

Service-Learning Panel

(Presented May 30th, 2013 ACMS Conf., Bethel U.)

Panelists: Dave Klanderman, Josh Wilkerson, Maria Zack

Moderator: Karl-Dieter Crisman

This panel session is an opportunity for faculty to learn a little bit about service-learning and hear from some examples of its use by colleagues.

1 Introduction

What is service-learning? A service-learning component (of a course) is an educational activity which¹:

- Renders some kind of useful service to society (typically a non-profit), and
- Provides a useful learning opportunity for the students involved, in close conjunction with the curriculum.

This can happen in contexts ranging from optional regular service to a required group consulting project.

There are many benefits to having such experiences. Naturally, there may be an institutional directive! However, there is also some documentation of this enhancing higher-order learning, and establishing a good bond between the university and the community (including good press). For the present context, the imperative for service in Christian thinking is a typical rationale, as well as the connection to enhancing student self-perception of moral development.

However, there can be barriers. Charles Hadlock of Bentley University says, “Unfortunately, the mathematical sciences are sometimes perceived as having a more difficult task to incorporate service activities in the curriculum.” This is substantiated by an anonymous professor in an online survey otherwise not about mathematics: “I can think of no service projects in the community that will enhance student learning of the abstract reasoning skills they should be learning in mathematics.” Though the panelists might disagree with this, the fact remains that there are few places where multiple service-learning ideas for collegiate mathematics are put together in one place (though there are scattered references elsewhere). Hence the need for our panel talks.

- MAA book: “Mathematics in Service to the Community”, ed. Hadlock.
- A website of talks from the 2011 Joint Meetings
<http://www.math-cs.gordon.edu/~kcrisman/SLTalks/>
- There is a forthcoming PRIMUS issue on the topic
- The Campus Compact website has a (very) few ideas

2 Statistics in Service – Josh Wilkerson

The purposes of this project, done with high schoolers taking AP Statistics in Texas, was to help a non-profit service agency. This required survey research for program evaluation or client needs assessment, which was identified by the class.

Students participated in a group providing the following four services:

- Meeting with agency and developing a survey instrument
- Conducting a survey
- Compiling and coding the data
- Analyzing the data

¹cf. Charles Hadlock

One important aspect of this project was that students were under the command of the service agency, but the teacher was *not* in the direct chain of command, serving more as an outside consulting facilitator.

The project was a great success. A member of one group wrote an article for a local newspaper; this group analyzed the differences between volunteer efforts and county-provided resources in responding to a devastating set of wildfires. The fact that this topic was chosen by students helped truly pique student interest. For the same reason, student professionalism and ability to engage the community was improved and stretched. The survey was a tool for real interaction.

However, at the same time survey development and analysis cemented the importance of statistics; this was a real-life scenario, allowing for deep connections to the course material that could not have been achieved without such a project.

3 Serving the Institution – Maria Zack

At Point Loma Nazarene, every student engages in some sort of large, year-long senior project as part of the graduation requirements. Many of them end up doing a significant service project, using real data analysis and mathematical organization skills. In this event, students are divided into teams.

These projects often serve the institution by taking institutional data and helping out where the institution does not have enough resources to adequately make use of the data they acquire for reporting and other purposes. Some typical projects include the following:

- Analysis of chapel attendance patterns
- Development of undergraduate curriculum for CS ‘service’ courses
- Analysis of student retention data
- Creation of a website showing laptop specs for incoming students
- Using GIS to help the Admissions Department refine recruiting efforts

As one can see, this is a wide variety of projects. The cooperation of faculty and staff from all over campus is crucial for implementing something like this. At best, one has full buy-in from both the constituencies on campus desiring help, *as well as* from the faculty in the department itself. Mentoring these projects is time-intensive and requires at least some load for an instructor for the course.

For the students, many skills are developed and required. They engage in research – asking questions, finding details – and turning these very same questions into problems. More specific skills may include managing data (perhaps via databases), analyzing data, and representing it graphically. Finally, the key skill of producing *reporting* material is also achieved; these may take many forms.

4 Trinity Math Triathlon – Dave Klanderma

Trinity Christian College has been offering a Math Triathlon as a community outreach event for fifteen years. It has turned out to be an excellent opportunity for service-learning in a number of different courses as well, providing a nice glimpse into the intersection of outreach and service.

For most of its time, the triathlon has been an event for late middle school (grades 7 and 8) – see <http://tcc.trnty.edu/mathtriathlon/>. It primarily focuses on local Christian high schools and homeschool groups, but this is not essential to the running of such an event. It consists of individual events, team events, and so-called ‘relay’ events for the various teams. In addition, to facilitate grading time for the organizers, there is a more open-ended halftime activity.

Note that the website above has information about *all* Triathlon materials (past year events, performance statistics, sample halftime activities, etc.)! More recently, the triathlon has been expanded to an event for students in grades 3-6.

There were many different service-learning components. The most immediate one was in a special January term course for mathematics and math education students; these students design and implement the entire event! Needless to say, this was a very useful learning experience, and had huge amounts of service.

However, there were many other opportunities for service. Elementary education majors were able to obtain field education hours, and created the halftime activities (such as ‘Human Connect 4’). Some of them also created some of the problems, as the grade levels were not so far off. In an upper-level probability/statistics course, students did more in-depth analysis of item difficulty and the performance of each participating school and group – useful both for the host and the participating schools.

One interesting aspect was with last-minute ‘volunteers’ from courses not as directly connected, such as Calculus II. These students provided reflections on the experience and connections, for extra credit. However, it was typically only the students *also* enrolled (not necessarily concurrently) in one of the other courses serving this event who did indeed see connections with the material; this is an important point to note in general for service-learning – that it can be hard to explicitly connect the service with the learning. But in general the students made clear connections and felt part of a team putting on the event for the community.