

The Relevance of Undergraduate Thesis to Climate Change Adaptation and Disaster Risk Reduction and Management

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Abstract: This study focused on the evaluation of the relevance of undergraduate thesis conducted by the students in the arts and sciences program to climate change adaptation (CCA) and disaster risk reduction management (DRRM). It used a documentary analysis to evaluate the Arts and Sciences program in terms of its program objectives, number of units offered in natural sciences and the environment. These were related to the percent of researches conducted relevant to the environment particularly to CCA and DRRM. Findings showed that the capacity of the students to generate researches on CCA and DRRM depends on their preparation and the goals of the program. The capability of the students to conduct studies on CCA and DRRM depends on the program objectives and the number of units taken about the natural sciences and the environment. The study recommends the integration of subjects in the environment with focus on CCA and DRRM and the program objectives should also be reformulated and be directed towards CCA and DRRM to strengthen the capacity of the students to generate researches on CCA and DRRM.

Key words: undergraduate thesis, climate change adaptation (CCA), disaster risk reduction and management (DRRM)

1. Introduction

Earthquakes, volcanic eruptions, hot days and hot nights, extreme weather events including deadly and damaging typhoons, floods, landslides, severe El Niño and La Niña events, drought, and forest fires are natural events that indicate the vulnerability of the Philippines to natural and human-induced hazard. In most cases, people and communities are prone to disasters because of lack of information about the hazards (Victoria, 2003). They also lack the preparation to deal and to reduce the risks of the hazards affecting their lives and livelihoods (Arembepola, 2002). These are compelling reasons why the Philippines should adopt disaster risk reduction and management (DRRM) and climate change adaptation (CCA). Preparedness is the keyword to keep people away from these two climatic issues and one can only be prepared if they are well informed. Generating more knowledge on environmental issues is one way of keeping people get proper information.

Are we really ready to face natural and human induced disasters? This was the Philippine President Pnoys' challenge to local leaders in his speech during the Tapatan Roadshow on Disaster Risk Reduction and Climate Change Adaptation. Readiness was made possible through the legal policies in the country that address issues on disaster risk management and climate change like the Republic Act No. 10121 or the "Philippine Disaster Risk

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Reduction and Management Act of 2010” and the Republic Act No. 9729 or the “Climate Change Act of 2009”. Several initiatives have already been made to enhance natural disaster risk reduction efforts in the local development planning process (Primer on DRRM). Yet, the Filipinos still suffer from losses of lives and properties whenever a disaster occurs in the country.

What else can be done? In educational institutions like the University of British Columbia focuses on Disaster and Risk Management Planning in their curricula. They offer subjects on geography of natural hazards, physical processes of natural hazard phenomena, including earthquakes, volcanoes, storms, climate variability, and landslides, earthquake engineering, “knowledge, policy and values in risk and resource management” and “integrated assessment” (Faculty of Applied Science, UBC). PATLEPAM, an organization concerned with the promotion of the environment protection and management provides assistance in curriculum development for environmental management among tertiary level educators had integrated the concepts on climate change, climate change adaptation and disaster risk reduction and management in the syllabi after a series of lectures/presentations given by a pool of experts and researchers. The study on the undergraduate thesis of students to climate change adaptation and disaster risk reduction and management evaluates the curriculum in the Arts and Sciences program to find out the capacity of students in the programs to generate data or information on climate change adaptation and disaster risk reduction and management. The study can result to curricular innovation in subject offerings like what the University of British Columbia has done or that of the PATLEPAM .

This study tried to evaluate the interrelationship or the coordination of the objectives of the program with the course offering down to the expected learning outcome of the study. If the program objectives aim for environmental protection, then it will develop the students’ awareness on the environment and their ability to generate researches on the environment. Given this idea, the relevance of conducting researches on climate change adaptation and disaster risk reduction and management relies on the objectives of the program objectives and this is what this research is looking for.

The purpose of the study is to evaluate the undergraduate thesis in the Arts and Sciences program and streamline them towards climate change adaptation and disaster risk reduction and management. Specifically, the study was conducted to examine if the objectives of the program has some bearing on the environment particularly to climate change adaptation and disaster risk reduction and management, determine the percentage of units offered in the program with relevance to the study about the environment, classify the undergraduate thesis with significance to climate change adaptation, disaster risk management and environment protection, management and utilization, and lastly, recommend curricular innovations on developing the students’ skills in conducting researches on climate change adaptation (CCA) and disaster risk reduction and management (DRRM).

The study is limited to the curricular evaluation of the undergraduate thesis conducted by the students in the Arts and Sciences program from year 2006 to 2012. This includes studies conducted by the students in the BS Geology, BS Biology, BS Mathematics, AB Communication and AB Political Science programs.

The study is useful in generating more researches on the environment particularly on climate change adaptation and disaster risk reduction and management in the undergraduate level. The knowledge or information that will be generated from the researches will develop a deeper awareness and appreciation of what is currently undertaking in the environment and find ways to explain, mitigate, or totally eradicate problems resulting to various climatic changes and natural and man-made disasters. Streamlining the curricula of various program offerings in higher education institutions by offering more courses on the environment or integrating topics on CCA and DRRM will enhance the awareness of the students and the community on the current environmental

issues and concerns. With greater awareness on the pros and cons brought about by various climatic changes and disasters will reduce loss of lives and properties and decline the decline of the economy.

2. Methodology

The study was purely a documentary analysis which looked into the curricular offerings of the program in relation to the undergraduate thesis conducted by the students in the Arts and Sciences program. The study evaluated the objectives of each program and identified the programs with the purpose on environmental issues. It identified the natural science courses that tackle the topics on CCA and DRRM, expressed them into percentage and related them to the kind of researches they have conducted. The study also classified the researchers conducted by the students in terms of its relevance to climate change adaptation, environment protection and utilization and disaster risk reduction. The inter relationship of the subjects and program objectives to the number of researches conducted with relevance to the environment were made. Researchers evaluated are undergraduate thesis conducted by the students from year 2006–20012. The general flow of the activity is presented in the diagram shown in Figure 1.

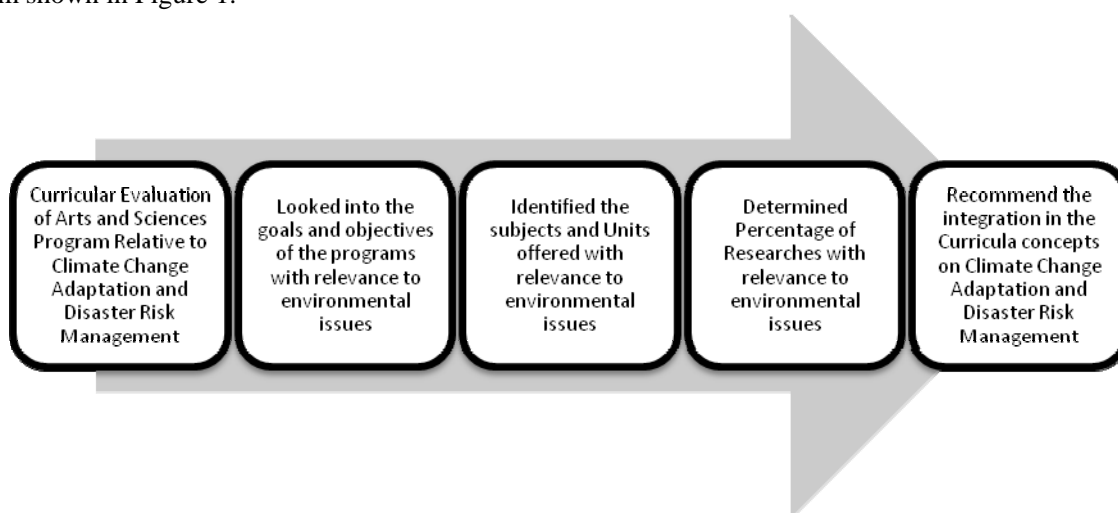


Figure 1 General Flow of the Study

3. Results

Relevance of the Program Objectives to CCA and DRRM. Looking at the objectives of the program it was noted that only the BS Geology and BS Biology programs have stated objectives with relevance to environmental protection and management. The objectives of the BS Geology program are focused on producing graduates that meet the demands of the society with specialized knowledge on geosciences by the providing them applied and theoretical geo-scientific knowledge and expertise. The program also aimed to prepare the students to assume professional role and leadership in interacting with multidisciplinary field confronting regional and national geo-scientific challenges (CMO 35, s.2008). The general and specific objectives of the BS geology program is highly relevant to climate change adaptation and disaster risk reduction, management and utilization. Students under this program learned about the earth's structure, rocks and minerals and their sources. They learned about fuel energy, pollution, waste disposal, conservation and use of natural resources. They were trained to explore mineral resources, generate geo hazard map, explain the occurrence of natural phenomena such as

landslide, earthquake, and volcanic eruption, prepare geologic reports. The knowledge and trainings they obtained from the program gave them enough capacity to conduct studies on climate change adaptation and disaster risk reduction and management. All of the objectives of the BS Geology program have relevance to the environment and with subjects that tackles on climate change adaptation and disaster risk reduction and management.

Two of the objectives of the Bachelor of Science in Biology program are focused on the environment. One of the objectives is to produce responsible citizens concerned about environment and its relation with physical world and the other one is to serve as partners of the government in solving problem on food shortage, medicine, agriculture and environment (CMO 24, s.2005).

The AB Communication program was offered to equip the students with the knowledge and skills in the theory and practice of communication applicable in various professions and context with focus on the media profession (CMO 10, s.2010). Graduates in this program are expected to facilitate the transformation of information into meaningful knowledge for human beings and respond effectively in cultural diverse employment and market environments. They are expected to possess desirable traits, values, qualifications, skills and ethics in communication. The objectives have no relevance to the environment.

The purpose of the AB Political Science is to produce a well informed and civic efficient individual who is very responsible citizen of the land. It specifically aimed to equip students with relevant knowledge and skills for effective participation in nation building, prepare them to meet the challenges in public administration, politics and economics in both local and foreign setting and Inculcate the value of good governance for a meaningful democratic life. The objectives for the AB political Science is more focused on social science and has no relevance to climate change adaptation and disaster risk reduction and management.

The objective of the BS Mathematics program emphasizes on the development of competent and highly skilled graduates in mathematics needed in research, trade and commerce. They are expected to achieve mastery of the mathematical skills, to serve as mathematical educators in the locality, apply mathematical theories through the use of modern technology effectively and efficiently, and be able to conduct mathematical researches (CMO 19, 2007). The objectives stated are more focused on the mathematical skills development and applications of such skills to various fields of discipline. It does not show any relevance to CCA and DRRM.

Relevance of the Subjects Offered to Climate Change Adaptation (CAA) and Disaster Risk Reduction and Management (DRRM). After examining the program objectives in the Arts and Sciences program, the program of study was evaluated to determine the degree of preparedness of the students under each program to conduct researches on the environment particularly on Climate Change Adaptation (CAA) and Disaster Risk Reduction and Management (DRRM). This was presented in Table 1 through the number of units offered to the program with relevance to the environment.

Table 1 Total Number of Units Offered to the Program with Relevance to the Study about the Environment

Programs	Total units offered in the program	Total units of subjects with relevance to environment	% of units to the relevance environment	with Total units of the subjects with focus on CCA and DRRM	% of units with focus on DRRM
AB Communication	199	12	6.03	0	0
AB Political Science	134	6	4.48	0	0
BS Biology	175	25	14.28	0	0
BS Geology	184	66	35.87	21	11.2
BS Mathematics	141	6	4.26	0	0

The BS Geology program offers the highest percentage (35.87) of units on the environment that lead to the development of the students' awareness and understanding on environmental issues and concerns. In fact, most of the core courses offered is focused on the study about the earth including its atmosphere. The subjects offered in the program with relevance to environment protection and management are the Principles of Geology, Mining and Environmental Laws, Energy Policies and Ethics, Structural Geology, Geodynamics and Tectonics, Computer Applications in Geology, Geomorphology, Field Geology, Geostatistics, Geotechnical Engineering/Engineering Geology, Environmental Geology, Geophysics, Resource Geology, Geology of the Philippines and Southeast Asia, Stratigraphy, Historical Geology, Photo geology and remote sensing, Hydrogeology, Structural Geology, Marine Geology, Metalliferous Deposits and Nonmetalliferous deposits. These subjects are more focused on CCA and DRRM and this compose 11.2% of the total units of the course. The subjects gave them advanced knowledge and skills in understanding the earth's structure, skills and methodologies in geologic and geohazard mapping, the ability to explain why the earth underwent climate changes and disaster and the capacity to recommend mitigations based on scientific observations.

The BS Biology program have 25 units or 14.28% of the total units focusing on the environment. Subjects offered with relevance to CCA and DRRM are General Biology, Plant Physiology, General Ecology, Microbiology, and Cellular Biology and Science, Technology and Society. However, the emphasis of their studies is more on biodiversity, relationship of living organisms to the environment, interrelationship of science to technology and society. Climate change and environmental disasters is discussed mostly in General Ecology. Their understanding about the environment is a bit more advanced and can have the capacity to conduct researches on climate change and its effect to plants and animals, their biodiversity, habitat and the like.

The subject on sciences and the environment in the AB Communication program is 6.03% of the total units of the course and this is useful in developing the student's awareness on the environment. The subjects are the Biological Science, Earth Science and Environmental Science. The AB Political Sciences and BS Mathematics offers 134 and 141 units respectively and they respectively offer 4.48% and 4.26% of the subjects with relevance to the environmental studies. In fact, the program only offers Biological Science and Earth Science. The two subjects are three units each which can be discussed in 56 hours per semester. Looking deeper into the syllabi of the two subjects, topics on climate change adaptation and disaster risk reduction were not even discussed. This means that students under these programs have very limited understanding about the various environmental conditions existing in the country today and therefore their capacity to do research on climate change adaptation and disaster risk management is limited. However, integrating in the curricula courses or topics on climate change and natural disasters, they may be able to enhance their awareness on the current environmental issues occurring in the country today. With this, students will have the capacity to conduct researches on the environment particularly on CCA and DRRM.

Relevance of Researches to Climate Change Adaptation (CAA) and Disaster Risk Reduction and Management (DRRM). There are 74 researches in the undergraduate level generated by the students since 2006 to 2012. These researches were classified in terms of their relevance to climate change adaptation (CCA), Environmental Protection Management and Utilization (EPMU) and Disaster Risk Reduction and Management (DRRM) and they are presented in Table 2.

It can be noted that the BS Geology program have the highest percentage of researches conducted with relevance to the environment. Majority of the researches are focused on environment protection, management and utilization and the rest are focused on climate change and disaster risk reduction and management. Following the

BS Geology is the AB Communication with 35.29% of the researches and the BS Biology with 4 or 26.67% of the research. The three programs have generated researches with relevance to the environment protection, management and utilization and on climate change adaptation and disaster risk reduction and management. So far, only the BS Geology program has generated researches on CCA and DRRM. The AB Political Science and BS Mathematics have not generated researches the environment nor on climate change adaptation and disaster risk, reduction and management.

Table 2 Classification of Researches Generated by the Students with Relevance to Climate Change Adaptation (CAA) and Disaster Risk Management (DRM)

Programs	Total research	No. of generated	% of research relevant to CCA	% of research relevant to EPMU	% of research relevant to DRRM
AB communication	17		0	35.29	0
AB political science	25		0	0	0
BS biology	15		0	26.67%	0
BS geology	12		25%	58.33%	25%
BS math	5		0	0	0

The data implies that the capacity of the students to generate researches on environmental protection and management depends on the program objectives and subject offerings. Program with objectives on the environmental issues and concerns offered subjects with relevance to the environment particularly to CCA and DRRM. The more subjects offered on the environment, the higher is the capacity of the students to conduct researches on CCA and DRRM. Integrating in the program objectives on environmental protection and management gives the reason to offer more courses on the environment focusing on CCA and DRRM.

4. Discussions and Conclusion

From among the five program objectives evaluated, the BS Geology and BS Biology programs manifested their concerns about various environmental challenges. Both programs have objectives with relevance to the environment but only the BS Geology program have a detailed course offerings on CCA and DRRM. This explains why only the students from the BS Geology program have generated researches on CCA and DRRM. It implies that an in depth preparation on the CCA and DRRM is required to enable the students generate knowledge or information about CCA and DRRM. The AB Communication, AB Political Science and BS Mathematics programs have not generated researches on CCA and DRRM because it is not their prime objective to equip students with theoretical knowledge and skills on the environment particularly on CCA and DRRM. This explains why the three programs have limited course offerings on the environment and have not even touched topics on CCA and DRRM in their natural science courses. This explains further why the students in these programs have not conducted researches on CCA and DRRM.

The question now is, “how can the three programs contribute to climate change adaptation and disaster risk reduction and management?” How can their knowledge and skills be applied to address issues on CCA and DRRM? How will good governance or effective leadership address issues on CCA and DRRM in the community or in the country? How can Mathematical equations be used to predict the occurrence of changing climatic conditions and unexpected disasters in the locality? One way to do it is to increase their awareness on CCA and DRRM and this can be done by giving them more subjects or knowledge about the environment with focus on

climate change and natural and man-made disasters. The topics will equip students better understanding on how to adapt to various climatic conditions and manage themselves in different disasters occurring around them.

Based on the foregoing discussions, the capacity of the students to conduct researches relevant to Climate Change Adaptation and Disaster Risk Reduction and Management depends on the degree of preparation and awareness of the students on the environment. The offering of the subjects on said fields and areas is also based on the program objectives. Programs with objectives on the environment have more subjects on the environment. More subjects offered on natural sciences and the environment enhances the capacity of the students to generate researches on CCA and DRRM.

The capability of the students to undertake researches on CCA and DRRM can be enhanced by integrating in the program of studies subjects on natural sciences and the environment with special focus and trainings on CCA and DRRM. To do this, the program should include objectives on climate change and environmental protection and management. Students should also undertake trainings on researches focusing on CCA and DRRM. All these can be made possible in policy formulation and implementation. Topics on climate change adaptation and disaster risk reduction and management may be integrated in biological science and earth science such a Biological Science with climate change adaptation and Earth Science with disaster risk reduction and management.

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