Methodology Paper—Final Exam, part-1 of 2

Measures to Significantly Improve the Quality of My Class Community Project

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INTRODUCTION

BACKGROUND

Two years ago, Norco College signed an agreement with Loma Linda University (LLU) Medical Hospital (LLUMH), permitting us to send externs to LLU for two of our semesters, encompassing four of their quarters. Our capstone, student externs, who participated, have now graduated from Norco College. With gratitude, Norco College presented LLU with an award plaque at our annual Industry Summit, and breakfast, recognizing and thanking them for partnering with us in the externship project which was a tremendous success and learning opportunity for our students. Now, we wish to take our relationship to the next level. In so doing, we wish to create a bilateral Service Learning (SL) project to support our Inland Empire community, and give hope and support to local amputees within our service area. To this point, we have not had a suitable platform to support this SL project. Now, we believe we have the means to move forward, because of confluence of supportive circumstances and timely opportunities.

FUTURE SUPPORTIVE FRAMEWORK AND DESIRED DIRECTION

LLU wishes to send us several of their Master's candidates for their Service Learning (SL) projects, required in their program. We wish to send our capstone SL students to LLU for cross-training with their institution, and resident students at LLU. The LLU Orthotics and Prosthetics (O&P) Department is where our students would meet during their class times. Our Engineering Design Lab is where their SL students would be working at Norco College. LLU students may also be accompanied by patients who are missing limbs, to be measured or

optically scanned, and/or even speak to our classes, as well as to organized Q&A forums on our campus. Our capstone SL students are all members of the Science, Technology, Engineering and Math (STEM) Club, which is also comprised of volunteer students for other Science and Engineering courses, and their club advisors. They would perform Engineering design of the prostheses for amputees. Those designs would then be sliced into 3D printable layer-files, and exported to the 3D printers (Fusion Deposition Modeling machines (FDM)). The STEM center has already offered to buy us two new FDM machines through their grant, to replace our two non-working FDM 3D printing machines. At my behest, our Department Chairperson accepted the STEM grant offer for us. We hope to use those machines to fabricate our student designs, so they may be used to fit upper limb prostheses to the patients. Final fittings would probably be fine-tuned at LLU. This reciprocal arrangement would involve our capstone students who would also be fulfilling their SL requirements for graduation from Norco College. Even though the STEM Club would provide the meeting venue for LLU SL students, the Engineering Labs are where they would meet, under the supervision of our staff and faculty. I would lead the team that directs their daily activities at Norco College, as well as coordinate activities with LLU.

LLU wishes to provide patients, SL students, and Biological expertise; Norco College wishes to provide space for LLU SL students to work with our Engineering Design students and STEM Club members, working under the supervision of our rotating team of participating professors. We plan to provide access to our Engineering team who would be using the new FDM machines to 3D-print the custom-designed prostheses for LLU students to fit onto the participating amputees. This seems to be a perfect fit between our institutions, because LLU students have Biological tools and knowledge that most of our students' lack; while Norco College has the Engineering tools and knowledge that LLU student lack. Together, we will

make up a complete team that can perform all the needed aspects of Bio-Engineering theory, measurement, design and fabrication tools and knowledge, as well as fitting them to each patient. And, Norco College students would benefit from having an application-specific need for their engineering expertise that is normally missing in a purely academic environment. The community would conceivably benefit from becoming more sensitive, and integrated, even bonded through better mutual understanding and cooperation. The STEM Club members would enlarge the footprint of the number of students affected by the bilateral exchange of our six SL students.

GOAL

The exact details of how this class community project will best work is still largely undefined. However, through development and refinement of this research methodology and eventual implementation, I hope to answer the question: **"How can I significantly improve the quality of my class community project?"** given this conceptual framework, opportunity, and the newly available resources. My dean also wants to increase awareness within the community of what we are doing, by maximizing the footprint of affected people, including students who become involved. For this, it has been mentioned that the Press-Enterprise Newspaper could cover many of our events. So, I have defined my primary goal; and, my dean has defined his—he wishes to magnify that with the greatest reach possible, to magnify our effect, for the same opportunity cost (the biggest bang for the buck).

METHODOLOGY

My methodology will consist of: a literature review; a draft of guidelines; the data from experts; the analysis of data; and a rewrite of guidelines.

LITERATURE REVIEW

Given the time constraints, I will begin with a review of the literature on the ERIC database for Education. It is always more efficient to review what others have done before launching off in pursuit of a similar goal. After all, there is no benefit to redesigning the same wheel that others have already designed. Plus, they may have already thought of issues that I have not even begun to reveal. I can learn from others, who may have had more time and resources to expend on a project such as mine.

I will search ERIC for many peer-reviewed, scholarly journal articles, to find the most appropriate matches to what I have outlined. Before choosing a topic from the list, I did a preliminary search of ERIC, and found many matches for similar topics, so I know that it is a target-rich environment. In filtering the ERIC database for, "3D Printing," I found 57 articles. Under the search phrase, "Service Learning in Higher Education," I found 19,670 articles. I found 124 articles related to the word, "prosthetics." And, I found five articles with the combination of, "Service learning AND 3D Printing." Because of the wealth of available articles, I chose the question related to the improvement of a class community project.

DRAFT OF GUIDELINES

After showing our Literature Review articles to our experts, and this methodology paper, we will individually ask our experts some of these many questions, such as: "Based upon your experience working with Service Learners, how can we maximize the quality of this class

community project?" "What aspects of 3D printing do you believe should be cross-taught to LLU students, and how much do you thing Norco students should control, and why?" "After reading the literature review articles, can you think of more effective ways to increase the quality of this community project?" "If we require reports be given orally, as well as in writing, by each SL student, do you believe it would increase the quality of work on this project?" "What things have you done to increase the quality of community projects in the past?" "How much cross-training of the biological aspects should be shared by LLU students with respect to Norco College students, and why?" "How do you think we could harness the power of Q&A sessions with the amputee volunteers to increase community awareness and sensitivity to disability issues, thus increasing the impact and quality of this program?" "Do you believe that involving the local news organization could both increase the reach of this information within the community project, and at the same time increase the quality of it—because the participants will know that more people will be watching?" "How can we use the disabilities of the amputees be harnessed to create a more empathetic, more understanding, and a more inclusive community—perhaps, through Q&A forums that you could define?"

As we prepare to implement this research project, later, we will also gather information from our experts in one group, rather than just one-on-one sessions, to discuss these questions, and to generate additional ideas that could improve quality of this community project. Later, we will integrate those ideas into these guidelines, as we gain valuable insights.

DATA FROM EXPERTS

I chose the same five experts that I chose before, after each of them expressed willingness to help me more in the future. I took this as a green-light to extend their participation to this

project. And, my chosen experts are these, along with the rationale I used for choosing each: my experts were comprised of four, Career and Technical Education (CTE) professors, three with Master's degrees; and two with PhDs. One PhD is the dean of my college counseling center. The other PhD is a tenured professor at CSULA and is an adjunct faculty at my school. Each of the other CTE professors I interviewed had over a decade of experience teaching college students, such as mine. One of these three was a Professional Engineer (PE) in the field of Supply Chain Technology (SCT), and specialized in automated systems and robotics. Another CTE professor taught Engineering Drafting, and was formerly a designer and manager for a robotics company. My final CTE professor taught at another community college where I was an adjunct instructor for 17 years. She holds a M.S. STEM-Ed, CTE and teaches in the Electricity/Electronics Department. Each of my experts worked in industry prior to becoming a professor. They all communicated well and were not shy in voicing their opinions. They served on multiple college committees with me in the past, which is one of the reasons I chose to invite them to participate as my experts. They were very personable and had been very helpful in my previous interactions with them. The dean of the counseling office holds a degree in counseling, and was previously the dean of Disabled Student Services, and Programs (DSPS). She had 11 years of experience with DSPS, and 7 years of experience as the dean of our counseling department. She is very personable and helpful; and, while very tactful, she expresses her opinions honestly and easily. When I asked them for help on this project, each of my experts eagerly supported me and set time aside to help me, and they offered to extend that help to future projects, such as this.

ANALYSIS OF DATA

Our data is comprised of the information from our Literature Review, as well as the feedback, and suggestions from our team of experts, in consensus, tempered by the knowledge of available time and resources, and our sense of logic. This is where all that information fuses together with the hope and promise to increase the quality of our community project. However, if some criticisms are unreasonable, or suggestions would be too costly, in terms of our scarce resources, we may choose to ignore those, especially if they come from just one or two of our experts, and not by consensus of the group.

Once we have collected all the data from the various sources, we will analyze it to see what patterns of agreement or disagreement emerge. This phase should take only about 10 days to accomplish. If anything is unclear, we will seek clarification, so we can be guided by clear direction. Our guidelines will be modified to adjust for any group consensus that has at least 60% agreement, if it is within our time and resource budget to integrate, and sounds logical.

REWRITE OF GUIDELINES

Based upon logic, 60% consensus of our experts, our literature review, and available time and other resources, I will rewrite my guidelines to include those additions, deletions, and other modifications. So, the guidelines are part of a living document that will continually be updated for improvement, in an iterative process, with the stated goal in mind.

CONCLUSION

I expect that this research effort positively, and effectively answers my initial research question of, **"How can I significantly improve the quality of my class community project**?" within the given constraints.