International Journal of
Recent Innovations in Academic Research
Open Access, Peer Reviewed, Abstracted and Indexed Journal

E-ISSN: 2635-3040; P-ISSN: 2659-1561
Homepage: https://www.ijriar.com/
Volume-5, Issue-8, August-2021: 35-41

Research Article

Need for Cognition in Information Seeking-Sharing During E-Learning

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Received: July 16, 2021 **Accepted:** July 29, 2021 **Published:** August 6, 2021

Abstract: Need for Cognition is a cognitive motivation that can predict involvement in information seeking-sharing during e-learning. Information Seeking-Sharing is a major component of current e-learning practice and it is important to understand possible determinants of such an activity. This paper was aimed at investigating the relationship between Need for Cognition and Information Seeking-Sharing behavior in e-learning. Using the Technology Acceptance Model (TAM) by Davis (1989), this work investigated the variables in two studies. The studies were conducted with participants in Germany (n= 107) and Ghana (n = 212), in both German and English languages with standard scales. Using simple linear regressions, the study tested Need for Cognition as an independent variable and Information Seeking-Sharing behavior as a dependent variable. Results support the relationship between the two variables. Discussions suggest that Need for Cognition can predict Information Seeking-Sharing behavior. Implications of such findings and limitations of the study are then outlined.
Keywords: Need for Cognition, Information seeking-sharing, e-learning.

1. Introduction

E-Learning research has primarily focused on learning outcome, satisfaction and technology with limited focus on the motivation to exchange information (Cidral, Oliveira, Di Felice & Aparicio, 2017). This has resulted in the need for more knowledge about learning activities and not only the learning outcome. The gap between knowledge about these activities and the outcome of e-learning has contributed to a high drop-out rate in voluntary e-learning (Toven-Lindsey, Rhoads & Lozano, 2015). This study aims to bridge this gap by contributing knowledge about the relationship between need for cognition and information seeking-sharing during e-learning.

The study presents information seeking-sharing behavior (ISS) as an important activity in e-learning and suggests that it can be predicted by need for cognition (NfC) (Luong *et al.*, 2017; Kramer, Van Duijvenvoorde, Krabbendam & Huizenga, 2021). Need for cognition is presented as a form of motivation (Grass *et al.*, 2019) for e-learners and a predictor of the degree to which people actively seek or share information (Kramer *et al.*, 2021).

This paper begins by defining NfC and ISS within the context of investigations to be presented. The theoretical background for predictions and investigations is the Technology Acceptance Model (TAM) by Davis (1989). This model was chosen to describe the motivation for technology use for information exchange. The sections will expand this model and provide detailed descriptions of its

key components before situating it in the context of this work. To ensure wider generalizability of results, this paper presents investigations of the same variables in two studies. The discussion and conclusion reflect findings from both studies, relates them to the current state of research and describes how the paper contributes to knowledge about e-learning.

Need for Cognition (NfC)

This is the tendency for individuals to obtain joy from effortful thinking (Cacioppo & Petty, 1982; Grass *et al.*, 2019). Del Barrio-Garcia, Arquero & Romero-Frias (2015) recall the differentiation between cognisers who prefer situations that require deep thinking and cognitive misers who avoid such situations. Cognisers are more likely to actively exchange information and engage in more intellectually stimulating discussions. Cognitive misers on the other hand are more likely to do only what is necessary to complete courses successfully or pass an exam.

Information seeking-sharing behaviour (ISS)

Information seeking and information sharing are reciprocal (Mills, Knezek & Khaddage, 2014), thus when information is sought, it is found because it has been shared.

Information seeking can be defined as activities learners engage in to encounter new information which improves their existing knowledge (Cojean & Jamet, 2017). This means it is an activity motivated by the desire of the learner to solve a problem through access to information (Mayweg-Paus, Zimmermann, Le & Pinkwart, 2020).

Information sharing can be defined as acts involving the distribution of learning content to inform other learners (Pai & Tsai, 2016). This is driven by a sense of autonomy and a social drive (Kang, Lee, & Kim, 2017; Pai & Tsai, 2016). Firstly, for autonomy, learners want to promote their view of a topic by developing and sharing content, as described by Kang *et al.*, (2017). Secondly, social drive leads to a sense of obligation to distribute information which the learner believes will help others seeking to understand the topic. This social drive may alternatively be caused by the expectation of reciprocity, where learners share knowledge with the expectation that others will do the same, as suggested by Pai & Tsai (2016).

1.1 Theoretical Background

Theoretical support for investigations and findings was derived from the Technology Acceptance Model (TAM) by Davis (1989). This model comprises system design, user motivation and actual use.

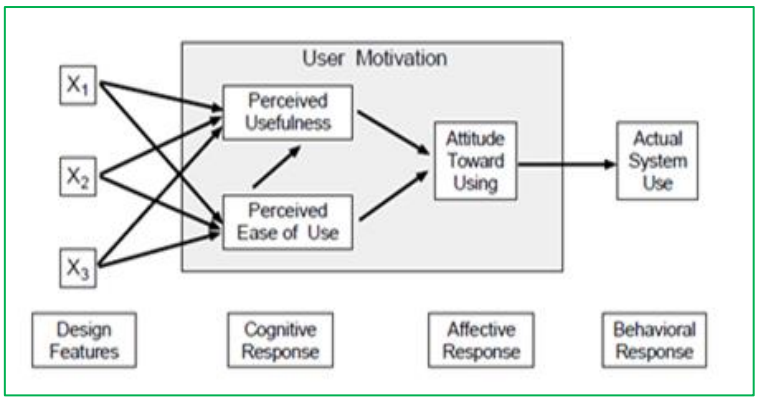

Figure 1. The TAM by Davis (1989)

System Design

System design (design features) describes attributes of a system which can influence actual use. If the system is designed to reduce effort and increase efficiency it is more likely to be used (Stantchev, Colomo-Palacios, Soto-Acosta & Misra, 2014). In e-learning, some of these attributes could include

chats amongst users, document sharing, access to multimedia content and ability to create interest groups.

User Motivation

The TAM classifies user motivation into perceived usefulness, perceived ease of use and attitude toward using (Wu & Chen, 2017). Stantchev *et al.,* (2014) describes both perceptions, with perceived usefulness viewed as the level to which the use of the system improves productivity. Perceived ease of use can be described as the degree to which individuals believe using the new system will be free of effort. These two perceptions of usefulness and ease of use influence the attitudes formed by people towards a system according to Wu & Chen (2017), who defined it as the extent of negative or positive feeling about technology.

Actual System Use

According to Stantchev *et al.,* (2014), actual use can be measured by the repeated utilization of the system by the individual to reach goals over a non-defined period. The model proposes that the use of this system will not be limited by time if the features are designed to promote a positive perception of usefulness and ease of use. If this perception extends beyond current objectives, then the repeated utilization of the system will result and thus lead to actual system use.

Summary of theoretical background

The theoretical background of this paper was aimed at describing the role of user motivation in technology acceptance. NfC is described in this paper as a motivational variable and can thus be placed within the user motivation component of the TAM. ISS can then be positioned as actual system use because it involves using the system to seek and share information.

2. Materials and Method

2.1 Method

2.1.1 Derivation of hypotheses

As mentioned in the introduction of this paper, investigations aim to understand the relationship between NfC and ISS with ISS described as central in e-learning. Several studies have mentioned the important role of NfC in e-learning including activities leading to academic success (e.g. Grass *et al.,* 2019). The aim of this study as hinted in the introduction and the suggestions from previous works advised the derivation of the hypothesis of this study.

2.1.2 Hypothesis

- ✓ Need for cognition is related to information seeking-sharing behavior.

2.1.3 Data collection and Investigation design

Data was collected in two studies from participants in Germany and Ghana.

Participants

In study 1, data was collected in the Bavarian city of Würzburg in Germany. A total of 107 adults participated in the study and were made up of 68 (64%) females and 39 (36%) males. They were aged between 19 and 53 (mean = 22.18 and standard deviation = 3.91). These were all university students studying in Würzburg. All participants were enrolled in German taught programs, which was the language for the study.

In study 2, there were 212 participants who were enrolled in universities in Ghana. From the participants who responded to the gender and age questions, there were 162 (76%) females and 47 (22%) males with ages from 17 to 51 (mean = 24.04 and standard deviation = 7.73). The study was conducted in English, which was the medium of instruction at the universities where the participants were enrolled.

Design and procedure

A survey design was used to collect data in both studies and all participants responded within 30 minutes.

In study 1, data was collected at a Computer Lab in Würzburg through the online survey tool umfrageonline.de. Participants were briefed by the researcher and afterwards given access to the online questionnaires.

In study 2, the participants were presented with printed questionnaires before the start of regular lectures in some lecture halls at the University of Ghana.

2.2 Instruments

In addition to demographic questions such as age, gender, mother tongue and study program, questionnaires presented scales to measure NfC and ISS. All items in study 1 were in German and items in study 2 were in English.

In study 1, NfC was measured with a 33-item scale (in German) developed by Bless *et al.,* (1994). This was presented on a 7-point Likert scale ranging from Strongly Disagree to Strongly Agree (*völlig unzutreffend* to *trifft ganz genau zu* in German). The scale yielded a Cronbach Alpha reliability score of .91. Of the 33 items, 19 were reverse coded as advised by Bless *et al.,* (1994), these were items 4, 6, 7, 8, 9, 10, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 30, 31 and 32. In study 2, an 18-item NfC scale (in English) developed by Cacioppo *et al.,* (1984) was used. Administered on a 5-point Likert scale, it produced a Cronbach alpha reliability of .70 for this study. Items 3, 4, 5, 7, 8, 9, 12, 16 and 17 were reverse scored as advised by the developers of this scale.

In study 1, a German language translation of the Information, Communication, Technology Learning Survey (ICTL) developed by Mills *et al.*, (2014) was used to measure ISS. The 15-item scale with a Cronbach Alpha of .70 for this study, was administered on a 5-point Likert scale from Strongly Disagree to Strongly Agree. Item 7 on the scale was reverse coded based on the advice of the developers. In study 2, the original (English) version of the ICT Learning Survey (ICTL) was used. The 15-item scale was measured on a 5-point Likert scale like in study 1 and yielded a Cronbach alpha reliability of .82. Items 2, 4, 7, 8, 10, 13 and 14 on the scale measured information seeking while items 1,3 5, 6, 9, 11, 12 and 15 measured information sharing.

3. Results

3.1. Descriptive statistics

In study 1, scores on the 33-item NfC scale ranged from 78 to 206 (*M = 158.26, SD = 26.15*). On the 15-item ISS scale scores ranged from 41 to 71 (*M = 55.62, SD = 6.22*). Scores on both variables were positively correlated (*r = .24, p = .01*). In study 2 scores on the 18-item NfC scale ranged from 18 to 78 (*M = 53.58, SD = 10.37*). The 15-item ISS scale yielded scores ranging from 28 to 75 (*M = 58.96, SD = 9.02*). Like in study 1, there was a significant positive correlation between NfC and ISS (*r = .29, p = .00*).

The results indicate that an increase in scores on NfC leads to an increase in scores on ISS and vice versa.

3.2. Hypothesis testing

Need for Cognition is related to Information Seeking-Sharing behavior

A significant model emerged in both study 1 (*F (1, 105) = 6.12, p = .02, Adjusted R Square = .05*) and study 2 (*F (1, 208) = 19.73, p = .00, Adjusted R Square = .09*). The variance in both models was attributable to scores on NfC. The contribution on NfC was further supported as significant as indicated by coefficient in both study 1 (*B (SE) = .06 (.02), β = .24, p = .02*) and study 2 (*B (SE) = .26 (.06), β = .29, p = .00*).

In support of the hypothesis, simple linear regression tests showed a relationship between scores on NfC in the scores on ISS. The meaning and implications of these results are discussed in the next section.

4. Discussion

Findings from this work suggest a relationship between NfC and ISS. This finding conforms to previous suggestions by Grass *et al.,* (2019) and Kramer *et al.,* (2021).

Firstly, the findings mean learners with a high NfC (*cognisers*) are more likely to enjoy searching information from multiple sources and consulting multiple materials. Their enjoyment will be sustained and improved if they find more content.

Secondly, the findings suggest that, *cognisers* will enjoy sharing content. This includes self-developed content such as contributions on learning platforms. The *cogniser* would expect other learners to reciprocate by sharing content. The exchange of such content and the discussions will lead to more satisfaction because it will create a need for more mental activity.

The importance of information seeking-sharing has been described by this work and the role NfC plays has been supported by findings. It is useful to explain the implications of these findings on psychological research and e-learning design.

Limitation

Despite the useful implications of this work a limitation was identified. This is about the omission of the role of other variables such as information literacy in e-learning. This variable may be an important determinant of the efficiency with which learners find or share information.

5. Conclusion

The findings have implications for psychologists and e-learning designers.

For psychology researchers this work presents interesting findings about need for cognition, information seeking-sharing behavior.

Firstly, need for cognition has been supported as an important variable in this work. This work draws the attention of psychology researchers to this important predictor of learning in current e-learning environments. This motivational variable can help psychologists predict ISS and prepare environments appropriately to meet likely individual needs.

Secondly, the contextualization of ISS as a key e-learning activity is insightful. This contextualization in this study departs from the usual learning evaluation as events to an activity which is more stable over time and thus a behavior. The prediction of the level of these activities can help psychologists improve their understanding of e-learning from a behavioral point of view.

Lastly, the collection of data in two countries improves the generalizability of these findings. This makes findings useful for psychology researchers interested in understanding individual differences of learners in both economically advanced and developing countries.

For e-learning designers these findings promote a better understanding of individual differences that predict e-learning activity. This includes the willingness of learners to access and make use of all the information provided to aid their understanding of topics.

Findings from this research conducted with two different samples and instruments in two languages point to one conclusion. That is, need for cognition can predict of information seeking and sharing in e-learning.

This study joins other works mentioned in this paper to support the importance of need for cognition in predicting learner information seeking-sharing behavior. This behavior has been described as an important element of e-learning.

Conflicts of interest: There is no conflict of interest of any kind.

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Citation: Martin Gameli Akakpo. 2021. Need for Cognition in Information Seeking-Sharing During E-Learning. International Journal of Recent Innovations in Academic Research, 5(8): 35-41.