager to use new technologies (Wang et al., 2010). Watjatrakul (2016) found that openness to experience positively influence students’ intention to adopt online learning. Camadan et al. (2018) also found positive indirect effect of openness on teachers’ intention to use tablet PCs.

Hence, in view of the above discussion, we propose the following hypotheses:

- H2a Extraversion positively influences teachers’ intention to adopt VR technology in teaching.
- H2b Neuroticism negatively influences teachers’ intention to adopt VR technology in teaching.
- H2c Conscientiousness positively influences teachers’ intention to adopt VR technology in teaching.
- H2d Agreeableness positively influences teachers’ intention to adopt VR technology in teaching.
- H2e Openness to experience positively influences teachers’ intention to adopt VR technology in teaching.

3.3 Technology-related personal characteristics

Other individual factors related to technology, such as, personal innovativeness, self-efficacy and CEX are also examined in the technology adoption research (Sun and Jeyaraj, 2013).

Personal innovativeness refers to “the degree to which an individual is willing to try any new information technology on his or her own” (Agarwal and Prasad, 1998). The reconceptualised domain specific version of this factor is personal innovativeness in information technology (PIIT) which refers to the “willingness of an individual to try out any new information technology” (Venkatesh et al., 2012). PIIT is an inherent attribute of a risk-taking individual that encourages him/her to indulge in innovative experiences (Thatcher and Perrewe, 2002). The effectiveness of PIIT in determining innovation adoption has been examined in various contexts such as e-government (Venkatesh et al., 2012), mobile communication technology (Han et al., 2006), and M-shopping (Aldas-Manzano et al., 2011). Because of their natural tendency to try out new technologies, individuals high on PIIT are more likely to experiment with innovative technologies (Zarmpou et al., 2012). Teachers with high degree of PIIT would consider VR technology as innovative, and their risk-taking nature would fuel their desire to

integrate VR in their teaching, without any concern for the outcomes (Al-Busaidi and Al-Shihi, 2010).

Self-efficacy refers to “the judgment of one’s capability to use a new information system” (Compeau and Higgins, 1995). It indicates the user’s confidence in his/her ability to use a technology (Taylor and Todd, 1995). CSE is linked with the knowledge and skills required to use computers and technology (Hartman et al., 2005). Several researchers have identified self-efficacy to be a strong predictor of technology adoption (Park and Ertmer, 2007; Ottenbreit-Leftwich et al., 2018). Teachers with limited exposure to technology are resistant to use technology in their teaching (Kilinc et al., 2017). Individuals with lower CSE levels perceive technology to be difficult to use (Alshammari et al., 2016). On the other hand, a teacher with higher levels of CSE feels confident in using technological innovations for teaching (Alsheibani et al., 2018).

CEX refers to “an individual’s skills and abilities that enable him or her to adopt innovations with relative ease” (Venkatesh et al., 2012). CEX or experience is one of the salient individual characteristics that have been observed to positively influence an individual’s intention to adopt technological innovations (Sun and Jeyaraj, 2013). Within the educational contexts, the success of educational technologies depends largely on the technical skills and computer experience of teachers (Aramide et al., 2015). Teachers’ lack of computer knowledge and skills is one of the most inhibiting obstacles for teachers to use technology in classrooms (Harris et al., 2009; Pelgrum, 2001). Teachers’ high levels of computer proficiency produce higher levels of technology integration in their instructional methods (Anderson and Putman, 2019; Christensen, 2002; Knezek et al., 2000). Teachers’ belief in their computer competence is the greatest predictor of their use of technology in teaching (Ifinedo et al., 2020; Berner, 2003).

Therefore, in view of the above discussion, we propose the following hypotheses:

- H3a Personal innovativeness in information technology positively influences teachers’ intention to adopt VR technology in teaching.
- H3b CSE positively influences teachers’ intention to adopt VR technology in teaching.
- H3c CEX positively influences teachers’ intention to adopt VR technology in teaching.

4 Method

4.1 Measures

The items for measuring latent constructs of the research model were adopted from the existing scales in the literature. Each of the five personality traits were measured using four items adapted from Donnellan et al.’s (2006) 20-item mini-IPIP scale. PIIT was measured using four items adapted from Agarwal and Prasad (1998). CSE and CEX were measured using three items each, adapted from Sun and Jeyaraj (2013). To measure teachers’ intention to adopt VR in teaching, two items were used that were adapted from Sharma and Srivastava (2019). All the items were measured on a five-point Likert response format ranging from 1 (strongly disagree) to five (strongly agree).

4.2 Sample

The primary data for the study was collected through a survey conducted at 50 different management institutions in the National Capital Region (NCR) of Delhi, India. The teachers teaching in the selected institutions were the target respondents for the study. The institutions and teachers were selected using convenience sampling method (Saunders, 2012).

The data from the respondents were collected using a self-administered questionnaire that comprised of questions on their demographic characteristics (age, gender, teaching experience), personality traits (extraversion, neuroticism, conscientiousness, agreeableness and openness to experience), and technology-related personal characteristics (PIIT, CSE and CEX). Before filling the questionnaire, the respondents were briefed about various VR enabled teaching methods such as simulations, virtual tours, virtual case studies and so on.

The initial draft of the questionnaire was pre-tested with ten academicians and researchers to ensure the face validity. Based on the suggestions obtained during pre-testing, few items were modified to improve the clarity. In the final survey, 600 questionnaires were distributed to the target respondents, out of which 543 filled questionnaires were returned. After removing unusable questionnaires (due to incomplete or unviable responses), 508 usable questionnaires were obtained that constituted the final sample.

The sample consisted of 56.5% male teachers and 43.5% female teachers. The average age of the respondents was 33.4 years and the average work experience of the respondents was 5.5 years.

5 Results and discussion

Statistical analysis of the collected data was done using exploratory factor analysis (EFA) and multiple regression analysis. SPSS 21 software was used to perform the statistical analysis.

5.1 Exploratory factor analysis

The convergent validity of the latent constructs was examined using EFA. The appropriateness of data was tested using Bartlett's test of sphericity and Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy. The results indicated that Bartlett's test of sphericity was significant (chi square (df) = 13,311.04 (496); $p < 0.001$), and the value of KMO was also large enough (0.841); hence the adequacy of data was supported. Using the eigen value criterion for factor extraction and direct oblimin criterion for rotation (Hair et al., 2006), nine factors were retained that accounted for 81.3% variance in the data. The factor loadings are indicated in Table 1. All the items loaded on their respective factors with item loadings > 0.50 . This indicated high correlations of items with their corresponding factors, which thereby indicated convergent validity of all the constructs (Hair et al., 2006). Table 1 also shows the Cronbach's alpha coefficients for all the nine constructs. The values of Cronbach's alpha in all cases exceeded the cut-off value of 0.7, indicating adequate reliability for each construct (Nunnally and Bernstein, 1994).

Table 2 Descriptive statistics and correlations

	Mean	SD	Gender	Age	EXT	NEU	CON	AGR	OPN	PIIT	CSE	CEX
Gender	0.44	0.50										
Age	33.45	8.28	0.011									
EXT	3.89	0.98	0.017	-0.344**								
NEU	2.85	0.89	-0.010	-0.059	0.191**							
CON	3.99	0.73	-0.048	-0.364**	0.587**	0.119**						
AGR	3.88	0.69	0.011	-0.076	0.008	-0.016	0.083					
OPN	4.20	0.66	0.011	-0.206**	0.164**	-0.071	0.199**	0.120**				
PIIT	3.63	0.84	-0.006	-0.287**	0.628**	0.319**	0.486**	-0.167**	0.215**			
CSE	3.39	0.94	-0.009	-0.294**	0.059	-0.010	0.071	0.035	0.050	-0.023		
CEX	3.43	0.95	-0.009	-0.380**	0.071	-0.014	0.041	0.018	-0.053	0.036	0.208**	
INT	3.99	0.62	-0.023	-0.708**	0.407**	0.039	0.412**	0.061	0.284**	0.359**	0.401**	0.489**

Note: **p < 0.01.

5.2 Hypotheses testing

To test the proposed hypotheses, we conducted multiple regression analysis with age, gender, EXT, NEU, CON, AGR, OPN, PIIT, CSE, and CEX as independent variables; and intention to adopt VR in teaching (INT) as dependent variable. The descriptive statistics (mean and SD) of the variables and correlations between the variables are shown in Table 2. Before conducting multiple regression analysis, we tested for its assumptions. The value of Durbin Watson statistic (1.5) indicated that there was no autocorrelation in the variables (Hair et al., 2010). The inter-construct correlations were below 0.90 (see Table 2), indicating that multicollinearity was not present (Hair et al., 2010). Finally, the P-P plot (see Figure 2) indicated normal distribution of the residuals.

Figure 2 Normal P-P plot

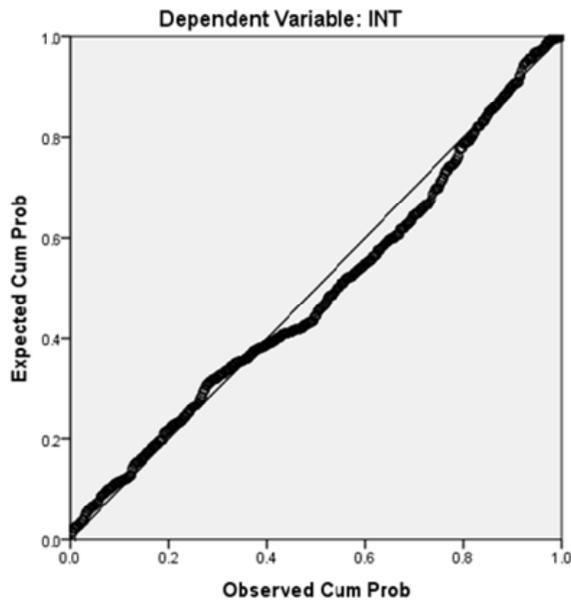


Table 3 shows the results of multiple regression analysis. Overall, the regression model was significant ($F = 101.14$, $p < 0.001$). The intention to adopt VR in teaching was well predicted by the demographic characteristics, personality traits and individual factors. Among the demographic characteristics, age ($\beta = -0.031$, $p < 0.001$) was found to negatively influence the intention to adopt VR in teaching, thus supporting the hypothesis H1b. Since the effect of gender was found to be insignificant ($\beta = -0.014$, $p = 0.654$), hence H1a could not be supported. Among the five personality traits, extraversion ($\beta = 0.051$, $p < 0.05$), conscientiousness ($\beta = 0.090$, $p < 0.01$) and openness to experience ($\beta = 0.132$, $p < 0.001$) were found to significantly predict the intention to adopt VR in teaching. Thus, the hypotheses H2a, H2c and H2e were supported. However, as the effects of neuroticism ($\beta = -0.024$, $p = 0.217$) and agreeableness ($\beta = 0.009$, $p = 0.715$) were found to be insignificant, hence the hypotheses H2b and H2d could not be supported. Finally, all the three technology-related personal factors namely, personal innovativeness in information technology ($\beta = 0.084$, $p < 0.01$), CSE ($\beta = 0.134$,

$p < 0.001$) and CEX ($\beta = 0.182$, $p < 0.001$) were found to have significant positive effects on teachers' intention to adopt VR in teaching. Overall, the model explained 66.4% variance in teachers' intention to adopt VR in teaching.

Table 3 Multiple regression analysis

<i>Variable</i>	<i>Standardised β</i>	<i>t statistic</i>	<i>p-value</i>
Gender	-0.014	-0.448	0.654
Age	-0.031	-12.951	0.000
EXT	0.051	2.224	0.027
NEU	-0.024	-1.235	0.217
CON	0.090	3.167	0.002
AGR	0.009	0.365	0.715
OPN	0.132	5.110	0.000
PIIT	0.084	3.089	0.002
CSE	0.134	7.469	0.000
CEX	0.182	9.921	0.000

Of all the variables, CEX was is to be the strongest predictor of the adoption intention, followed by CSE. The findings indicate the pivotal role of teachers' computer skills and knowledge in the success of VR-based educational technologies in B-schools. Since B-school teachers are generally not very tech-savvy, their capabilities to organise and perform the activities required for using new technologies strongly influence their intention to adopt new educational technologies such as VR. Our findings are in line with some of the previous studies that also indicated the important role of computer competence (Lee and Shea, 2020) in the teachers' adoption of technology in education; and CSE in the teachers' intention to use tablet PCs (Camadan et al., 2018). The B-school teachers who have limited exposure to technology as compared to those in other disciplines such as science and medicine, are resistant to using technologies (Kilinc et al., 2017). Operating VR devices require adequate technical and computer skills (Jensen and Konradsen, 2018). Thus, if teachers feel that they have the desired technical skills and can use a new technology without much support, they will feel confident and motivated to use VR technology in their teaching methods. Teachers possessing higher levels of CEX and CSE will not find difficulties in using VR technology and hence will be more likely to integrate it in their teaching style. Similarly, Nissim and Weissblueth (2017) also found that teacher with high self-efficacy can face challenges, unfamiliar situation and can deal with it without difficulty. Teachers with lower self-efficacy have a hard time using VR, therefore, they form a negative attitude towards technology (Fransson et al., 2020). The personal innovativeness in information technology is also found to be a significant predictor of the teachers' intention to use VR, though its effect was observed to be relatively lesser than that of the other individual characteristics. Our finding is in consistence with previous studies (Venkatesh et al., 2014) that have found a significant positive influence of personal innovativeness on adoption of technology. The teachers with high level of personal innovativeness are able to sense the advantages associated with VR technology in management education, and hence are more likely to adopt it in teaching.

Amongst the Big Five personality traits, openness to experience, extraversion and conscientiousness are found to be significant determinants of teachers' intention to adopt VR. The teachers who are open, extraverts, and conscientious, are more inclined to explore innovative methods of teaching. The significant influence of openness is consistent with the perspective that individuals having high trait of openness are investigative and hence willing to experiment with new technologies (Probst et al., 2000). Teachers who are more open to experiences possess high degree of intellectual curiosity and actively seek new and unconventional methods of teaching such as educational VR. The finding regarding the significant positive influence of extraversion on teachers' intention to use VR is in line with some of the previous studies that positively linked extraversion with enjoyment of using technologies (Wang et al., 2012), trust in mobile service provider (Zhou, 2011) and e-government adoption (Venkatesh et al., 2014). However, our finding contrasts with some of the previous studies that have observed a negative relationship between extraversion and technology use (Barnett et al., 2014). However, our finding that extraversion positively influences teachers' adoption of VR in management education can be explained through the fact that sharing of information is quite common in teaching community. Hence, extravert teachers are likely to enthusiastically seek to use VR in their teaching, as it will give them an opportunity to share their experiences with other teachers. Similarly, teachers having high degree of conscientiousness will be more likely to experiment with VR technology in their teaching as it will make their teaching more productive and effective. Previous research has also shown that individuals who are conscientious are more likely to use productivity-enhancing technologies (Venkatesh et al., 2014).

Out of the two demographic characteristics considered in the study only age is found to be a significant predictor of teachers' intention to use VR technology. The finding regarding the significant negative influence of age on teachers' intention to adopt VR implies that older teachers are less inclined to use VR as compared to younger teachers. Younger teachers are more teach-savvy and hence are keener on experimenting with new educational technologies such as VR. Our finding is in consistence with those of Morris and Venkatesh (2000) who indicated that older people have negative perceptions about computers because of their limited knowledge. It is also worth noting that though the effect of age is found to be significant, it is identified as the weakest predictor among all the variables included in the research model. The insignificant impact of gender of the adoption of VR by teachers implies that gender differences in teachers do not play any role in determining their attitude towards adopting VR in teaching. This finding is in consistence with that of Sánchez-Mena et al. (2017) who also found that gender does not affect teachers' behavioural intention to use educational video games.

6 Contributions and implications

Our study contributes to several areas of research. First, educational technologies are seen as an important way to bridge the gap between teachers and students of today's generation, who are no longer motivated by traditional learning methodologies. We contribute to this area of research by exploring the factors that contribute to the adoption of VR-based teaching methods in higher education. Specifically, we examined personal dispositional factors of teachers as predictors of their intention to adopt VR technology in management education, within Indian context. Our focus on the 'management' discipline

of higher education showcases findings that could potentially address the issues of B-school teachers who are generally not very pro-technology as compared to other disciplines such as science and engineering. Second, the study contributes to the general body of technology adoption research. Although there is abundant research in this area, only recently have studies begun to focus specifically on adoption of innovative educational technologies from teachers' perspectives (Gunasinghe et al., in press; Gunasinghe and Nanayakkara, in press; Sánchez-Mena et al., 2017; Kearney et al., 2018; Camadan et al., 2018). By examining VR adoption in management education, we extend general technology adoption research to a context that is relatively under-investigated. Third, researchers in the area of psychology, sociology and organisational behaviour have extensively studied the impact of personal factors on various behaviours; however, such investigations have been very limited in technology adoption research. By employing this theoretical perspective to understand teachers' willingness towards adopting an educational technology, the present study demonstrates the applicability and generalisability of the concept.

The findings of the study can be helpful to the educational leaders, B-schools and other HEIs that are moving to VR-based teaching methods. The insights gained from the findings can help them in designing strategies and support structures to assist their teachers in effectively and successfully embracing this educational technology. The institutions can organise training and development programs for their teachers to make them understand the applicability of VR as an impressive teaching and learning tool. Considering the strongest roles of CEX and CSE in determining teachers' intention to adopt VR, the institutions should emphasise on developing the technical skills and knowledge of their teachers. Seminars or workshops focusing on the usage of educational technologies would be beneficial for the teachers who lack confidence in using innovative technologies. Our findings also suggest that personality differences can potentially affect the teachers' attitude towards adopting VR in teaching methods. Hence, the training programs can be targeted towards different personality profiles of teachers. For example, the hedonic aspects of the VR technology can be emphasised in order to motivate teachers with a high level of curiosity and openness to new experiences. Similarly, training programs focussing on the benefits of using VR technology such as effective and efficient teaching, enhanced learning outcomes, and increased productivity can be highlighted to motivate conscientious teachers. Likewise, different support structures can be implemented for older and younger teachers.

6.1 Limitations and future scope of work

The study has few limitations that can be addressed in the future research. Firstly, regarding the research methodology, the data collected in the study through questionnaires using convenience sampling may suffer from response bias. Future studies can include more diversified samples and other methods of data collection to reduce response bias. Future studies may also add interviews and include qualitative aspects to explore more in-depth information, which would add value to the empirical findings. Secondly, we have used one particular theoretical lens which is based on the demography and personality of teachers. Future research could consider different theoretical lenses that have been used in prior technology adoption research such as, the technology acceptance model, the unified theory of acceptance and use of technology, and the theory of diffusion of innovations (Venkatesh et al., 2012). More recent models, focusing on

technology adoption with peer supports (Sykes et al., 2009), could yield insights in the context of teaching community where interpersonal interactions in social networks are quite common. Thirdly, Future studies could also consider other personality variables such as goal orientation and locus of control that may be important in this context. Lastly, we did not explore any moderating effects in our study. Future studies combining the situational and technological factors with moderating effects of personality and demographic variables could be helpful in further understanding of the research problem.

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