An Integrative Pre-Capstone Course Approach to Service Learning – Creating a Win, Win, Win Information Systems – Liberal Arts

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Abstract

Tough economic times often raise questions as to the relevance and value of a liberal arts (LA) education. Responding to these concerns, many institutions across the United States are increasingly engaging in innovative educational endeavors to demonstrate the value and worth of a holistic integrative liberal education.   A growing portion of LA institutions are requiring courses that provide students an opportunity to demonstrate the value of students' LA experiences to other key aspects of their lives – relevance to their majors, connections to the local community through service learning, comprehension of diversity and global perspectives in collaborative endeavors, and holistic culminating/capstone reflective learning courses. Simultaneously, service learning (SL) for example is just one of the many dynamic trends impacting information systems (IS) higher education stressing the need for providing real world experiences. Given increasing pressures to include new and dynamic practices and technology coming from the business and information world and the additional course content requirements at LA institutions, many IS instructors and program coordinators are facing increasing pressure to be creative in addressing these demands. This paper outlines an approach to integrating information systems service learning project components with culminating LA experience objectives in a pre-capstone IS course.

Keywords: service learning, liberal arts experience, experiential learning, methodology, reflective experience

1. INTRODUCTION

An increasing number of liberal arts colleges and universities are starting to require undergraduate students to take culminating learning experience courses that provide students an opportunity to holistically reflect upon, integrate and apply the learning skills and knowledge acquired from their previous courses (LA, major, minor and electives) and their out-of-classroom experiential learning, "real-world", activities. The intent is to provide opportunities for students to demonstrate the value and relevance of their individual learning experiences. Providing, integrating and squeezing such holistic integrative experiences into business or management IS programs can prove challenging.

Similarly, more institutions are now requiring students to engage in SL projects and courses. The primary objective of SL projects and courses is for students to obtain real-world experience in safe nurturing academic settings where the skills the students develop and learn are applied in addressing the needs of community

organizations (e.g. Jacoby, 1996; Wilcox & Zigurs, 2003). Secondly, SL projects can demonstrate an academic institution's commitment and engagement to its local community and its responsiveness to local needs. An additional benefit of information systems service learning (ISSL) projects are that many nonprofit and community organizations frequently do not have the financial, technical or business resources needed to create or implement organizational information systems that would allow them to operate more efficiently and effectively and thus be able to provide greater outreach and more services to the local community. Consequently, business information systems (BIS) and management information systems (MIS) SL projects may have an ongoing compounding positive impact on local nonprofit organizations and communities.

Historically, the information systems (IS) fields of BIS and MIS in particular have considered student real-world cross-functional experiences extremely valuable in that they provide students an opportunity to demonstrate successfully application and integration of business, technical and people skills and knowledge acquired from their academic program courses in real-world settings. Therefore, many BIS/MIS programs incorporate applied organizational system analysis design and implementation project components in their courses and may require students complete internships or co-ops. However, in times of economic downturns, businesses may be offering less paid internship and co-op positions for students still lacking in real-world IS skills and experiences. During downturns organizations frequently hire IS interns and co-ops based upon the students' already demonstrated real-world organizational and IS skills as a way of inexpensively supplementing existing staff and tryout potential future fulltime hires.

Incorporating and integrating LA experience reflection and service learning projects in BIS/MIS courses may provide a "win-win-win" opportunity. First, students may reflect upon and utilize their LA learning and experiences in addressing the challenging organizational, social and human needs of local nonprofits thus demonstrating the value of their rich LA experiences. Secondly, nonprofit organizations through SL projects

may be able to obtain needed technical and managerial expertise and products that they may not otherwise be able to procure and subsequently be able to have a greater impact on the local community. Thirdly, executing complex ISSL projects with local nonprofit organizations can provide strong evidences of an academic institution's commitment to its local community while simultaneously provide students with real-world cross-functional IS project experience.

Research in the area SL in the IS discipline areas has primarily consisted of a number of case studies bring out contextual implementations of SL while some papers bringing out SL best practices and critical success factors. A few papers attempt to develop systematic approaches to SL. From a student value perspective, the existing ISSL literature tends to focus on the techniques and value of using SL projects to integrate IS students' course knowledge in real world IS settings. Relatively little attention has been given to the need to integrate IS experiential learning with that of students' broader LA holistic university learning experiences in a systematic manner.

This paper draws together best practices in ISSL with techniques, tools and measures of integrating and utilizing a reflective LA, holistic learning experience to help address the literature gap. The paper begins by reviewing the existing literature in the areas of SL in IS by focusing in on best practices and structural approaches to implementing SL in IS courses. Literature in the area of providing students a LA and holistic learning reflective course experience will then be reviewed with attention given to the significant gap in the literature in the area of integrating the reflective liberal experience with that of IS and SL. Fourth, a short discussion of factors influencing system development methods for consideration and selection in the area of ISSL will be presented. Fifth, an integrative approach to ISSL utilizing LA holistic learning experience exercises will be presented followed by descriptions of the various exercises, and project phase approaches used to help implement and create an integrative holistic learning experience in SL for IS students. This paper addresses gaps in ISSL literature by providing a framework for relating and integrating IS project learning objectives to

those of SL with those acquired through students' various LA experiential learning experiences and classroom knowledge in the context of an organizational database and website course. This paper not only provides a framework drawing upon Kolb's (1984) experiential learning model, Checkland's (1981) soft methodologies, and agile/adaptive development principles, but also suggests strategies for improving learning outcomes of project phases and thus overall project success.

2. FOUNDATIONS & BEST PRACTICES FOR INFORMATION SYSTEMS SERVICE LEARNING

Service Learning according to Rogoff (1990) could be thought of as an individual or community learning and being "transformed" through a "collective socio-cultural experience [where knowledge acquired is]… a construction by individuals and is relative to the current context [community]". This definition of SL gets at the nature of high value learning by doing as stressed by various learning academics.

By 2001, according to Zlotkowski, SL approaches were being applied to wide ranges of disciplines and have been stressed in a growing number of U.S. institutions. Consistently, SL projects are perceived as being complex for a variety of reasons including setting and meeting the diverse needs of multiple stakeholder groups (Eby, 1998) and that across these groups it is difficult to establish common expectations of SL projects and their outcomes and to maintain high respect for all the various groups. To achieve success for complex projects numerous experts claim that it takes a combination of skill sets, trail-and-error and reflection. Overall, for SL course success, Gujarathi and McGuade (2002) feel that it is critical that SL projects strongly relate to the objectives and content of the course.

Wilcox and Zigurs (2003) in their review of the research literature on SL critical success factors found several factors that they summarized around three major themes focused on project context while research of the last couple of years has stressed three corresponding student centered themes. First, careful selections of organizations and projects to match course and academic program goals are needed (e.g. Gujarathi &

McQuade, 2001). Similarly, recent research highlights carefully selecting SL projects of the appropriate scope and duration to match the students' knowledge and skill levels. Secondly, selecting a cohesive committed balanced mix set of stakeholders warrants careful consideration (e.g. Eby, 1998; and Gujarathi & McQuade, 2002). Likewise, current research brings out the importance of carefully balancing student team composition to insure the right combination of skill sets, personalities, and work habits and schedules. Thirdly, providing adequate opportunity for reflection and feedback by all stakeholders and student team members throughout project phases is crucial (e.g. Citrin, 1993; & Saulnier, 2004). Complementing this, other recent researchers drawing upon McEachem (2001) are emphasizing systematically structuring course time to facilitate deep analysis of organizational cultures and contexts where selected projects often are complexly intertwined with related organizational problems.

Similarly, Gurjathi and McQuade (2002) and others note three additional underlying facilitating key factors that help enable SL project success: 1) institutional, faculty and student belief in the value of community service; 2) alliances established with community organizations; and 3) long-term value and relevance of SL course projects and the related skills valued over the long-term.

Consistently, some common themes emerge as best practices for ISSL Projects. Through SL projects as documented by numerous researchers (e.g. McEachern, 2001), students gain greater understanding of the social nature of problems, which is reflected in their writing and problem-solving solution systems. Plus, SL projects should provide a context for applying course content, thus promoting greater understanding and learning both in quantity and depth (Eyler & Giles, 1999; Gurathi & McQuade, 2002). As in many organizations, students should be required to serve in both primary and backup roles in their teams. This will facilitate evaluating students on their technical, project management and individual learning by their instructor(s), project organization representatives and their teammates throughout the SL project system's analysis, design, construct and

implement phases. The nonprofit organizational context also brings out the added complexity of having to work around severe resource limitations.

In the end, the nonprofit organizations value the systems that they get that they will not otherwise be able to obtain and area employers appreciate the experience the students subsequently bring to their organizations.

In their analysis of system development methodologies to consider for an ISSL project course, Wilcox and Zigurs (2004) recommend agile methods bringing out that these methods are "adaptive rather than predictive" and "people oriented rather than process-oriented", which closely matches SL organizational contexts. Based upon similar recommendations and examples from various case studies and a pilot offering of a LA reflection ISSL project course associated with this paper, it is believed that agile methods provide a good starting point for a system analysis and development approach for such integrative IS LA SL projects. The subsequent sections of this paper will delve into how and why other IS analysis and experiential learning tools could be blended with the agile methods to help students reflect upon their LA learning experiences in creating a successful integrative ISSL project experience.

Learning research notes several benefits of SL projects and courses particularly for IS students. First, through reflective exercises students are able to strengthen their critical thinking abilities (e.g. Gerberich, 2000; Hales 1997; Sedlak, et.al. (2003)) [See Holistic Critical Thinking Rubric in Appendix]. Secondly, they provide a context for students to develop integrative professional perspectives fairly reflecting different points of view (Paul, 1993; Sedlak, et.al. (2003)) [See Interview Assessment Rubric in Appendix]. Thirdly, particularly in ISSL projects, students are challenged to develop "double-loop learning" skills that help them to learn more effectively in the rich organizational project context. Fourthly, the community nonprofit settings challenge students to develop deeper empathetic understandings of the various project stakeholder groups [See Student Reflection Exercise in Appendix]. Fifth, students are confronted with having to integrate ideas,

perspectives and organizational contexts utilizing their enhanced critical thinking and project management skills in developing innovative solutions to address the needs of SL project organization (Saulnier, 2004) [See Experiential Learning Reflection Tool in Appendix].

3. HOLISTIC LIBERAL ARTS EXPERIENCES IN THE INFORMATION SYSTEMS DISCIPLINES

Various perspectives exist as to what should constitute an integrative holistic LA learning experience. This paper does not intend to summarize the various perspectives and arguments of such a complex debate amongst academics. Instead, some basic common component threads found in the literature will be brought out. Some institutions stress that students must be able to take part in independent inquiry and then be able to adequately apply their critical think abilities to address an issue or problem. Most agree that self-reflection on determining how to improve one's problem-solving and learning skills is necessary along with reflecting upon the topic or problem context at hand and the various associate perspectives. Finally, an integrative inward reflective look at how an individual has drawn upon their LA education and experiences in addressing the topic or problem at hand is needed.

Relatively few institutions are starting to bring together the integration of two or three disciplines through series of two capstone courses [e.g. Edgewood College brings together computer science, LA, and Dominican religious values in their capstone series, while Lenoir-Rhyne College brings together computer science and LA in their capstone series according to Miles and Kelm (2007)]. They also say that students in the two semester project courses draw upon their "… knowledge and skills of the LA such as Ethics, Communication, Psychology, Sociology, and Mathematics (p. 4)".

Numerous academics will attest that it is very challenging to develop integrative courses spanning more than one discipline. However, given current trends for interdisciplinary collaboration in higher education, there will be pressure to create such courses while yet maintaining solid LA cores, and strengthening major courses that promote professional development that

encourage healthy work environments fostering collaborations with internal and external stakeholders.

The current global business and IS environment demands students in these disciplines to be prepared much differently than in the past, in that they must be culturally sensitive to the various often geographically and/or culturally diverse stakeholder groups with which they must interact and understand. Today's IS students must also master fundamental business and technical skills and knowledge spanning a variety of cultural, international, and local community settings where they will need to utilize and integrate language, political science and regional social science skills (e.g. Khan & Martinez, 2007), which they have acquired through their LA curriculum and experiences. Khan and Martinez (2007, p. 168) go on to say that is very important for business related discipline students to maintain strong "specialization and professionalization" skills and yet acquire and integrate "generalization-socialization" or what frequently are called "soft social skills". Proof of the need of interdisciplinary skill sets can be drawn from the growing number of hybrid business-technical with social science major and minor programs being offered as discussed in the academic press.

Students when leaving academia will be entering a business and information world where students will face growing global competition and greater demand for: transparency and accountability; increased flexibility, cooperation and adoptability skills; improved critical thinking skills; and life-long learning skills that incorporate soft as well as analytical skills according to Khan & Martinez (2007), which frequently use technology. They go on to say that students need to have "technical, social, analytical, communication, multi-disciplinary and inter-disciplinary [skills] where [they] are challenged to be more creative through courses [incorporating] less lecture and more experiential learning activities. (p. 272)". Numerous skill sets when closely examined integrate multiple disciplines, which students should stress in reflective exercises (see Appendix: Student Reflective Exercise).

4. SYSTEM DEVELOPMENT METHODS CONSIDERATIONS FOR INTEGRATIVE LIBERAL ARTS INFOMRATION SYSTEMS SERVICE LEARNING PROJECTS

Lee et. al (1995) based upon a large survey of IS managers and consultants predicted that possessing integrative problem-solving skills across multiple business domain would be critical for IS professionals. Tiwana and McLean (2002, p. 121) go on to note that knowledge integration in teams is effective because "they coordinate their project activities guided by project-level knowledge" resulting from integration.

Similarly, Todd et. al. (1995) in a 20+ year analysis of the evolution of IS skills found that specialists who could relate to a wide range of domains were more valuable to organizations. Additionally, team members have been found to be more satisfied with projects when larger portions of their personally possessed knowledge is utilized (Griesinger, 1990). Likewise, Leonx et. al. (2005), found that consensus exists that IS project management skills involving organizational core competency subtleties are difficult to outsource. Numerous academic studies as well as business leaders state that IS educators should stress to students the importance of problem-solving and analysis skills as well as developing effective team collaboration capabilities (See Holistic Critical Thinking Scoring Rubric in Appendix).

There are various system development methodologies that may be considered for use in SL projects. As Wilcox and Zigurs (2003) say, "No single approach has been proven to be the best one for all projects…" Some of the humanistic experiences students gain working on SL projects that can directly map to projects with a variety of small businesses and end-user groups are: 1) there is a tendency towards informal consensus [e.g. McEachern (2001)], for which students need to develop skills of bringing groups to effective closure to keep the project on track when divisiveness exists, 2) frequently very little forethought and strategic assessing problem priorities has often been done, thus students must develop skills at asking "and then what happens?" and "which would you rather fix first?", and 3) realize that immediately assessing the positive value and

effectiveness of project solution is difficult [McEachern (2001)].

Soft methodologies has often been suggested and utilized as an approach to complex unclear situations as often found in nonprofit settings, where differing initial perspectives exist about the nature of the current situation and problems at hand in an organizational context. Particularly in the context of nonprofit organizations where goodwill and volunteerism are often important, it is important for students to go through an initial positive or "appreciative inquiry" analysis (focusing on what stakeholders like about the current system/situation) and capture the perspectives, interactions, tasks, and information flows of the various stakeholder groups, which may be succinctly represented in a rich picture (Checkland, 1981) [See Appendix: Rich Picture Checklist]. Through subsequent investigations and discussions the joint student-stakeholder teams will come to consensus or compromise as to what changes in the current systems are desired and of highest importance. Models of the proposed system changes will be created for review and subsequent revisions or potential creation and implementation (students used a Soft Methodology Checklist which may serve as an informal progress tracking measure).

5. AN IS INTEGRATIVE CONTEXT FOR HOLISTIC LIBERAL ARTS REFLECTIVE EXPERIENCES

SL projects provide an opportunity for IS educators to work closer with real-world organizations to discover skills needed by regional employers. Plus, they provide dynamic innovative course contents that are interdisciplinary in nature that match attempts by academic institutions to increase IS enrollments (Lenox et. al. 2005) and dovetail with high IS career growth skills areas of integrative strategic, business process, and technical knowledge as forecasted by multiple U.S. Bureau of Labor Statistics studies that are generally agreed upon as being difficult to offshore successfully (Straub et. al. 2003). These skills are general perceived as being critical for sustaining competitive advantage for organizations, communities and countries. Some researchers and academics have suggested that SL projects stressing a

variety of "soft skills" may be a means to attract minority and female students to IS programs. Plus, as Hoganson (2004, p. 172) brings out, these integrative jobs underline the need of IS professionals to develop "'meta' thinking/knowledge abilities" and skills for "…understanding dependencies and integrations of subjects that are generally taught [in isolation]".

To foster, as Blumefeld et. al. (1991, p. 370-371) brings out, learning research "emphasizes the critical role played by tasks and environments" where tasks "serve as critical links among student motivation, student cognition, instruction, and learning" and environments provide settings where "learners construct knowledge by solving complex problems…[using] cognitive tools, multiple sources of information, and other individuals as resources". Thus, SL projects provide problem-solving contexts that drive team members' activities and tasks to produce "final products" or "artifacts" (systems) that address the projects' central problems for the nonprofit organizations. They go on to say that "A quarter century of research … suggest[s] that innovation in curriculum… requires… considerable attention be paid to … content, organization,… learner individual differences, professional practice issues, and time for reflection (p. 373)" so that knowledge in students is fostered that is "integrated, dynamic and generative (p. 375)" and students strive "to acquire information, generate and test solutions, and evaluate their findings".

6. IMLEMENTATION APPROACHES AND TOOLS

Malone and Lepper (1987) stress that projects selected must be both interesting and valuable to students by including novel varied tasks-problems that are challenging and real with value in finalized solutions, which involve interactions with others. Existing SL project research utilizing agile methodologies stresses that student teams, if to be successful, must have a key role in the selection of project questions, artifacts, activities, and the assignment of resources, and responsibilities in addressing the project at hand because such control is important for fostering student motivation and learning (e.g. Blumenfeld et al. 1991). Thus, through these SL projects (see Appendix for

listing of "Pilot Offering" course projects) and associated deliverables students must demonstrate knowledge, competence and learning abilities at communicating, raising questions, debating ideas and highlighting multiple perspectives. Likewise, they must also demonstrate competence in other traditional IS skills such as carefully evaluating alternatives, formulating solution plans, and systematically monitor their individual and collective team progress in developing and implementing solutions. Finally, they must learn to deal with change and mistakes all of which are significant factors in collaborative learning (e.g. Blumenfeld et al 1991; Eichinger et. al 1991).

In rich cross-functional ISSL environments, members of the nonprofit organization and community share their various unique stakeholder roles, perspectives, knowledge and experiences relevant to the specific real-world community projects and problems to be addressed. The cross-functional student team members utilize their various academic and technical background skills and experiences in analyzing the problem, evaluating alternatives, designing system solutions, and implementing the finished products while simultaneously learning. The IS faculty share their relevant technical, academic, and real business world expertise with students not only as instructor but frequently in a senior level external consultant role. Thus, faculty can provide additional specific management and technical expertise relevant to individual specific team projects and help students understand their user-community. The faculty may also concurrently serve as a sounding-board for teams in evaluating the quality and reasonableness of their suggested alternatives and solutions.

A number of applied technology skills researchers (e.g. Lambrecht & Sheng, 1998) brings out that it is important for instructors to have a solid understanding of the organizational context where office staff will use a technology so that they can develop an effective holistic approach to course content to match project needs.

A key foundational and theoretical concept and framework behind service learning has been that of Kolb's work (19981 & 1984) in developing an "experiential learning cycle", which is based upon the concept that the most effective learning requires different amounts of four different learning styles and abilities (active experimentation, concrete experience, reflective observation and abstract conceptualization) depending upon the individual learning and the task or content at hand. As Kolb (1984) stresses all four of the learning styles in his experiential learning model are usually required. However, in applied learning projects, active experimentation and concrete experience are likely to be strong, with reflection play a major role between iterations.

SL projects in an IS database and web design and management course provide a more rich learning experience for all four of Kolb's learning styles than is found in most SL courses across academia where students primarily perform tasks in manners similar to those already in use. Whereas, when designing and creating database and website systems and altering business processes used by multiple stakeholder groups, students must engage in deeper levels of learning and reflection to insure that the SL project system goals are achieved successfully (See appendix for: Experiential Learning Reflection tool).

7. CONCLUSIONS AND INITIAL OBSERVATIONS

This paper brought several contributions to ISSL literature. First, by integrating agile methods, soft methodologies including rich pictures, appreciative inquiry, and experiential learning models, students may be able to better determine which critical issues must be addressed first in a project solution. Secondly, using common requirements of LA reflective experience courses can help students gain a richer understanding and empathy for the various stakeholder groups and their information needs. Finally, by providing students a real world SL project experience in an IS pre-capstone course, they are better prepared for internships.

The methods, techniques and tools described in the paper may provide an integrative way to enriching IS students learning experiences at LA institutions. In the NEA 2008 Almanac, Schneider in "Liberal Education Takes a New Turn" outlines ten new "Engaged Learning Reforms" innovations. The integrative LA ISSL course

described in this paper incorporates seven of the ten instructional engaged learning innovations, thus helping to reduce competing content pressures on IS programs and helping to provide students with richer integrative skill sets employers are demanding.

8. FOOTNOTES

The seven "Engaged Learning Reform" Innovations of Schneider's (2008) used in this ISSL course are the following: Common Intellectual Experiences; Learning Innovations Communities; Writing-Intensive Course; Collaborative Assignments and Projects; Diversity/Global Learning; Service Learning/Community-Based Learning; and LA Experience Capstone Course and Project. The course helps to facilitate an eighth, internships, for students.

9. REFERENCES

Blumenfeld, P.C.; Soloway, E.; Marx, R.W.; Krajcik, J.S.; Guzdial, M.; & A. Palincsar (1991) "Motivating Project-Based Learning: Sustaining the Doing, Supporting the Learning", Educational Psychologist, Lawrence Erlbaum, 26(3-4):369-398.

Checkland, P.B (1981). Systems Thinking, Systems Practice, John Wiley, NY.

Citrin, T. (1993). "Linking Community Service with Independent Studies." In Howard J., PRAXIS I: Faculty Casebook on Community Service-Learning. OCSL. Press, Ann Arbor.

Duffy, T.M. and D.J. Cunningham (). The Handbook of Research for Educational Communications and Technology

Eby, J.W. (1998) "Why Service Learning Initiatives Bridge the Gap Between America's Technology Haves and Have-Nots", Chronicle of Higher Education, 48(43):28.

Eichinger, D.C.; Anderson, C.W.; Palincsar, A.S.; & Y.M. Daivd (1991). "Illustration of the roles of content knowledge, scientific argument, and social norms in collaborative problem-solving". American Educational Research Association Meeting, Chicago, April 1991.

Eby, J.W. (1998) "Why Service Learning Initiatives Bridge the Gap Between America's Technology Haves and Have-Nots", Chronicle of Higher Education, 48(43):28.

Eyler, J. & Giles, D.E. (1999). "Where is the learning in service-learning." Jossey-Bass, San Francisco.

Gerberich, S.S. (2000). "Care of homeless men in the community." Holistic Nursing Practice, 14(2):21-28.

Gujarathi, M.R. & R.j. McQuade (2002). "Service-Learning in Business Schools: A Case Study in an Intermediate Accounting Course." Journal of Education for Business, Jan/Feb 2002, 144-150.

Hales, A. (1997). "Service-learning within the nursing curriculum." Nurse Educator 22(2):15-18.

Hoganson, K. (2004). "Computer Science Curricula in a Global Competitive Environment." Consortium for Computing Sciences in Colleges, 168-177.

Jacoby, B. (1996). Service Learning in Higher Education: Concepts and Practices, Jossey-Bass San Francisco.

Khan, M.A., & S.T. Martinez. (2007). "An Integrative Business Education Model: A Theoretical Framework" from ScientificCommons, http://en.scientificcommons.org/42269967.

Kolb, D.A. (1984). Experiential Learning, Prentice Hall, New York.

Lambrecht, J.J. & Sheng, (1998). "Developing End-User Technology Skills", Organizational Systems Research Association.

Lee, D; Trauth, E.; & D. Farwell (1995) "Critical Skills and Knowledge Requirements of IS Professionals: A Joint Academic/Industry Investigation," MISQ, 313-340.

Lenox, T.L.; Woratschek, C.R.; & G.A. Davis, G.A. (2005). "Exploring Declining CS/IS/IT Enrollments", Proceedings ISECON 2005, volume 22, 1-11.

Malone, T.W. & Lepper, M.R. (1987). "Making learning fun: A taxonomy of

intrinsic motivations for learning", In R. Snow & M. Farr (Eds), Aptitude, learning, and instruction: Cognitive and affective process analyses (Vol. 3): 223-253, Lawrence Erlbaum, Hillsdale, NJ.

McEachern, R.W. (2001). "Problems in Service Learning and Technical/Professional Writing: Incorporating the Perspective of Nonprofit Management", Technical Communication Quarterly, 10(2):211-224.

Miles, G. & K.M. Kelm (2007). "Capstone Project Experiences: Integrating Computer Science and the Liberal Arts", ISEDJ, 5(30): 3-10.

Paul, R. (1993). "Critical Thinking: What every person needs to know to survive in a rapidly changing world." Center for Critical Thinking, Robert Park, CA.

Rogoff, B. (1990). Apprenticeship in thinking: cognitive development in social context. Oxford University Press, NY.

Saulnier, B.M. (2004). "Service Learning in CIS: 'Significant' Learning for Tomorrow's Computer Professionals". Proceedings ISECON 2004, (v. 21):1-10.

Schneider, C.G. (2008). "Liberal Education Takes a New Turn", NEA 2008 Almanac of Higher Education, pp. 29-40.

Sedlak, C.A.; Doheny, M.O.; Panthofer, N. & E. Anaya (2003). "Critical Thinking in Students' Service-Learning Experiences", College Teaching, 51(3):99-103.

Straub, D.; Weill, P.; & K.S. Schwaig (2003). "Strategy and IT Outsourcing, A Test of Strategic Control Model", Journal of Information and Organization.

Tiwana, A. & E. McLean (2002). "Knowledge Integration and Individual Expertise Development in E-business Project Teams: Pod to the Peas", RCPR 2002, pp. 120-123.

Todd, P.A., McKeen, J.D. & R.B. Gallupe. (1995). "The evolution of IS job skills: content analysis of IS job advertisements from 1970- 1990", MISQ, (Vol. 19):1-27.

Wilcox, E. & I. Zigurs (2003). "A Method for Enhancing the Success of Service-Learning Projects in Information Systems Curricula". Proceedings ISECON, 2003.

Zlotkowski, E. (2001). "Mapping New Terrain: Service-Learning Across the Disciplines", Change, Jan./Feb. 2001, pp. 25-33.

APPENDICES

Interview Assessment Rubric   Team/Individual: _____ **Total Score:** _____

(For each item of both rubrics, select the most appropriate level)

In the summaries of the interviews, does the student (student team) attempt to perform the following and at what level of proficiency:

Item	Level Assessed	Item Weight	Comments and/or Examples Notes
1. Sought out and attempted to interview all relevant stakeholders Evidence: Collection of "Interview Summary Documents" and references made to other stakeholders by interviewed groups or individuals match or exceed those referenced in the documents and those that would be expected for the organizational context and instructor's communications and knowledge of the team's project organization and context.			
2. Asked pertinent questions Evidence: Questions documented in "Pre-Interview Submission Questions" that correspond and seem relevant to the information tasks and problems expressed by the project organization and members of its various stakeholder groups.			
3. Asked relevant follow-up questions Evidence: "Follow Up Questions" documented in "Interview Logs" that seem pertinent to the needs, issues brought up by the interviewed stakeholders and the questions needed to address IT/IS project requirements.			
4. Collected relevant existing artifacts (i.e. documents, screen shots, process maps) Evidence: "Existing System Documentation" collection. Evaluating the collection of existing system documentation and artifacts collected and organized that correspond to the discussion or comments of various stakeholders interviewed.			
5. Clearly explained/howed existing relationships and info flows between key stakeholders Evidence: Evaluating how discussion in the "Interview Logs" corresponds to the Information Flow Diagrams mapping the existing relationships of information transferred, organizational processes performed and entities engaged in the existing system(s) and the summary "Rich Pictures" documenting the overall sequence of information flows, task sequences, and stakeholder attitudes towards existing system(s).			
6. Conducted open-minded interview Evidence: "Pre-Interview Submission Questions" were structured in an "open ended" manner to let the interviewed individual or groups respond adequately, freely and completely in honest, trusting and frank manner. The interview questions and "Interview Logs" did not contain language or phrasing that suggested predetermined perspectives, opinions, or ideological or technological leanings on the part of the interviewer(s).			
7. Unbiased accurate interview summary Evidence: "Interview Summary Documents" seem to be complete and based upon follow up discussion with the project's organization's stakeholders by the instructor and triangulation of evidence within/between documents.			

Holistic Critical Thinking Scoring Rubric - Through the interviews and their summaries, does the student (student team) do the following?

Item	Level 1 Consistently does all or most of the following	Level 2 Does most or many of the following	Level 3 Does most or many of the following	Level 4 Consistently does all or almost all of the following
1. **Handling of evidence, statements, questions, and points of view of others**	Offers biased interpretation of evidence, statements, graphics, questions, info, or perspectives of others	Misinterprets evidence, statements, graphics, questions, information, or perspectives of others	Accurately interpret evidence, statements, graphics, questions, etc.	Accurately interpret evidence, statements, graphics, questions, etc.
2. **Identifying of relevant arguments**	Fails to identify or hastily dismisses strong, relevant counter-arguments	Fails to identify strong relevant counter-arguments	Identifies relevant arguments (reasons & claims) pros & cons	Identifies the salient arguments (reasons and claims) pros and cons
3. **Evaluation of alternatives and other perspectives**	Ignores or superficially evaluates obvious alternative points of view	Ignores or superficially evaluates obvious alternative points of view	Offers analyses and evaluations of obvious alternative pts of view	Thoroughly analyzes and evaluates major alternative points of view
4. **Forming of conclusions**	Does not form conclusions or draws totally unwarranted conclusions	Draws unwarranted or fallacious conclusions	Draws warranted, non-fallacious conclusions	Draws warranted, judicious, non-fallacious conclusions
5. **Justifying of results and procedures**	Regardless of evidence or reasons, maintains or defends views based on self-interest or preconceptions	Justifies few results or procedures, seldom explains reasons	Justifies some results or procedures, explains reasons	Justifies key results and procedures, explains assumptions and reasons
6. **Fair-minded reasoning**	Exhibits close-mindedness or hostility towards reason.	Regardless of the evidence or reasons, maintains or defends views based on self-interest or preconceptions	Fair-mindedly follows where evidence and reason lead	Fair-mindedly follows where evidence and reasons lead

Adopted from: Holistic Critical Thinking Scoring Rubric (P. Facione and N. Facione,

(Critical Thinking: A Statement of Expert Consensus for Proposes of Educational Assessment and Instruction, ERIC Document Number: ED 315423)

Student Reflective Exercise

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1. To what extent have you studied or reflected on liberal arts and BIS subject matter and methodology through such perspectives as globalism, multiculturalism, gender and ethnicity?

a. Which papers / projects offer evidence that you have achieved this goal?

b. How does this evidence demonstrate your achievement of the goal?

c. What additional information / evidence about your course of study supports your self-assessment of this goal?

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2. To what extent have you developed and demonstrated the ability to utilize advanced critical and analytical thinking and writing skills, including the ability to present and support a technology plan to specialists and to the broader public?

a. Which papers / projects offer evidence that you have achieved this goal?

b. How does this evidence demonstrate your achievement of the goal?

c. What additional information / evidence about your course of study supports your self-assessment of this goal?

Name: _____   Date: _____

Adapted and Modified from "History Major Portfolio Manual" MSU. History.misu.nodak.edu 2006 Revision

Rich Picture Checklist:

1. Visually represent all important system stakeholder groups
2. Document the interactions between stakeholder groups
3. Indicate critical tasks performed by individuals/groups
4. Document the direction of information flow and key information content
5. Stay true to the current situation and activities

Experiential Learning Reflection Tool:
1. Document which tasks you performed working with stakeholders helped you gain a better understanding of their situation and organizational system needs?
2. What abstract scenarios and planning do you think helped your team design and build a better system for your project organization?
3. For what activities and portions of the information system did you and your team experiment the most or were the most innovative in coming up with the best solution?
4. What liberal arts subjects and experiences did you draw upon while working on this project?

Service Learning Course Logistical Considerations:

Implementation Considerations:	Common Approaches	Author's University & IS Service Learning Implementation
New course development preparation	- Faculty load release time (common 1 to 3 faculty load credits) - Small stipend for preliminary visits to nonprofit organizations - Compete in competition for university internal stipend or grant	- Author promised a small stipend of > $1,000 from university course development funds - No faculty release time granted for course development
Organizational visits	- Mileage rewarded - Reimbursement based upon a university set hourly salary rate	- No compensation or expense reimbursement
Student Credits Rewarded	- Typically, a sequence of two semester courses each worth three credits with one geared towards systems analysis and design. The second course will usually either focusing on database or website design and management, with both having different phases of the service learning project. - Other common approaches are to have a single four or five credits course incorporating the either website design and management or database design along with three or four phases of the service-learning project.	- A single three credit semester course incorporating database design and management, website design and management, service learning project, and liberal arts reflection component and paper - Instructor has placed a request that the course be offered for four credits for the spring 2010 semester, given the amount of content and contact time when taught in spring 2009. - Weekly extra optional help labs with instructor offered to go over additional course content and to interact with teams (substantial attendance).
Student-Faculty Interaction Times	- Routine team-faculty meetings during faculty's office hours - Additional meetings schedule at service learning organization site - Special team-appointments scheduled	- Teams meet with faculty during office hours. - Additional meetings scheduled at service learning sites. - Special team-appointments scheduled - Weekly extra optional help labs scheduled Thursday and Friday evenings
Faculty Load	- Reduced faculty load of typically one to three faculty load credits during the semester	- No faculty load release credits granted

Pilot Offering Project Information and Complex Implementation Issues

Project Type	Brief Description of Project
Food Pantry Inventory Management	Design database and interfaces to track food in a multi-storage location food pantry and dealing with multiple types of relationships between even single food suppliers/donors.
Volunteer Coordination	Design database and interfaces for coordinating overlapping volunteer groups and individuals
Fund Raising Event Management	Designing DB and interfaces for dealing with multi-staged events was difficult
Tracking Food Pantry Patrons	Designing DB and interface to address both privacy and reporting concerns was a balancing act.