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Consideration factors and adoption of type, tabulation and framework for creating e-portfolios

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ABSTRACT

The purpose of this research is to analyze the content of e-portfolios created by students in order to understand their tabulation and ways of displaying content. The analytic result shows that the number of outcome portfolios created by students is more than that of process portfolios. The five types of e-portfolio tabulation, in order of those most commonly created by students, are combination-based, content item-based, work-based, course unit-based, and time-based. The combination-based type incorporates the advantages of other tabulation types, while the content item-based and work-based types are better for clearly classifying data and step-by-step organization of it. Future research may further explore factors related to students' decision of tabulation type, the difficulties they face in the process, and their mentality as they adopt a portfolio type.

1. Introduction

As Internet usage becomes more widespread, e-portfolios represent an advantage over traditional portfolios in terms of storage, access, management, interactivity, real-time functionality, and presentation method. E-portfolios have the capability to digitize information and organize content through hyperlinks (Barrett & Garrett, 2009; Lorenzo & Iittelson, 2005). Compared with paper-based portfolios, they also have the added value in terms of keeping records, connecting ideas, relating information, and publication (Barrett, 2006; Barrett & Garrett, 2009). Portfolios are categorized based on intended purposes, include outcome, process, assessment, and reflective portfolios, presentation, showcase, and assessment, etc (Abrami & Barrett, 2005; Greenberg, 2004; McPherson, 2007; Tillema & Smith, 2000). Of course, portfolios differ not just in terms of student's learning process but also their particular personal styles as well. Also, the way in which content is collected, organized, and displayed is very important in creating an e-portfolio. However, portfolio content differs according to the proficiency of the student who created it, resulting in different types of portfolios. Therefore, the purpose of this study is to explore whether student e-portfolios can be categorized, and if so, what these categories are. This is one of the motivations for this study.

In terms of structure, e-portfolios favor systematic organization rather than random displays of data (Lee, 2006), and this organization is essential for helping viewers quickly get a grasp of the student's learning process. The tabulation of the portfolio provides a communication interface as well as a way to exchange information for its viewers, which is the only way for them to interact with the portfolio. In e-portfolios, tabulation is similar to the concept of website navigation, the primary function of which is to help viewers browse information. Navigation aids are often a part of web design, such as hyperlinks, search indexes, and tabulation. At the same time, good web navigation enables users to efficiently execute tasks and locate information quickly, which not only influences data retrieval, storage, and management, but also affects how information is obtained, produced, and organized (Barrett, 2006, 2010; Barrett & Garrett, 2009; Ntuli, Keengwe, & Kyei-Blankson, 2009; Oskay, Schallies, & Morgil, 2008; Tubaishat, Lansari, & Al-Rawi, 2009).

Tabulation, which refers to a set of buttons arranged according to a specific method and order, has both the navigational mechanism and hyperlink functionality. Its primary function is to help viewers interact with portfolio content. It is similar to a navigation tool which includes

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category indexing and searching functionality, serving to organize the overall structure of the portfolio and facilitate interaction with users. It is therefore apparent that design of a portfolio's tabulation has a significant influence on how content is organized and presented. Tsai, Lowell, McDonald, and Lohr (2003) found that much of the time students spent creating e-portfolios went toward designing an interface and arranging the order in which content was presented, showing that organizing a good portfolio can present quite a challenge. Therefore, deciding on a suitable tabulation type or method of organizing content for students to follow can make it easier to create a good e-portfolio.

Wang's research (2004) establishes three categories of e-portfolio navigation interfaces: folder-style menus, double level style menus, and guide map style menus. Different types affect the performance and attitude of learners as they navigate the portfolio, and portfolios are divided into these three categories based on navigation interface and button types. The three types of tabulation are irrelevant to the content items of an e-portfolio or the learning process of a student. Are they exactly the types of tabulation used in all e-portfolios? That remains to be researched. Kuo (2004) proposes several types of portfolio organization based on fields of study, content item, student works, chronological order, etc. These organization methods are relevant to the portfolio content items and the student's learning process, and may be used as a reference in designing the tabulation of the portfolio. However, they are designed for paper-based portfolios. Should e-portfolios have similar tabulations with those of paper-based portfolios? Or should they employ a different form of organization? And can these forms be categorized? These unanswered questions interested the researcher, and prompted exploration and induction of the types of portfolio tabulation used by students, forming the second motivation for the research.

In summary, the purpose of this research is to analyze the content of e-portfolios created by students in order to understand their tabulation and ways of displaying content. Portfolio structure refers to the way in which students use hyperlinks to organize and link portfolio content according to a specific method. Portfolio structure includes tabulation, navigation design, and links between different items in the portfolio. Questions to be explored include: (1) Can e-portfolios be categorized in terms of content, and if so, what are these categories? (2) Can portfolio structure be categorized according to tabulation, and if so, what are these categories?

2. Literature reviews

2.1. Types of e-portfolio and considerations of creation

Several universities have already included the creation of e-portfolios to their graduation requirements (Greene& Ferrell, 2006; 2007), and many teacher education institutions have also listed e-portfolios as a requirement for teacher certification and the institution itself, showing that the creation of portfolios is a necessary skill for both university students and pre-service teachers. Therefore, a firm grasp of the principles and correct process for creating e-portfolios is a skill every university student must have. Also, in order to ensure that the creation process goes smoothly, it is important to understand beforehand the portfolio types or features that one wishes to make use of.

Types of portfolios include the presentation portfolio, documental portfolio, assessment portfolio, process portfolio, outcome portfolio, comprehensive portfolio, record portfolio, work portfolio, course portfolio, reflective portfolio, structured portfolio, and learning portfolio (Carlson, 1999; Cole, Ryan, & Kick, 1995; Danielson & Abrutyn, 1997; Greenberg, 2004; Tillema & Smith, 2000), with the main difference being portfolios oriented toward assessment as opposed to those focused simply on presenting one's learning process or outcome. In regards to the features of digitalized portfolios, Abrami and Barrett (2005) argued that e-portfolios may be designed as three types: process, showcase, and assessment portfolio. McPherson (2007) divides e-portfolios into presentation portfolios, learning portfolios, work portfolios, and resource portfolios. Presentation portfolios are focused on presenting professional achievements; learning and work portfolios present one's learning process and reflections on the process; resource portfolios use a variety of portfolio formats and hyperlinks and multimedia to present digital resources.

2.2. Framework and tabulation of e-portfolios and considerations of creation

The purpose of e-portfolios is to systematically gather data in order to present the student's learning process. However, portfolios with an abundance of data that are not properly organized run the risk of being cluttered and unfocused. In a sense, the importance of portfolio tabulation may be shown. However, there are so few previous studies discussing the tabulation of e-portfolios. Generally, tabulation or table of contents (TOC) is a basic element in a portfolio (Oskay, Schallies, & Morgil, 2009). According to Wang (2009), Chalk & Wire's e-Portfolio system has table of contents linking to assessment. In bibliography or the study of tabulation, it is held that the tabulation is a series of buttons arranged in a specific order, which functions as a tool for assessing the portfolio's contents. These buttons are composed based on the content and form of the portfolio; in other words, they are a condensed version of the portfolio's contents. Library collections, for example, are organized according to bibliographical principles into collection catalogues, categorized catalogues, and subject catalogues, etc. Regardless of how it is presented, a portfolio's tabulation reflects not just its form and content but how it will be understood by creators or viewers.

An e-portfolio's tabulation helps viewers navigate content, and includes menus and hyperlinks. It can also lead users to establish relationship structures between information nodes, helping them switch back and forth between the nodes, and help them choose the content they wish to read without getting lost among the complex information presented (Wang, 2004). Therefore, a good tabulation makes organization of data more logical, helps viewers establish connections between the portfolio's structure and its content, and enables more systematic browsing. Therefore, the generic relationships of information may be sorted in order to create buttons which reflect content, following which tabulation types may be differentiated. According to Kuo (2004), organizing information in a proper way can effectively display a student's development, progress, or achievements, which is a necessary part of creating an e-portfolio. He offers several methods for portfolio organization, including those organized by fields of study, topics within a field of study, types of content item, student works, chronological order, or one of two distinct models: "student works first, followed by self-assessment and reflection," or "self-assessment and reflection included as an attachment following the works." In some e-portfolio samples (Burnett & Williams, 2009; Sweat-Guy & Buzzetto-More, 2007; Tubaishat et al., 2009), tabulations were created in terms of fields of study as learning content was the main focus. Otherwise, tabulations could be based on e-portfolio content items, e.g. goal setting, reflection, work, evaluation etc.

According to Lee (2006), students should design the tabulation for navigation after gathering data and organizing it into a portfolio. Wang's research (2004) establishes three categories of navigation interfaces: folder-style menus, double level style menus, and guide map