SERVICE LEARNING: BRIDGING THE GAP BETWEEN CLASSROOM THEORY AND APPLICATION FOR TECHNOLOGY STUDENTS

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Abstract

Service learning provides an avenue where students are able to take what is learned in the classroom and provide a service to the community. Service-learning projects are typically organized to address a communal and/or societal need; however, students gain hands-on experience based on application of classroom theory. It is an academic approach that involves the instruction of students and/or participants on a prescribed objective. Often viewed as a progressive and sometimes constructivist practice, service learning is an effective strategy to help participants develop technical skills through abstract problem-solving simulations and activities.

This paper provides definition for and discussion of the application of service learning, and how technology is implemented in service-learning activities. In this study, the authors looked at how students in a Technology Education Master's Degree-level course learned fundamental concepts about instructional aides and adult learners, and created service-learning training to assist office personnel at a local agency. The class researched and identified a need for Microsoft Excel and Access proficiency for work for office personnel. While communicating with a non-profit organization in Mississippi, the Technology Education students discovered that their organization lacked some efficiency in record keeping due to deficiencies in Microsoft Excel and Access. Under the direction of the instructor of the Technology Education class, the students provided a service that was a fulfilling learning experience.

Introduction

Service learning is a process in which students take classroom applications and experiences to assist in fulfilling a societal need. The Virginia Office of Volunteerism and Community Services contends that service learning is an educational process by which students learn and develop through direct involvement in service that meets the needs of a community. It is coordinated between a school/ institution, community service program, and targeted community groups. This concept encourages the lifelong learning of participants and includes structured time for participants to reflect on the service experience [1]. Students may reflect by making hand-written or electronic journal entries with comments regarding experiences, thoughts, and views throughout the project. Since technology is such an integral part of lifelong learning and our ever-changing society, the union of service learning and technology will afford opportunities that will enable a progressive pedagogy for instructors. This will also allow participants to have autonomy in creative project development, and promote technological advancement throughout their community.

According to the International Technology and Engineering Educators Association (ITEEA), technology is defined as human innovation in action that includes the production of knowledge and progressions that will develop systems to solve problems and lengthen human competencies. Technology also involves advancements, transformations, or modification of the natural environment to satisfy professed requirements and needs [2]. With continuous advancements, transformations, and modifications, the community stands at the vanguard of a constant need for technological training and assistance. This renders a need for service [2], [3].

To assist in fulfilling this need, technology students may participate in service-learning activities to enhance their awareness of societal needs. In order for technology students at a post-secondary level to better assist, there must be research, assessment, and the evaluation of technological deficiencies in a community. This will aid the development of student comprehension on the pedagogy of technology integration. Students may identify a communal need such as computer literacy for which they may devise training sessions that will minimize computer illiteracy, as well as providing strategic methodologies and future recommendations. Once these objectives are satisfied, students will have more clarity of the theory and application acquired in the classroom, skills that they will use in the contemporary workforce.

Student Comprehension

Burr [4] suggested that today's progressive learning methods require a departure from emblematic, set and preconceived objectives because the learning will be student di-

rected. Progressive education occurs as real-life applications are joined with a self-directed series of experiences that create unlimited possibilities. Burr further recommended that increased enthusiasm for learning could happen with the collaboration of progressive educational principles and service learning, resulting in progressive service learning.

In addition, great sums of persuasive confirmation attest to the benefits of service learning and experiential methods, thus revealing that teachers yet depend on the traditional practices of lecture and teacher-directed educational procedures—not appealing to all learning styles. Traditional practices should in no way be dismissed; however, they should include approaches where students are able to apply what has been learned in the classroom. Cohen and Brawer (as cited in Burr) stated the following:

> It is reasonable to assume that in an institution dedicated since its inception to "good teaching," new instructional forms will be tried. However, traditional methods of instruction still flourish. Visitors to a campus might be shown mathematics laboratories, the media production facilities, and computer-assisted instruction programs. But on the way to those installations, they will pass dozens of classrooms with instructors lecturing and conducting discussions just the way they and their predecessors have been doing for decades. (p. 155)

Service learning is an appropriate teaching and learning approach in which the workplace provides a practical setting for structured problem-based learning experiences. It has been indicated that technology can play a powerful role in project-based learning [5]. Technology contributes to student learning by enhancing interest, giving more access to information, providing active representation with the multimedia capabilities of technology, structuring the process to provide more tactical and strategic support, diagnosing and correcting errors more easily, managing complexity and aiding production, and providing potential for motivating students to carry out projects. During and after the service-learning project, it is essential that students have opportunities to reflect on what they have learned in the classroom, what they have experienced, and how they have positively impacted their community.

Service learning reflections

Service learning is an extension of classroom curriculum. It allows students to learn by performing services in their respective fields. It provides a great opportunity for students to receive hands-on training through application of classroom theory. Effective service-learning programs challenge students to reflect on their service experiences through such activities as group discussions and journaling. The need to introduce reflection and self-regulation into the learning experience is the most neglected component of service learning. However, it is a well-established fact that students learn through a combination of thought, theory, application, reflection, and civic engagement [6]. Effective learning can be achieved while discussing intellectual, civic, ethical, moral, cross-cultural, career, or personal goals [7]. According to Bradford [8], "students from middle schools are mastering academic content standards while immersed in hands-on, technology-integrated projects that provide learning experiences that are not usually possible within the confines of the traditional classroom". Integrating these various components greatly impacts learning experiences, especially when technology is present.

Technology Integration

Implementing technology into service learning is a major asset. Kurt [9] asserted that service learning can be a meaningful way to combine service with academic learning in a variety of technology courses. Technology-savvy students are eager to take on new roles in service learning. Service learning provides this change because students become more aware of their positive impact to the community while working on technical projects. "Integrating technology with service learning catches and holds the attention of students who have grown up in the digital age and rely on computers, video games, cell phones and digital music players for their information and entertainment" [9]. Students are given the opportunity to make advances in technology, especially when they assert that some technological applications are limited to their local community. With this in mind, students must have a strong technical skill set (e.g., computer application, electronics, manufacturing processes) and be able to develop a method of instruction that will appeal to those of various learning styles and abilities.

While technology is being integrated into every subject area, it is the instructor who decides what technology and how much of it will be used in his or her classroom. Instructors must stay abreast of the latest technologies and trends in order to prepare students for academic pursuits and the contemporary workforce. Since technology in the classroom can enhance instruction, it is very important that instructors develop effective ways to manage their classroom and the technology used in it. Along with managing the classroom and incorporating technology, instructors must not lose sight of activities involving critical-thinking skills, especially for graduate students.

Example of Graduate Student Involvement

At a research university in Mississippi, graduate students assisted a local non-profit agency in creating an electronic spreadsheet template that would allow the agency to better organize client information such as e-mail, phone, social network site data, and mailing addresses. The information was also to be placed in sub-groups that would categorize the clients. The original request was for a Microsoft (MS) Access 2007 database, but the participants were encouraged to utilize a Microsoft (MS) Excel 2007 program since the instructors were highly proficient. Based on the verbal communication from the Chief Administrative Officer (CAO) of the agency, the MS Excel 2007 spreadsheet would address their immediate needs. However, there were plans for the next service-learning project, which would convert the MS Excel 2007 spreadsheet into an MS Access 2007 database.

The fall, 2010, academic semester was when this venture began. As a part of the professor's syllabus, the students were informed about the service-learning project. According to Hatcher & Bringle [10], courses with service-learning objectives should provide opportunity for student reflection, community partnerships, student supervision and assessment, and course assessment and research. Adhering to this philosophy, twenty-four technology education graduate students became oriented with service learning, its concepts, and how service learning reflected their course objectives. The professor provided the students with a general definition of service learning, and provided three technology education philosophical concepts: progressivism (change), constructivism (building on pre-existing knowledge), and pragmatism (practical approaches).

To better assist the students on their venture, the professor invited a representative from the University's Center for Community & Service Learning to provide an orientation and inform the students about a local Mississippi non-profit agency's need. The agency was inundated with client data in various forms (e.g., business cards, forms, email addresses). The agency needed a system to better organize and store client data, and to become more skilled in a modern technology application to handle this process.

Methodology

The class was broken into smaller groups (5 members per group) that focused on logistics, instructions, training materials, and spreadsheet template design and development. Each group had a designated captain who made progress reports to the professor and organized collaboration with other groups. All groups had to work collaboratively in order to progress with their designated responsibilities.

Thirty hours were collectively spent by these groups and the technical advisor to assess the agency's objectives, build the Excel template, create in-class and take-home learning materials, secure training equipment and facilities, as well as administrative duties and parking permits for the agency participants. Throughout the semester, the students posted their reflections on the discussion board section of Web-CT. This allowed the students to share their learning experiences and post questions to the professor as well as other students. After the students completed their assigned tasks, they invited the seven agency representatives to participate in two, two-hour courses. The purpose of the training course was to teach the agency representatives about the new features in MS Excel 2007 and short-cut techniques, as well as to have the students present the new template. In addition, the students provided training modules and a short-cut table. Nevertheless, the professor and students wanted to ensure that training and resource materials were helpful to the agency representatives.

Instrumentation

Merranko & Zeolla [11] stated that in any service-learning project one must reflect on whether the objectives were mastered. During this project, these reflections caused the students to ponder whether their plan of action would benefit the individuals they were serving. As a result, the students reflected on the following: How did the service-learning process link to the essential needs of the participants? Did the participants actually learn the concepts? How could execution of the project be improved for future implementation?

The agency's seven participants were taught how to properly use MS Excel 2007 and how to enter data into the new template—these were the learning objectives. The learning objectives for the agency's participants were to be mastered during two training sessions. After the completion of the first training session, a survey was administered to the participants to discover whether the participants' needs were met. In addition, the survey was used to analyze the quality of the instruction, resources employed, and training materials.

The survey was divided into two sections: instructional materials and instructional effectiveness. Participants were able to rank their responses based on a 5-point Likert Scale (where 1-poor; 2-fair; 3-indifferent; 4-good; 5-excellent). The results of the participant feedback survey were as follows:

Table 1. Instructional Material

Instructional Materials	Score	Attainment
Quality of the Training Materials	20	100%
Quality of the Electronic Materials Covered	20	100%
Quality of the Work Sample	20	100%
Usefulness of the Materials	20	100%
Quality of the Resources Employed	20	100%

Table 2. Instructional Effectiveness

Instructional Effectiveness	Score	Attainment
Innovation and Creativity in the Teaching Technique	18	90%
Verbal Communication of the Instructors	19	95%
Eye Contact and Interaction of the Instructors	20	100%
Ability to the Instructor to "Reach" Every Learner	19	95%
Confidence, Carriage, and Conviction on the Subject	20	100%

Overall, the participants indicated that they were satisfied with the instruction and the training materials. However, the students did make stronger efforts to improve verbal communicate and transition of the instructional delivery. The graduate students also modified pedagogical approaches to ensure that participants of all learning styles were being reached. This was accomplished through lectures, distribution of MS Excel condensed short-cut guides and interactive activities (e.g., spreadsheet data entries, calculations, mail-merge and pivot tables). The graduate students wanted the participants to be 100% satisfied with the instructional materials and effectiveness.

Methods to Improve Performance Measurement

Unfortunately, the participants did not share any comments on how the students could improve upon their performance as a class. The graduate students strived for improvement based on feedback from the peer evaluation on group members and self-evaluation to identify areas of improvement. Some areas of improvement included: proper and timelier communication among team members, submission of materials to meet project milestones, and better delegation of workload. To mitigate these concerns, the graduate students indicated that proper execution of the service-learning project may have been reflective of the participants' mastery of the objectives. In addition, the student feedback would be implemented in the following semester's course, in which they would continue service-learning projects.

However, the professor evaluated all training materials and student participation projections and made the following constructive comments: make transitions from one activity to the next smoother; make sure the participants remain engaged; and, provide activities where participants can demonstrate comprehension and mastery. The graduate students believed that it would have been prudent for the class to construct "take home" exercises after both sessions that required the participants to e-mail the instructors a document that proved mastery of the concepts taught. The graduate students also indicated that a take-home activity would have been a better measure of whether or not the information had been properly retained after the participants departed from the classes and returned to their respective offices to apply the knowledge. This was a part of the students' period of reflection.

Student Reflections

Billig [12] asserted that reflections in service learning should connect the experience, content, skill, and value. The graduate students posted comments on the discussion board using Web-CT. The graduate students indicated that the service-learning experience was fulfilling and it helped them to better understand the course content. Additional student comments revealed that the project increased their desire to work collaboratively and more effectively. The graduate students indicated that they obtained knowledge from the services that were provided, and they learned the culture of the community through providing instruction for the agency.

Furthermore, Billig contended that reflections should be on-going and used to evaluate the improvement of service for students. The professor provided information that provided foundational service-learning content and technology implementation (i.e., as an instructional aide or to remedy a technological application deficiency). In addition, the professor provided the following assignments and activities: service-learning article reviews, reflection comment postings on Web-CT, verbal reflections during class discussions, a service-learning research and reflection project paper, and a classroom presentation at the conclusion of the project. The professor found that the graduate students grasped the technology education course content and were able to apply

classroom knowledge during the service-learning project. However, the professor found that the activities should be condensed to allow the students more time to fully execute additional service-learning concepts and reflect on service-learning experiences. The professor did know that there would be a limit on opportunities so students had to share their thoughts about the project and exchange ideas.

Limitations and Future Recommendations

When attempting to teach and implement course objectives, time is of the essences. This may cause the professor to condense some course materials, and it may cause students to rush to complete projects. The professor and students acknowledge that timing was a significant constraint in this project as several weeks were lost due to the participants' scheduling conflicts. In considering timing, it was recommended that the next project with the agency and future service-learning projects begin earlier in the semester

The distinctive element of service learning is that it enhances the community through the service provided, but it also has powerful learning consequences for the students or others participating in providing a service. According to Cherrington [13], service learning is a distinctively effective and satisfying method that develops the educative process for both students and communities [13]. In addition, service learning allows for the opportunity to deliberate on their experience, where students desire to achieve real objectives for the community and deepen understanding of all facets surrounding such a service.

Service learning combines experiential learning and community service opportunities. Service learning is distinguished in the following ways: curricular connections, student voice, reflection, community partnerships, authentic community needs, and assessment. Curricular connection is integrating learning into a service project, which is then coupled with student interactivity. Students have the opportunity to select, design, implement, and evaluate their service activity. Then, students' reflection of service-learning activities helps to establish dialogue and provide communication regarding the overall experience [14]. There should be balance of reflection and students should have the opportunity to develop a deeper comprehension of classroom applications. This may occur when the students are able to become active participants in the learning process, while taking the theory and utilizing it to solve problems.

Conclusion

There is a demand for technology literacy in lower social economic areas. Some people tend to avoid technology and computer utilization for numerous reasons: 1) they have never been properly introduced and instructed on computer technology utilization, 2) they have never been informed of the benefits of using computer technology for professional or personal development, and 3) they are unaware of entertainment components. However, completion of proper training will minimize the computer illiteracy issue. Since this is an area in which students may provide assistance to minimize or alleviate this and other societal issues, it gives them the opportunity to apply acquired classroom knowledge.

Technology students should participate in service-learning activities to enhance their awareness of societal needs. They may assist in efforts in fulfilling those needs and other demands by utilizing classroom knowledge to fulfill the demands of the community in such areas as technology. Such efforts enable technology to serve as a means that continues improving the quality of life for all. Service learning motivates students and it also motivates learning. Moreover, service learning can help students develop leadership skills, teach them how to be involved citizens, and give them practice in working with others.

Genuine community needs are when local community members or service recipients are involved in determining the significance and depth of the service activities involved. Well-structured assessment instruments with constructive feedback through reflection provide valuable information regarding the positive, reciprocal learning and service outcomes for sustainability and replication. Service learning is one of the most prominent school-based approaches to involving students in their community. At its best, community service learning integrates school or community-based service projects with academic skills and content, and provides opportunities for structured reflection on the service experience [15-17]. Since service learning allows students the opportunity to learn through experiences, students may develop competencies that will prepare them for the contemporary workforce. Participating in a service-learning project not only helped employees of the non-profit organization learn valuable computer applications (MS Excel and MS Access), it created a positive connection between learning and the community for the technology education graduate students.

Since technology is ever-changing, some community entities may find it challenging to stay abreast of current trends. According to Wang [15], students who participate in high-quality service-learning programs demonstrate an increased

sense of personal and social responsibility, and this was reflected in the students' project [18]. At the same time, these students showed an inspiration to learn. This translates into higher attendance rates and increased academic performance. Service learning has a positive effect on interpersonal development, student comprehension, and teamwork [19]. Students see themselves as positive contributors to their community, thus feeling they can impact the world around them. These were sentiments expressed by the technology education graduate students.

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