



E-portfolio functional requirements for the final semester baccalaureate practicum course: A qualitative research study



Chi-Ping Chang^a, Ting-Ting Lee^{b,*}, Mary Etta Mills^c, Yi-Pei Hsieh^d

^a Department of Nursing, Tzu Chi University of Science and Technology, 880, Sec 2, Chien-kuo Rd, Hualien 970, Taiwan

^b School of Nursing, National Yang-Ming University, 155 Sec. 2, Linong St., Taipei 11221, Taiwan

^c School of Nursing, University of Maryland, 655 West Lombard Street, Baltimore, MD 21201, USA

^d Computer Center, Tzu Chi University of Science and Technology, 880, Sec 2, Chien-kuo Rd, Hualien 970, Taiwan

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ABSTRACT

Background: The purpose of the nursing practicum course is to enable students to integrate cognitive, psychomotor, and affective skills into professional competencies prior to clinical work. With advances in information technology, e-portfolio focusing on individualized learning, reflection, and self-management has received positive consideration. The nursing profession has since adopted it as part of nursing education.

Purpose: This study explored the needs and perceptions of students in a baccalaureate nursing program regarding the use of e-portfolio in the final semester practicum course.

Method: This study used semi-structured focus group interviews and applied the principles of content analysis to interview content.

Results: Four key research themes were revealed: (1) anticipated functions achieved, (2) ease of uploading data and showcasing learning results (3) functionality extensions to enhance mobile learning, and (4) policy guidelines for mandatory use and plagiarism prevention.

Conclusion: E-portfolio assists in integrating knowledge, practical skills, and achievement recognition into the learning process. The use of e-portfolio with upgrades can enable learning of clinical competencies by students in preparation for clinical nursing practice.

Introduction

Nursing education enables students to integrate cognitive, psychomotor, and affective skills necessary to the development of professional competence prior to the start of clinical practice. The first year of clinical work as a registered nurse is a challenging and stressful time with inadequate preparation being cited as the most serious contributing factor (Takase, Yamamoto, Sato, Imai, & Kawamoto, 2017). In response, the nursing community has been reforming clinical practice education. Nursing education is promoting the e-portfolio (electronic-portfolio) method as a means of facilitating learning, motivation and sense of accomplishment (Wassef, Riza, Maciag, Worden, & Delaney, 2012; Willmarth-Stec & Beery, 2015). Understanding individual acceptance of information technology is one of the most mature streams of information systems research and includes perceived factors pertaining to user's technology acceptance process (Venkatesh, Thong, & Xu, 2012). Poor student acceptance has led to the abandonment of many innovations (Alamrani, Alamar, Alqahtani, & Salem, 2018; Lim,

Zhao, Tondeur, Chai, & Tsai, 2013). As a result, it is important to understand the potential effect of e-portfolio use during the final stage of clinical training - the Final Semester Senior Practicum (FSSP). The FSSP is a vital component in the education of professional nurses, as it functions not only as an educational tool, but psychologically prepares students for clinical unit work experience. Nevertheless, it has been noted that many new nurses have not felt adequately prepared for their profession once they were on the ward (Takase et al., 2017). It is hoped that successful integration of the FSSP with e-portfolio enhancement will eventually lead to a reduced attrition rate of recently graduated nurses post-employment. The goal of e-portfolio use is for students to integrate both classroom and practice knowledge and skill, while acquiring professional competence and confidence to ensure a smooth transition to clinical practice (Tsai, Lee, Lin, Lee, & Mills, 2015). Due to recent advances in technology over the last 20 years, the introduction and impact of e-portfolios remains to be understood within the nursing context. The aim of this study was to explore the perceptions of students in a baccalaureate nursing program regarding use of e-portfolio during

* Corresponding author.

E-mail address: tingting@ym.edu.tw (T.-T. Lee).

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the FSSP.

Literature review

The nursing workforce shortage is a global problem. According to a previous study, the rate of attrition is highest in the first year of work post-graduation. The main reasons have been a perceived lack of competence and low job satisfaction (Takase et al., 2017). Strengthening nursing students' competency in professional clinical care and improving perceived job satisfaction have become crucial issues for employers as well as academic nursing. Clinical training involves learning processes that assist student nurses in acquiring nursing knowledge and skills required in clinical practice (Ludin & Fathullah, 2016). This objective is achieved, in part, through cooperative education with hospitals. Last Mile (direct translation of the course name from Chinese to English) - a clinical practicum course - is a formal transition program for students in their final semester of study who complete the practicum as an intern at a hospital and continue as an employee upon graduation. Employment post-graduation was linked to job offers received during student's clinical placements or hospitals where they had completed their final practicum. Recent research has shown that due to familiarity of the work environment via the last practicum course; the psychological and emotional impact of transition into the professional setting of clinical nursing post-graduation is reduced (Tuckett & Oliffe, 2016). Unit selection for the course is based on hospital demand, availability, and attempts to include nursing student field of interest. The last mile course extends over 6 weeks totaling 225 practicum hours. Nurse supervisors with extensive clinical experience from the hospital serve as preceptors (Chang, Lee, & Mills, 2017).

The teaching approach focuses on active learning, reflective thinking, and evaluation of students' learning outcomes according to demonstrated capabilities during clinical performance (Ryoo & Ha, 2015). Nevertheless, new nurses continue to have the highest attrition rate in healthcare institutions.

E-portfolio, also known as electronic portfolio, digital portfolio, or online portfolio, involves the use of information systems to access multiple media: documents, photos, videos, and hyperlinks. This enables users to showcase their learning achievements and summarize personal experiences. By reviewing and integrating what they have learned, students establish a record of skills attained and a sense of accomplishment linking theory and practice in a useful manner (Lai & Wu, 2016). In addition, the e-portfolio provides real-time interaction, data storage, and management advantages, while creating opportunities to share and view peer work (Tsai et al., 2015). Students can send and receive feedback from their instructors via the e-platform. Through reflective thinking, discussions and sharing information, motivation to use the system is reinforced (Wassef et al., 2012). In other research, it has been shown that the use of e-portfolios enhanced and encouraged knowledge acquisition through reflection and communication during peer discussions (Chaudhuri & Cabau, 2017; Hsieh, Chen, & Hung, 2015). The major advantages of e-portfolio learning can be summarized as providing: (1) a student centred method of integrating knowledge and skills acquisition with achievements and assessment (Lai & Wu, 2016); (2) a focus on students' ongoing self-evaluations, active learning, and reflective thinking, while summarizing their learning process and connecting to their future careers (Wassef et al., 2012). E-portfolios are hosted on a web based service platform and accessible by both students and instructors. E-portfolios may contain the following categories such as student/instructor communication, peer discussion, tuition accounting information, and school messages. The university has employed an e-portfolio system, which to date has only been used in an informal or voluntary basis by students.

Despite development of various educational technologies supported by advances in computer science, constructing e-learning tools requires significant effort and expense. Successful implementation relies on multiple factors based on application of the technology acceptance

model (TAM): 1) perceived ease of use; 2) perceived usefulness; and, other factors pertaining to user's technology acceptance (Venkatesh et al., 2012). Therefore, the willingness of users (teachers and students) to adopt new teaching and learning methods based on the applicability of the technology (Birks, Hartin, Woods, Emmanuel, & Hitchins, 2016; Chan, Sit, Wong, Lee, & Fung, 2016), and the element of enjoyment as emphasized by the younger generation (Abdullah, Ward, & Ahmed, 2016) are important to supporting utilization. The increase in online-based learning not only facilitates educational advances, but also poses challenges to academic integrity. Violations of academic integrity such as cheating, plagiarism and other dishonest behaviors are an important concern for faculty and students. This extends to the public who trust that graduates have the requisite knowledge for their profession (Chertok, Barnes, & Gilleland, 2014). Consequently, if user requirements for a new technology are not accounted for prior to establishing a new system, it may exist only as a momentary novelty before being abandoned (Lim et al., 2013).

Based on the previous cited literature: the nursing practicum course is designed to enable students to integrate multiple competencies simultaneously. These competencies include: 1) cognitive, 2) psychomotor, and 3) affective skills prior to engaging in professional clinical work. Due to advances in information technology, e-portfolios can be fine-tuned to focus on individualized learning, promote independent reflection, and enhance self-management. Understanding students' perceptions and expectations will aid and enhance successful development and deployment of e-portfolios in the professional nursing education context. The purpose of this study was to investigate senior nursing students' e-portfolio perceptions and needs of student nurses regarding the use of e-portfolio in the FSSP course. The advantages of e-portfolios when correctly administered may assist schools in constructing better suited teaching tools and enhancing professional clinical education to enable students to increase clinical competency and self confidence in their practice.

The specific research questions were:

1. Which aspect of the e-portfolio technology did students perceive to be the most useful to enhance their clinical performance?
2. What are the acceptance requirements, willingness and intent to use e-portfolios of the students?

Methods

A descriptive qualitative design was used for this study. Semi-structured interviews and focus groups were recorded, transcribed, and analyzed for qualitative content analysis. Researcher-participant interviews were used to generate the data. Data presented in this article are derived from a larger data set that focused on student functional requirements for e-portfolios.

Sample

The study inclusion criteria consisted of students: 1) in the fourth year of their nursing baccalaureate program and 2) who had completed the mandatory FSSP course. Participants included a purposive sampling between 20 and 23 years of age. These participants were recruited via an announcement on the school information web site and were entirely voluntary. Students were in no manner coerced, as neither the focus group leader nor the nursing department instructors were part of the student's nursing course teaching staff. Participants were recruited after the end of the semester and grades had been submitted. Of the 215 students (male: n = 27, female: n = 188) eligible for inclusion in the study, 58 students consented to participate resulting in a response rate of 27%, all of which were female.

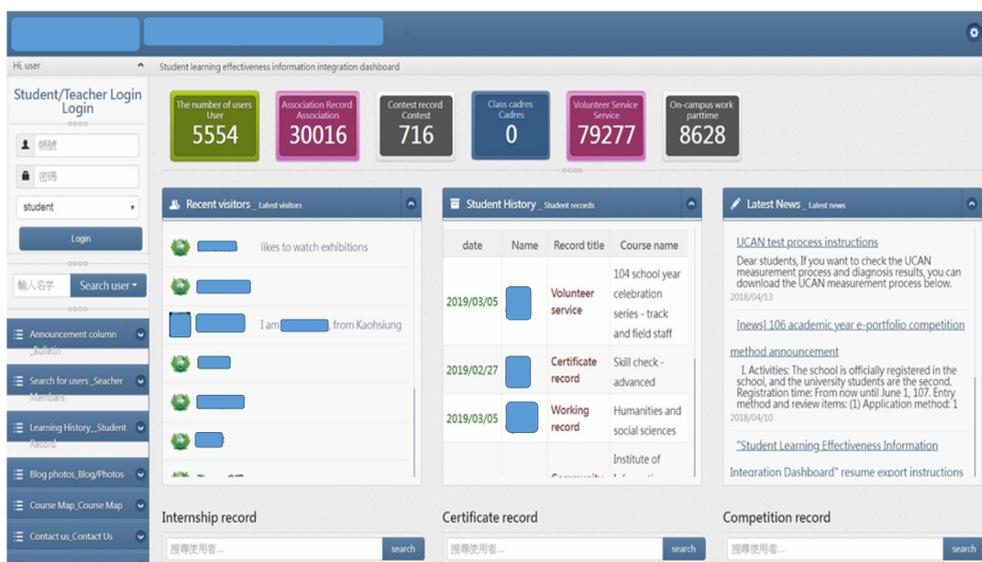


Fig. 1. The Web-based e-portfolio system (example).

Data collection

A web service platform for e-portfolios was employed in the present study. E-portfolios may be uploaded to the platform for multiple forms of record keeping in the following categories: 1) student/instructor communication, 2) peer communication via blog or forum, 3) tuition accounting information and 4) general school announcements and updates (Fig. 1).

A semi-structured interview guideline was used to conduct focus group investigations in this descriptive qualitative study (Schreier, 2012). All interviews were conducted by the same member of the research team. Focus group interviews were used to generate the data as this method is ideal for the capture of interactions between participants sharing experiences and perspectives. This method allows for further exploration of beliefs and attitudes (Freeman, 2006). Rich data and valuable information can be effectively collected using group interviews. Focus group interviews are considered less intimidating than one-on-one interviews while allowing for multiple perspectives which may be elicited to explore various issues and experiences of the functional requirements for e-portfolios (Jayasekara, 2012).

Five focus groups consisting of 10 to 12 participants met in a conference room after class on weekdays for a series of interviews. Each focus group interview lasted 40 to 90 min. Students were asked to describe their perceptions of and experiences using the e-portfolio during guided interviews which included the following questions:

- 1) If e-portfolio was mandatory as part of clinical learning, what functional requirements do you feel are necessary for this platform?
- 2) How might the use of e-portfolio enhance your learning?
- 3) What issues are of concern to you regarding the use of e-portfolios?

Interviews were taped, transcribed and shared with participants who could then add to, alter or remove their opinions and statements by e-mail or telephone.

Ethical considerations

Prior to participant recruitment for this research, institutional review board approval was secured. The research purpose was explained as well as the data collection process before interviews commenced. Signed informed consent from participants was obtained and confidentiality assured throughout the research process. Participants were informed they could drop out at any time during the research process,

without any consequence.

Data analysis

Interviews were transcribed verbatim and read and re-read to extract the major themes. Data was analyzed using the content analyses method proposed by Schreier (2012) using Atlas ti software (Atlas. ti Scientific Development Software GmbH, Berlin, Germany) (Muh, 1991), for computer assisted qualitative data analysis. The inductive process of analysis was initiated by identifying meaningful units illustrating patterns of how the students perceived their functional requirements for e-portfolios in the FSSP course. Comparison and contrast between words, phrases, and sentences were implemented post organization. Open coding included conceptualizing, defining and developing categories derived from the data, followed by reduction to assess relationships among themes using tables and diagrams to indicate conceptual patterns. The emerging findings were discussed with researchers. The final abstractions of meaningful units and subcategories into categories were discussed and agreed to by all authors. Conclusions derived from the participants' descriptions were based on major categorized concepts and themes.

Rigor

Credibility, dependability, confirmability and transferability were established to ensure trustworthiness of the qualitative data (Houghton, Murphy, Shaw, & Casey, 2015). For credibility, two-way follow-up communication between researcher and students confirmed the accuracy of communicated intent. Interviews were validated through reading the transcripts and listening to the tape recording simultaneously to ensure accuracy. For dependability, the appropriateness of emergent themes relied on the data interpreted by the principle investigator and the second researcher to warrant the objectivity of data analysis. For confirmability, accurate recounting of experiences of the participants during data collection was enhanced by requesting direct feedback from the participant for confirmation while following the interview guidelines, and the data was ensured through sending the interview texts and extracted codes and categories to the third author as an external check. To enhance transferability, numerous quotes from participants' verbal descriptions regarding the e-portfolio program were included to ensure that the results are applicable to other similar usage contexts. Members of the research team were doctorally prepared, and experienced in conducting qualitative studies such as users' perceptions

Table 1
Themes and subthemes associated with nursing students' experiences of e-portfolios.

Main themes	Subtheme
1. Anticipated functions achieved	1.1 Reinforces the instructor–student relationship. 1.2 As a reference guideline 1.3 Record progress and accumulate knowledge
2. Ease of uploading data and showcasing learning results	2.1 System capacity must be sufficient 2.2 Functions of large file sizes need to be improved 2.3 Interoperable file format
3. Functionality extensions to enhance mobile learning.	3.1 Integrated learning system of the internship units 3.2 Peer psychological and educational support 3.3 Develop more applications for mobile use
4. Policy guidelines for mandatory use and plagiarism prevention	4.1 Instructor competency of e-platform use 4.2 Enhancement of e-portfolio adoption process 4.3 Preventing Plagiarism

of e-portfolio programs or users' experiences in using clinical nursing information systems.

Results

Data analysis revealed the following four main themes: 1) anticipated functions achieved, 2) ease of uploading data and showcasing learning results, 3) functionality extensions to enhance mobile learning, and 4) policy guidelines for mandatory use and plagiarism prevention. Four major themes along with sub-themes are summarized in Table 1.

Theme 1: anticipated functions achieved

The students requested greater functionality to enhance the instructor–student relationship and learning needs within the e-portfolio for the FSSP. Reinforcing the instructor–student relationship remains a key component of success for the last mile practicum course and e-learning platform.

1.1 Reinforces the instructor–student relationship

Participants believed that e-portfolios extensively record students' learning progress. The accumulation of students' learning results and instructor acknowledgement of the students' capabilities reinforces the instructor–student relationship.

I believe e-portfolios should have a self-introduction design to help instructors quickly assess my potential. For the learning progress, a section should be provided where I can include my biography and list my experiences as a group/organization management member and volunteer, as well as the awards and certificates I have obtained. For example, in a previous study experience, I obtained an internship opportunity from a long-term care institution in Japan. With these experiences, my mentor will definitely have a more favourable impression, which will certainly be helpful for my next internship.

1.2 As a reference guideline

Participants in internships are required to have a clear framework regarding their learning objectives. The content obtained from e-portfolios can be used for training new nurses as a reference guideline.

The goal of our internships is to apply our knowledge in clinical practice. The internship hospitals (our future employment locations) can upload the practical training guidelines and content for new employees into e-portfolios so we are informed of the necessary skills and theories we must be proficient in. This helps with our own SWOT (strengths, weaknesses, opportunities, and threats) analysis of the professional skills we still lack in this unit, so we can make up for them.

1.3 Record progress and accumulate knowledge

Participants stated that it is inconvenient and time consuming to maintain hard copies, unlike e-portfolios, which are large cloud databases that enable accurate recording of past learning experiences, record progress and accumulate knowledge. Based on the participants'

experience with using information systems, they felt that e-portfolios should include various online application functions.

I believe the e-portfolio design should make people feel like they are managing their own profile. E-portfolios should have diverse functions to meet my needs. For example, I should be able to select categories and upload items such as internship assignments, photos, qualified nursing skills, test results, instructor evaluations, homework/grade improvements, and daily journal entries to my learning goals. From this cumulative learning process throughout the internship, we will have a sense of accomplishment upon seeing the final result.

Theme 2: ease of uploading data and showcasing learning results

Participants stated that up-load speeds need to be improved and the formatting problems in the learning report require correction.

2.1 System capacity must be sufficient

Participants believed that if the system is incapable of accommodating multiple users and fails during data upload, it will fail to effectively facilitate learning progress.

(In the previous experience) uploading my daily journals was often unsuccessful and I had to keep trying, which was a waste of time. I was wondering about the problems and later learned that it was because there were other users online at the same time and the system capacity was inadequate. The system capacity must be sufficient if the school really wants to implement e-portfolios for the clinical training program.

2.2 Functions of large file sizes need to be improved

E-portfolios can use photos (for example, project of medication safety poster) as image files to depict learning outcomes. Due to their large file sizes, it is inconvenient to upload photos with the current system design, and participants hope this function can be improved.

Sometimes using photos/image or video files to record our learning progress is better and clearer than using text. However, now the system only allows limited files to be uploaded one at a time which is inconvenient. I would prefer to upload multi-media files with a single click as is common in social networking websites/blogs.

2.3 Interoperable file format

Participants stated that the formatting of their experience reports was altered after uploading them to the e-portfolios which affected the presentation of the information.

Sometimes when I share my uploaded experience report with my friends, the layout and format are altered and the full text cannot be read. I am unable to properly present what I have written, which has taken a lot of effort. I wonder if there is something wrong with the system design.

Theme 3: functionality extensions to enhance mobile learning

The students also stated expectations about the e-portfolio accessibility. By combining: 1) e-learning system, 2) social network and 3)

mobile application into a complete educational resource.

3.1 Integrated learning system of the internship units

Participants believed that the e-learning system already in use is an essential knowledge base. They hope that it can be included in the internship units for a more integrated learning system.

I think we use the e-learning system the most often. For example, pediatric teachers use video tutorials which are very useful for previews or reviews. I hope the e-portfolios used during clinical training can be linked to the e-learning functions of the hospital. The nursing skill videos that are often used in the hospital are uploaded, and I can learn the skills that I need to know.

3.2 Peer psychological and educational support

Despite maintaining that the e-portfolio is an official learning system, participants also hoped they could post their concerns and issues to their peers' social networking websites. This would provide a parallel communication platform for messages between peers during internships.

If we encountered care events which were not familiar, we could post our questions to those who have had those experiences.... Students or seniors who have interned at this unit can leave notes on matters requiring attention or share their experiences. These may not be the formal records in the wards but some tips for the new comers. We could take these tactical tips to avoid undermining the established workflow.

3.3 Develop more applications for mobile use

Participants stated that mobile phones are the most convenient communication technology for nursing students. Mobile phones would be a useful support tool if e-portfolios could be accessed and fully functional, enhancing the utility of the technology.

Mobile phones are important accessories in our lives. Everyone (nursing students) has a mobile phone, but they may not necessarily have computers at hand. Therefore, schools should design more mobile applications of the website to meet our different study needs when they are designing the e-portfolios. I could use my phone to access my e-portfolio for learning purposes whenever I am available.

Theme 4: policy guidelines for mandatory use and plagiarism prevention

Students agreed that the e-portfolio is useful, and stated it must follow school guidelines and be protected from plagiarism.

4.1 Instructor competency of e-platform use

In assessing the use of e-portfolio systems, participants were more confident in themselves than were their instructors.

Using e-portfolios during internships should not be a problem with our technological capability. We are more worried about the teachers (laughs) because for e-learning, some teachers said they were not familiar with how to upload the handouts and asked their TAs (teaching assistants) for help. Some teachers haven't gotten used to annotations and track changes—most teachers still preferred reading our homework with hardcopies. If e-portfolios are really implemented, I hope schools will encourage the teachers to learn to use them first (laughs)!

4.2 Enhancement of e-portfolio adoption process

Participants stated that as the e-portfolio is a new system, it must be implemented with guidelines and rewards to facilitate students' willingness to access it.

When I started (using e-portfolios), compiling my information was time-consuming and it made me miserable. Everything is difficult in the beginning and everyone can be lazy, so to better motivate students, the school should implement it together with guidelines and rewards. Once established, the system will continue to be used as everyone comes to realise the benefits of e-portfolios. Therefore, the school should announce the use of e-portfolio as mandatory for teachers and students to adopt the

system.

4.3 Preventing plagiarism

Concerns regarding plagiarism were raised by participants. Students hoped that apart from advocating academic integrity, the consequences of plagiarism would be made known. Participants agreed that e-portfolios can inspire constructive criticism by facilitating feedback on their work from peers. Of particular importance, e-portfolio owners ought to have control over access permissions.

The school expects students to use e-portfolios to encourage team and group learning. Learning to review others' work emphasizes team spirit and is supported via e-portfolios facilitating feedback from teachers and students. However, take case reports (case studies) for example. These are crucial assignments and we fear plagiarism by others. I hope the system contains warnings explaining the importance of respecting intellectual property rights as well as the consequences of plagiarism. In addition, we should have strong control over access permissions.

The students requested more functionality within the e-portfolio for the FSSP. The up-load speeds need to be improved and the formatting problems in the learning report need to be corrected. Finally, students agreed that e-portfolio is useful, and must follow school guidelines while being protected from plagiarism.

Discussion

Instructor guidance during nursing internships has shown a significant impact on professional training (Tuomikoski & Kääräinen, 2016). However, one study found that students were concerned about privacy and potential for bias on the part of the instructors when using e-portfolios (Willmarth-Stec & Beery, 2015). Another study examined instructors' perceptions and guidance strategies that were adopted when they possessed a clear understanding of student nurses' backgrounds in certificates, awards, language proficiency, and work experience (Chang et al., 2017). The content of e-portfolios contains: a clear curriculum, skill set goals, and evaluation of learning outcomes (Chaudhuri & Cabau, 2017). This study found that, students were open to sharing their results and achievements from previous studies to better aid their instructors in educating them on a specific basis. This aided establishing a strong teacher–student rapport and improved learning outcomes. Additionally, for student nurses, feeling confident that their personal competencies meet the requirements of the hospital wards is a key factor affecting future attrition rates (Takase et al., 2017).

Students are responsible for actively collecting, organizing, and reflecting on the information for evidence of learning results. E-portfolios enable nursing students to assess their performance as well as link theory and practice (Lai & Wu, 2016; Wassef et al., 2012). One study argued that attaining satisfaction from the accumulation of knowledge is crucial for the continuing use of e-portfolios (Hsieh et al., 2015). E-portfolios retain the potential to resolve problems related to file storage and management in monitoring learning progress. Collectively, e-portfolio allows for convenient knowledge accumulation, knowledge management, and attaining a sense of satisfaction and accomplishment which may be attributed to the learning outcome (Chaudhuri & Cabau, 2017). The findings in the present study are in alignment with previous research, while highlighting the necessity of making the use of e-portfolios mandatory in the FSSP.

According to the technology acceptance model (TAM), the perceived ease of use and resultant use of a technology is linked to successfully educating others to recognize the positive effects of it. This in turn improves the perceived usefulness of the technology, and influences willingness to use it. Students' perception of e-portfolio was negatively affected due to insufficient storage capacity, slow system speeds, files uploading difficulties, and poor document layout. Research

has noted that in the use of e-portfolios, the tool itself is secondary to the knowledge attained through the digital medium (Cordier et al., 2016). Participants in the current study stated that showcasing their results is the crucial factor affecting e-portfolio usage.

Perceived ease of use followed by enjoyment are essential factors influencing the perceived usefulness of new technology (Abdullah et al., 2016). The digitalization of portfolios facilitates powerful data access functions, and extensions via linking to other systems potentiates its use further. Developing more applications for mobile use will improve accessibility and enhance self-directed learning. E-portfolio systems with complicated use requirements, or not incorporating Internet usage conventions expected by users, obstruct the promotion of e-portfolios (Willmarth-Stec & Beery, 2015). Social network sites enabling the sharing of internship information and moral support among peers may act to reduce learning stress (Horgan, Sweeney, Behan, & McCarthy, 2016). The clinical instructors' perceived value and usefulness of e-portfolios directly affects students' acceptance and enthusiasm for the system (Chang, Liang, Tseng, & Tseng, 2014). As such, while promoting the e-portfolio system, the teaching environment requires sufficient resources for instructors to enhance the usage of this teaching tool. The findings in this study support the same conclusions of previous research in the deployment of e-portfolio.

Despite the advantages that an innovative item or system may offer, it remains challenging for people to accept (Doyle, Garrett, & Currie, 2014). E-portfolios can be difficult to promote as it currently remains optional for student participation. To successfully promote the use of e-portfolio, it must be a requirement within the nursing curriculum. The student and teacher users must be able to access technical support to speed this adoption process. Furthermore, plagiarism was a conspicuous concern of the students. The convenience of rapidly sharing information with peers over the internet makes the problem of plagiarism inevitable (Chertok et al., 2014; Lynch et al., 2017). To improve the rate of successful e-portfolio implementation, academic integrity must be reinforced (Lynch et al., 2017). Emphasis placed on academic ethics by teachers, limited file access, and the provision of anti-plagiarism software are essential for students to understand the seriousness of violating academic integrity (Chertok et al., 2014). As technology continues to improve and takes on a more prominent role in the education of nurses, it remains clear that the human component must not be overlooked. Due to both the speed and ease of access, the internet, as well as e-portfolios is subject to the same pitfalls and abuses of rapidly advancing technology.

Implications for nursing education

At present the technology remains relatively new and has not been maximized for most effective potential use. Based on student perceptions, experiences and willingness to work with the web platform e-portfolios it is clear that the e-portfolio is presently not being implemented to its greatest effect. Collectively, teaching institutions, instructors and students require a better understanding of the software technology and how to maximize its use to improve the quality of nursing education, knowledge acquisition and support of new nurses post-graduation. The technological aspect of e-portfolios is constantly improving, while its faculty users must concurrently update their knowledge base, in order to best serve their students.

Study limitations and suggestions

The purpose of this study was to explore undergraduate student nurses' functional requirements for e-portfolios. The findings in this study were obtained from a nursing school in Taiwan where students had a similar learning and practice context and were highly homogeneous that may not be similarly reflected in a different setting. It is necessary to enroll undergraduate student nurses from other learning settings to explore further e-portfolio learning experiences.

Conclusion

Successful integration of the e-portfolio system must facilitate rapport between students and instructors, be linked to the hospital teaching system, be user-friendly, integrate with mobile applications, and most of all, ensure mandatory use and enforced anti-plagiarism policy. These measures would enhance portfolio use, improve nursing students' clinical practice competency and improve compliance.

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