

Cognitive absorption and behavioural intentions in virtual health communities: A focus on posters

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Abstract

Purpose - This paper aims at providing a conceptual model that elucidates the role of cognitive absorption in explaining behavioural intentions in virtual health communities.

Design/methodology/approach - Data was collected from 361 contributing members of virtual health communities from Gauteng, South Africa using a structured questionnaire. Structural equation modelling using AMOS software was used to analyse the data.

Findings - The findings show that cognitive absorption has significant direct positive influence on members' intentions to continue participating on virtual health community platforms. Cognitive absorption was also found to have indirect influence on behavioural intentions through its influence on members' attitude. It was also found to play a mediating role on the influence of perceived usefulness and behavioural intention.

Research limitations/implications - The study shows the value of linking the flow theory and the technology acceptance model to provide a comprehensive understanding of behavioural intentions in virtual health community forums.

Practical Implications - Managers of virtual health communities need to pay attention to experiential aspects of their sites. Success in ensuring that community members are cognitively absorbed is key to the development of positive attitude and intentions towards virtual health community forums.

Originality/value - Virtual health communities play a new and growing role in the way health-related information and support is offered and accessed by those in need. Despite their importance, not much research has been done to explain the role of consumer experience on member behaviour on such forums. The study contributes to this understanding by demonstrating the value of cognitive absorption

in directly explaining users' attitude and behavioural intentions. The study also sheds light on the role played by cognitive absorption in explaining the influence of perceived usefulness on behavioural intentions.

Keywords: virtual health community, cognitive absorption, perceived usefulness, attitude, flow theory, behavioural intentions.

1. Introduction

The use of the internet for collaboration through virtual communities has greatly transformed the way in which consumers engage with one another and with service providers (Chang et al., 2014, Ho 2015). Demiris (2006) defined a virtual community as "a social unit that involves members who relate to one another as a group and interact using communication technologies that bridge geographic distance" p. 179. Among the sectors that have experienced a growing use of virtual communities by consumers is the health sector (Zhang et al., 2014, Laing et al., 2011). Health-related virtual communities provide platforms for individuals to interact with one another, sharing information and experiences relating to health conditions, including treatment regimes. Such communities commonly develop around focal health conditions such as breast cancer, prostate cancer, HIV/AIDS, diabetes and depression. Irrespective of the focal condition, health-related virtual communities provide current and past patients, carers and other interested parties with opportunities to share and access information that is helpful in improving the quality of life. They serve as outlets of emotional support and health education, thereby enabling more informed decision making to take place (Flickinger et al., 2017; Zhang et al., 2017). Laing et al., (2011) pointed out that online health communities address the cognitive shortcomings that patients and carers often experience when utilising specialist technical information coming only from health professionals. This is because information sharers mostly include lay people using lay persons' language.

The establishment of health-related virtual communities can be initiated by lay people or by health service providers such as doctors wanting to establish a support group for patients. Irrespective of who initiates and establishes it, the success of any virtual community largely depends on its ability to attract and retain members who are not only there to read other people's postings but also contribute to discussions through sharing their knowledge and experiences as well as responding to other people's posts (Lai and Chen 2014, Stockdale, 2008). This ability to attract and retain members is especially important given that participation in virtual communities is voluntary. Researchers including Hung et al., (2015) as well as Ma and Agarwal (2007), however, commonly note the fact that many virtual communities find it difficult to attract significant numbers of active members who contribute to discussions. Ridings et al., (2006) observed that of the two categories of virtual community members, namely lurkers and posters, lurkers form the larger percentage of members in most communities. Unlike posters, lurkers are members of a virtual community who like reading other people's postings but not to engage in knowledge sharing (Lai and Chen 2014).

The establishment and management of virtual communities represent a substantial investment in time and effort whose value can only be realised when sites are utilised by intended users in a manner that contributes to the objectives of establishing them. Given the importance of active membership for the success of virtual communities, there is a heightened need for knowledge on factors that contribute to the attraction and retention of such members in virtual communities (Chang et al., 2014, Choraria , 2012). This paper aims to contribute to this knowledge.

As virtual health communities are a new information technology platform, research in this area stands to benefit from theories that have been developed and used in past research to help understand users' attitudes and behavioural responses to various information technologies. A review of literature shows that most past studies emphasise the importance of beliefs in understanding users' response. Many use the technology acceptance model (TAM) to help explain users' as well as non-users' behavioural intentions towards information technologies, including web-based systems. Islam (2016) as

well as King and He (2006) identify TAM as the most widely used and accepted theory among researchers interested in behavioural intentions relating to information technologies. While this may be so, Ahn et al., (2007) noted that TAM does not provide enough explanation to understanding web users' behavioural motives. This can be attributed to the fact that TAM takes more of a technology-focused approach to explaining user behaviour. As use of information technologies intensifies and individuals become more technologically savvy, factors such as ease of use stipulated in TAM, are unlikely to be of much influence on information technology use decisions. The need for studies that go beyond the technology-focused approach in understanding information technology user behaviour cannot be over-emphasised more so as use of information technologies continues to proliferate and become an integral part of modern normal life (Lin 2009; Ahn et al., 2007). This study aims to contribute to literature by incorporating the intrinsic factor of user holistic experience to explaining behavioural intentions in virtual health communities.

Researchers in service experience including Helkkula (2011) as well as Zomerdiijk and Voss (2010) point to the need for ensuring that customers are afforded a holistically appealing service experience in order to ensure continued service patronage. According to Zhu and Morosan (2014) as well as Saadé and Bahli (2005), users' holistic experience with technology can best be captured using the concept of cognitive absorption. Lin (2009) specifically observes that online engagement has the ability to result in cognitive absorption. However, there is no consensus in literature on how the concept of cognitive absorption nor user experience should be delineated (Bargas-Avila and Hornbæk, 2011; Zhu and Morosan 2014). Furthermore, past studies that have looked at user experience in online contexts have largely done so from the perspective of commercial websites particularly online retail websites (Carlson and O'Cass (2010) and not from the perspective of user content driven non-commercial websites.

Taking cognisant of limitations in TAM, and the fact that use of virtual community sites i.e. posting and reading of messages, does not require high levels of technical skills, this study examines behavioural intentions relating to continued use of health-related virtual communities by integrating cognitive

absorption with TAM elements of perceived usefulness, attitude and behavioural intentions. The specific objectives of this study are: (a) to examine significant dimensions of cognitive absorption in the context of health-related virtual communities; (b) to examine the relative influence of cognitive absorption, perceived usefulness and attitude on behavioural intentions, (c) to investigate the influence of cognitive absorption on the relationship between perceived usefulness and behavioural intentions and (d) to investigate the influence of attitude on the relationship between cognitive absorption and behavioural intentions. The author has not found past studies that have proposed and tested the nomological framework examined in this study. The proposed nomological framework can assist in providing a more comprehensive understanding of the influence of user experience in virtual health communities. Practitioners, particularly managers of virtual health communities, can use the findings in the study to isolate factors that may need to be interrogated in order to enhance their ability to retain members of their communities.

The paper has been structured such that the next section provides the theoretical framework for the study. Included in this section are discussions on constructs of interest and their hypothesised relationships. Thereafter the methodology used in the study is discussed, followed by the presentation of findings. The findings are then discussed and their implications outlined. The paper ends by presenting limitations of the study and offering suggestions for future research.

2. Theoretical framework

Figure 1 illustrates the conceptual model used in this study to understand the influence of cognitive absorption on behavioural intentions towards health-related virtual communities. The underlying theories that inform this model are the technology acceptance model and the flow theory. The model posits that cognitive absorption has a direct as well as indirect influence on behavioural intentions. The indirect influence is through the proposed positive influence on users' attitude towards online health community.

The model further postulates that perceived usefulness of virtual health community exerts significant direct influence on levels of cognitive absorption as well as on behavioural intention. Additionally, the model posits that cognitive absorption mediates that relationship between perceived usefulness and behavioural intention and that the influence of cognitive absorption on behavioural intention is mediated by attitude towards virtual health community.

[Insert figure 1 here]

2.1 Technology acceptance model and the flow theory

Proposed by Davis (1986), the technology acceptance model emphasises the importance of perceived usefulness and perceived ease of use in explaining the use of information technologies. Perceived usefulness refers to the benefits derived from using an information system, while perceived ease of use examines the degree to which use of a system is perceived to be free from mental and physical efforts (Cheng *et al.* 2015). TAM postulates that perceived usefulness exerts both direct and indirect influence on people's behavioural intentions towards information systems. The indirect influence is noted to be through one's attitude. Perceived ease of use, on the other hand, is said to have an effect on behavioural intentions through its influence on attitude (Camarero *et al.*, 2012). TAM has been validated in different studies involving varied technologies and systems in such fields as banking, education, health care, tourism and many more. TAM validation studies have in the main consistently shown the significance of perceived usefulness in explaining use of information systems while the perceived ease of use often produces mixed results (Holden & Karsh 2010; Gefen & Straub, 2000). Gefen and Straub (2000) attributed this to the fact the perceived ease of use is relevant in so far as the nature of the task performed using an information system is complex requiring special knowledge or skills. Posting of comments on a virtual community site is a task that does not require special knowledge or skills. Furthermore, this study

only focused on individuals who are already active participants on virtual health communities. As such the respondents are already knowledgeable and skilled on use of virtual community sites to post comments. Accordingly, the proposed model in this study did not include perceived ease of use as an important factor to understanding user behaviour in virtual health communities.

Chooprayoon *et al.* (2007) argued that more insight on user behaviour can actually be gained when TAM is combined with other theoretical models. In line with this thinking, this study combines the flow theory with arguments advanced in TAM in relation to the role of perceived usefulness in explaining attitude and behavioural intention respectively to explain participation in virtual health communities. Proposed by Csikszentmihalyi (1975) flow theory seeks to explain people's holistic experience within consumption environments. He described flow as a subjective state of complete absorption with what one is doing. As noted by Nakamura and Csikszentmihályi (2009) as well as Csikszentmihályi, (2014) flow experience is associated with a number of elements including the merging of actions with awareness; intense and focused concentration on the present moment; loss of reflective self-consciousness; a sense of personal control specifically lack of anxiety about losing control; distortion of temporal experience and autotelic experience i.e. experience of the activity as intrinsically rewarding.

The flow theory has over the years been applied in different fields to understand optimal or holistic experience including in information technology studies. Trevion and Webster (1992) were among the first to apply the flow theory to explain consumer experience in the context of information technology. They noted that flow is a continuous variable ranging from none to intense and argued that the conditions for flow given in Csikszentmihályi (1975)'s flow theory inform the constructs' dimensions. In their study, Trevion and Webster (1992) identified four dimensions as being associated with flow in the context of information technologies namely a control dimension, focused attention dimension, curiosity dimension and an intrinsic interest dimension. Noticing the applicability of flow theory to computer-mediated environments, Hoffman and Novak (1996) observed the possibility of appealing to consumers by simply creating opportunities for them to experience flow.

Agarwal et al., (1997) stated that holistic experience in the context of information technologies can be denoted by the term cognitive absorption. Agarwal et al., (1997) defined cognitive absorption as 'a state of deep involvement with software that is exhibited through three dimensions namely a flow dimension, a playfulness dimension and a usability or ease of use dimension' p. 294. A few years later, while maintaining the definition, Agarwal and Karahanna (2000) refined the concept of cognitive absorption noting that cognitive absorption is exhibited through five dimensions associated with elements of flow experience. They defined the dimensions as temporal dissociation, focussed immersion, heightened enjoyment, control and curiosity. Since then, many researchers view dimensions of cognitive absorption are synonymous with those of elements of flow experience (Hoffman & Novak 2009; Ozkara et al., 2017; Zhanget al., 2006). This has resulted in a situation where cognitive absorption as a construct is commonly conceptualised in literature in the same way as the flow construct. Reviews by Hoffman & Novak (2009); Nah et al., (2010); Rissler et al., (2017) as well as Ozkara et al., (2017) on flow or cognitive absorption contain a comprehensive analysis of studies done in the area and provide evidence of how similar dimensions are commonly used to measure flow experience and cognitive absorption. Tan et al. (2015) accordingly described cognitive absorption as the operational term for flow in the context of information technology. In the context of this study cognitive absorption is defined as a state of deep involvement with a virtual health community website.

2.2 Dimensions of Cognitive absorption

Cognitive absorption is commonly conceptualised in literature as a multidimensional construct. Lack of consensus however exists in literature on what the important dimensions of the construct are (Kaur et al., (016), Tuunanen & Govindji 2016; Ozkara et al., 2017). As noted before Agarwal (1997) when he first conceptualised cognitive absorption argued that is made up of three dimensions and a few years later in Agarwal and Karahanna (2000) cognitive absorption was described as comprising five dimensions in line

with elements of flow experience. Saadé and Bahli (2005) argued that cognitive absorption is best captured using three dimensions of temporal dissociation, focussed immersion and heightened enjoyment. Zhu and Morosan (2014) on the other hand argued that core to cognitive absorption are the three dimensions of temporal dissociation, focussed immersion and curiosity. A review of literature however shows that wide differences also exists in how studies that make use of flow as a multi-dimensional measured it (Ozkara et al. (2017). After reviewing the varied ways including number of dimensions used to measure flow experience/cognitive absorption Tuunanen and Govindji (2016); Ozkara et al. (2017); Zhu and Morosan (2014) as well as Saadé and Bahli (2005) argue for the need for one consider the relevance of each dimension in deciding on what to include in a research study.

This study included temporal dissociation, curiosity, and focused immersion as dimensions of cognitive absorption. A review of literature shows that while some studies include control as part of the holistic experience associated with flow, strong arguments also exist for considering control as a precursor of flow. Ghani and Deshpande (1994), for example, found control to be a significant antecedent of flow. They argued that lack of control over an environment results in an individual feeling anxious and frustrated and that this results in a person not having a positive experience in their engagement in the environment. This is consistent with arguments by Csíkszentmihályi, (2014) as well as Schaffer (2013) that knowing what to do and how to do it, which is what control is essentially all about, is critical to achieving flow. Csíkszentmihályi, (1990) pointed out that for flow to occur one needs to feel to be in control. As for heightened enjoyment, one could expect the enjoyment dimension to take a prominent role when dealing with websites that are hedonically oriented, that is aimed at entertaining users. Wenigner and Loebeecke (2011) observed that information systems differ in that some are predominantly hedonic while others are predominantly utilitarian. They noted that the hedonic information systems are closely related to pleasure activities. The main reason why consumers visit virtual health-related sites is not to be entertained. Rather, it is for the utilitarian value of such sites, particularly the need for information as well as support (Nambisan 2011; Flickinger et al., 2017; Huh et al., 2016; Zhang et al. 2014; Zhang et

al., 2017). Furthermore, Tan et al (2015) noted that cognitive absorption as conceptualised by Agarwal and Karahanna (2000) has only enjoyment as an affective component while control, curiosity, focused immersion and temporal dissociation, are all cognitive components. They pointed out the flaws associated with combining cognitive and affective components in measuring a single construct noting that doing so can mask the variance unique to the different types of dimensions more so as affective and cognitive dimensions have distinct relationships with behaviour. Accordingly, this study did not include control and heightened enjoyment in measuring cognitive absorption in virtual health communities. Rather as with Zhu and Morosan (2014), this study identifies temporal dissociation, curiosity and focused immersion as core dimensions of cognitive absorption. Temporal dissociation is in this study expressed by the extent to which time is perceived to pass quickly when using a virtual community. Curiosity refers to the extent to which use of a virtual community arouses one's inquisitiveness or desire to know more. Focused immersion, on the other hand, is about perceived levels of mental engagement when using a virtual community.

2.3 Perceived usefulness and cognitive absorption

The utilitarian nature of health communities makes beliefs relating to usefulness of virtual health communities of high levels of interest. Most studies that have looked at the relationship between perceived usefulness and cognitive absorption have posited cognitive absorption as a precursor of perceived usefulness. These include the study by Saadé and Bahli (2005) who argued that cognitive absorption has a positive influence on the perceived usefulness of online learning systems. Shang et al., (2005) stated that users' experience of cognitive absorption positively relates to the perceived usefulness of online shopping. Other studies that have reported a positive relationship between cognitive absorption and perceived usefulness include Lin (2009); Roca et al., (2006); Wakefield and Whitten (2006). These studies draw their support from Agarwal and Karahanna (2000) who argued for the posited relationship on the basis of self-perception theory which argues that individuals will seek to rationalise their actions in

order to reduce cognitive dissonance. Agarwal and Karahanna (2000) observed that that people will rationalise their spending of much time on technology and enjoying it by attributing usefulness to it.

Contrary to Agarwal and Karahanna (2000), this study argues that perceived usefulness stimulates cognitive absorption. This is more so with respect to information systems that are predominantly utilitarian as is the case with virtual health communities. As noted before with virtual health communities, what drives people to such sites is the need for information and social support necessary for management of ailments. The goal is to benefit or be of benefit through shared information. The argument advanced in this study is in line with Kim and Han (2014) who found that in smartphone advertising, flow experience is positively influenced by perceived value. Perceived value results from perceived utility of a service or activity (Omotayo and Babalola , 2016). The influence of value, which inherently is about perceived usefulness, on cognitive absorption can be explained by the fact that presence of value unlike lack of it, is what will attract people's interest to engage with a virtual community. High levels of interest is consistent with cognitive absorption dimensions of curiosity and focused immersion. It is also unlikely that one would spend much time and in the process lose track of time, as a result of engaging on website that one does not associate any type of value with. Moreover, the flow theory argues that clarity of goal is necessary for flow experience to materialise (Nakamura and Csíkszentmihályi, 2009; Csíkszentmihályi, 2014). Csíkszentmihályi (2014) specifically notes that 'goals serve to add direction and purpose to behaviour' and that the value of goals 'lies in their capacity to structure experience by channelling attention' p.232. Chang (2013) in a study on social network games, found that flow experience is significantly influenced by levels of perceived utilitarian as well as hedonic value. Hausman and Siekpe (2009) found that perceived usefulness of online shopping websites positively influences flow. Similarly Hsu et al., (2017) found that user beliefs of online sites, made up of perceived ease of use and perceived usefulness, exert positive influence on flow experience. In this study it is hypothesised that:

H1: Perceived usefulness of virtual health community website has a positive influence on cognitive absorption.

2.3 Behavioural intentions – the role of cognitive absorption and perceived usefulness

As virtual healthy community sites are content-driven platforms, it can be argued that community members who not only read but also contribute to discussions are more critical to the success of any virtual community. Accordingly, in looking at behavioural intentions, this study focuses on the intentions of content contributing members i.e. comment posters, to continue making use of their respective virtual health communities. Studies that have looked at the influence of cognitive absorption or flow experience on behavioural intentions have produced some mixed results thereby necessitating the need for more studies on the relationship. Lin (2009) for example, found that cognitive absorption does not have significant influence on behavioural intentions to use virtual community. Suki et al., (2008) as well as Shang et al., (2005) found that cognitive absorption has no influence on online shopping behaviour. Visinescu et al., (2015) found that behavioural intention to buy online is significantly influenced by only some of the dimensions of cognitive absorption but not all. Zhuang et al., (2014) on the other hand found that cognitive absorption does exert significant influence on behavioural intention in online interest communities. Hsu et al., (2017) found that social shopping behaviour is positively influenced by experience of flow. Similarly, Zhou (2013) found that flow experience has a positive effect on mobile TV usage intention. In this study it is thus hypothesised that:

H2: Cognitive absorption has a positive influence on behavioural intentions to continue using virtual health communities.

The proposed model in this study posits that behavioural intentions of users of virtual health communities can be explained by perceived usefulness of the communities. This argument is in line with arguments advanced in TAM. Empirical evidence abound on the influence of perceived usefulness on behavioural

intentions. Luo and Remis (2014) for example found a positive association between the perceived usefulness of web-based information services and behavioural intentions towards such services. Steininger and Stiglbauer (2015), found that perceived usefulness is a significant direct predictor of doctors' intentions to use electronic health systems. Accordingly, it is hypothesised in this study that:

H3: Perceived usefulness has a positive influence on intentions to use virtual health communities.

The proposed relationships between perceived usefulness, cognitive absorption and behavioural intentions presents potential for mediation effect. Hair et al. (2010) noted that the mediation effect of a construct can be established so long as there are significant relationships between independent and outcome variable as well as between the proposed mediating variable and the independent as well as the outcome variable respectively. While a review of literature shows lack of studies that have examined the mediation effect, if any, of cognitive absorption on the relationship between perceived usefulness and behavioural intentions, studies that have looked at customer experience in general note that it can have mediation effect on customer affective and behavioural response. A study by Srivastava and Kaul (2014) conducted on retail customers, for example, found that the influence of perceived convenience on satisfaction is mediated by customer experience. A study by Sheng and Teo (2012) found that customer experience mediates the effect of perceived usefulness on brand equity among mobile phone users. Wang (2015) found that user experience mediates the relationship between technology excellence and service use continuance intentions. Keeping cognisance of the fact that cognitive absorption is an experience construct, this study posits that:

H4: The influence of perceived usefulness on behavioural intention is mediated by cognitive absorption.

2.4 Attitude towards virtual health community

Attitude is a construct of interest in behavioural studies due to its posited direct influence on behaviour. Of interest in the proposed model is users' attitude towards health-related virtual communities and its relationship with perceived usefulness, behavioural intentions as well as cognitive absorption. Attitude in the context of this study refers to favourable or unfavourable perceptions that users have of a virtual community. The technology acceptance model postulates that perceived usefulness is a precursor of positive attitude and also that attitude is an important precursor of behavioural intentions (Davis et al., 1989). The direct influence of perceived usefulness on attitude and of attitude on behavioural intentions has been confirmed in a number of empirical studies. Steininger and Stiglbauer (2015), for example, found that perceived usefulness is a significant direct predictor of attitude towards use of electronic health systems and also that attitude exerts significant influence on doctors' intentions to use such systems, respectively. Munoz-Leiva et al (2012) found that perceived usefulness of travel 2.0 websites had positive influence on users' attitude towards such websites as well as on their behavioural intentions to use the websites. Ruiz-Mafe et al (2014) found that attitude towards facebook fan pages exerts significant influence on customer loyalty and that attitude is positively influenced by perceived usefulness of the fan pages. Empirical investigations by Chiang (2013) also confirmed the positive influence that perceived benefits associated with using social networking sites have on behavioural intentions as well as the influence of attitude on behavioural intentions. Accordingly, it is hypothesised in this study that:

H5: Perceived usefulness has a positive influence on attitude towards virtual health communities.

H6: Attitude towards virtual health communities has a positive influence on use intentions.

A review of literature shows that not many studies have explored the direct relationship that may exist between cognitive absorption and attitude. One notable study that has examined the relationship between the two constructs is by Zhu and Morosan (2014). In their study, the context of which was the adoption by guests of interactive mobile technologies in hotels, they found cognitive absorption to be a significant

predictor of attitude. Studies that have looked at flow experience, specifically Van Noort et al., (2012) as well as Ho and Kuo (2010) also note its positive influence on users' attitude towards information systems.

In this study it is thus hypothesised that:

H7: Cognitive absorption has a positive influence on attitude towards virtual health communities.

In examining the role of cognitive absorption in virtual health communities, this study also explores a number of issues including the extent to which cognitive absorption helps explain attitude towards virtual health community as well as the influence on attitude, if any, on extent to which cognitive absorption influences behavioural intentions. As per Hair et al. (2010), the proposed nomological framework in this study, specifically, the positive relations hypothesised between cognitive absorption, attitude and behavioural intentions presents potential for attitude to have mediation effect on the relationship between cognitive absorption and behavioural intentions. While no study could be found in literature that examined the mediating role of attitude on the relationship between cognitive absorption, some consumer behavioural studies that have looked at the relationship between consumer's affective and behavioural responses such as Sparks et al., (2013) as well as Limbu et al., (2012) show that attitude as an affective response can have a mediation effect on behavioural intentions. This study hypothesises that:

H8: The influence of cognitive absorption on behavioural intention is mediated by attitude.

3. Methodology

3.1 Population and sampling

The proposed model was tested using data collected as part of a larger study on participation in virtual health communities. The study's target population was specifically contributors in virtual health communities. Only individuals who indicated that they actively participate in their virtual community by contributing to discussions and not only reading other people's posts were allowed to take part. As there was no readily available list of contributors that could be used as a sampling frame, convenience sampling

was used. Convenience sampling is a non-probability sampling method in which subjects are selected on the basis of being readily accessible and willing to take part (Burns and Bush 2010). Convenience sampling is a widely used sampling method in studies involving online information system users. Studies such as Lee and Lehto (2013) as well Carlson and O’Cass (2010) show that it is an acceptable sampling method in studies involving testing of structural models.

3.2 Measures and data collection

All constructs of interest in this paper were measured as multi-item constructs. Items used to measure each construct were adapted from literature. Use of past scales in research is known to help enhance construct validity (Hyman et al., 2006). Specifically, dimensions of cognitive absorption were measured using items that were adapted from Agarwal and Karahanna (2000), Saadé and Bahli (2005) and Lin (2009). Items used to measure the perceived usefulness of virtual health communities were adapted from Davis et al., (1989). Items used to measure attitude towards virtual health communities were adapted from Berger and Messerschmidt (2009), while items used to measure behavioural intentions to continue using virtual health communities were adapted from Lin (2009). Items were measured using a seven-point Likert scale ranging from 1 = very strongly disagree to 7 = very strongly agree. Details of statement items that were used to measure the constructs are provided in table 2.

Trained research assistants belonging to an independent registered research company were used to help with data collection. Screening questions were used to help identify individual respondents of interest. The questions asked whether one participated in a virtual health community by reading postings as well as contributing to discussions. Those who qualified were then invited to participate in the study by filling in the questionnaire. Respondents were approached in public and the research assistants were physically present when the respondents were completing the questionnaires ready to address any possible questions or concerns that the respondents would have. A total of 361 respondents participated in the study. Table 1 provides details of the demographic profile of the respondents including age and

gender. 42.7% of the respondents were male and 57.3% were female, while 24.4% were aged between 18 and 30, 62.0% were aged between 31 and 40, and 13.6% were over 40 years old. Respondents were asked to keep one virtual health community in mind when responding to the questions. 90.1 percent of the respondents indicated that they had been using the website of virtual health community that they kept in mind for a period of over one year with 65.1% indicating they had been using it for a period of 3 years and above. When asked to indicate the extent to which they agreed with the statement that 'I find it easy to use the health forum website', the mean value of 6.03 on a 7 point Likert scale shows high levels of agreement that they perceived the sites to be easy to use.

[Insert table 1 here

3.3 Data analysis

The proposed model was tested using structural equation modelling. Version 21 of SPSS/AMOS software was used to run the tests. Since this study involved completion of the whole questionnaire by single participants and it was a cross sectional study, the possibility for existence of common method bias was tested before the main analysis. Harman's single factor test was used and the results showed no evidence of common method bias as the single factor extracted failed to account for more than 50 percent of the variance (Eichhorn (2014)). The main analysis took a two-stage approach as recommended by Hair et al., (2010). The first stage entailed assessing the measurement model for goodness of fit, construct reliability as well as validity. The second stage entailed testing the proposed hypotheses. The study made use of the Maximum Likelihood method in estimating the model's parameters. A number of indices were used to test the goodness of fit of the measurement model. These included the normed chi-square, the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI) and the Normed Fit Index (NFI). Multiple fit indices were used to provide adequate evidence of model fit. Hair et al., (2010) recommends use of three to four fit indices in order to provide adequate evidence of model fit. Construct reliability was

tested using composite reliability coefficients. Assessment of construct validity involved examination of constructs for convergent validity, discriminant validity and nomological validity. Convergent validity was tested using factor loadings and average variance extracted (AVE) scores. Discriminant validity was assessed by comparing AVE scores with maximum shared variance (MSV) scores. Nomological validity, on the other hand, was tested by examining correlation coefficients of constructs hypothesised in the study as related.

4. Results

4.1 Assessing the measurement model

The reliability of the primary constructs was tested using composite reliability coefficients. According to Hair et al., (2010), composite reliability coefficients of 0.7 or higher indicate good internal consistency and thus high construct reliability. The findings in this study, as reflected in table 2, show that all constructs had composite reliability coefficients greater than 0.7. This indicates that all primary constructs were reliable.

[Insert table 2 here]

Assessment of the measurement model for goodness of fit showed acceptable fit as per Hair et al., (2010). As presented in table 4, the normed chi-square (χ^2/df) was found to be 2.294, the NFI was .913, the TLI was .932, and the CFI was .944. The chi-square (χ^2) was found to be 355.571 with 155 degrees of freedom and a significant p value of .000.

Results in table 2 show that all items associated with the six primary constructs had loadings greater than 0.5. According to Hair et al., (2010) item loadings of 0.5 or greater on corresponding factors provide evidence of convergent validity. Furthermore, results in table 3 show that the AVE for each construct was greater than 0.5. Hair et al., (2010) stated that convergent validity is also evident when the

average variance explained is greater than the unexplained variance, i.e. AVE >.5. The results thus provide support for the convergent validity of the constructs.

As noted earlier, discriminant validity was assessed by comparing the average variance extracted of each construct with the maximum shared variance between the constructs. According to Hair et al., (2010), discriminant validity is evident when the AVE is greater than the MSV. Results in table 3 show that the AVE values were all greater than the MSV values, thus providing evidence of discriminant validity.

[Insert table 3 here]

An examination of correlation coefficients in table 3 shows that the model's hypothesised relationships were all statistically significant, thereby providing evidence of nomological validity. Based on model fit statistics and results of reliability and validity tests, the measurement model was accepted as showing good psychometric properties and was thus considered acceptable for further analysis.

[Insert table 4 here]

4.2 Assessing cognitive absorption as a second order factor

As the proposed model included cognitive absorption as a second order factor consisting of three first order factors, confirmatory factor analysis was performed on the model in figure 2. The results showed that the model had a chi-square (χ^2) value of 106.603 with 24 degrees of freedom and a significant p value of .000. The normed chi-square (χ^2/df) was 0.185, the NFI was .939, the TLI was .927, and the CFI was .952. The loadings were significant at .001 level. The results thus empirically support the existence cognitive absorption as a second order factor in virtual health communities.

[Insert figure 2 here]

4.3 Hypothesis testing

Upon validation of the measurement model, the proposed hypotheses in the model were tested using the bootstrapping procedure. This was done in series of steps aimed at examining the proposed direct and mediation effects. Table 5 presents the results of the regression models testing the direct and indirect effects. The results show that perceived usefulness has significant positive direct influence on levels of cognitive absorption ($\beta = .600$; $p = .000$), behavioural intention ($\beta = .325$; $p = .000$) as well as on attitude towards virtual health community ($\beta = .612$; $p = .000$). Based on the results H1, H3 and H5 are accepted. The results also show that behavioural intentions are directly influenced by levels of cognitive absorption ($\beta = .656$; $p = .000$) and attitude ($\beta = .371$; $p = .000$) respectively. Furthermore, the direct influence of cognitive absorption on attitude was found to be significant ($\beta = .632$; $p = .000$). Accordingly H2, H5 and H6 are accepted.

The results in table 5 on indirect paths are for the mediation analysis conducted to test if the influence of perceived usefulness on behavioural intentions is mediated by cognitive absorption (H4) and if attitude mediates the relationship of cognitive absorption on behavioural intentions (H8). The results show that the influence of perceived usefulness on behavioural intentions dropped in the presence of cognitive absorption ($\beta = .184$; $p = .001$). The results also show that the influence of cognitive absorption on behavioural intentions is mediated by attitude. This is evidenced by the drop in the regression coefficient in the absence of attitude ($\beta = .102$; $p = .008$). Based on these findings H4 as well as H8 are accepted.

Note that while the results show drops in regression coefficients, it is important to note that both the influence of perceived usefulness on behavioural intentions as well as the influence on cognitive absorption in the presence of mediator variables remained significant. This means that the mediation effects were partial.

[Insert table 5 here]

Findings on the amount of variance in the dependent variables explained by the model are presented in figure 3. The results show that the model was able to explain 43.6 percent of the variance on behavioural intentions; 40.7 percent variance in attitude and 28.8 percent of the variance in cognitive absorption.

[Insert figure 3 here]

5. Discussion and implications

The current study aimed at extending knowledge on the role consumer experience plays in understanding behavioural intentions of members of virtual health communities. The study posited that cognitive absorption plays a significant direct and indirect role in influencing behavioural intentions and that perceived usefulness of virtual health community is a significant antecedent of cognitive absorption in virtual health communities. The findings in the study confirm the proposed relationships. In contrast with findings by Lin (2009) which shows that cognitive absorption does not exert significant direct influence on intentions to make use of virtual communities, the findings in this study, which looked specifically at virtual health communities, indicate that it does. The findings support assertions by Hsu et al (2017) as well as Zhou (2013) that behavioural intentions can be positively influenced by consumer experience with technology. They also support findings by Zhu and Morosan (2014) as well as Van Noort et al., (2012) on the positive role that experience plays in influencing attitude. Moreover since in this study cognitive absorption was measured using three dimensions of focused immersion, curiosity and temporal dissociation, all of which are cognitive components (Tan 2015) the findings demonstrate the positive variance that cognitive experience has on affective consumer response towards health virtual communities.

Findings on perceived usefulness demonstrate its importance in explaining not only behavioural intentions but also levels of cognitive absorption in virtual health communities. Findings showing positive

influence of perceived usefulness on behavioural intentions are consistent with arguments advanced by the technology acceptance model (Davis, 1986) and past studies including Luo and Remis (2014) as well as Steininger and Stiglbauer (2015). Findings on the positive influence that perceived usefulness plays in facilitating cognitive absorption show the importance of health community sites that meets the informational and social or psychological support needs of users. This is contrary to assertions by Agarwal and Karahanna (2000) that perceived usefulness is an outcome of cognitive absorption, based on the need for users of information technology to manage cognitive dissonance arising from spending too much of their time engaging with such. This study argues that users who visit virtual health communities visit the sites with clear goals in mind namely to seek information and support or share the same for ease of management of ailments. The findings in this study show that as sites that are predominantly utilitarian, users of virtual health community sites will get deeply engrossed in them when they are able to satisfy their needs. The findings are consistent with those by Hausman and Siekpe (2009) who also argued that perceived usefulness exerts positive influence on cognitive absorption.

The expected mediation effect of cognitive absorption on the relationship between perceived usefulness and behavioural intentions were also confirmed. Additionally, the findings in this study helped establish the mediation effect of attitude on the levels of influence exerted by cognitive absorption on behavioural intentions. Taking cognisance of the high potential benefits associated with virtual health communities to patients and carers, this paper helps in understanding the use intentions of active participants and the role played by cognitive absorption in influencing the same. The findings in the present study have numerous theoretical and practical implications.

5.1 Theoretical implications

The proposed model presented in this study extends extant literature on cognitive absorption to explain behavioural intentions in virtual health communities. The study demonstrates that holistic experience of users, as denoted by cognitive absorption, exerts significant direct and indirect influence

on behavioural intentions within the domains of virtual health communities. Not many studies have examined the influence of holistic consumer experience on behavioural intentions in virtual communities (Gao et al., 2017). The few that have done so have produced mixed results resulting in lack of consensus particularly on the direct influence of holistic consumer experience on behaviour in virtual communities for example Lin (2009); Zhuang (2014).

In looking at the predictive role of cognitive absorption, the study is, to the author's knowledge, amongst the first, if not the first, to examine the mediation effect of cognitive absorption on the influence that perceived usefulness of virtual health community has on behavioural intentions. The established mediation role played by cognitive absorption in this regard is of significance because utilitarian value helps attract users to virtual health communities (Nambisan 2011).

Apart from examining the mediating role of cognitive absorption, this study also tested for the first time, according to the authors' knowledge, for the mediating effect of attitude on the influence that cognitive absorption plays on behavioural intentions. The findings confirm the expected mediating role of attitude on the influence of cognitive absorption on behavioural intentions. In doing so the study shed more light on the importance of examining attitudes in relationship with cognitive absorption in order to have a more comprehensive understanding of the effect played by cognitive absorption on behavioural intentions.

Furthermore, the findings show the relative direct impact of cognitive absorption on outcome variables. The results specifically show that cognitive absorption had the strongest direct impact on the behavioural intentions in virtual health communities, followed by perceived usefulness and attitude towards such communities. The results provide support for studies that acknowledge the importance of examining users' experience with information technology products such as Tuunanen and Govindji (2015) and Zhu and Morosan (2014) in order to better appreciate behavioural responses.

Other than demonstrating the predictive role of cognitive absorption, the findings in this study also shed light on the structural properties of cognitive absorption in virtual health communities. The findings

specifically validate focused immersion, curiosity, and temporal dissociation as three distinct dimensions in the context of virtual health communities. Additionally they show that each of these dimensions contributes significantly to the measure of cognitive absorption when conceptualised as a second order factor.

5.2 Practical implications

From a practical perspective, the findings in this study can help virtual health community managers better understand participants' behaviour and in turn enhance their ability to positively influence it. The findings demonstrate the value of cognitive absorption in respect of users' attitude, and behavioural intentions. These findings point to the need for managers of such sites to pay attention to users' experience when engaging with their sites. The interplay of the relationships between cognitive absorption, attitude, perceived usefulness and behavioural intentions needs to be noted also by practitioners when assessing virtual health communities. Managers need to understand specifically that while users may have a positive attitude towards their sites and perceive their sites to be useful, the impact of these two factors on intentions to continue using their sites may be negatively affected if experiential factors are neglected. The findings show that by paying attention to experiential aspects of their sites, managers will directly influence not only behavioural intentions but also attitude relating to community usefulness as well as the extent to which perceived usefulness influences behavioural intentions.

By validating the multidimensional measure of cognitive absorption, the findings in this study can help managers understand specific factors to focus on in their efforts to enhance the experiential value of their communities. The results specifically show that interaction filled with focused immersion, curiosity and temporal dissociation is what is associated with high levels of cognitive absorption in virtual health communities. It is important for managers to look for ways in which they can enhance users' levels of focussed immersion, curiosity and temporal dissociation on their sites. The results in this study show that managers can contribute to this by ensuring that their sites are associated with high levels of usefulness.

One way in which managers can do this is by paying attention to ensuring that they promote high levels of member interactivity on their sites. This can be stimulated by seeding the site with trending discussion topics. Such topics are likely to stimulate discussions. Managers can also invite experts on given topics to share content and engage with virtual community members. Managers need to appreciate the fact that virtual health communities cannot effectively serve their purpose of being a good source of information and support if there is not much interaction taking place between members of the community. Moreover, higher levels of interaction help ensure that a virtual community has the much-needed user-generated content that one can engage with.

It is also important for managers to have a good understanding of the needs of their community members in terms of topics of interest. In doing so they need to take cognisance of the fact that the needs of community members may vary depending on background characteristics such as age, gender and the health conditions facing them as well as prior knowledge on health matters. Identifying the needs of different segments of the community can assist managers to be in a position to effectively stimulate discussions on their sites by, for example, seeding appropriate ice-breaker questions or discussion points. The ability of discussion topics to attract one's attention largely depends on whether they are found to be of interest or not.

Apart from focusing on member interactivity and site content, managers of virtual health communities also need to pay attention to issues of the usability and appeal of their sites. The aim should be to enhance user control when navigating their sites and ensure that the user interface enhances pleasurable engagement with their sites. Low levels of site usability can result in users abandoning their site navigation efforts. Managers can also explore the use of multimedia to attract user attention. To this end managers can design their sites to support not only text but also voice and pictures, including short videos.

6. Limitations and future research

As with any research, there are limitations to the study that need to be borne in mind when interpreting the findings. The limitations offer opportunities for further research in this area. The first limitation relates to the fact that convenience sampling was used in selecting respondents. Additionally, the respondents were from a limited geographical area in South Africa as the study was conducted only in Gauteng, the economic hub of the country. This limits the extent to which the results can be generalised to all users of virtual health communities in the country. Future research could consider using probability sampling methods and/or extending the study to other geographical areas. Such studies could also help in validating the model and findings in the current study. Other limitations include the fact that in measuring cognitive absorption, this study made use of only three dimensions. Furthermore, the study examined only perceived usefulness as a precursor of cognitive absorption and outcome variables of attitude and behavioural intentions. Cognisant of the fact that there are other dimensions associated with cognitive absorption as well as other possible precursors and outcomes of cognitive absorption, future studies can consider including additional dimensions, antecedents as well as outcomes and testing for their relevance in the context of virtual health communities.

In conceptualising cognitive absorption, the study focused on only three dimensions: focused immersion, curiosity and temporal dissociation. While there is no consensus in literature on important dimensions of cognitive absorption, some studies highlight additional factors such as heightened enjoyment and control as part of the construct. Future studies could consider including such additional factors in examining cognitive absorption and its role in influencing behaviour in virtual communities. In doing so, the researchers would allow for richer coverage of experiential factors that motivate behaviour in virtual communities.

Keeping in mind findings in this study showing that cognitive absorption plays an important role in influencing behaviour in virtual health communities, more studies are needed to empirically examine and identify factors that influence the level of cognitive absorption experienced by users of virtual community sites. The proposed model in this study was able to explain only 28.8 percent of the variance in cognitive

absorption through the influence of perceived usefulness of virtual communities. Further efforts are needed to help uncover other key predictors of cognitive absorption in virtual communities.

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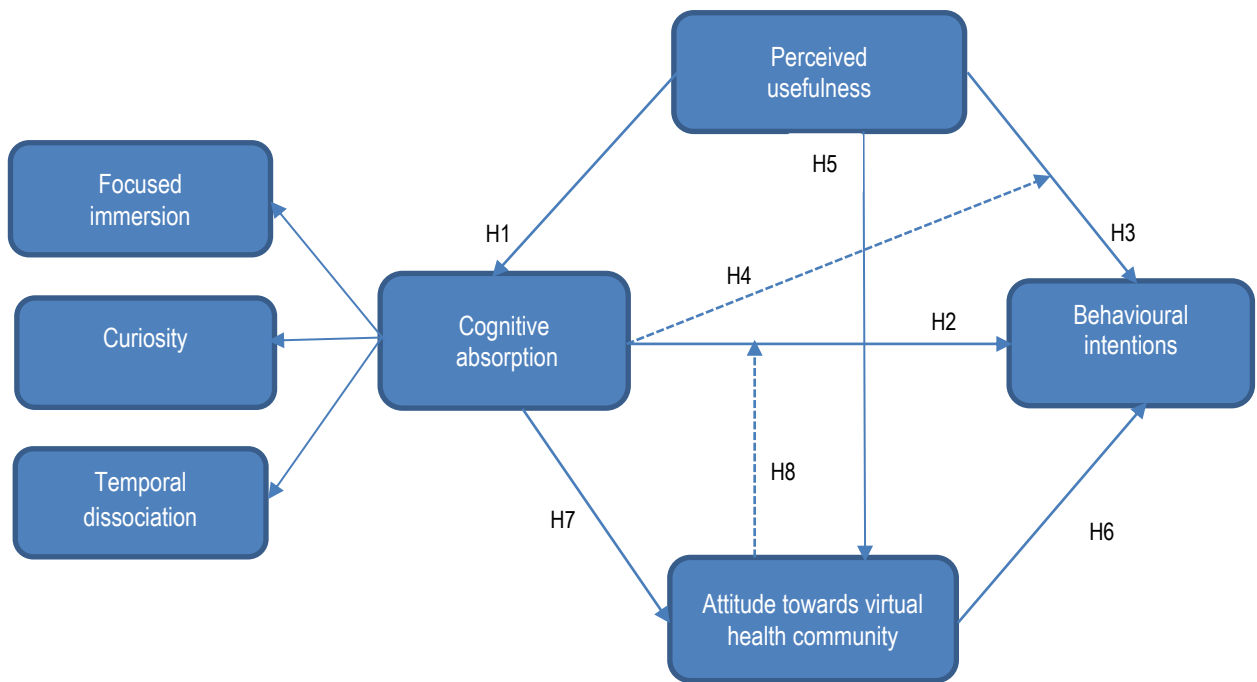


Figure 1: Proposed model – cognitive absorption and its influence on behavioural intentions

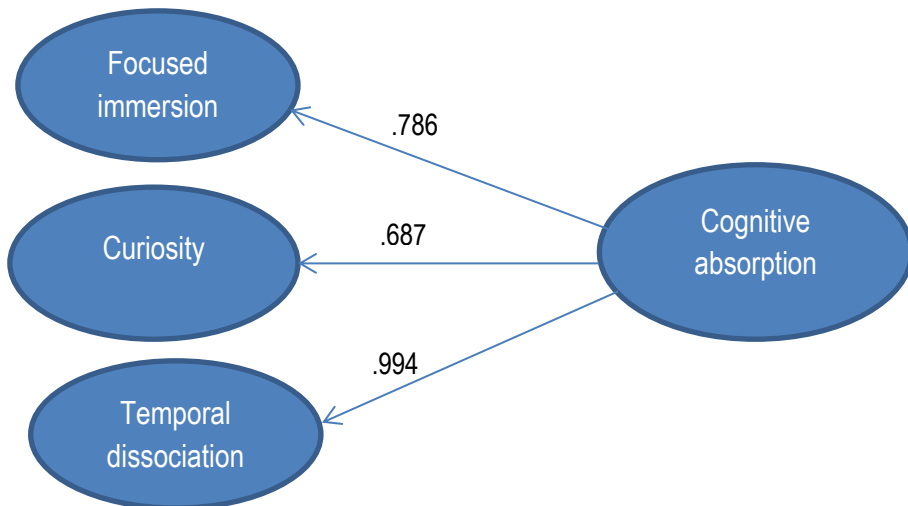
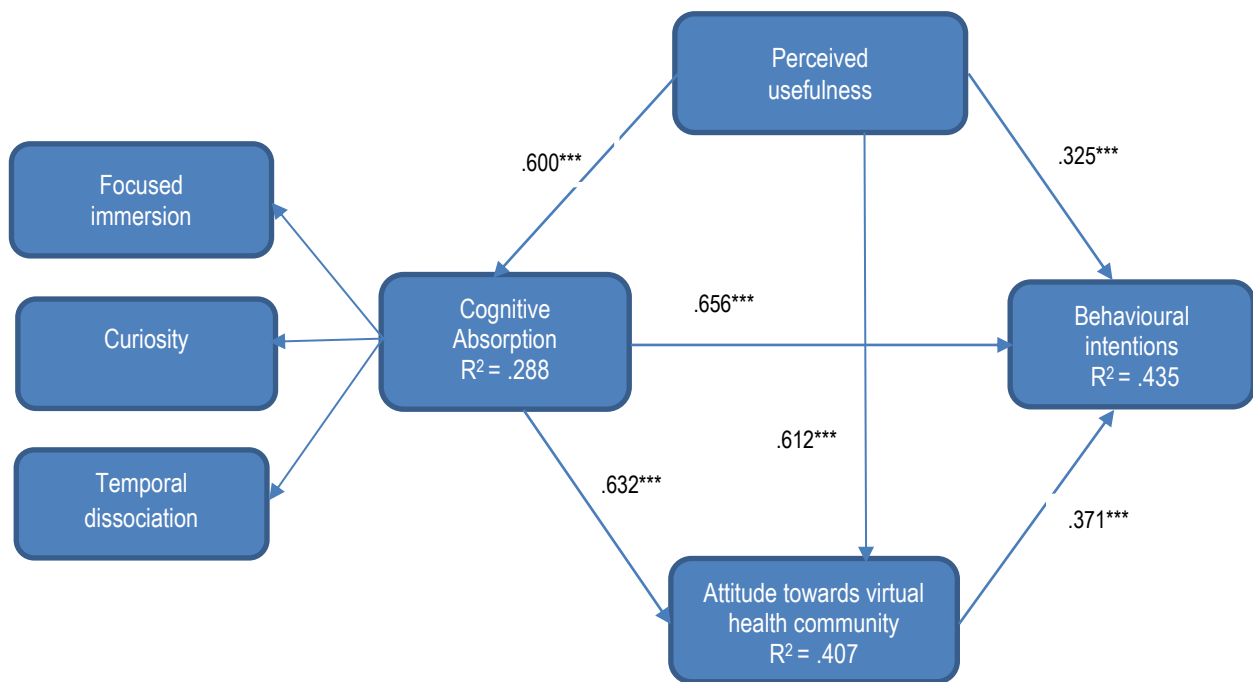


Figure 2: Measurement model of cognitive absorption as a second order factor



Path significance: ***P<0.001

Figure 3: Amount of variance explained by proposed model

Table 1: Demographic Profile of Respondents

	Item	Frequency (%)
Gender	Male	42.7%
	Female	57.3%
Age group	18-29	24.4
	30-40	62.0
	41-49	9.1
	50 and over	4.5
Highest level of education	High School and below	4.7%
	Post-High School Diploma/Certificate	19.1%
	Bachelor's degree	38.0%
	Post-graduate qualification	38.2%
Length of time using the online community website (years)	Less than one year	9.1%
	1-2 years	25.8%
	3-5 years	37.4%
	Over 5 years	27.7%

Table 2: Measurement items, reliability and factor loadings

Constructs and items	CR	Factor loadings	Scale Sources - adapted from...
Focl – Focused immersion	.868		
Focl 1 - When I am using the health forum website I am able to block out most other distractions		.876	Agarwal and Karahanna (2000)
Focl 2 - While using the health forum website, I get absorbed in what I am doing		.894	Saadé and Bahli (2005)
Focl 3 - While on the health forum website, I get immersed in the task I am performing		.897	Lin (2009)
Cur – Curiosity	.805		
Cur 1 - Using the health forum awakens my desire for knowledge		.814	Agarwal and Karahanna (2000)
Cur 2 - Interacting with others on the health forum makes me curious		.876	Saadé and Bahli (2005)
Cur 3 - Using the health forum arouses my thoughts		.847	Lin (2009)
TemD – Temporal dissociation	.832		
TemD 1 - Time appears to go by very quickly when I am on the health forum website		.881	Agarwal and Karahanna (2000)
TemD 2 - Sometimes I lose track of time when I am using the health forum website		.884	Saadé and Bahli (2005)
TemD 3 - Oftentimes when I get onto the health forum website, I end up spending more time than I had planned		.827	Lin (2009)
PU – Perceived usefulness	.764		
PU 1 - This health forum is valuable to me		.758	Davis et al., (1989)
PU 2 - This health forum has helped me be in a position to better manage health issues of concern		.865	
PU 3 - This health forum is very useful to my needs		.796	
Att – Attitude towards virtual health community	.807		
Att 1 - I like using this online health forum		.850	Berger and Messerschmidt (2009)
Att 2 - This online health forum is pleasant for me to engage with		.870	
Att 3 - This online health forum is good for me		.824	
BI – Behavioural intentions	.753		

BI 1 - I am very likely to use this health networking forum in the future		.760	Lin (2009).
BI 2 - My intention is to continue using this online networking forum rather than others		.879	
BI 3 - I do not want to discontinue my use of this online forum		.788	

Table 3: Descriptives, construct correlation and validity

Construct	Mean	Standard deviation	Focl	Cur	TemD	PU	Att	BI
Focl	5.94	.865	.828					
Cur	6.13	.722	.539	.761				
TemD	6.05	.740	.781	.683	.789			
PU	6.16	.654	.534	.397	.410	.722		
Att	6.09	.681	.519	.440	.488	.536	.763	
BI	6.15	.658	.539	.554	.524	.468	.500	.713
AVE			.686	.579	.623	.521	.583	.508
MSV			.610	.466	.610	.287	.287	.307
<p>Note: All correlations significant at 0.01 level.</p> <p>Coefficients in bold are the square root of the average variance extracted. Below them are the correlation coefficients between constructs.</p>								

Table 4: Fit indices for measurement models

Fit indices	Research Model	Cognitive absorption as a second order measure	Recommended Criteria
χ^2/df	2.294	4.442	<3.0
NFI	0.913	0.939	>0.9
TLI	0.932	0.927	>0.9
CFI	0.944	0.952	>0.9

Table 5: Hypothesis test results

Path	β	P	Conclusion
Direct paths			
Perceived usefulness ---► Cognitive absorption	.600	.000	H1 Supported
Cognitive absorption ----► Behavioural intentions	.656	.000	H2 Supported
Perceived usefulness ---► Behavioural intentions	.325	.000	H3 Supported
Perceived usefulness ---► Attitude	.612	.000	H5 Supported
Attitude ---► Behavioural intentions	.371	.000	H6 Supported
Cognitive absorption ---► Attitude	.632	.000	H7 Supported
Indirect paths			
Perceived usefulness ---► Cognitive absorption ---► Behavioural intentions	.184	.001	H4 supported
cognitive absorption ---► Attitude ---► Behavioural intentions	.102	.008	H8 supported