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ORIGINAL PAPER

The Practical Application of e-Portfolios in K-12 Classrooms: An Exploration of Three Web 2.0 Tools by Three Teachers

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Abstract Portfolios used in K-12 classrooms give students the opportunity to collect, showcase, and reflect upon the work they have completed throughout a class or program. With the advent of the digital age, e-portfolios have allowed for this process to be conducted online through the use of Web 2.0 tools, offering a number of advantages and features that were not possible before. In this article, three teachers reflect over the integration of e-portfolios in their K-12 classroom and discuss the relative advantages and limitations of three different e-portfolio creation tools.

Keywords E-portfolios · K-12 classroom · Web 2.0 tools

The creation of student portfolios to collect, showcase, demonstrate growth, and reflect upon assessments and projects at the K-12 level is not a new phenomenon (Stiggins 1994; Sweet 1993). Portfolios allow students to gain a better understanding of the assessment process, to think critically about the work they have done, to become more self-regulated learners, and to actively reflect on their progress throughout a class or program (Blackburn and Hakel 2006; Hillyer and Ley 1996; Kish et al. 1997; Riedinger 2006; Sharp 1997). Portfolios can also offer a structured environment where students can systematically analyze their learning processes and begin to develop beneficial habits and critical reflection skills (MillsCourts and Amiran 1991; Perry 1998; Zubizarreta 2009).

However, with the advent of the digital age, the rise of online e-portfolios has heralded a change in the way these portfolios are managed (Abrami and Barrett 2005; Lorenzo and Ittelson 2005). While still giving students the same opportunities to focus on learning goals, showcase progress, demonstrate growth, and reflect on work (Abrami et al. 2008; Barrett 2010), e-portfolios also offer distinct advantages over their analog counterparts. E-portfolios allow for students to not only self-regulate their learning, but to curate and showcase their previous work and talent while at the same time expressing their individuality and creativity, all within a digital space which can be easily shared with peers, teachers, parents, and others (Abrami et al. 2006; Buzzetto-More 2010; Cheng and Chau 2013; Lambert et al. 2007; Wade et al. 2005).

Student e-portfolios can also help facilitate connections, collaboration, and understanding between teachers, students, and parents, allowing for a more seamless sharing of student assignments, goals, and accomplishments (Englund 2009). Finally, e-portfolios offer a dynamic method for teachers to examine a student's progress over the course of a program and by doing so, gain a greater understanding of that student's growth, goals, needs, achievements, and talents (Abrami et al. 2008; Englund 2009; Lorenzo and Ittelson 2005; Meyer et al. 2010).

It is also important to note that the affordances that are gained from the implementation of e-portfolios have only begun to be recognized in recent years. The research on these tools, particularly at the K-12 level, is still somewhat limited (Barrett 2007; Lambert et al. 2007; Meyer et al. 2010), however, given their growing popularity and potential benefits,

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there is a need to explore and reflect upon the practical implementation of these tools within the field.

In this article, an examination of three teachers who are using three different free e-portfolio tools within their classroom is offered. The authors will discuss not only the practical applications of these tools but also the processes for, and successes and challenges in their implementation.

Data Collection Method

The authors implemented the following procedures to collect the data used in this article. Initially, a blog post outlining the article's goals and recruitment criteria was created, posted, and shared throughout social media. Additionally, emails were sent to 12 classroom teachers who had been known to use, or had considered using, e-portfolios in their classrooms. Based on the criteria described in the recruitment e-mail and social media announcement, eight responses were received. Of the eight, the authors purposefully chose the three described below, as they were willing to participate and met the criteria of 1) the teacher had used an e-portfolio for at least one semester, 2) the teachers had used a free tool, and 3) the three teachers taught different subject areas and K-12 grade levels which allowed the authors to better address a wider audience.

Once the three teachers were selected, the authors sent a questionnaire containing seven questions which asked the teachers to discuss and provide details about their specific e-portfolio tool, the demographics of their school, the design of their e-portfolio project, their classroom technology setup, the reactions from students towards the e-portfolios, their challenges and successes, and their final thoughts about the project as a whole. Additionally the authors requested that teachers send several screen shots of student portfolio samples, and direct quotes from students on what they thought about the overall experience. After these narratives, images, and quotes were returned to the authors, revisions were made in order to ensure that all reflections were written in a similar format. To ensure validity and that the teachers' intentions were still represented after the revisions, the narratives were returned to the teachers for member-checking.

Wix

Wix is a free Web 2.0 application that is used to create websites in a drag and drop, online environment, and is available at www.wix.com. Founded in 2006, Wix originally only allowed users to create flash-based sites, but with the release of HTML 5 the service now offers a choice between the two. Users can create websites from scratch or from templates and they have control over the content, design, and structure of their site, all of which is stored online, making it easy for students to conduct their work on any device available within a school or teachers' classroom. With a free membership, users have access to the majority of features, but will be unable to have a custom domain name and will see the Wix logo displayed in the footer of their published site. The Wix blog and YouTube are home to numerous tutorials to help users get started, and the user interface is designed to facilitate a short learning curve, making it ideal for classroom use, even with younger students.

The computer literacy teacher at an international school in Colombia chose to use Wix in order to facilitate the creation of student e-portfolios over the course of one academic year. The course was broken into sections based on three grade levels, from 6th-8th grade, and each section contained between 27 and 30 students. The classroom was set up with 30 PC desktop computers so that each student was able to work on this project individually.

Instruction began with a demonstration from the teacher on the functionality of Wix and how to use the site to build an e-portfolio. Following this demonstration, the teacher shared an example e-portfolio that he had created in order to provide the students with a better understanding of the project as a whole. To motivate the students, the teacher engaged the class in a short discussion on the purpose and benefits of creating an e-portfolio, such as the ability to share and reflect upon an entire year's worth of work. Once these foundational instructional activities were completed, the students created their free Wix accounts and were asked to build the framework for their e-portfolio by creating the five sections (Presentations, Microsoft Office, Computer Basics, Other Projects, and a Homepage which provided an overview) that their work would later fill. By organizing the e-portfolio in this way, the students were better able to understand how specific assignments related to the course's major themes throughout the year. Upon completion of this initial setup, which took two 45-min classes, the teacher reiterated what they hoped to accomplish with the e-portfolio and asked the students to share their opinions on what they thought about the project so far.

Overall, the majority of students were excited and motivated to create their e-portfolios and several of the students who were already familiar with Wix were eager to assist their peers in the development process. Despite student engagement, as with many technology-based projects, classroom management issues did arise when students got off task and visited websites other than Wix or forgot their login information. The teacher dealt with these issues by regularly moving around the room to ensure that the students were predominantly on task and keeping a log of student account information in case they forgot their username or password.

For the first month of this project, the students took longer than expected to upload or embed their assignments (which consisted of everything from word documents to simple

programs), write reflections, and list the curricular standards associated with the task, which were provided by the teacher. On average, students would take approximately 60 min to finish posting their assignment and writing their reflection (see Fig. 1). However, by the end of the second month, once the students had gained more familiarity with the Wix e-portfolio structure and interface, they were down to 15–20 min per submission.

At the end of the year, both the teacher and the majority of students found the creation of e-portfolios to be worthwhile and engaging. Student reflections also showed a critical analysis of the work they had done and the growth they had achieved throughout the course of the year. The ability to share their portfolios with peers and teachers in other classes helped the students to better understand the potential impact their e-portfolios could have outside of the classroom, and this idea was seen in many of their culminating reflections, which served as a summative self-assessment for these students. For example, one student summarized this idea by stating, "I really liked the e-portfolio because it was an easy way to organize my work, and it looked great…If I need to show my past work to someone, I can link them to my portfolio and my work is easily organized for that person to see." Many of the other students asked if they could use Wix in other classes for the same or similar purposes. Based on these reactions, the teacher led a school-wide professional development activity over Wix and e-portfolios, and multiple teachers began exploring the process in their own classes as well. In the end, Wix proved to be an excellent platform for creating e-portfolios, and giving students the opportunity to reflect upon and share their work. The teacher highly recommends both the site and the incorporation of e-portfolios into the curriculum wherever possible.

Schoology

Schoology is a free learning management system that can be used to create an interactive online environment for students. Within the Schoology ecosystem, students can work on and submit assignments, receive feedback, and collaborate with peers. And, although it is not necessarily the primary feature of the system, Schoology can be used to construct and curate e-portfolios by acting as a digital hub for students' work and feedback.

To build e-portfolios, students can create different folders to organize their assignments and digital artifacts, which can then be shared with others for reflection and review (see Fig. 2). Students and teachers also have the option of commenting on each other's posts, assignments, and reflections, which allows for more formative and informal evaluation possibilities as the students can easily make revisions based on the feedback they receive. Finally, students have the ability to design their personal home page as well, so as to add a sense of ownership and expression within the digital space.

To explore the classroom benefits of e-portfolios, a teacher in a rural Midwest school utilized Schoology on a variety of devices and on a daily basis for the fall semester of his three language arts classes, with a total of 64 middle school students. The process began on the first day of the semester, with each student creating a personal account in Schoology where every document they completed and shared with the teacher or

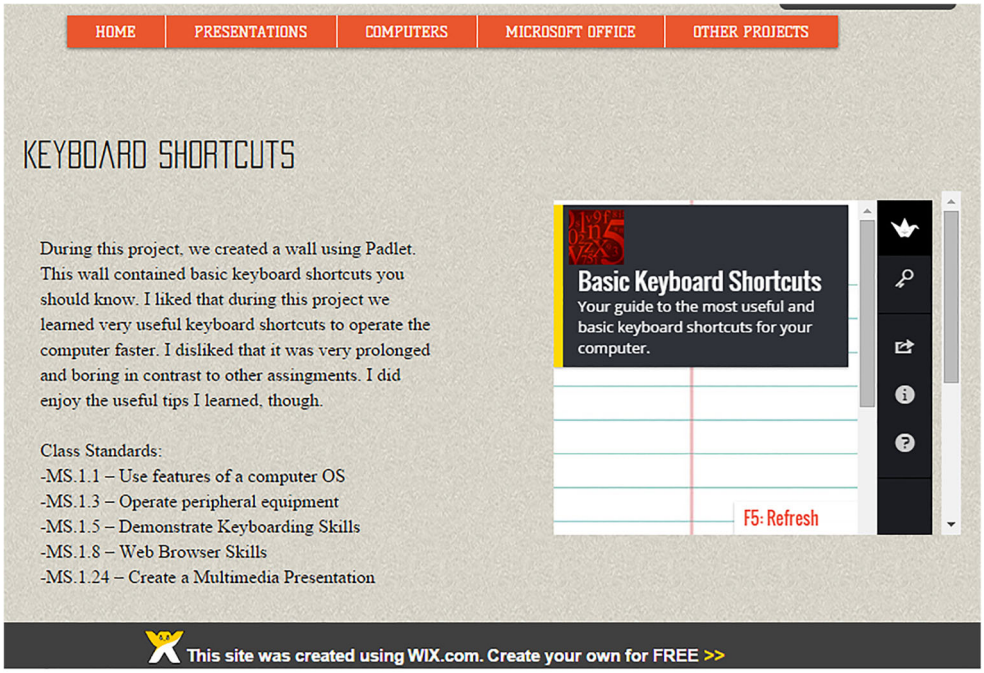

Fig. 1 Sample of student e-portfolio assignment upload using wix

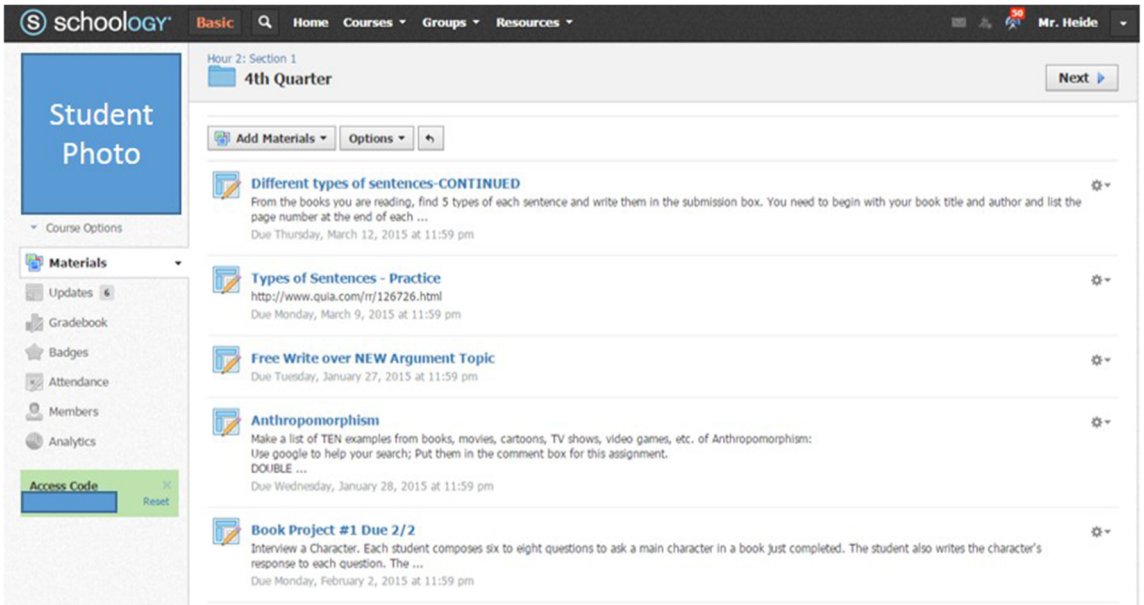

Fig. 2 Sample of student e-portfolio using schoology

classmates would be contained. The teacher then explained that he would be sending out a variety of assignments over the course of the semester through the Schoology system, and that the students would be using the system to create e-portfolios and to write, organize, collaborate, and share their writing progress and processes.

When an assignment was created by the teacher, the students were able to manipulate the document (similar to a text file in Microsoft Word), add text, images, and other multimedia as per the specific assignment, and then save or submit the assignment for the teacher, while still being able to access it themselves for revision and reflection. Each assignment was added to a specific student folder, which was organized by the topic or book that was currently being taught. In general, the folders contained brainstorming sessions, drafts, and final versions of the tasks they were completing. In regards to this overall workflow and artifact creation process, one student shared, "I like how easy it was on Schoology to just save your draft and come back to it later. I liked the format of Schoology."

As each student's work accumulated, their past work was still available in their folders, allowing them to create an e-portfolio of all the assignments they had submitted over the course of the semester, including any feedback they had received from their peers or the teacher. Peer feedback was shown as an annotation at the bottom of each document, and the students learned how to use this feature very quickly and without difficulty, especially given that the interface was similar to social networking sites they were already familiar with. By allowing students to offer peer feedback to each other, Schoology helped to foster an environment of collaboration and self-reflection. The teacher found that when students had a digital record of feedback from their peers, they were better able to self-assess and reflect upon their own work.

Throughout the semester, two types of essays were written covering the various stages of the traditional writing process. As mentioned, all drafts and brainstorming sessions were included in folders created by the students on their Schoology accounts. Additionally, the teacher found that the availability of this cloud-based portfolio system aided students in a variety of ways, particularly in that they no longer had the need to keep track of multiple papers, binders, or other physical resources. This could serve as a great benefit in schools where students do have technology access, but access to physical materials is more limited.

In order to follow student progress and provide feedback and rubric-based scoring, the teacher regularly commented on all the documents students submitted, allowing the students to receive feedback throughout their writing process. Very few errors or technical difficulties arose while writing via Schoology. However, since Schoology does not currently have an autosave feature, student drafts were occasionally lost when they would click over to other pages and forget to save their work. This flaw in Schoology was noticed by the students as well, with one commenting, "the technical difficulties the site had sometimes got annoying…if I tried opening a draft the next day, some of that draft would be gone." To account for this, the teacher would remind the students throughout the class period to regularly save the drafts they were writing.

Overall, classroom management proved to be a much easier process than the teacher was expecting. As the students in this school have been working in digital environments for several years now, the teacher believes they have become

familiar with the expectations of both the class and the school as to what is acceptable and unacceptable behavior. For this project, the students were highly focused and engaged which allowed the teacher time to move throughout the classroom and spend more one-on-one time with each student.

In the end, the teacher found that two of the most beneficial features of Schoology were the peer commenting and document sharing elements, which allowed students to share and collaborate on their projects. By interacting with each other, and not just with the teacher, the students were able to receive, and later reflect upon, well-rounded feedback that was sometimes more beneficial, given that it was coming from their peers. The students in the class agreed that the ability to share their work with peers greatly benefited their processes of reflection and revision, given that they had feedback from multiple sources and not just the teacher. Finally, based on the positive response of the students, and the benefits seen by the teacher, the e-portfolio project has been continued during the current semester.

Google Sites

Google Sites is a free web-based application that lets users create, edit, and share custom websites. With a valid e-mail address, users can quickly set up a free Google account at sites.google.com, which allows them access to not only Google Sites but also a wide array of business and educational applications. After making a Google account, creating a Google website is as easy as clicking "create" and naming the site.

Users have the option to choose a template from the gallery, which includes directory templates and publically-shared templates. The ability to publically share templates allows a school or classroom teacher to create and share a master template with users, which can be accessed and manipulated to allow for individual creativity and needs. Google Sites can be accessed from any computer with Internet access, and users have the ability to share their site with one person, a group, or everyone in the world! Users also have the choice whether they want to give someone else editing capabilities or merely viewing rights. The easy to use features, including site layout options and theme choices, make creating a professional looking website both simple and fun.

Starting in the 2013–2014 school year, students at a southern suburban school began the transition from paper-based career development portfolios to e-portfolios and all students in grades 9–11 were required to make the switch. In order for teachers to more easily monitor the minimum requirements of the e-portfolio, students created their e-portfolios from a shared Google Sites template, which was built based on input from all teachers and administrators. The original template was divided into four categories, which focused on career development, college readiness, personal success, and work samples. During the 2014–2015 school year, the school added a community service category to better reflect the school's mission statement.

The school implemented e-portfolios at all grade levels through a 35-min daily advisory period. Students were issued Dell Latitude 10 Windows 8 Tablets, which allowed them to individually work on their e-portfolios. Building the e-portfolio was designed to be a 4-year process and began with a "kick-off" lesson in the freshman advisory class that focused on the importance of a professional e-portfolio in a global, connected, and technical society. The teacher explained how an e-portfolio can help students showcase their skills and document evidence of their knowledge, which in turn can help them prepare to apply for college or take advantage of job/career opportunities. The teacher then showcased her own portfolio as well as portfolios of current and past students (see Fig. 3).

During the next lesson, students created their Google accounts and browsed the Google gallery for the school's template. After naming their sites with their own names, students adjusted the layout of their sites and changed the theme to represent their personalities. Throughout the year, students used at least one advisory period per week to work on assignments that would help showcase their college and career readiness and then, upload these assignments to their e-portfolios. Examples of work included in the portfolios are: resumes, cover letters, letter of recommendations, college research, community service documentation, work samples, and so forth. Students revisited their work yearly, and continued to update and edit assignments to reflect their growth based on peer and teacher feedback.

To help with teacher accountability in implementing the e-portfolio and student accountability in building the e-portfolio, the school also launched a showcase that allowed all students to annually present their progress on the e-portfolio. Parents, district employees, community members, and local business owners were invited to the campus where students, in professional attire, lined the hallways and gym in a job fair setting, using their tablets to showcase their individual e-portfolios. This showcase allowed the students to share their work in a professional environment and to better understand the practical purpose that e-portfolios can serve.

During the creation process, the majority of students used their advisory time to upload work and edit existing work; however, some classroom management issues did arise. Teachers who offered support and walked around the classroom to monitor computer screens found fewer students off-track. In addition, teachers who gave mini-motivational lessons that focused on the relevancy of the e-portfolio had more students with comprehensive e-portfolios. When the showcase was first introduced to students, many voiced an unwillingness to participate. However, all students presented at the

Fig. 3 Sample of student e-portfolio using google sites

first showcase and the feedback from stakeholders, including students, was overwhelmingly positive.

Overall, Google sites has provided the school with a more professional and efficient method for students to document their own learning. When asked, staff and students agreed that the e-portfolio is more relevant than the paper binder and is more aligned with college and career readiness skills. One student added, "I love the ability to add work samples to my e-portfolio. It can be difficult to express your abilities through words alone." This year, student complaints and lack of engagement has significantly decreased regarding the compilation and presentation of the e-portfolios. Based on discussions, the staff believes this change is due in part to two factors: 1) the e-portfolio becoming a norm on campus and 2) student and staff feedback being used to constantly update the e-portfolio requirements. Because Google Sites is an easy to use platform, schools have the option of creating structure through a shared template without stifling individual student creativity. Students also have the option to keep their portfolios private or to share them with potential employers or schools. This flexibility allows students a safe environment to document their growth over the course of their educational careers.

Discussion

While not free from challenges in both implementation and management, all three teachers found the integration of e-portfolios to be engaging for students and a practice worth continuing. Their experiences mirrored what current research has shown and suggested, in that the students were better able to reflect on their learning processes and create a resource that showcased their goals, growth, talents, and achievements.

As to the specific tools, the primary advantage of Wix proved to be its easy to use, intuitive drag-and-drop interface which allowed students to quickly learn how to use the tool and which gave them complete control over the look and feel of their portfolio. That being said, Wix did not offer a collaborative aspect, where students could comment on and interact with each other. As shown by the Schoology reflection, this would have certainly been a worthwhile addition to the project and allowed for a more substantial and permanent collection of peer feedback.

Schoology, although not specifically designed for the creation of e-portfolios, did have a collaborative component. This allowed students to share and comment on each other's work and turned out to be one of the highlights of the tool. Additionally, Schoology contains the features of a learning management system, allowing the teacher to create assignments, conduct discussions, and offer feedback all from one service. However, as Schoology is not primarily a resource for e-portfolio creation, the students lack the ability to create fully customized portfolios that reflect their personality and that are easily shared with those outside of the Schoology network. When using e-portfolios for university or career applications, this inability to share outside of the network would certainly be detrimental. Additionally, the lack of an auto-save feature for student drafts proved to be the cause of frustration for both the teacher and students throughout the semester.

Finally, Google Sites was advantageous in that teachers or schools could send out pre-made templates to their students, which covered the specifics that students needed to include while still offering the potential for customization and stylizing based on individual interest. Additionally, Google Sites offered direct integration to other Google applications, and custom sharing options, both of which also proved to be beneficial. On the downside, the user interface was not as easy to learn and as customizable as the Wix e-portfolios, so while students were given some flexibility in the creation process, they did not have unlimited control over how their portfolios looked in the end.

Overall, aside from being free of charge, all three Web 2.0 tools offered distinct advantages which, depending on a teacher or schools' circumstances, might be an excellent fit.

Regardless of the tool, integrating e-portfolios into the K-12 curriculum has shown to be, at least for these three teachers and their students, a positive and worthwhile experience which they would highly recommend.

Future Directions

Based on the reflections in this article, and the current state of research on e-portfolios in K-12 education, there are a number of directions that future research could explore. Additional quantitative and qualitative data could be collected to look at student experiences, a wider number of teachers and subject areas could be analyzed, and comparisons could be made between the benefits of free e-portfolio tools and paid or subscription-based tools. In summary, there is still much to be done in this area of study, but the authors hope that this article serves as a practical and beneficial examination of these specific tools and their implementation and integration practices that are currently being used in the field.

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