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Towards a Conceptual Framework of an Educational Web Portal

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ABSTRACT

Technology plays an important role in everyday life of K-6 students born in the digital age. In the past several decades, educational institutions have made substantial investments in technology infrastructure with the aim of enhancing student learning, increasing student achievement, and helping students acquire digital literacy skills early on in their education. However, to fully leverage web-based technologies for student learning and communication inside and outside of school, teachers must be prepared to effectively plan, develop, and integrate technology into the curriculum-based activities of their classrooms. Educational web portals with resources for teaching, learning and communicating, can help teachers create a “connected” classroom environment that extends student learning well beyond the school’s brick-and-mortar boundaries. This article delineates a framework of an educational web portal for an elementary school classroom. Three inter-related dimensions comprise the framework: 1) web portal structure, 2) web portal impacts, and 3) web portal development strategy. This framework is of value to educators and school administrators interested in integrating web portal technologies into the educational and social infrastructure of their schools.

INTRODUCTION

Technological advances of the past decade opened up new opportunities for teaching and learning in the 21st century. In 1995, Bill Gates (1996) predicted that new technologies and the Internet will play a significant role in learning both inside and outside of classrooms. However, while the investments in computing infrastructure have been steadily increasing over time, teachers’ training and the actual integration of technologies into the elementary school classrooms have lagged far behind the infrastructure investments. The US Department of Education’s National Technology Plan, a product of the *No Child Left Behind Act*, points to a dire need to bridge the digital divide between teachers and their students (United States Department of Education, 2005). One of the ways to address the digital divide problem is to develop customized grade-level educational web portals for elementary classrooms and to train the teachers to maintain and integrate portal technologies into the teaching/learning and communication processes of their schools (Preiser-Houy & Navarrete, 2011; Preiser-Houy, Navarrete, & Russell, 2005).

Educational web portals, with a targeted set of grade-level, “kid-friendly” digital resources for teaching, learning and communicating, provide a vehicle for scaffolding the vast digital resources available on the Internet into the educational and social infrastructures of the elementary schools. The elementary school children born in the digital era are the “digital natives,” that is the native speakers of the digital language of computers, smart phones, video games and the Internet (Prensky, 2001). They enjoy a full range of digital activities, from texting and Internet searches to video and computer games, and this use of technology for entertainment and communication greatly impacts their lives outside of school (Yelland & Lloyd, 2001). As a result of the digital stimuli that today’s students are exposed to on a daily basis, digital natives tend to think and process information differently from their pre-digital predecessors (Prensky, 2006). Educational web portals have a potential to bridge the gap between “digital natives” and “digital immigrants.” These portals can provide teachers with technologies and targeted digital resources to add to their pedagogical strategies aimed at motivating and engaging this new generation of learners. Educational web portals can also create learning communities by promoting and extending parent-teacher-community dialogues beyond the rigid physical boundaries of elementary school classrooms.

BACKGROUND

Over the next several decades, the complex, interconnected, technologically-enabled global environment will necessitate the mastery of information and communication technologies in many areas of human endeavor. Consequently, the need to integrate technology into the school curriculum, and to develop digital literacy skills at the place where education begins, kindergarten through sixth grade, is becoming increasingly important for educators and school administrators. Digital literacy skills involve the ability to use the Internet and a variety of information and communication technologies to retrieve, organize, evaluate and create information (Lemke, 2003).

Technology integration into elementary education is likely to have a positive effect on student attitudes, learning, and collaboration, especially for today’s generation of students born in the digital era. Students who are exposed to technology early on in their education may be better prepared to use it in secondary and post-secondary schools. A new emphasis on technology as an integral part of a modern pedagogy in elementary education necessitates bridging the digital divide between teachers and their students. Educational web portals, with a customized set of digital resources and tools for elementary school teachers, students and their families, offer a variety of opportunities to integrate technology into the educational and communication processes of elementary school classrooms (Preiser-Houy & Navarrete, 2011; Preiser-Houy et al., 2005).

What is a web portal? A web portal is a digital collection of web pages that provides a gateway to other resources on the World Wide Web (Zhou, 2003). Web portals originated from the Internet directories (e.g., Yahoo!) and search engines (e.g., AltaVista) in the mid-1990s, and became popular as vehicles for business-to-business (B2B), business-to-consumer (B2C), and consumer-to-consumer (C2C) commerce in the late 1990s. In the early 2000s, however, tailoring

the web resources to the interests and needs of specific groups of users and connecting these users to helpful web domains, became the area of rapid growth in web applications (Jasco, 2001).

The fastest-growing second generation of Internet gateways is a vertical web portal which provides web pages of deep content targeted to the needs and interests of a specific user group. Such portals can be defined by their content, community and commerce features (O’Leary, 2000). *Content* refers to an amalgam of proprietary and generic content including search engines, e-mail, discussion forums, and news. For example, the content of Realtor.com, a vertical portal that targets buyers and sellers of homes, includes a search engine for real estate topics, homebuyer tools, resource center links for realtors, and articles of interest to the community of homebuyers and sellers. *Community* refers to a group of people with common business, professional, or personal interests who visit the portal for information and social communication. For example, iVillage.com is a vertical portal for a community of women in the 20-50 years of age group. Finally, the *commerce* component refers to the consumer-to-retailer or business-to-business transactions enabled by the portal. For example, Covisint.com, a business-to-business vertical portal, provides a platform for car manufacturers to trade with parts suppliers.

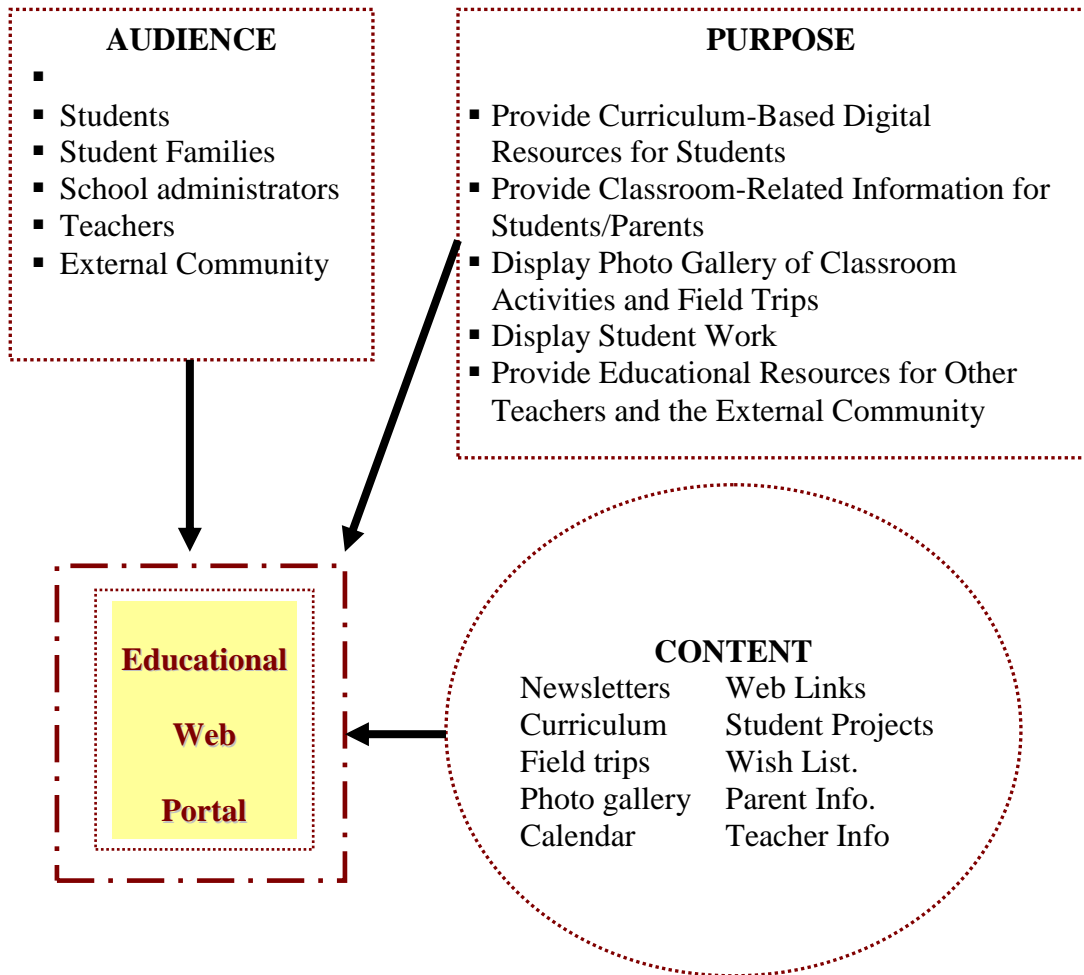
Educational web portals for elementary school classrooms are vertical web portals with a targeted set of grade-level educational resources and communication tools. Nowadays, many free educational resources are available to students over the Internet. Grade-level educational portals can make a subset of these resources available to students in the asynchronous mode and expose students to digital content that is specifically targeted to their curriculum. Students can use the portal resources to enrich their learning at higher levels by augmenting the materials of classroom lectures with subject-related multimedia content. Furthermore, classroom portals provide students with a vehicle to explore a variety of ways of learning and experiment with the knowledge they have acquired. The portals can also redefine parent-teacher communication by offering opportunities for a continuous dialogue about teaching, learning and classroom activities.

In the next section, we will delineate a conceptual framework of an educational web portal for an elementary school classroom. The essential components of this framework include the following: 1) web portal structure, 2) web portal impacts, and 3) web portal development strategy.

WEB PORTAL STRUCTURE

Educational web portals provide the technology scaffolding for a “connected” classroom environment. Figure 1 depicts the structural components of an educational web portal. These components are: *audience*, *purpose* and *content*.

Figure 1: Structural Components of an Educational Web Portal.



The **audience** for an elementary classroom portal may include students and their families, school and district administrators, the students and teachers from other schools, as well as the members of the community organizations. Educational web portals may be developed with the **purpose** of providing curriculum-based digital resources to students and their families, communicating classroom policies, and/or sharing student work and classroom activities/events with the portal’s target audience. **Content** options for an educational web portal may include newsletters, grade-level curriculum resources, descriptions and photos of field trips, photo gallery of the major classroom activities and events, classroom calendar, student projects, a wish list of items for the classroom, and parent/teacher information pages.

For example, the second-grade educational web portal shown in Figures 2 and 3 provides students and their families with digital resources for teaching, learning, and communicating. Figure 2 shows the Curriculum page of this portal. The teacher uses this page to share with students and student families the digital resources related to the second-grade curriculum in the

content areas of language arts, mathematics, social sciences, technology and visual/performing arts.

Figure 2: Curriculum Page of the Second-Grade Educational Web Portal.

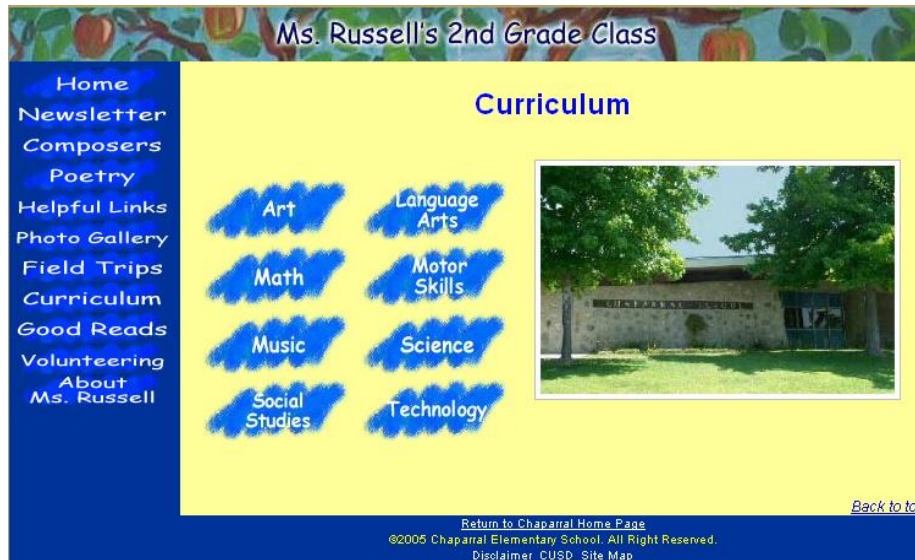


Figure 3 shows the Photo Gallery page of the portal. This page displays pictures and video clips of the classroom events, activities and field trips.

Figure 3: Photo Gallery Page of the Second-Grade Educational Web Portal.



By integrating the classroom’s own learning and teaching network with the rich educational resources of the World Wide Web (WWW), and leveraging the Internet to extend that network into the student homes, the educational web portals enable simultaneous learning and communication for students and their families. In the next section, we will explore the impacts of

educational web portals on the teaching-learning and parent-teacher communication processes in elementary school education.

WEB PORTAL IMPACTS

Web Portals and the Teaching—Learning Process

Human intelligence, a unique way of thinking, learning and solving problems, takes many forms. The theory of Multiple Intelligences (Checkley, 1997; Gardner, 1993) holds that all human beings are endowed with at least eight different “intelligences”. Table 1 summarizes these distinct forms of human intelligence. Although the profile of each person is comprised of eight “intelligences”, people differ in the relative strength of each intelligence, and consequently, can learn in a multitude of different ways. Technology of a digital classroom can be used to design projects that leverage students’ strengths in one area (e.g., logical-mathematical intelligence), while exposing them to areas where they may feel less comfortable (e.g., spatial intelligence), thus providing students with an opportunity to “exploit the many ways of knowing” (Gardner, 2000).

Table 1: The Eight “Intelligences” (Checkley, 1997).

| Intelligence Form | Description |
|-----------------------------|--|
| <i>Linguistic</i> | Using language to express oneself and to understand other people |
| <i>Logical-Mathematical</i> | Using numbers, abstract relations and logical thinking; understanding principles of a causal system |
| <i>Spatial</i> | Perceiving and using visual or special information |
| <i>Bodily Kinesthetic</i> | Using all or part of one’s body to solve a problem or “create” something |
| <i>Musical</i> | Creating, recognizing, remembering, communicating and understanding meanings made out of sound |
| <i>Interpersonal</i> | Understanding and working well with other people |
| <i>Intrapersonal</i> | Understanding oneself and using that understanding to make decisions about various courses of action |
| <i>Naturalist</i> | Discriminating among living things and being sensitive to the features of the natural world |

The use of educational web portals in elementary classrooms holds the promise of diversifying the teaching and learning environment to teach through multiple intelligences. Web portals provide teachers with tools to craft teaching strategies aimed at different forms of intelligence, thus building a positive community for all types of learners. For example, the portal’s combination of visual and auditory stimulation engages multiple senses, which may not only increase retention, but also deepen the students’ understanding of the subject matter. And for today’s digital generation brought up with computers, video games, and the Internet, using web portals for learning, is a natural extension of the uses of digital media in their lives.

Furthermore, students learn better when academic material is presented in their preferred learning style (Dunn & Dunn, 1992). Teachers can use web portals to promote learning in ways that are more appealing and engaging to students. For example, in utilizing web portals for research projects, book reports, and educational games that reinforce lecture materials, students are free to explore, experiment with, and make mistakes as they learn how to learn. This approach to learning can build confidence and motivate students to further engage themselves with the learning process. For example, in reflecting on the use of the educational web portal shown in Figures 2 and 3, the second graders commented that they like to use their classroom portal to play fun games, see pictures of their field trips and class events, and showcase their work to family and friends.

Finally, the use of web portals in elementary grade levels may promote the development of multiple literacy skills early on in child's education. Multiple literacies are defined as media literacy, visual literacy, and information literacy (Oseas & Wood, 2003). Table 2 summarizes these literacy skills, each of which may be strengthened through the use of grade-level educational web portals.

Table 2: Multiple Literacy Skills (Oseas & Wood, 2003).

| Literacy Skill | Definition |
|-----------------------------|--|
| <i>Media Literacy</i> | Ability to critically analyze information from mass media sources (e.g., TV, radio, newspapers, magazines, etc.) |
| <i>Visual Literacy</i> | Ability to ascertain implicit and explicit meaning encoded in visual images |
| <i>Information Literacy</i> | Ability to collect, evaluate, and integrate information from multiple sources |

For example, portals can be used for inquiry learning as students search for answers to their own questions related to specific curriculum themes of their class. This process of learning can help students develop visual and information literacy skills. Furthermore, knowledge gained through inquiry learning can then be formalized and shared with others through the classroom portal. Inquiry learning not only motivates students to conduct research, but engages them creatively with the outside world, thus broadening their understanding of the subject matter (Oseas & Wood, 2003).

An additional benefit of a classroom portal is in supporting and enhancing the communication processes between the teachers and the student families. Next, we will consider the impacts of educational web portals on parent-teacher communication process.

Web Portals and the Parent-Teacher Communication Process

Parental involvement in primary education influences children's academic achievements in school (Englund, Luckner, Whaley, & Egeland, 2004). A readily available communication link between teachers and student families is essential to meeting educational goals and enabling

working parents to get involved in the early stages of their child's academic and social development. Parental decisions about involvement are strongly influenced by schools and the degree to which involvement requests are adapted to the specific circumstances of the parental life contexts (Hoover-Dempsey et al., 2005). Effective parent-teacher linkages and involvement may be fostered by frequent dissemination of current information about the classroom activities, events, and student work, and by diversifying the involvement opportunities for working families. By leveraging the ubiquitous nature of digital technologies in parent-teacher communication, teachers can begin overcoming barriers to parental involvement (Yoon, 2004).

Educational web portals provide a vessel for enhanced parent-teacher communication by "building bridges" in relationships and "breaking walls" in the communication processes. Teachers can use their classroom portals to create learning communities by extending relationships beyond the classroom boundaries and engaging student families into the educational processes of the classroom (Preiser-Houy et al., 2005). The portals provide working parents with a real-time, asynchronous platform for keeping informed of the grade-level curriculum, classroom activities and events, policies and expectations, and the kind of effort that is put into the child's education. This information helps parents feel more "connected" to their child's education and promotes collaborative parent-teacher relationships. For example, in reflecting on the use of the educational web portal depicted in Figures 2 and 3, one family commented, "We see a big benefit to having a classroom web portal because we are both working parents, and unfortunately, cannot spend time in the classroom. The class portal helps us feel more involved with the daily activities and events happening in the classroom."

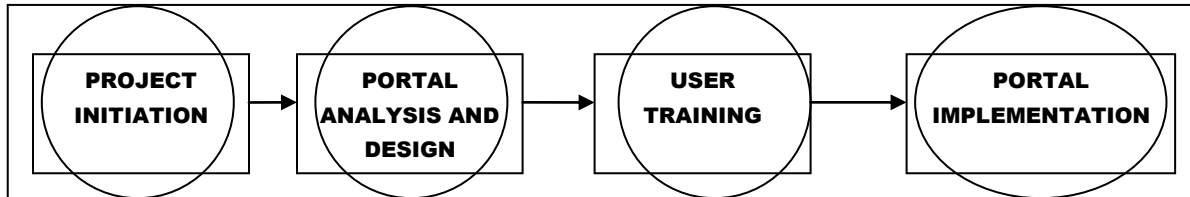
Furthermore, student families are often a good source of supplemental information and digital materials that are of value to other students in the classroom. These materials could also be posted on the classroom portal to benefit all students in the class. Finally, many ESL families with English as a second language, could utilize classroom portals to gain a better understanding of the intricacies of the American educational system and get access to specific grade-level resources to help their children succeed in school. In the next section, we will provide general guidelines for educators to design and develop their own classroom portals.

WEB PORTAL DEVELOPMENT STRATEGY

Educational web portals for elementary school classrooms may be developed through service-learning programs and academic-community partnerships between primary schools and their local colleges and universities (Preiser-Houy et al., 2005; Preiser-Houy & Hansen, 2011; Preiser-Houy & Navarrete, 2011). This collaborative approach to web portal development provides college students with experiential education in web development, project management, and consultant-client relationships. Such projects also help college students develop and enhance the "soft skills" of communication, presentation, and collaboration. Furthermore, the technology partnerships with colleges offer elementary schools an opportunity to leverage the specialized technical skills and resources of the university community towards the development of educational web portals free of charge.

The strategy for developing educational web portals consist of the following elements: 1) project initiation, 2) portal analysis and design, 3) user training, and 4) portal implementation. (Preiser-Houy & Navarrete, 2011). Figure 4 depicts this four-phase development strategy.

Figure 4. Web Portal Development Strategy
(adapted from Preiser-Houy & Navarrete, 2011).



During the *project initiation* phase, the project team, comprised of a teacher and a technology consultant, determines the target audience and the purpose of the teacher's portal. For example, the second-grade web portal shown in Figures 2 and 3 has the target audience of students and student families. Furthermore, the portal's dual purpose is to enhance student enrichment through exposure to the developmentally appropriate digital resources on the Internet, and to provide a medium for sharing information about the classroom activities and events with student families.

During the *portal analysis and design* phase, the project team determines the content areas of the portal through joint application development. The portal's content should reflect its purpose and the needs/interests of its target audience. One of the tactics in the analysis/design phase is to conduct Internet research to identify and evaluate appropriate grade-level resources to be included in the portal's design. Finally, the project team uses web development tools like Dreamweaver or Contribute to prototype the graphical user interface and the navigation strategy of the web portal.

During the *user training* phase, the teachers learn how to maintain the content and user-interface of their portals. While the portals may have been developed in a functionally-reach, yet complex web development environment (e.g., Dreamweaver), the intuitive, word-processor like interface of software tools like Contribute, make it an ideal web content management tool for teachers with minimum technical proficiency. Thus, during the training phase, teachers acquire the requisite skill set to become proficient in using Contribute to connect to the web portal, modify web pages with new links and photos, publish these pages on the school's server, add new pages through templates, and administer the portal. The technical skills and knowledge acquired through training can boost teachers' confidence in their own abilities to administer, maintain, and evolve the content of their portals over time.

During the *portal implementation* phase, the project team implements all portal components on the school district's server. The team also develops a set of integration tactics for diffusing the portal's digital resources into the elementary school classrooms. The portal's implementation activities may include setting up web server accounts for teacher, uploading the portal files to the school district's server, and installing the web content management software on the teachers' classroom and home computer. Once the portals are implemented, teachers can use them for research projects and book reports, as well as the in-class demos of social sciences, language arts and math concepts. "It is important for us [teachers] to use this technology as a teaching and communication tool and not think it is just for games on the weekend—it needs to be a part of

the daily teaching-learning experience,” reflected a second-grade teacher who was among the participants of the web portal development project at her school (Preiser-Houy et al., 2005).

FUTURE TRENDS

Educational web portals provide a gateway for the acquisition and communication of subject-related knowledge in elementary schools. They provide a vehicle for exploration and experimentation. They make learning more engaging, motivating, and exiting for primary students born in the era of technological proliferation. Furthermore, they provide a means for broad student-to-student collaboration unconstrained by the brick-and-mortar infrastructure of the schools. However, in spite of their promise to enrich the educational opportunities for students, there are social and technological challenges of integrating portal technologies into the elementary school contexts (Preiser-Houy et al., 2005). Among the challenges are the lack of technology infrastructure at the school sites, the lack of technical skills and knowledge to develop and implement web portals, and the need to continuously maintain and update the web portal’s pages to keep them current and up-to-date. Table 3 provides a list of critical success factors for integrating portal technology into the elementary schools. These factors include the technology infrastructure for portal development and maintenance, alignment of portal design features, teacher training, and portal integration/technical support.

**Table 3: Critical Success Factors for Web Portal Integration
(adapted from Preiser-Houy et al., 2005).**

| Critical Success Factor | Description |
|-----------------------------------|---|
| <i>Technology infrastructure</i> | Having access to the state-of-the-art technical infrastructure (i.e., computer hardware, software, networking, and Internet access) to develop, maintain and sustain web portals over time |
| <i>Portal design</i> | Aligning web portal design features with the portal’s purpose, the needs and interests of its target audience, teacher’s philosophy and strategies for learning in the classroom and beyond |
| <i>Teacher training</i> | Training the teachers to manage the content of their web pages and to design new pages to evolve the web portal content and GUI |
| <i>Portal integration support</i> | Providing support for teachers to integrate web portal technology into the day-to-day instructional activities and communication processes |
| <i>Technical support</i> | Providing technical support for teachers to help resolve problems with computer hardware, software and/or networking |

Furthermore, since the concept of the grade-level web portals is relatively new to the elementary school classrooms, there is a need for quantitative and qualitative research to assess the impacts of portal technologies on teaching, learning and parent-teacher communication. The avenues for future research on web portal technologies in elementary school education are listed in Table 4.

Table 4: Future Research on Web Portals.

| <i>Research Area</i> | <i>Description</i> |
|---|--|
| <i>Student attitude towards web portals in primary education</i> | Assess student attitude towards using classroom portals for learning, collaborating and communicating with their peers and the broader community |
| <i>Web portal's impact on students and teachers</i> | Investigate the ways in which web portals enrich students' learning and enhance teachers' work |
| <i>Web portal's impact on student families</i> | Assess the impacts of web portals on student families and their involvement in the education of their children |
| <i>"Best practices" of web portal use inside and outside of the classroom</i> | Identify "best practices" of using portals to transform instruction in different subject areas for different grades |

Finally, as educational web portals for elementary school classrooms evolve over time, they will be increasingly utilized as a medium for student collaboration and exchange of digital portfolios. Digital portfolios are curriculum-based assignments that integrate graphics, text, video clips and sound into an organized, portable and accessible format (Voitheofer, 2003). Digital portfolios can foster active inquiry into the curriculum-based subject matter, promote a cooperative learning environment, and help students gain satisfaction and a sense of ownership from their work. They also provide the context for reflecting on the newly acquired knowledge, and promoting critical thinking through the collection, evaluation, synthesis and communication of textual, visual and audio-based information sources.

One example of a digital portfolio project is a social sciences project about California Missions. After months of studying about the first settlements started in early California and the building of Spanish Missions all along the West Coast, each student is assigned to research one of the California's twenty-one Missions. Next, students develop a storyboard with the sketches of their digital narrative pages, including the images of the chosen mission, text, animation, sound, and navigation controls. Once the storyboard is designed, the students use Contribute or Flash software to create a digital narrative presentation about a California Mission of their choice. The presentation may include textual, visual, and audio components. Finally, students test their digital portfolios, upload project files to the school's web server, demonstrate the portfolios to the class, and share their work with the broader community via the classroom portal.

Another example of a digital portfolio project is a Classical Composers' project. Students utilize the digital resources of their teacher's educational web portal to research the life and music of their favorite classical composer, from Bach to Tchaikovsky. The students then write a brief report on the biography and the music of their chosen composer, and present the report in class. The teacher videotapes each student's presentation and works with students to create digital portfolios of their projects. Figure 5 shows a digital portfolio page of a student's Classical Composer project. The portfolio includes the student's picture in a hand-made replica of the composer's outfit, an excerpt from the research report, a video clip of the report presentation, and

an audio clip of the student's favorite piece of the composer's music. Once the digital portfolios are assembled and finalized, they are linked to the teacher's educational web portal to showcase student work to students, families and the external community.

Figure 5. Digital Portfolio Page of the Composer Project.

The screenshot shows a digital portfolio page titled "Composer Project" and "BYRON'S PAGE". The page features a header with a violin image and a "BACK" button. The main content area includes a student photo labeled "Byron", a "COVER PAGE" for Johann Sebastian Bach, and a "BYRON'S REPORT ON JOHANN SEBASTIAN BACH". The report excerpt discusses Bach's music and mentions "Minuet in G" as a favorite piece. Below the report are two icons: "AUDIO" and "VIDEO". A footer note states: "* Audio and Video links open in a new window. Flash Player 8 is required to listen".

CONCLUSION

Elementary school educators are at a pivotal juncture at the start of the 21st century. Over the next decade, the increasingly complex, integrated global environment will necessitate digital competencies and mastery of technology in business, science, and the humanities. The World Wide Web, with its ubiquitous nature and its array of free digital resources, offers new opportunities for teaching, learning and communicating in the new millennium. Educational web portals provide scaffolding for a connected classroom environment, full of resources that engage students with the outside world and promote the development of digital literacy for future educational and professional endeavors.

Successful integration and use of educational web portals in elementary schools require good understanding of the portal's structural components, portal's impacts on the teaching-learning and parent-teacher communication processes, and the portal's development strategy. It requires the technical knowledge and skills to plan, develop, and implement web portals on the school servers. Furthermore, it necessitates the tactical knowledge of K-6 educational policy, pedagogy, and primary-level curriculum to effectively utilize educational web portals in elementary

schools. Elementary school educators that harness the power of the Internet and web portal technologies to create the connected classrooms of the new millennium will be better prepared to educate the future generations of “digital natives” for the knowledge economy.

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