Issues and Concerns Arising from Research Collaboration Among Civil Engineering Students of De La Salle University and Central Philippine University in the Philippines

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ABSTRACT

This paper is an assessment of the outcome of research collaboration between 4th year De La Salle University (DLSU) Civil Engineering students major in Transportation Engineering and 4th year Civil Engineering students of Central Philippine University (CPU), Iloilo City. Specifically, it aims to identify issues and concerns in terms of time, communication, computation knowledge and tools, and logistics/resources during the research collaboration process, gather feedback from those involved and recommend improvements. Three undergraduate thesis groups from DLSU-Manila composed of eleven (11) students and four (4) groups from CPU-Iloilo City composed of twelve (12) students were asked to rate the research collaboration between the institutions as the students worked together under the guidance of their thesis advisers from both universities. Out of the original four (4) groups composed of twelve (12) students from CPU-Iloilo City, only two (2) groups involving six (6) students were able to conduct studies on transportation engineering. The data gathered by two other groups were utilized in the completed research of both institutions. The collaboration has helped the student groups from both institutions to finish their civil engineering projects on time. It has provided opportunities to help a local community as well as disseminate information to other communities through the presentation of the research papers in national and international conferences. Overall, the research collaboration was considered successful.

Keywords: student research collaboration, transportation studies, undergraduate thesis

Introduction

Few civil engineering schools in the country require students to make a research paper or thesis to apply the theories and engineering models learned from four to five years of undergraduate course. Other civil engineering institutions require students to make a project study with emphases on the design of a civil engineering structure, to apply structural design principles and to address the need for that structure.

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This research paper discussed what transpired after one year of research collaboration in the field of transportation engineering between DLSU-Manila and CPU- Iloilo City. The objective of this study was to assess the outcome of this research collaboration between the civil engineering departments of DLSU-Manila and CPU-Iloilo City. Specifically, it aimed to identify issues and concerns during the research collaboration process and to gather feedback from those involved to improve the research work collaboration between the two schools.

A total of three groups of thesis students (11 students in all) from DLSU-Manila and four groups of students (total of 12 students) from CPU-Iloilo were involved in this collaboration.

The civil engineering department of DLSU-Manila belonged to the first group, while the civil engineering department of CPU-Iloilo formed the second group. This disparity, however, did not hinder the two departments from collaborating and conducting research in the field of transportation planning and engineering with Iloilo City as the area of study.

Many previous studies have been done about research collaboration, especially between the university and industry. Frame and Carpenter 1979, (International Research Collaboration) and Katz and Martin 1997 (Research Policy) tried to measure research collaboration through co-authorship. Lee (1996) examined the emerging 'technology transfer' that the US academics play in industrial innovations. A paper by Uden et al. (2007) mentioned about the need to pool experts and resources to maximize research collaboration between universities.

The degree of Bachelor of Science in Civil Engineering (BSCE) is offered by CPU and DLSU-Manila. However, DLSU-Manila offers this course with five different majors, namely; Structural Engineering, Construction Management, Water Resources, Geotechnical Engineering and Transportation Engineering which deals with transportation systems engineering and planning, land use and transportation interaction, urban planning studies, and the traditional planning process of trip generation, trip distribution, modal split, and traffic assignment. CPU, on the other hand, offers no specialization.

In DLSU-Manila, the regular senior students in the civil engineering department do their thesis in each of the three trimesters in the 4th year. The students enroll a 1-unit thesis course per trimester. The first-trimester offering is THSCIV11-Project Study 1. The second-trimester is THSCIV12-Project Study 2, and the third-trimester is THSCIV13-Project Study 3, for a total of 3 units. On the other hand, CPU-Iloilo senior students enroll their project study during the 2nd term of their fourth year namely: Engr. 422 – Methods of Research (1 unit) and 1st term in their fifth year, CE 5102 – Civil Engineering Project (3units) with a total of 4 units for the project study. Therefore, both institutions require BSCE students to have civil

engineering projects before they graduate.

Methodology and Discussion of Results

A Visit to Iloilo City

The senior students from DLSU-Manila visited Iloilo City for two days only last September 2011. Upon arrival, these students from DLSU-Manila immediately met with CPU-Iloilo senior students to discuss the procedures for collection of data. Before this, several e-mail exchanges between the faculty advisers were made to formulate possible titles for the collaborative researches and to schedule the time most convenient for the data gathering of both parties.

Figure 1. DLSU-Manila and CPU-Iloilo Students and Faculty Advisers Involved

Research Collaboration Output

From DLSU-Manila, three research groups composed of eleven (11) students were able to finish on time and defended their undergraduate thesis. The research titles and corresponding authors were shown in Table 1. From the original four (4) groups composed of twelve (12) students from CPU-Iloilo City, only two (2) groups involving six (6) students were able to conduct researches on transportation engineering. These two (2) groups completed their researches on the 1st Semester AY 2012-2013.

Table 1
DLSU-Manila Undergraduate Thesis Conducted in Iloilo City

Proposed Thesis Titles	Student Authors	Remarks
A Proposed Circulation System for the Old Calle Real Iloilo	Adrian Alarcon, Angelica Christine Ongkinco, Juanito Dator III, Hector Lemmuel Macapagal	The three groups successful defended and finished their undergraduate thesis on time
Establishing the Vehicular Speed-Density-Flow Relationships along Selected Primary Roads in Iloilo City	Keane Gregory Landoy, Miguel Antonio Pena, Joselito Luis Pabiton	
Proposed Scheduling Scheme for Public Transport in Iloilo City	Angelo Dominic Dumalus, Anezka Bianca Go, Ray Geynil Samonte	

However, the data gathered by the two other groups were still utilized in the completed research of both institutions. The research titles with corresponding authors are shown in Table 2.

Table 2
CPU-Iloilo Undergraduate Thesis Conducted in Iloilo City

Proposed Thesis Titles	Student Authors	Remarks
Proposed Parking Facilities for the Heritage Site in Iloilo City	Paul Vincent Lacson, Razel Davila, Jolly Mae San Luis	Also Involved in the data gathering were six other CPU BSCE students, namely: Alvin Cabangal, Glenn Estenor, Shiela Faldas, Angelo Somcio, Raymund James Leganio and Jude Gonzales
A Preliminary Study on the Service Operating Characteristics of Jeepneys in Iloilo City	Kristian John Carvajal, Cel John Crisostomo, Faye Marie Francisco	

These researches were presented by the students in national and international conferences. The titles and the student members are listed in Table 3.

Table 3
List of Papers Presented in International and National Conferences

Paper Titles	Student Authors	International/ National Conference/ Venue/Date
A Proposed Circulation System for the Old Calle Real Iloilo	Alarcon, Ongkinco, Dator III, Macapagal (DLSI-Manila)	• Student Conference on Transportation Research/ DLSU-Manila /March 10, 2012 • 2012 Asian Transportation Research Society (ATRANS) Student Symposium/ Bangkok, Thailand/ August 24, 2012 • Transportation Science Society of the Philippines (TSSP) Annual Conference/ Panglao, Bohol/September 28, 2012
Establishing the Vehicular Speed-Density-Flow Relationships along Selected Primary Roads in Iloilo City	Landoy, Pena, Pabiton (DLSU-Manila)	• Student Conference on Transportation Research/DLSU-Manila/March 10, 2012 • 2012 Asian Transportation Research Society (ATRANS) Student Symposium/Bangkok, Thailand/August 24, 2012
Proposed Scheduling Scheme for Public Transport in Iloilo City	Dumalus, Go, Samonte (DLSU-Manila)	• Student Conference on Transportation Research/DLSU-Manila/March 10, 2012
Proposed Parking Facilities for the Heritage Site in Iloilo City	Lacsao, Davila, San Luis (CPU-Iloilo)	• Student Conference on Transportation Research/ DLSU-Manila /March 10, 2012 • 2012 Asian Transportation Research Society (ATRANS) Student Symposium/ Bangkok, Thailand/ August 24, 2012 • Transportation Science Society of the Philippines (TSSP) Annual Conference/Panglao, Bohol/September 28, 2012

Therefore, four types of researches were presented in two national conferences while three researches were presented at an international conference. Only one group from CPU-Iloilo was able to present in two national and one international conference. In the case of DLSU-Manila, two groups were able to present in at least one national and one international conference.

Feedback from Students Involved

There were twelve (12) students from CPU and ten (10) of the eleven (11) students from DLSU who gave feedback on the collaboration. A questionnaire survey was conducted with the students involved in the research as respondents.

The following were summarized answers of CPU and DLSU students based on the questionnaire survey.

1. What were the problems and issues that you encountered during the research collaboration, especially during your research?

Responses from CPU Students

a. Time
   - The two-day stay of DLSU students was not enough to gather the massive data required for the research. The CPU students gathered the missing data.
   - There was still a problem with the availability of CPU students and the time required to gather accurate data.
   - Moreover, the students also did not have ample time to work comfortably together especially during the data gathering process.

b. Communication.
   - There were errors in the data gathering procedures, thus, the need to repeat collection of data.
   - The two-day stay was not sufficient to adequately connect the students from the two universities.
   - During the computation of results, there were also some miscommunications in the computation procedures.
   - Some CPU students were not aware of what was required of them. They did not know where to use the data they gathered about their specific researches.

c. Computations Knowledge and Tools
   - CPU students cannot analyze and appropriately interpret the results of their gathered data because of the lack of knowledge on computations and also use of computer software in transportation engineering.

Responses from DLSU Students

a. Time
   - The time allotted for the data gathering was quite short.
   - Limited planning and preparation to be familiar with the place. Limited time to familiarize with jeepney routes and the road network of Iloilo City
   - Six out of 10 mentioned this in their comments

b. Communication
   - Miscommunication with other students due to the differences in dialect
   - There is only one-way communication because CPU students cannot comprehend the instructions coming from their DLSU group mates.
   - Clarity of instructions in the data gathering since some data (like street names) was not obtained

c. Logistics/Resources
   - Few people conducted the data gathering
   - Difficulty in delegating the work to be done

2. Do you have any suggestion on how we can further improve and strengthen the research collaboration between DLSU and CPU?

Responses from CPU Students

a. Improve communication between the students and advisers
   - The communication between the students can be improved by conducting a one-day team-building activity. Team-building can be done during the yearly annual visit of CPU 4th year students to DLSU-Manila in their subject Inspection Trips and Seminars where in March CPU students visit Manila and nearby provinces at civil engineering related companies and institutions.
   - An internet group forum must be created and regular scheduled meetings must be conducted.

b. Conducting more researches in Iloilo and nearby provinces
   - Is a sure way to improve and strengthen research collaboration to continue the partnership or linkage between the two schools.

c. Management of Time and other Resources
   - Briefing and preliminary research titles must be provided beforehand.
   - Documentation must be kept by both parties. These documents include forms, data collection procedures, computations, and so forth.
   - Individual student roles must be defined from the start of the research collaborations.
   - A calendar of activities and list of contact persons must be created and provided for both parties.
   - Commitment, the delegation of work, more systematic procedures must be agreed upon by both parties.

Responses from DLSU Students

a. More time to plan and conduct data gathering
   - DLSU students should stay longer in Iloilo City to be familiar with the place and to gather data
   - Those involved should have met earlier to plan and discuss the data gathering in order to be prepared during the data gathering
   - More trips going to Iloilo for the data gathering and CPU

students can also visit DLSU to discuss the research
- More time to meet the students from CPU and get to know them
- More hands-on practice with the data gathering method

b. Improve communication between DLSU and CPU groups
- More communication between DLSU and CPU students like face-to-face meeting with the students using skype
- If possible, the members from DLSU and CPU have talked already before the actual data gathering
- Create an interaction program for the DLSU students and CPU like Yahoo groups or Facebook
- Students with CPU should be more confident to suggest ideas

c. More research collaboration between the two schools
- There should be more research projects to best strengthen the collaboration between the schools.

3. Aside from finishing your undergraduate research, what did you gain from this research collaboration?

Responses from CPU Students

a. Appreciation of the civil engineering profession
b. How to deal or work with people / team player / cooperation / gain friends
c. Build up non-technical skills such as self-esteem, confidence, patience, and decision-making skills.
d. Acquire sound knowledge of research methodologies
e. Improve technical writing abilities
f. Appropriately respond to criticisms and give constructive feedback
g. Opportunity to participate in local, national and international conferences

Responses from DLSU Students

a. Ability and knowledge in data gathering improved
b. Know more people and gained friends, students from CPU were very hospitable and friendly
c. Once in a lifetime opportunity and experience
d. Developed resourcefulness, common sense, and interpersonal skills
e. Learn ideas and feedback from others
f. Enjoyed vacation and fun
g. Improved leadership and ability to work with others
h. Gained insight/perspective from other students and their research
i. Ideas about how transportation engineers conduct research
j. Exposed to the culture of Iloilo City.

4. Would you recommend this research collaboration to the junior civil engineering students who are about to do their undergraduate research/thesis and why?

All students with CPU answered affirmatively to this question with the following opinions about the research collaboration:

a. It provides an opportunity to explore the different fields of civil engineering and appreciation of their future profession.
b. It helps to make students understand how to conduct researches.
c. It develops one's non-technical skills such as self-esteem, confidence, decision-making, team playing, and personality as a whole.
d. It provides an opportunity to be presented at conferences locally, nationally and internationally.
e. The two different schools with different cultures can share their knowledge and resources to turn ideas into reality.

All students from DLSU also answered affirmatively to this question for the following reasons:

a. To gain experience in researching a new place and is more interesting
b. It promotes camaraderie with thesis mates and fellow student researchers.
c. The research collaboration will save much effort, time and even expenses in data gathering
d. This kind of research will help them realize the value of hard work
e. Learn how to delegate and manage time properly since everybody has a task to do
f. With collaboration, there will be more workforce in data gathering, and there will be sharing of knowledge and ideas
g. Great opportunity and places outside Metro Manila need studies for the improvement of its transportation. We should give focus to these areas for the betterment of the whole nation.

All students from CPU (12 students) and DLSU (10 students) were asked to rate the research collaboration at a personal and group level. This is to evaluate the influence of the collaboration on the individual student and also on the institutions. The results of the evaluation with 5 (highest) and 1 (lowest) are shown in Table 4.

As reflected in Table IV and also as shown in Figure 2, the rating of CPU students at the personal level were slightly higher than that of DLSU students. These include ratings on developed confidence in research, improved interpersonal relations and increased skill and ability to conduct research. While on a group level, the ratings of DLSU students was a bit higher than that of CPU students. These include ratings on the helpfulness of faculty and students, the sharing of data and research materials, the extent of communication between groups and the success of the research collaboration. The differences in the ratings were not that significant between the groups. Notably important was that "constant communication" got the lowest rating since limited communication was going on between the two student

groups. This communication gap could be influential in the decision of the two groups from CPU to change their research topics. However, necessary data were still gathered and provided by those CPU students to their DLSU counterparts to complete the latter's researches.

Table 4
Rating of Students Regarding the Effect of the Research Collaboration

	School	Rating					Ave.
		1	2	3	4	5	
Personal Level							
1. Increased my skill and ability to conduct research	CPU				(5) 41.67%	(7) 58.33%	4.58
	DLSU			(3) 30.0%	(4) 40%	(3) 30%	4.00
2. Improved my interpersonal relations with a group especially data gathering	CPU				(5) 41.67%	(7) 58.33%	4.58
	DLSU			(2) 20.0%	(3) 30%	(5) 50%	4.30
3. Developed confidence in my research capability	CPU				(6) 50%	(6) 50%	4.50
	DLSU			(1) 10.0%	(6) 60%	(3) 30%	4.20
Group Level							
1. Faculty and students from both schools are helpful and shared a lot in terms of data and research materials	CPU			(1) 8.33%	(7) 58.33%	(4) 33.33%	4.25
	DLSU		(1) 10.0%		(3) 30.0%	(6) 60.0%	4.40
2. There was constant communication and collaboration through the course of the research	CPU		(1) 8.33%	(6) 50.0%	(2) 16.67%	(3) 25%	3.58
	DLSU		(2) 20.0%	(2) 20.0%	(3) 30.0%	(3) 30.0%	3.7
3. the research was successful between the two schools	CPU				(6) 50%	(6) 50%	4.50
	DLSU				(3) 30.0%	(7) 70.0%	4.70

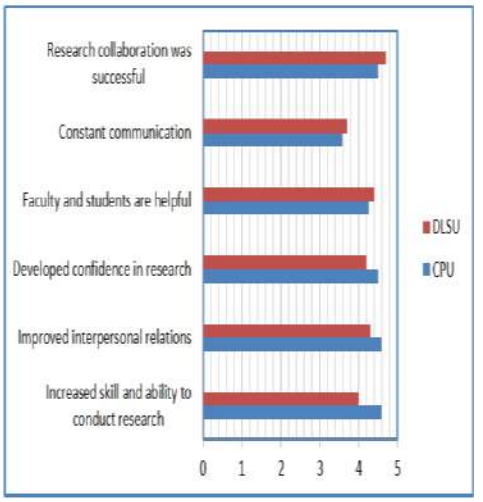

Figure 2. Summary of Rating of Students

The research collaboration, at the student level, has resulted in an increased confidence and capability in the conduct of researches and has also improved interpersonal relations among the students. This was implied that collaborative researches was an excellent way for exchanges of thoughts and ideas as well as improve the technical and social skills of the students.

As a whole, the faculty and members involved in the collaboration were reasonably helpful for the researches to be completed on time. Although there were communication problems between the groups, research collaboration was still considered successful. This entails a culture of unity, commitment, focusing on overcoming any barrier to achieving the goal.

The application of issues and problems in the conduct of the research collaboration between the two universities and prepare possible solutions can improve the research collaboration process, reduce delay and misunderstanding between the groups.

This research collaboration further includes the following implications:

a. Creation of a continuing partnership between two or more institutions is a great possibility,
b. Many resources such as time, facilities, materials and money are shared and saved, and
c. A local community, in this case Iloilo City, is a beneficiary of this endeavor.

Conclusion and Recommendation

Conclusion

The major concerns in the conduct of the research collaboration identified by the students from both schools, are the following: lack of time allotted for data gathering, the limited logistical resources (manpower and materials) during the data gathering, the limited communications between the groups during the progress of the researches, and the limited knowledge and tools to analyze the data gathered. Suggestions to address these concerns include:

1. Planning and allotting more time to conduct the data gathering.

2. Improving communication between the two groups through the use of online resources, and continuing research.

3. More collaboration between the schools to enhance research skills and at the same time share new knowledge as well as the use of

appropriate tools and facilities for research.

Aside from finishing their research projects, a lot has been gained by the students involved which include: appreciation of the civil engineering profession especially transportation engineering, hands-on experience of conducting research, becoming a team player, gaining collaboration to their junior civil engineering students for reasons cited previously.

The research collaboration has greatly helped the student groups from both institutions to finish their civil engineering projects on time. It has provided opportunities to help a local community as well as disseminate information to other communities through the presentation of the research papers in national and international conferences. Overall, the research was considered successful.

Recommendation

As mentioned by students, the lack of time especially during the data gathering phase and the limited communications during the research study period were the major issues encountered. The recommendations made by the students are quite insightful such as the use of the internet for continuous communication and constructive feedback while the lack of time during the data gathering could be addressed by going to Iloilo City several times but would entail more costs. However, the proper guidance of CPU students in Iloilo City in data gathering can help minimize the travel cost of the DLSU-Manila students.

It was strongly recommended that a Memorandum of Understanding (MOU) between the local government units (LGU) and the two universities be developed to assure continuous involvement and linkages and also to demonstrate additional logistical and financial support. Expenses incurred in the conduct of the collaborative researches have been shouldered by the student researchers. Thus, it is suggested that external research funding must be sought and that administration of both institutions must subsidize some if not all of the research expenses.

In 2012 and 2013, transportation research collaborations between DLSU-Manila and CPU-Iloilo were conducted in Iloilo City and Guimaras. This time, the collaboration involved graduate students from DLSU-Manila. In 2014, the research collaborations extended to the structural engineering researches specifically in the assessment of structures with regards to wind, seismic and fire risks. The heritage buildings in Iloilo City and schools in Guimaras were primary beneficiaries of these researches. Hardbound copies of the researches were endorsed by persons in authority both for Iloilo City and Guimaras. These researches have been used for

friends, development of non-technical skills, improvement of technical writing skills, learning the culture of a place, participation in national and international conferences, among others.

One hundred percent (100%) affirmatively responded that they would recommend this research

policy-making and evaluation of some current ordinances.

Finally, the two schools have committed in making the collaborations became part of the college's annual research agenda where the City of Iloilo and nearby places will be the areas of study. In the future, there were plans to be revised and offer graduate and post graduate degree program in line with these researches.

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