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Usefulness and Ease of Interactive Video Technology Integration among Faculty Members in Online Nursing Courses

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Abstract: A descriptive correlational design was used in this study to evaluate faculty perceptions of the usefulness and ease of interactive video technology integration in online nursing courses, in order to predict behavioral intention. This paper presents The Technology Acceptance Model (TAM) related hypotheses in the study which all showed positive correlations that were statistically significant. Using innovative technology to deliver course content that relates to healthcare technology, and supports student learning, is critical to clinical technology competency acquisition and implementation of best-practice in academia.

INTRODUCTION

According to Williamson and Muckle (2018), the Technology Informatics Guiding Education Reform (TIGER) initiative recommends that all nurses develop informatics competencies during their educational studies. The caveat is how nursing faculty are integrating technology in online courses to engage students in active and social learning in order to assist students in developing informatic competencies which will be needed in clinical practice. The significance is twofold: 1) nursing accrediting bodies call for integration of technology across nursing curriculums, and 2) the “millennial” generation expects faculty to implement technology to enhance the learning experience (May et al., 2013).

Technology not only plays an integral role in nursing practice, but it is essential in nursing education. While the concept of online course offerings has been realized through advances in technology such as learning management systems (LMSs), faculty struggle to implement the newest technologies in online courses which engage students, enable social learning, and enhance the learning experience. In addition, selecting practical multimedia materials for a class is a new challenge for educators (Weng, Yang, Ho, & Su, 2018). Posting static video lectures is one method of content delivery in online courses, but it does not afford the student an opportunity to interact with faculty or peers nor does it build informatic competencies. As noted by Zhang, Zhou, Briggs, and Nunamaker (2006), “interactive video technology increases learner-content interactivity, thus potentially motivating students and improving learning effectiveness” (p. 17). Interactive video technology refers to technology used by faculty that enables students to interact with video content itself through a variety of modalities such as clicking, dragging, scrolling, gaming, immediate response systems, videoconferencing, or gesturing. Telehealth is another example of interactive video technology that can be used in online nursing courses and relates directly to current technology use in the healthcare sector.

Barriers must be recognized in behavioral intention to integrate technology into nursing courses. Merrill (2015) highlighted how the integration of technology has the potential to be very stressful on nursing faculty who possess limited knowledge of the use of computers and technology. In addition, educators must be familiar with content of multimedia teaching as well as gathering teaching material which brings additional burdens (Weng et al., 2018). At the current time there are limited findings from research in regards to the integration of technology into nursing education settings (Williamson & Muckle, 2018). Integration of technology should not only enhance the delivery of content and increase student engagement, but it should also improve the teaching and learning process. May et al. (2013) highlighted how various technology is available to nurse educators, and when used appropriately can augment and enhance both the classroom and clinical experience. By understanding faculty’s behavioral intention to use interactive video technology, which therefore determines technology acceptance, this information can be used to guide processes of technology selection and implementation as well as recognizing external variables that impact behavioral intention and acceptance.

CONCEPTUAL FRAMEWORK

This study incorporated the Technology Acceptance Model (TAM) (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989) as the conceptual framework which is one of the most influential theories for examining new technology acceptance and adoption (Chen, Sivo, Seilhamer, & Sugar, 2013; Pavlou & Fygenson, 2006). The TAM has been validated as reliable for predicting the acceptance or adoption of new technologies by end-users and provides a causal relationship for explaining or predicting technology acceptance among users based off of their perceptions, attitudes, and intentions (Alharbi & Drew, 2014; Chuttur, 2009; Davis, Bagozzi, & Warshaw, 1989; Lai, 2017). Based on the TAM, there were four constructs that influence overall interactive video technology acceptance. Behavioral intention was the end construct and an important factor that determines whether faculty will actually utilize interactive video technology in online nursing courses to enhance the scholarship of teaching and learning. Perceived usefulness is the faculty's internal beliefs that interactive video technology can enhance their teaching/job performance. Perceived ease of use is the faculty's internal belief that integration of interactive video technology into online nursing courses can be done effortlessly. Feelings faculty possess in regards to using interactive video technology were measured by the attitudes construct. Furthermore, the TAM theorizes that perceived usefulness and perceived ease of use are affected by external variables (Davis, Bagozzi, & Warshaw, 1989). The two external variables of interest in this study were usage experience and job relevance. Therefore, perceived usefulness and perceived ease of use are affected by these variables and mediate the effect of users experience and job relevance on end user's attitude and behavioral intention, therefore impacting actual interactive video technology use.

METHODOLOGY

Research Design and Sample

A descriptive correlational design was used in this study. The study sample consisted of nurse educators in the United States who had an active membership in Sigma Theta Tau International Honor Society of Nursing (Sigma). These faculty had given consent upon joining the organization to be involved in research. The response rate among the targeted 820 (N=820) members was 6.5%, or 53 members willing to participate voluntarily in this study. Among the 53 respondents to the study invitation, 7 (13%) failed to complete the survey, therefore were omitted from the study. All remaining 46 respondents completed the survey questions pertinent to the study in its entirety. Thus, the final sample size for the study was $n = 46$. This convenience sample of nurse faculty allowed for a diverse population to participate in the study. Participants completed an electronic survey. Research began after Institutional Review Board (IRB) approval.

Hypothesis

The following hypotheses (H) tested in the study aligned with the purpose of the study which was to evaluate faculty perceptions of the usefulness and ease of interactive video technology integration in online nursing courses, therefore defining the acceptance of this technology through behavioral intention. The five TAM-related hypotheses were as follows:

H₁: Perceived ease of use positively affects perceived usefulness of interactive video technology.

H₂: Perceived ease of use positively affects attitudes towards using interactive video technology.

H₃: Perceived usefulness positively affects attitude towards using interactive video technology.

H₄: Perceived usefulness positively affects intention to use interactive video technology.

H₅: Attitude towards using positively affects intention to use interactive video technology.

Instrument

In this study, a questionnaire survey was disseminated to investigate the acceptance of interactive video technology in online nursing courses of nurse educators in the United States. The survey was based on the constructs validated by Davis (1989) and adapted to the context of this study. The scale uses a 5-point Likert Scale, ranging from 1-Strongly Disagree to 5-Strongly Agree. The original TAM is comprised of six questions that measure perceived

usefulness (PU) and six questions that measure perceived ease of use (PEOU). The two determinants for attitude are PU and PEOU, and according to the TAM, PU has an independent effect on behavioral intention while PEOU has an effect on PU (Davis, 1989). Cronbach's alpha was used to address reliability concerns for internal consistency. Constructs are considered to have internal consistency reliability when the Cronbach's alpha exceeds 0.70. In this study, the reliability assessment was done using Statistical Package for Social Sciences (SPSS) version 25. All measures in this study show a good to excellent level of reliability, ranging from 0.865 to 0.934, the results are as follows: perceived usefulness scale (Cronbach's $\alpha = 0.887$), indicating the internal consistency of the questionnaire was good; perceived ease of use scale (Cronbach's $\alpha = 0.889$), indicating good; attitude towards use scale (Cronbach's $\alpha = 0.865$), indicating good; behavioral intention scale (Cronbach's $\alpha = 0.893$), indicating good and behavioral intention scale-job relevance scale (Cronbach's $\alpha = 0.934$), indicating excellent. The pattern of internal consistency was consistent with published research and the overall instrument reliability had a Cronbach's α of 0.950. Measurement criteria of this study was revised based on the related literature and discussed with invited experts. Dr. Davis granted permission to use the tool. The survey was disseminated via electronic format through the Sigma members only platform known as The Circle. The survey questions can be located in Appendix A.

DATA ANALYSIS AND RESULTS

Demographic data

Demographic information was analyzed with descriptive statistics generated by SPSS version 25. Of the surveys completed, 98% of the participants were female and 2% were male. The majority of participants were Caucasian (92%). The participants work setting showed that 47% worked in a private university, 38% in a public university, 11% in a community college, and 4% in a technical college. Academic rank of participants included 17% Professors, 20% Associate Professors, 33% Assistant Professors, 2% Lecturer, and 28% Instructor. The majority of participants were between 50 to 69 years, with 7% from 31 to 39, 20% from 40-49, 33% from 50-59, 35% from 60-69, and 7% above 70. Participants level of education ranged from Doctoral Degree 57%, Master's Degree 41%, and Baccalaureate Degree 2%. Participants indicated they worked primarily in the following programs: Associate Degree Nursing (ASN) 13%, Bachelor of Science in Nursing Completion (RN-to-BSN) 11%, Pre-Licensure Bachelor of Science in Nursing (BSN) 44%, Masters of Science in Nursing (MSN)-Education, MSN- Leadership, and MSN -Advanced Practice 9% respectively, Doctorate of Nursing Practice (DNP) 4%, and other 1%. Usage experience ranged from over five years (32.6%), 3-5 years (8.7%), 1-3 years (19.6%), less than a year (21.7%), and concluded with no use (15.2%).

Hypotheses

Spearman's Rho is commonly used in correlational research when variables are measured at the ordinal level and was the statistical approach in this study to examine the relationship between variables used within the study. Hypothesis testing on the relationship between TAM variables are presented next.

The first hypothesis was "Perceived ease of use positively affects perceived usefulness of interactive video technology." Using Spearman's Rho correlation, a statistically significant strong positive relationship can be observed between perceived ease of use and perceived usefulness ($r_s = .659$, $p < .05$, $N=46$), thus supporting hypothesis 1.

The second hypothesis was "Perceived ease of use positively affects attitudes towards using interactive video technology". Using Spearman's Rho correlation, a statistically significant moderate positive relationship can be observed between perceived ease of use and attitude towards usage ($r_s = .481$, $p < .05$, $N=46$), thus supporting hypothesis 2.

The third hypothesis was "Perceived usefulness positively affects attitude towards using interactive video technology". Using Spearman's Rho correlation, a statistically significant strong positive relationship can be observed between perceived usefulness and attitude towards usage ($r_s = .745$, $p < .05$, $N=46$), thus supporting hypothesis 3.

The fourth hypothesis was "Perceived usefulness positively affects intention to use interactive video technology." Using Spearman's Rho correlation, a statistically significant strong positive relationship can be observed between perceived usefulness and behavioral intention ($r_s = .768$, $p < .05$, $N=46$), thus supporting hypothesis 4.

The fifth hypothesis was “Attitude towards using positively affects intention to use interactive video technology.” Using Spearman’s Rho correlation, a statistically significant very strong positive relationship can be observed between attitude toward usage and behavioral intention to use ($r_s = .849$, $p < .05$, $N=46$), thus supporting hypothesis 5.

DISCUSSION

In this study, all five TAM-related hypotheses were proven to have positive correlations that were statistically significant. Overall, the findings from this study are consistent with the original TAM and published research. Nursing faculty who participated in this study showed positive attitudes towards using interactive video technology and intent to use this technology in their courses, which was the most dominant determinant of behavioral intention with a correlation coefficient of .849. These findings were similar to findings by Teo (2012) in that from the direct effects on behavioral intention, inferences can be made that when nursing faculty have positive attitudes and believe that technology will improve their work performance, they are likely to use that technology. Findings also indicate that when nursing faculty perceived interactive video technology as easy to use, they developed positive attitudes toward integrating it. Not surprisingly, perceived usefulness increased positivity toward use of interactive video technology which affected behavioral intention to use, these results were similar to results noted in a study conducted by Alharbi and Drew (2014). Technology with high perceived usefulness indicates that users believe in a positive use-to-performance relationship.

The two external variables studied included usage experience and job relevance. Surprisingly, the results show no significant correlation between usage experience and perceived usefulness, perceived ease of use, and behavioral intention to use. A very weak relationship can be observed between usage experience and perceived usefulness ($r_s = -.163$, $p = .285$, $N=46$), a weak relationship can be observed between usage experience and perceived ease of use ($r_s = -.372$, $p = .012$, $N=46$), and a very weak relationship can be observed between usage experience and intention to use ($r_s = -.198$, $p = .192$, $N=46$). The results of usage experience to the TAM constructs imply that these variables may not relate to one another and the direction cannot be deciphered. One reason for this may be due to the randomness affecting one or both variables, or perhaps other variables affect the two variables in question. Therefore, the moderator of usage experience did not have statistically significant effects on the TAM constructs and the direct relationship was not strong.

In terms of job relevance, a statistically significant strong positive relationship can be observed between job relevance and perceived usefulness ($r_s = .753$, $p < .05$, $N=46$) as well as a weak positive relationship between job relevance and perceived ease of use ($r_s = .434$, $p < .05$, $N=46$). Job relevance had statistically significant positive relationships with both perceived usefulness and perceived ease of use, which subsequently affects behavioral intention to use. Nursing faculty believe using interactive video technology is relevant to their job and is a useful resource. Age, academic rank, and highest earned degree did not correlate significantly with other variables. This was not a surprise as usage experience did not correlate with study constructs either. Furthermore, the study did not differentiate between voluntary use settings, mandatory use settings, or different types of technology used.

Implication to Practice

Academic freedom can allow for voluntary integration of resources in the delivery of course content. Therefore, it is important to explore the perceptions of nursing faculty toward new technologies whose use is voluntary and investigate which perceptions correlate with acceptance and use. This means that nursing faculty need more information and knowledge about interactive video technology as a product and evidence-based integration strategies which supports student learning outcomes and have job relevance. This knowledge could potentially offset the burdens and time constraints related to content development and integration of technology into course load. With that said, nursing educators and students may feel burdened or overwhelmed with this technology but students learn more when they are involved in both the academic and social aspects of the educational experience according to Astin's theory (1984) of involvement. Furthermore, administrators should devise implementation strategies and support structures that foster successful experiences in the use of technology for nursing faculty and students, which may lead to positive attitudes toward the use of interactive video technology and thus, strong intention to use (Teo, 2012). Lastly, interactive telehealth is a growing in popularity in the healthcare sector. According to McLendon (2017), telehealth may be an option for improving access to cost-effective quality care and reducing risks of chronic health complications. As noted by van Houwelingen, Moerman, Ettem, Kort, and Cate (2016), most nurses are insufficiently

trained to use these technologies effectively, thus the potential of telehealth fails to reach full utilization. Telehealth is a form of interactive video conferencing which has significant job relevance for nurses involved in clinical practice; therefore, students experienced with this technology through exposures in nursing coursework may have established positive attitudes regarding its use and ease of use, thus impacting behavioral intention to use this technology to improve patient care and impact patient outcomes.

Limitations

The limitations of this study include a small sample size based on g-power analysis and overall low survey response rate which impacts generalization. Another limitation was the self-report questionnaire and the fact that the majority of participants were female and Caucasian. Moreover, other statistical tests could be conducted on data as well as exploring the impacts and relationships of external factors such as technology availability and usage mandates. Lastly, the focus of the study was not on one specific interactive technology platform so no data was collected to explore what was being utilized and whether or not that was a factor in end system use or acceptance.

CONCLUSION

This study modified the original TAM in order to evaluate faculty perceptions of the usefulness and ease of interactive video technology integration in online nursing courses so that the research could measure behavioral intention to use said technology. The core constructs of the TAM were adopted for this study and used to develop the five hypotheses. Findings in this study were consistent with empirical evidence and prior findings from the utilization of the TAM and validates the relationship between perceived ease of use, perceived usefulness, attitude towards usage, and behavioral intention to use. The results of this study add to the body of knowledge related to nursing education as no other studies looked exclusively at the acceptance of interactive video technology in online nursing courses. The main contribution of this study is to predict behavioral intention based off of the TAM constructs. Further research will need to explore specific barriers to the integration of interactive video technology in online nursing courses so that technology can be used to provide learners an interactive learning experience and build upon informatic competencies. This study incorporated external variables such as usage experience and job relevance. Within the context of this study, job relevance had a positive relationship with the TAM constructs. One cannot assume usage experience to be an indicator of perceived usefulness, perceived ease of use, or predict behavior to use. Administrators in higher education may benefit from this study in their future plans to purchase or implement interactive video technology into online courses. Licensing agreements can be costly and limited, therefore fiscal responsibility is of importance while investing in technology to enhance the teaching and learning experience while also aligning technologies implemented with healthcare sector trends.

As noted by Weng et al. (2018), multimedia teaching has gradually substituted traditional teaching. Technology tools such as interactive video platforms offer an innovative method of content delivery and engage faculty and students in the use of technology as well as the teaching-learning process (Khan, Egbue, Palkie, & Madden, 2017). Interactive video that provides individual control over random access to content may lead to better learning outcomes and higher learner satisfaction (Zhang et al, 2006). Results from a study conducted by Hunga, Kinshuk, and Chen (2018) showed that learners who learned with embodied interactive video lectures performed better in comprehension and retention of learning content which provides needed evidence to nurse educators on best practices in education. LMSs tend to be focused, lack personal interaction, and have less capacity for networking than social media sites according to Brady, Holcomb, and Smith (2010); Chen and Bryer (2012), but that could change if interactive video technology was integrated and utilized in LMSs. Furthermore, Albayrak and Yildirim (2015) found that the use of social networking sites as a form of an LMS has the potential to increase out-of-class communication among instructors and expose students to the interactive capabilities that are similar to interactive video technology offerings in LMSs. Results of the current study has implications in nursing courses. The culture in nursing programs is shifting toward more technology. Advances in emerging technologies offer nurse educators a variety of current and future teaching applications (Foronda et al., 2017). The integration of interactive video technology must be used to maximize building interactions, communication, and relationships with students who are enrolled in online learning either through social networking sites or LMSs. Albiet, Bowman and Akcaoglu (2014) noted that students do not currently use LMSs to communicate with their instructor and peers which is a major concern in terms of soft skills necessary in the profession of nursing and for student retention, attrition, and informatic competency skills. Communication is an expected skill in the profession of nursing; therefore, nurses need to be prepared to use similar technology in patient-care areas

allowing one to communicate with the healthcare team, patients, and families. As noted by healthcare experts, the importance of being able to communicate clearly in videoconferencing and knowing what to do to enhance contact with patients is an essential technology skill required in nursing (van Houwelingen, Moerman, Ettem, Kort, & Cate, 2016). The use of interactive video technology allows nursing educators to transform the educational experience while meeting a call-to-action to integrate technology in nursing curriculums which prepare future nurses in the use of a wide range of healthcare technologies to improve patient outcomes and increase access to care.

APPENDIX A: MODIFIED TAM TOOL FOR STUDY

Perceived Usefulness (PU):

Q1. Using interactive video technology in online and/or hybrid nursing courses would enable me to control the pedagogy.

Q2. Using interactive video technology in online and/or hybrid nursing courses would enhance my teaching performance.

Q3. Using interactive video technology in online and/or hybrid nursing courses would increase my productivity.

Q4. Using interactive video technology in online and/or hybrid nursing courses would enhance my effectiveness on the job.

Q5. Using interactive video technology in online and/or hybrid nursing courses would make it easier to do my job.

Q6. I would find using interactive video technology in online and/or hybrid nursing courses useful in my job.

Perceived Ease of Use (PEOU):

Q7. Learning to operative interactive video technology would be easy for me.

Q8. I would find it easy to apply interactive video technology in my course.

Q9. My interaction with interactive video technology would be clear and understandable.

Q10. I would find interactive video technology flexible to interact with.

Q11. It would be easy for me to become skillful at using interactive video technology.

Q12. I would find interactive video technology easy to use.

Attitude Toward Using (ATU):

Q13. I believe it is good to use interactive video technology in online and/or hybrid nursing courses.

Q14. I like the idea of using interactive video technology in online and/or hybrid nursing courses.

Q15. It is a positive idea for me to use interactive video technology in online and/or hybrid nursing courses.

Q16. I think it is valuable to use interactive video technology in online and/or hybrid nursing courses.

Q17. I think it is a trend to use interactive video technology in online and/or hybrid nursing courses.

Intention to Use (BIU):

Q18. I intend to use interactive video technology in online and/or hybrid nursing courses in the future.

Q19. Assuming I have access to interactive video technology, I intend to use it.

Q20. Using interactive video technology in online and/or hybrid nursing courses enhance students' learning interest.

Q21. In my job, the usage of interactive video technology is important (*Job Relevance*).

Q22. In my job, the usage of interactive video technology is relevant (*Job Relevance*).

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