INFORMATION SYSTEMS EDUCATION JOURNAL

In this issue:

EDSIG
Serving Information Systems Educators

The **Information Systems Education Journal** (ISEDJ) is a double-blind peer-reviewed academic journal published by **EDSIG**, the Education Special Interest Group of AITP, the Association of Information Technology Professionals (Chicago, Illinois). Publishing frequency is quarterly. The first year of publication is 2003.

ISEDJ is published online (http://isedjorg) in connection with ISECON, the Information Systems Education Conference, which is also double-blind peer reviewed. Our sister publication, the Proceedings of ISECON (http://isecon.org) features all papers, panels, workshops, and presentations from the conference.

The journal acceptance review process involves a minimum of three double-blind peer reviews, where both the reviewer is not aware of the identities of the authors and the authors are not aware of the identities of the reviewers. The initial reviews happen before the conference. At that point papers are divided into award papers (top 15%), other journal papers (top 30%), unsettled papers, and non-journal papers. The unsettled papers are subjected to a second round of blind peer review to establish whether they will be accepted to the journal or not. Those papers that are deemed of sufficient quality are accepted for publication in the ISEDJ journal. Currently the target acceptance rate for the journal is about 45%.

Information Systems Education Journal is pleased to be listed in the 1st Edition of Cabell's Directory of Publishing Opportunities in Educational Technology and Library Science, in both the electronic and printed editions. Questions should be addressed to the editor at editor@isedj.org or the publisher at publisher@isedj.org.

INFORMATION SYSTEMS EDUCATION JOURNAL

Editors

A Community-Based Research Approach
To Develop an Educational Web Portal

Lara Preiser-Houy
lpreiser@csupomona.edu

Carlos J. Navarrete
cjnavarrete@csupomona.edu

Computer Information Systems Department
California State Polytechnic University, Pomona
Pomona, CA 91768, USA

Abstract

Service-learning projects are becoming more prevalent in Information Systems education. This study explores the use of community-based research, a special kind of a service-learning strategy, in an Information Systems web development course. The paper presents a case study of a service-learning project to develop an educational web portal for a second-grade class by an Information Systems student and an elementary school teacher. The study's findings demonstrate the reciprocal benefits of community-based research to the IS student and the community partner. In spite of these benefits, there are pedagogical challenges to using community-based research as a service-learning strategy in an Information Systems course. The study's findings have implications for structuring effective service-learning experiences to promote student learning and to secure community gains from technology projects.

Keywords: community-based research, service-learning, Information Systems education, educational web portal, case study, web development, primary education

1. INTRODUCTION

Service-learning pedagogy integrates the academic content of a course with community service. Many universities are incorporating service-learning into their curricula to enrich students' educational experiences, to foster students' civic engagement, and to strengthen relationships with the local community. Students benefit from service-learning projects in many different ways - from enhanced academic learning to cognitive and affective development (Eyler & Giles, 1999; Furco, 2002). Furthermore, community-based research (CBR), a special kind of service-learning, not only enriches student learning, but contributes to community empowerment and social change (Strand, 2000; Strand et al., 2003).

In the past several years, we have implemented service-learning projects in web development courses to promote the use of educational web portals in elementary schools. An educational web portal is a social space for teaching, learning and communicating (Preiser-Houy & Russell, 2007). These portals are specialized websites that consist of an organized, integrated collection of web pages with age-appropriate educational resources and communication tools for elementary school teachers, their students, and student families.

In assessing the impacts of our previous service-learning projects, we found that while our students benefited from experiential education, the benefits to the community partners were minimal, at best. The web portals that our students developed for elementary schools were neither maintained by the school teachers nor used by their students for curriculum-based activities. We learned that developing web portals for the community partners did not necessarily mean that these portals would be maintained and used by them.

The failure to achieve community gains through our service-learning projects in web development led us to believe that some IT-supported environments, such as the educational web portals, require a different approach to their development to ensure successful implementation. Traditional software development strategies may not, by themselves, secure the goals of educational web portals. Web development projects differ from traditional IT projects in that the use of web-based systems is often not mandatory, the user requirements may not be well understood through work studies alone, and the users may not attend the training sessions to learn how to use the system (Vidgen, 2002). Furthermore, technology projects with vague and highly unstructured requirements necessitate that developers play the roles of collaborators and change agents who secure client's commitment to the project, manage client's expectations throughout the project, promote client's mastery of the system, and build systems that clients actually use (Preiser-Houy & Markus, 2000; Walton, 1989).

In the effort to achieve the *reciprocal* benefits of service-learning to IS students and their partners, we have explored the use of community-based research as a supplemental approach to web-based systems development. The context of our study was the development of an educational web portal by an IS student and a second-grade teacher. The study's results demonstrate the benefits of CBR to the student-client dyad and highlights the pedagogical challenges of using CBR as a service-learning strategy in an IS course.

The importance of this study is twofold. First, from the service-learning perspective, the study demonstrates a successful implementation of community-based research in an IS course. Secondly, the study shows that the development of social spaces, such as educational web portals, can benefit from supplementing the traditional systems development process with community-based research tactics aimed at meeting the needs of community partners and securing community gains. These kinds of service-learning projects necessitate systematic collaboration between the software developer and the client to align client needs and expectations with the portal design and integration tactics. The study's findings provide insights for the IS educators interested in structuring effective service-learning experiences with reciprocal benefits to IS students and their community partners.

2. BACKGROUND

Service-learning is a teaching strategy that integrates discipline-based learning with relevant community service. The service-learning pedagogy has been successfully adopted in undergraduate as well as graduate courses in disciplines ranging from education and sociology to engineering and business. In an undergraduate Human Resources Management course, students assisted community organizations with job benefits and compensation analysis (Madsen, 2004). At the graduate level, MBA students applied service-learning in Business Policy and Leadership courses (Godfrey, 1999), while doctoral students have used service-learning in a seminar on the organizational effectiveness and change (Thomas & Landau, 2002).

In Information Systems education, service-learning projects contribute to "significant" learning in foundational knowledge, application, integration, and social dimensions (Saulnier, 2005). For example, in web development courses, students enhanced their knowledge of the systems development life cycle and improved their communication skills (Guthrie & Navarrete, 2004; Preiser-Houy & Navarrete, 2006). Students also gained a better understanding of the ethical and political issues by working with real community partners, thus learning about the social dimensions of IT-related work (Lazar & Lidtke, 2002). In a telecommunications course, students designed a local area network for a community organization and liked being a part of the project that benefited their community (Ruppei & Ruppei, 2002).

However, since the benefits of service-learning projects typically accrue to multiple stakeholders, the assessment of service-learning impacts must include not only students, but their community partners, as well (Driscoll et al., 1996; Payne, 2000). Yet, few studies have systematically addressed the *reciprocal* nature of the service-learning engagements (Zlotkowski, 2000).

In the past five to seven years, new models of service-learning have begun to emerge in higher education. Once such model, community-based research, is an advanced from of service-learning that focuses on civic engagement, community impacts, and social change (Vogelgesang & Rhoads, 2006; Strand et al., 2003). While the goal of the service-learning pedagogy is to attain positive outcomes in student learning, the *dual* goals of community based research are to enhance students' academic / civic learning and to provide value to the community served by the projects.

The mainstream CBR model emphasizes functionalist social integration and is based on the principles of academic-community collaboration, validation of multiple sources of knowledge, and social change (Stoecker, 2003). The practitioners of CBR argue that when students collaborate with community partners on complex problems that promote social justice and experience their own self-efficacy in facilitating social change, they are more likely to develop broader academic knowledge, critical thinking, and civic literacy skills that represent a higher-level of service-learning (Stoecker, 2005; Strand et al., 2003; Strand, 2000). Students also benefit from enhanced personal development in self-worth and efficacy (Paul, 2006). Furthermore, CBR has a potential to positively impact the community affected by the outcomes of the service-learning projects (Preiser-Houy et al., 2005). However, structuring the CBR experience, which involves planning, scheduling, managing, coordinating, and troubleshooting the project, is a formidable pedagogical challenge of community-based research (Stocking & Cutforth, 2006; Strand et al., 2003).

3. RESEARCH QUESTIONS AND METHODOLOGY

The purpose of this study was to explore the use of community-based research strategy of service-learning to develop an educational web portal for an elementary school teacher. The study addressed the following two questions:

- What are the benefits of community-based research as a service-learning strategy in an IS course?

- What are the challenges of community-based research as a service-learning strategy in an IS course?

We utilized a case study method to conduct an intensive investigation of CBR's benefits and challenges in the context of an IS core course in web development. The case study method investigates a contemporary phenomenon in its real-life context (Yin, 2009). Case studies are best suited for exploratory research focused on interpreting and comprehending the meaning of actions (Creswell, 2009). Furthermore, the intensive research studies are characterized by focusing on one or a few cases and striving for detail and depth of analysis (Stoecker, 2005).

Our choice of a case research method was anchored to the exploratory nature of the study, and to the need to interpret and comprehend the meaning of actions in utilizing CBR as a service-learning strategy in an IS course. Furthermore, since we aimed to explore the complex nature of the CBR phenomenon as it unfolded in a real-life context of a service-learning experience, we chose to investigate intensively one case.

The study's unit of analysis was a CBR-based web development project in a service-learning course of Interactive Web Development. The ten-week course covered the topics of XHTML, Java Script programming, web design, prototyping, and project management. The project's context was a collaborative development of an educational web portal by an IS student and a second-grade teacher. The project was supervised by the Information Systems faculty who was teaching a service-learning section of the web development course.

Prior to this project, neither the IS student nor his community partner had any experience working on a full-scale, real-life web development project. Furthermore, while the community partner had many years of teaching experience, she had never used technology for curriculum-based activities in her classroom, and

scored at the introductory level of microcomputer proficiency on the school district's standardized technology exams.

The data collection methods for this study consisted of the following: the review of project documentation; the semi-structured personal interviews with the student, the community partner, and the IS faculty member; the student's background survey; and the student's reflections essays on the perceptions of the service-learning experience. The first stage of the analysis consisted of reconstructing the interview audio notes and project documentation notes into detailed written accounts. The second stage involved translating the benefits and challenges identified from the written accounts into the community-based research categories.

4. CASE ANALYSIS

The CBR project in web development consisted of four interrelated phases: project initiation, analysis and design, community partner's training, and web portal integration. In the project initiation phase, the student-community partner team developed a high-level project schedule, determined the purpose and the target audience of the partner's educational portal, and made the software choices for web design and web portal maintenance. In the analysis and design phase, the student collaborated with the partner on the development of the portal prototypes. In the training phase, the student developed a customized training program for the community partner and conducted training sessions on web content management. In the web portal integration phase, the student-partner team implemented the second-grade educational portal on the school district's server, identified the tactics for diffusing the portal into the partner's work environment, and determined the critical factors for the portal's long-term sustainability.

Project Initiation Phase

During the CBR project initiation phase, the community partner gained a better understanding of the potential value in using an educational web portal inside and outside of her second-grade classroom. The partner wanted to use her class portal to enrich students' educational experiences through the age-appropriate and safe digital resources tied to the second-grade curriculum and to share information about classroom activities and events with students and student families.

The project initiation activities also promoted "significant" learning on the part of the student. The project required the student to learn how to manage a real-life IS project, how to evaluate software for adoption and future use, and how to manage the relationships with a non-technical client. The student reflected, "One of the things I have learned is how to schedule my time better and how to organize myself, because I knew that my client depended on me to finish certain tasks as scheduled. So that kind of pushed me to work on time and deliver on time. In the end, my time management skills really improved."

The CBR activities of project initiation also presented challenges to the student-client dyad and to the faculty member. One of the challenges was that the project demanded a considerable amount of personal time from the student and the community partner. The student had to assess the computer literacy of the community partner and to research / evaluate the web content management software to match the partner's technical skills. The community partner, who rarely used technology for classroom-based activities, had to learn about the potential value of using the educational web portal in her class. She and the student spent a lot of time on the Internet to identify and document best practices for using web sites in primary grade levels. Furthermore, the faculty member spent a lot of time aside from the regular course preparation and teaching to plan and integrate the CBR activities into the course.

Analysis and Design Phase

During the CBR analysis and design phase, the student worked collaboratively with the community partner to design the educational web portal aimed at supporting the classroom activities of the second-grade class. The collaborative prototyping process facilitated by CBR promoted an integrative design that leveraged the experiential knowledge of the community partner and the technical knowledge of the student. Consequently, CBR enabled the development of a content-rich, yet maintainable web portal targeted to the needs of the partner and her constituents. One of the content areas of the classroom portal included weekly newsletters to keep student families informed about the upcoming academic and social

activities of the second-grade classroom. The other areas of the portal incorporated age-appropriate learning resources for the curriculum-based activities in language arts, mathematics, social studies, science, and visual/performing arts.

Through the CBR-based analysis and design activities of the project, the student had the opportunity to enhance his communications skills and his ability to elicit and critically assess web portal requirements. The student said, "The project helped my existing [technical] knowledge. But I also learned how to deal with the real client, share ideas with her, not being afraid to disagree with her, and how to talk to her in non-technical language. I can see many of these things coming into play in every [IT] consulting engagement." Furthermore, through the CBR activities of analysis and design, the community partner defined the adoption of the educational web portal to scaffold her teaching strategies.

One of the challenges faced by the student during the CBR analysis and design phase was the need to manage the evolutionary changes in partner's system requirements throughout the iterative prototypes. The requirement changes were the result of the partner's learning curve and the difficulty in ascertaining the navigational preferences for the portal's interface. The partner reflected, "I did not know where I was going and since he [the student] was not familiar with the elementary school education, we were at times talking over each other's heads and across purposes." At the same time, the partner had to evolve her own understanding of the alternative uses for an educational portal. Consequently, she invested a lot of personal time to conduct online research on the content alternatives for the portal site.

The main role of the IS faculty member in this phase was to encourage the team to work on multiple prototypes and to avoid shortchanging the analysis process, while at the same time meeting the project's deadlines. This phase turned out to be crucial to the future adoption of the educational portal by the community partner, and the use of the portal by the second-grade students and student families.

Community Partner's Training Phase

During the CBR training phase, the student developed a customized training program for the community partner and conducted training sessions on web content management. In the case of the student, the CBR activities required that he design and implement a training program to secure the partner's skills to maintain the portal. The development of a training program for a non-technical client enhanced student's critical thinking and communication skills. The main benefit of CBR to the partner was that she was acquiring technical proficiency in maintaining the portal. The transfer of technical knowledge in web portal maintenance from the student to the partner helped the partner become more and more self-sufficient in maintaining and enhancing her educational web portal. The partner's mastery in web portal maintenance increased the likelihood of adoption and future use of the portal site over time. The community partner's empowerment was one of the important levers of CBR in promoting social change in the community.

The main challenge of the CBR for the student was to succeed in the training program in spite of having no experience in training a non-technical client. This challenge was amplified by the external constraint that the student had to conduct the training workshops on an Apple computer, since the partner's school site had the Macintosh-based technology infrastructure. However, the student had no previous experience with this hardware platform and did not have access to an Apple computer to develop and test the training materials. A second challenge was to develop a web portal maintenance manual in such a detail that a non-technical user could easily follow it. "One challenging part of the project was making the training manual. I had to learn how to make a step-by-step set of instructions with screen shots and narrative text. It took a long time to get it right," said the student.

The main challenge of the CBR for the community partner was to overcome her technology aversion and to become self-sufficient in maintaining her educational web portal. "I was surprised how much work it was to go through training, and how difficult the training is for someone at my level of technical proficiency," said the community partner.

Web Portal Integration Phase

During the CBR integration phase, the team collaborated on implementing the educational portal at the community partner's site. The CBR activities of this phase provided the context for the student to gain testing and implementation skills and helped the partner understand the challenges of implementing technology on the school district's web server. The benefit of the CBR in this phase was the successful implementation of the portal site to support the community partner's classroom curriculum.

There were several challenges of the CBR process during this phase. The challenge for the student was the lack of access to the school district's web server to test the web portal. The district's policies on the use of and access to the district-wide technology infrastructure constrained the student's ability to test/upload the portal's files. Furthermore, the partner faced problems in communicating her requirements for file transfer/access to the district's IT personnel. She also had to seek the support of the school's principal to properly adopt the use of her educational portal in the classroom. This support required upgrading the classroom's hardware and software, installing a classroom projector, and securing an on-site technical support for the hardware, software and networking infrastructures. Lastly, the faculty member had to play the role of a business liaison to coordinate and facilitate the interaction between different stakeholders – the IS student, the community partner, the school principal, and the district's IT personnel.

5. DISCUSSION

Our findings demonstrate important benefits of CBR to the key stakeholders involved in a service-learning project. However, we also found that there are pedagogical challenges of the CBR-based Information Systems projects aimed at enhancing student learning while solving contemporary problems for community organizations.

CBR Benefits

The empirical literature on service-learning in IS education led us to believe that students
benefit from service-learning experiences in many ways. These benefits include a better understanding of the user issues (Lazar & Lidtke, 2002), a broader knowledge of the systems development life cycle and enhanced communication/project management skills (Guthrie & Navarrete, 2004; Preiser-Houy & Navarrete, 2006), and "significant" learning in academic and social domains of Information Systems (Saulnier, 2005). Furthermore, CBR projects may facilitate social change and empower the community affected by these projects (Preiser-Houy et al., 2005).

Our findings extend the literature on service-learning and community-based research in IS education by demonstrating the *reciprocal* benefits of such a project to the student and the community partner. We found that one of the essential benefits of CBR to the student included broader academic learning and enhanced communication skills. Throughout the project, the student had to address the complexity and uncertainty of real-life technology implementation issues, ranging from planning, prototyping, and researching to training and integration of the educational web portal at the partner's site. Furthermore, in working with a technologically-challenged community partner, the student had to learn the art and science of collaboration and empathy. This integrated academic and interpersonal learning enhanced the student's capacity to address complex, unscripted IS implementation issues inherent in the real world of IT work.

We also found that CBR's collaborative development activities facilitated the design and implementation of the educational web portal that met the needs of the community partner and secured community gains. At the conclusion of the project, the community partner, her students, and student families received a fully-functional, content-rich, maintainable web portal to enhance teaching and learning inside and outside of the second-grade classroom.

The collaborative project initiation and participatory design/ integration activities, facilitated by CBR, secured the partner's commitment to the project and helped her see the value of using an educational web portal in her line of work. Furthermore, the CBR-based training activities facilitated the partner's use of the web portal and empowered her to adopt new technology in her work setting. The consequent adoption, integration, and use of the educational web portal by the community partner and her key constituents contributed to social change in

the way new technology was used in primary education.

The age-appropriate educational resources compiled by the project team and posted on the community partner's web portal constituted a rich repository of on-line information targeted to the specific curriculum-based needs of her class. In reflecting on the use of her educational portal by several generations of second-graders, the teacher commented: "Our portal offers opportunities for students to extend their own learning beyond the traditional school day and choose for themselves whether and how they want to extend their learning through the portal." And the school principal said, "This grade-specific web portal site provides the teacher with a vehicle for curriculum development and enhancement, while helping the students become more technologically educated."

The second-grade students accessed their class portal in school and at home. They browsed through "Poetry" links to memorize and recite the weekly poems. They used the "Helpful Links" section of the portal to complete homework assignments and to engage in learning through a set of age-appropriate educational games selected by their teacher. For example, the second-graders reinforced their understanding of the grammar rules for singular and plural nouns or explored important math concepts while playing fun games linked to their class portal. One second-grade student said, "I visit my classroom portal often because it has fun games and you learn a lot about composers and math and reading."

The parents of the second-graders accessed the educational portal of their children's class to read weekly newsletters, to browse through the photo gallery of class activities and events, and to use the specialized resources of the portal to help their children with homework assignments and research reports. In reflecting on the use of the educational web portal, one family commented, "Among the important benefits of having a classroom portal is to keep the parents posted on what is going on in the classroom. For working parents who are not able to volunteer in their child's class, the portal makes us feel more connected to the classroom activities and to the education of our children as it unfolds in real-time." Another family concurred, "The classroom site provides real-time, anywhere/anytime

platform for communicating classroom events, projects, field trips and curriculum to the parents. It exposes both parents and the child to the media of the future."

CBR Challenges

Studies of CBR projects find that structuring the CBR experience is very challenging (Stocking & Cutforth, 2006; Strand et al., 2003). For example, instructors may face scheduling and time constraints in teaching a CBR course during a "regular" academic term, which may be as short as 10 weeks. Furthermore, due to the complexity of CBR projects, they are difficult and time-consuming to manage and troubleshoot on a day-to-day basis.

Our findings shed new light on the pedagogical challenges of CBR projects in the context of IS education. We found that one of the challenges is the considerable amount of time invested into the CBR activities by all project participants – the IS student, the community partner, and the IS faculty. For example, collaborating with a real client in a field setting and applying what is learned in the class just in time to meet the tight schedule of the project, was a challenging and time-consuming task for the IS student. Furthermore, it took a lot of time and effort on the part of the community partner to acquire basic computing skills, to participate in the intensive training workshops to learn new software, and to research the content alternatives for an educational web portal. Finally, the IS faculty spent a considerable amount of personal time to oversee the CBR project – to structure it, to troubleshoot it on daily basis, and to integrate community-based research through all the phases of the web development life cycle.

Another challenge was the inherent communication gap between a technically-oriented student and a technically-challenged community partner. While the aim of the CBR activities, as structured by the faculty member, was to collaborate and to validate multiple sources of knowledge, the uncertainty and complexity of unstructured requirements and the community partner's technology aversion made it difficult to overcome the student-client communication gap. Furthermore, training a non-technical client to use of a new software tool was challenging for both the student and the community partner. The social challenge of communication and training was in part

mitigated by the faculty member who played the role of a business liaison between the technically-oriented student and a non-technical client.

Still another challenge of the CBR project was the lack of proper testing infrastructure for the analysis / design phase of the project. Since the community partner's computing environment was Macintosh-based, and the student lacked access to Apple computers, testing the web portal in the Safari browser and developing a training manual for use on an Apple computer proved to be a challenge. Furthermore, the lack of hardware and software in the community partner's second-grade classroom and the minimal technical support from the school district's IT personnel proved to be formidable challenges to the successful completion of the CBR project. The technology infrastructure challenges were mitigated by the IS faculty who worked with the community partner to develop grant proposals for the acquisition of the requisite hardware/ software for the teacher's second-grade classroom. The IS faculty also provided additional training to the community partner on maintaining the second-grade web portal after the portal was implemented on the school district's web server.

6. CONCLUSION

The aim of this exploratory case study was to investigate the use of community-based research approach to develop an educational web portal for a community partner. The impetus for the study came from the failure of our previous service-learning projects in web development to secure community gains from the projects. We also aimed to address the gap in the literature on the multidimensional impacts of the service-learning experiences, and the paucity of research on using community-based research in IS education.

Our findings demonstrated the *reciprocal* benefits of community-based research to the student-client dyad. The benefits accrued by the IS student included broad academic learning in web development as well as the technical skills of project management, training, research, and technology implementation. The student also enhanced his interpersonal skills through extensive communication and collaboration with a non-technical client. Furthermore, from the perspective of the community partner, CBR

facilitated the analysis and design process to help her discover the characteristics of web technologies before designing the educational web portal. She also learned how to use web technology before adopting it for teaching and learning strategies in her classroom. Finally, we found that not only the IS student and the community partner benefited from the project, but several generations of the partner's second-grade students and student families successfully used the educational web portal of their classroom for learning and parent-teacher communication.

The complexity and richness of the educational web portal demonstrated the IS student's technical skills; the portal's content and partner's satisfaction with the project demonstrated the student's ability to identify systems requirements and to translate them into working prototypes that addressed the partner's needs; and the actual use of the portal demonstrated the student's proficiency as analyst, designer, programmer, and trainer. We also witnessed the student's civic learning as he actively promoted the service-learning courses in IS to other students and volunteered to share his experience at a Conference on Service Learning hosted by his university. Moreover, in the past several years, we have observed the active use of the educational web portal by the community partner, her colleagues at the elementary school, and more importantly, by several generations of her second-grade students and student families.

The case also demonstrated the evolving nature of the software development process leading to the project initiation, analysis /design, training, and integration of an educational web portal supported by information technologies. The project initiation phase is critical for determining the purpose and the target audience of the educational web portal and for selecting the proper technology infrastructure for system development and training. Moreover, the analysis and design process must be coupled with client training to ensure that the features of the educational web portal match its intended purpose and are consistent with the client's skills and experience. Furthermore, the integration tactics must take into consideration the contextual factors for technology implementation, diffusion and use. Our findings suggest that when the project involves the development of an educational web portal for an elementary school through community-based

research, traditional software design techniques should be complemented with research activities and user-designer collaboration through all the phases of the web development life cycle.

Finally, the study's findings revealed that structuring an effective CBR experience is a challenge. CBR projects are unstructured, complex, time consuming, and labor intensive. They have scheduling and time constraints, necessitate that the faculty member be proactive in facilitating the project throughout its life cycle, and require certain technology infrastructure that may not be readily available to students and their community partners.

In summary, this study demonstrated the significant potential of CBR as a service-learning pedagogy in an IS course. CBR promoted *reciprocal* benefits to the student and the community partner, from broad academic learning of the student to the use of new technology for teaching, learning, and parent-teacher communication by the community partner and her constituents. This fulfills the goals of community-based research as a *transformative* form of service-learning with far reaching implications for Information Systems education.

One of the limitations of our study is in the use of a single case to explore the benefits and challenges of CBR as a service-learning pedagogy in an IS course. However, a single case study is often used as a preliminary or pilot study for future multiple-case studies (Rowley, 2002). The case study strategy used in this exploratory research will allow us to design a multi-case study to evaluate the impacts of the CBR-based service-learning experiences on multiple projects involving the IS student-client dyads. Thus, the next stage in this line of research will be to investigate the impacts that multiple CBR projects have on social change that comes about from the initiation, analysis and design, training, integration, and use of educational web portals in elementary school education.

7. REFERENCES

Creswell, J. (2009). *Research design: qualitative, quantitative and mixed methods approaches*. Thousand Oaks: Sage Publications.

Driscoll, A., Holland B., Gelmon, S., & Kerrigan, S. (1996). An assessment model for service-learning: comprehensive case studies of impact on faculty, students, community, and institution. *Michigan Journal of Community Service Learning*, Fall, 66-71.

Eyler, J. and D. E. Giles. (1999). *Where's thelearning in service-learning?* San Francisco: Jossey-Bass.

Furco, A. (2002). Is service-learning really better than community service? In A. Furco & S. Billing (Eds.), *Service-learning: The essence of the pedagogy* (pp. 23-50). Greenwich: Information Age Publishing.

Godfrey, P. (1999). Service-learning and management education: a call to action. *Journal of Management Inquiry*, 8(4), 363-377.

Guthrie, R. & Navarrete, C. (2004). Service-learning impact on IS students in a web development course. *Information Systems Education Journal,* 2(12), 2-11.

Lazar, J. & Lidtke, D. (2002). Service-learning partnerships in the information systems curriculum. In J. Lazar (Ed.), *Managing IT / community partnerships in the 21st century* (pp. 1-16). London: Idea Group Publishing.

Madsen, S. (2004). Academic service learning in human resource management education. Journal of Education for Business, 79(6), 328-332.

Paul, E. (2006). Facilitating student growth as citizens: a developmental model for community-engaged learning. Diversity Digest, 10(7).

Payne, D. (2000). *Evaluating service-learning activities and programs.* Maryland: Scarecrow Press, Inc.

Preiser-Houy, L. & Markus, M. (2000). Technical expert, service provider or partner: What determines the role choices of IS specialists? *Proceedings of the Sixth Americas Conference on Information Systems (AMCIS)*, Long Beach, CA, August 10-13, 1985-1992.

Preiser-Houy, L. & Navarrete. C. (2006). Exploring the learning in service-learning: a

case of community-based research project in web-based systems development. *Journal of Information Systems Education, A Special Issue on Systems Analysis and Design*, 17(3), 273-284.

Preiser-Houy, L., Navarrete C. J. & Russell, M. (2005). The adoption and integration of web technologies in K-6 education. *Proceedings of the Eleventh Americas Conference on Information Systems,* Omaha, USA, August 11– 14, 710-718.

Preiser-Houy, L. & Russell, M. (2007). Vertical web portals in primary education. In A. Tatnall, (Ed.), *Encyclopedia of portal technologies and applications* (pp. 1079-1084). Hershey: Information Science Reference Publisher.

Rowley J. (2002). Using case studies in research. *Management Research News*, 25(1), 16-27.

Ruppei, D. & Ruppei, C. (2002). A university/community partnership to build a K-8 school network infrastructure. In J. Lazar (Ed.), *Managing IT/community partnerships in the 21st century* (pp. 52-68). Hershey: Idea Group Publisher.

Saulnier, B. (2005). Service learning in computer information systems: 'significant' learning for tomorrow's computer professionals. *Information Systems Education Journal*, 3(10), 1-12.

Strand, K. (2000). Community-based research as pedagogy. *Michigan Journal of Community Service Learning,* Fall, 85-96.

Strand, K., Marullo S., Cutforth N., Stoecker R. & Donohue, P. (2003). *Community-based research and higher education: Principles and practices.* San Francisco: Jossey-Bass.

Stoecker, K. (2005). *Research methods for community change.* Thousand Oaks: Sage Publications.

Stoecker, K. (2003). Community-based research: from practice to theory and back again. *Michigan Journal of Community Service Learning,* 9(2), 35-46.

Stocking, V. & Cutforth, N. (2006). Managing the challenges of teaching community-based research courses: Insights from two instructors. *Michigan Journal of Community Service Learning,* 56 – 65.

Thomas, K. & Landau, H. 2002).Organizational development students as engaged learners in teaching OD. *Organizational Development Journal, 20(3), 88-99.*

Vidgen, R. (2002). Constructing a web information systems development methodology. *Information Systems Journal*, 12, 247-261.

Vogelgesang, L. & Rhoads, R. (2006). Advancing a broad notion of public engagement: the limitations of contemporary service-learning. *Journal of College and Character*. Retrieved from http://www.collegevalues.org/articles.cfm?a =1&id=1016,2006 on October 1, 2010.

Walton, R. (1989). *Up and running: integrating information technology and the organization*. Boston: Harvard Business School Press.

Yin, R. K. (2009). *Case study research: design and methods.* London: Sage Publications.

Zlotkowki, E. (2000). Service-learning research in the disciplines. *Michigan Journal of Community Service Learning*, *Special Issue on Strategic Directions for Service-Learning Research,* 61-67.

Editor's Note: