

# Towards Improved Student Experiences in Service Learning in Information Systems Courses

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## Abstract

The paper explores briefly past research on service-learning in Information Systems courses over the previous 15 years. One of the conclusions from this is that most of them are not founded on specific theoretical models and are mainly about sharing instructor or student experiences. Then several theoretical frameworks from Education and other disciplines and their relevance for service-learning are analyzed. As a result, several directions for future research towards improvement of service-learning in IS education are proposed.

**Keywords:** service-learning, IS education, experiential learning, active learning.

## 1. INTRODUCTION

Service-learning is an educational approach that balances formal instruction and direction with the opportunity to serve in the community in order to provide a pragmatic, progressive learning experience (Bingle & Hatcher, 1995). The recent interest in service-learning (SL) has been strengthened by the work of national organizations interested in combining service and education such as Campus Compact, American Association for Higher Education, Council of Independent Colleges, Council for Adult Experiential Learning and The National Center for Service-Learning and the Partnership for Service-Learning.

Academic programs in the Humanities like psychology, education, sociology, social work, nursing and many others have a well-established record of research and implementation of service-learning. Service-learning is increasingly applied in business disciplines as well (Andrews, 2007). Several papers appearing at the start of the century pointed to the relevance of service-learning in Information Systems (IS) programs and the opportunities for practicing it (Lazar & Lidtke, 2002; Hoxmeyer & Lenk, 2003; Saulnier, 2004). Service-learning is particularly applicable in the information systems and technology

management (IS&TM) field, which continues to grow in complexity and hence the demand for students to accumulate practical experience (Wei, Siow & Burley, 2007).

There are quite a few papers on service-learning in Information Systems published after 2003 including Hoxmeier and Lenk (2003), Preiser-Houy and Navarette (2006), Petkova (2012), Chuang and Chen (2013) and others. However, they focus only on descriptions of experiences without attempting to systematically generalize findings and present a structured view and understanding of the process. While there is a lot of research and tradition in the use of experiential learning in the disciplines of Information Systems, Computer Science (CS) and Information Technology(IT), service-learning has not taken in them yet the place it deserves. Part of the reasons for that are associated with the lack of a sufficiently comprehensive approach to guide the design and implementation of SL courses in IS or CS.

The goal of this paper is to derive a set of research directions leading to research on service-learning delivering improved student experiences in an IS program. This work is part of a larger project on analysis and improvement of service-learning in an IS program. The paper proceeds with a brief

review of past publications on service-learning in Information Systems, followed by an analysis of models and frameworks for service-learning in other disciplines and concluding with the proposed directions for research and practical work towards a comprehensive framework for design and implementation of service-learning student experience in Information Systems courses and improved student learning experience through SL.

## **2. BRIEF REVIEW OF PUBLISHED PAPERS ON SERVICE-LEARNING IN THE DISCIPLINE OF INFORMATION SYSTEMS**

Rathshwohle (2000, 2003) provides some of the first accounts of service-learning in Information systems courses. In his 2000 paper the author describes the work on several web development projects with community partners as part of an introductory IS course. This paper is followed by more narratives of implementations of service-learning in different courses. Saulnier (2003) shares his students' SL experiences in Systems Analysis and Design course. Preiser-Houy and Navarette (2006) analyze student learning and transformation of the students into engaged and active learners through a community-based research project in a web-based systems development course.

A detailed description of the planning and implementation processes of a service-learning project in an Information Systems and Technology Management undergraduate course is provided in Wei et al. (2007). More undergraduate pre-capstone service-learning experiences in web development, databases, systems analysis, software engineering and project management courses are presented by Lennox (2008), Citurs (2009), McCoy and Wimer (2010), Petkova (2012), and Chuang and Chen (2013). Some of the problems related to capstone service-learning projects are analyzed in Reinicke and Janicki, 2007.

The development of a web portal for a non-profit organization is the focus of the custom designed interdisciplinary course "Community Empowering through Information Systems and Technology", described by Lawler and Joseph (2008). Another custom designed community engagement service-learning course, based on the Ignatian Pedagogical Paradigm of context, experience, reflection, action and evaluation is presented by Tellis and Campbell (2004).

Saulnier (2004) discusses the theoretical background of service-learning, its applicability to the discipline of Information Systems, the suitability of different Information Systems courses to service-learning projects, and gives more examples of such projects. While some authors relate their service-learning experiences to particular pedagogical principles and frames (e.g. Saulnier, 2004; Citurs, 2009; Abrahams & Singh, 2010), most of the papers on service-learning in Information Systems simply aim to share educational experiences and to promote interest toward community engaged service-learning in the academic community. Hence the need for a more detailed analysis of different models, frameworks and approaches to service-learning that is going to be presented in the next section.

## **3. ANALYSIS OF MODELS, FRAMES AND APPROACHES TO SERVICE-LEARNING AND THEIR RELEVANCE FOR IMPROVEMENT OF SERVICE LEARNING**

Some of the following models like Wilcox and Zigurs (2003) are from the IS field while most are from education and other disciplines.

### **Six Models/Types of Service- Learning**

According to Heffernan (2001), there are six models for Service-Learning: (1) "Pure" Service-Learning, (2) Discipline-Based Service-Learning, (3) Problem-Based Service-Learning (PBSL), (4) Capstone Courses, (5) Service Internships and (6) Undergraduate Community-Based Action Research.

Adhering to this classification, only two of the examples listed in the previous section, namely the ones by Rathshwohl (2003) and Lawler and Joseph (2008) represent "pure" service-learning. The model of "pure" service-learning is rather suitable for interdisciplinary courses and courses within the humanitarian disciplines.

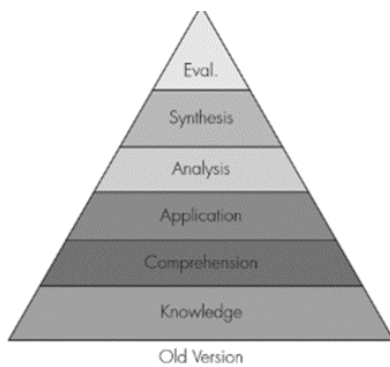
Most of the service-learning experiences reported in the IS literature are a mixture of Discipline-Based-Service-Learning, where "students are expected to have a presence in the community throughout the semester and reflect on their experiences on a regular basis throughout the semester using course content as a basis for their analysis and understanding" (Heffernan, 2001) or Problem- Based Service-Learning, in which the students' role is explained by Heffernan (2001) as "consultants" working for a "client". When offered in the final year of a program and drawing upon knowledge and skills obtained from all other

courses in this program, combined with relevant community service work, the service-learning experience is classified as a “capstone” experience.

Although very relevant to information systems education, and widely represented in the literature, Service Internship as a model of service-learning is outside the focus of this paper and will not be discussed here. The last model of service-learning, Undergraduate Community-Based Action Research, which is somewhat similar to an independent study if it involves active engagement of a student with the subjects of his/her study, is a relatively new approach for IS education and to the best knowledge of the author there are no published examples in IS or CS of this type of service-learning.

**The Classics: Bloom’s Taxonomy and Kolb’s Experiential Learning Model**

The widely popular Bloom’s taxonomy of learning (Bloom et al., 1956) is used by many educators today to promote active learning, to set up learning objectives and to assess the learning achievements of their students (see Fig.1).

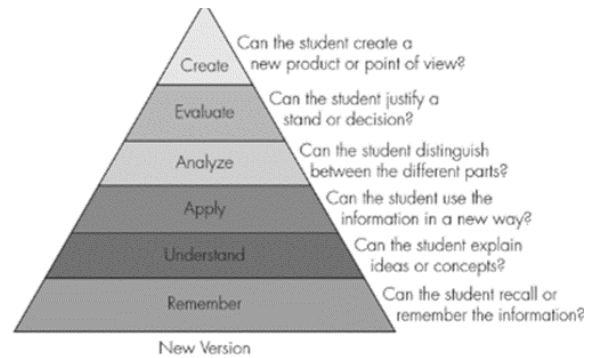


**Fig.1.** Bloom’s Taxonomy- old version (based on Bloom et al., 1956)

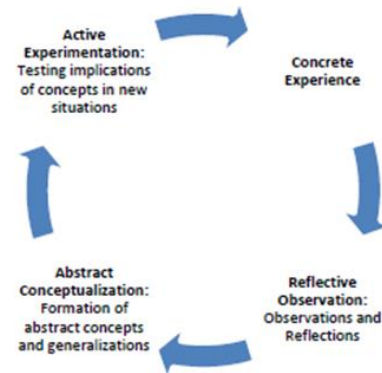
In the new improved version of Bloom’s taxonomy (see Krathwohl, 2002), the six hierarchical levels of learning-knowledge, comprehension, application, analysis, synthesis, and evaluation are transformed into Remembering, Understanding, Applying, Analyzing, Evaluating and Creating (see Fig.2). Such naming is probably more suitable for reflecting the sophisticated learning processes taking place in the information systems classroom. More empirical evidence is needed however to justify that conclusion.

Since service-learning is a subset of experiential learning, it is not possible to understand the processes of service-learning without knowledge

of Kolb’s experiential learning model (Kolb, 1984). In this model, students obtain real, concrete knowledge, observe and reflect on their experience, generalize what they learned, and actively experiment in new situations (Fig.3). By following Kolb’s experiential learning model instructors can design service-learning projects that could help the information systems students to move successfully into handling tasks at the highest advanced levels of Bloom’s taxonomy and to be ready for employment in the real world.



**Fig.2.** Bloom’s Taxonomy- new version (after Krathwohl, 2002)



**Fig. 3.** Kolb’s Experiential Learning Model (after Kolb, 1984)

Some of the authors mentioned in the second section of the paper position their theoretical understanding of service-learning pedagogy on Bloom’s Taxonomy and Kolb’s Experiential Learning Model (Citurs, 2009; Abraham, 2010; Petkova, 2012; Chuang & Chen, 2013) and roughly follow the four steps (phases) of Kolb’s model, but some of them move a step beyond and modify it in order to make it more suitable for the purpose of designing service-learning courses.

Borrowing from Kolb (1984), and based on his e-Commerce service-learning course, Abrahams and Singh (2010) propose a replicable model for

experiential learning (see Fig.4). The model facilitates attainment of the learning levels defined in Bloom's Taxonomy and consists of six steps: Identify, Assess, Deploy, Implement, Evaluate and Revise. Documentation and Project Management are important in every step and they are also included in Abrahams model.



**Fig.4.** A Replicable Experiential Learning Cycle for Information Technology Students (after Abrahams & Singh, 2010)

Although good for understanding the basic pedagogical principles of service-learning, Kolb's model of experiential learning and Bloom's Taxonomy are not sufficient to be used on their own as tools for design of service-learning projects. The complexity of the learning environment needs the inclusion of additional elements in the models.

### Inclusion of Roles, Techniques and Deliverables

Wicox and Zigurs (2003) borrow from agile methodologies and concepts for systems development projects and apply them to the field of service-learning in order to create a new service-learning method. Their method includes phases, techniques, deliverables, roles, and an underlying philosophy. In any educational situation stakeholders are very important, but in service-learning apart from students and instructors, the community also has very important role. This is why the explicit underlying philosophy of the proposed method for service-learning is that the stakeholders drive the process and success of the project.

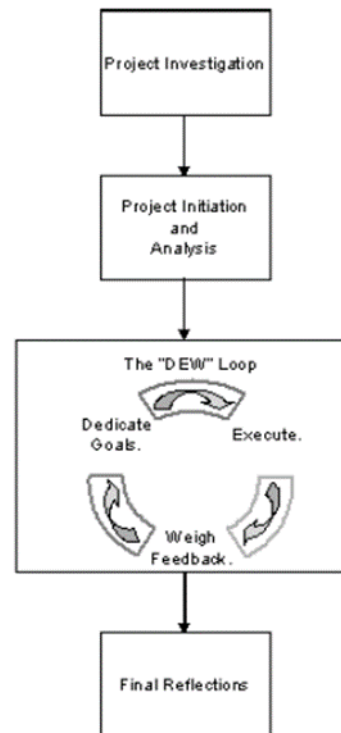
The Wilcox and Zigurs method consists of four phases: Project investigation, Project initiation and analysis, "DEW" loop (dedicate goals, execute and weigh feedback) and Final reflections. Their paper provides also examples of possible techniques used in the different phases and deliverables (the results of carrying out of various techniques).

### Inclusion of Communication Flows

Wei et al. (2007) improve on the previous model (method) of service-learning by including communication channels and information interchange between the students, educators and clients' community (see Fig. 6).

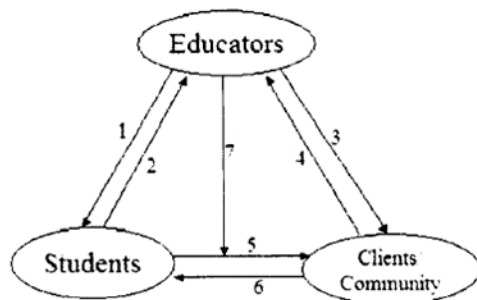
The authors of this paper identify the following information and communication channels:

1. Educators design content and provide structured reflection opportunities
2. Students think and conceptualize knowledge
3. Educators contact clients for feedback
4. Clients send feedback to educators about students' performance
5. Students work with the community/clients
6. Clients provide requirements details and feedback to students
7. Educators coordinate students and clients



**Fig. 5** Phases of a Method for Service-Learning Projects (after Wilcox & Zigurs, 2003)

The overview can be used for the generation of research directions to improve student experiences in service-learning in Information Systems which are discussed next.



**Fig. 6** Information and communication channels between students, educators and community (after Wei et al., 2007)

#### 4. ON POSSIBLE RESEARCH DIRECTIONS ON SERVICE-LEARNING IN INFORMATION SYSTEMS PROGRAMS

The previous analysis of service-learning in IS education was mainly concerned with course level evaluation of SL. It seems that dedicating to service-learning just one or two courses in an academic program will not provide the needed transformation of IS education towards greater role of service-learning. Another conclusion is that a single experiment of a new idea on service-learning in IS at a particular university is not sufficient to transform SL in an academic program or the discipline of Information Systems. Hence the motivation for the following possible directions for research on service-learning in IS education and practical steps towards improved student experience:

- What kind of model/type of service learning in Hefferman's typology is better suited to IS courses on the basis of delivered improvement of the measured quality of student learning?
- Drawing on the interactive nature of the IT profession establish cases and gather evidence on the usefulness of applying the model of action research in IS service-learning courses.
- Gather evidence on the effectiveness of the new form of Bloom's taxonomy of learning for promoting better service-learning in IS courses.
- Analyze empirical evidence on forms of documentation of students' concrete experiences in SL courses along the stages of Kolb's learning cycle.
- Gather and analyze empirical evidence on the effectiveness to SL in IS courses of any modifications of Kolb's learning cycle, including Abraham's replicable experiential learning cycle.

- Compare the effectiveness in IS education of the Abraham's replicable experiential learning cycle and Kolb's learning cycle.
- Explore and propose ways for documentation of evidence on student learning in IS education not just in single courses but at program level as well through appropriate assessment methods for student-learning at program level.
- Organize special streams on service-learning in IS education at specialized conferences and seek further ways for institutionalizing research on SL in IS education within the IS and related computing disciplines.

The above research directions are quite broad in nature but they can be flexibly modified within the environment of a particular academic program if necessary.

#### 5. CONCLUSION

The paper was motivated by the lack of comprehensive frameworks guiding the design and implementation of service-learning courses in an Information Systems program. It provided an overview of the scarce previous published research on SL in IS education and on any other models or frameworks that were proposed in the past to support service-learning. As a result a small set of proposed research directions on SL in information systems was proposed. Some of those might be ambitious but they are not impossible given the noble goal that is pursued – improved student experiential learning in Information Systems. They require coordinated effort by many individuals in small realistic steps towards the improvement of SL in Information Systems education.

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