Disaster Risk Reduction and Management Infusion in the Education Curriculum in Tacloban City, Philippines

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ABSTRACT

This study was conducted to examine the process of integrating Disaster Risk Reduction and Management (DRRM) in Bachelor of Secondary Education (BSED) and Bachelor of Secondary Industrial Education (BSIED) programs in the College of Education of Eastern Visayas State University (EVSU) Tacloban City, Leyte, Philippines. The study revealed that 80% of the faculty-implementers endorsed the method of integration and infusion which emphasized faculty capacity and resiliency building, revisiting the Outcomes- Based Education Syllabi, design and preparation of learning resources, and guiding students in hazard mapping and assessing different risks in the schools and community. They recognized that the approach afforded them the opportunity to incorporate DRR key messages that led to the development of the students of DRR comic books. The faculty-implementers believe that the integration is relevant to the individual, family and community understanding of DRR which will result in resiliency in times of disaster.

Keywords: disaster, resiliency, curriculum, education, Tacloban City.

INTRODUCTION

Among the countries considered disaster-prone, the Philippines stands out and occupies a prominent position as a natural hazard-prone nation where the occurrence of extreme weather events such as dry spells, excessive rain, and typhoons has led to hazards like floods and landslides (Yumul, Cruz, Servando, & Dimalanta, 2011). This reality has had enormous economic and social consequences on the Philippines (Israel & Briones, 2012; Ciurean, Schroter & Glade, 2013). Consequently, disaster risk reduction is now an essential component of the country's development objectives (World Bank, 2005).

A recent proof of the extent that such calamities negatively impact the Philippines was the damage caused by Typhoon Haiyan (local name: Yolanda). This cyclonic disturbance struck the central part of the country notably Tacloban City (the locale of this study) on November 8, 2013. It packed a maximum sustained wind velocity of 375 kilometers per hour, making it the strongest typhoon to have made landfall in the western North Pacific Ocean. It caused a storm surge that reached six meters, causing severe destruction to life and property. Government officials reported that the death toll reached 6,293 and 1,991 listed as missing. It devastated the lives of 16 million people and damaged 551,000 houses. The total cost of damages reached US$864 million (McPherson, Counahan & Hall, 2015).

On top of the death toll and damage to property, among the lasting effects of disasters

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is the disruption of education with the resulting psychological distress and post-traumatic stress disorder that leads to child exploitation and, in turn, results in increased vulnerability (Peek, 2008).

In addition to absorbing the effects of disasters, education plays a pivotal role in enhancing the awareness of the public on Disaster Risk Reduction and Management (DRRM). Such a promotional effort can be done in many ways including training, international fora, and conferences that will help realize the full development of human capacities (Gwee, Shaw, & Takeuchi, 2011). Moreover, education is an essential concern that cuts across all the four priorities in the Sendai Framework on Disaster Risk Reduction 2015-2030 adopted by 187 nations in March 2015. Specific issues in this regard, are those on curricula, training of teachers, and linkage of schools to their respective communities (Shiwaku & Shaw, 2016).

Varied reasons are cited in several researches showing the potential of schools in contributing to a community's ability to react and build from a disaster (Mutch, 2015). Among these factors is the belief that the school is second to the family as the most significant institution that influences the development of people's values, knowledge, skills, attitudes, and behavior that result in the resilience of a community (Mutsau & Billiat, 2015; Oktari, R., Shiwaku, Munadi, Syamsidi, and Shaw, 2015). A similar view contends that schools are useful avenues for teaching the youth about disaster resilience by embedding learning activities that form part of the curriculum (Dufty, 2014). In the same vein, to achieve a "build back better" type of recovery, the schools occupy the primordial role in promoting safety education. The Sendai Framework for Disaster Risk Reduction Framework adopts this view and fully integrates education within the comprehensive framework of disaster risk reduction in the entire disaster management cycle, from prevention, mitigation and preparedness to response, recovery and rehabilitation (Sakurai & Sato, 2016).

To further extend the argument about the role of education, it should be noted that there are many examples all over the world which reveal the impact of DRRM integration at all age levels. This situation exists even in informal education through co-curricular and extra-curricular activities especially in promoting safety education (Izadkhah & Hosseini, 2013; &Takahashi, Kodama, Tomokawa, Asakura, Waikagul, & Kobayashi, 2015). Related to this proposition is the contention that a well-educated citizenry is a requirement for making a country resilient, productive and prosperous (Holloway, 2015).

In research commissioned by UNICEF and UNESCO on the Integration of DRR into the Education Curricula, it was found out that an "infusion" approach was usually adopted in the teaching of specific topics in the physical and natural sciences. This study, covering cases from thirty countries, identified several weaknesses that included the observation that there was little evidence of cross-cultural linkages. It was also pointed out that DRR learning at the primary and secondary grade levels were not integrated. Moreover, there are only a few examples of interactive, experiential and action-based learning; similarly, affective learning approaches such as the textbook-driven approach and the pilot-project approach (Selby & Kagawa, 2012) are not also extensively practiced. Relatedly, during the past decade, significant gaps in research still exist even when the number of inquiries increased, particularly in the area of effectiveness of programs (Ronan, Haynes, Towers, Alisic, Amri & Petal, 2016). Despite the substantial growth in research with principally positive findings, there are still many issues about methodology, implementation, and effectiveness over the long-term (Ronan, Alisic, Towers, Johnson, & Johnson,

2015). Along the same line, few empirical studies have been made focusing on the conceptualization of ideas about resilience, particularly concerning actual implementation. Moreover, the meaning of disaster resilience varies among practitioners thus resulting in different storylines (Aldunce, Beilin, Howden, & Handmer, 2015).

In promoting resiliency, governments resort to a variety of strategies in education governance and content. When a disaster occurs, resiliency becomes a primary concern (Norris, Stevens, Pfefferbaum, Wyche & Pfefferbaum, 2008; Alexander, 2013; Coles and Buckle, 2004). In this context, the meaning of "resilience" is crucial. A legal definition is found in Republic Act 10121, also known as "The Philippine Disaster Risk Reduction and Management Act (PDRRM) of 2010". This law defines resilience as the ability of a community exposed to hazards to withstand the effects of a hazard in a timely and efficient manner through the preservation or subsequent recovery of its basic structures and functions. Resilience has been defined as the ability of a community to anticipate and prepare for a disaster and when it happens, to respond to and recover quickly from its impact (Mayunga, 2007). Resilience has also been considered as having many dimensions and contributes in different ways to recovery. However, stakeholders often neglect to plan ways that would encourage communities to be resilient (Coles & Buckle, 2004).

The studies cited above highlight the observation that the resilience of a community is influenced by the education sector. A vital component of this influence is the school curriculum (UNICEF, 2014). The relevance and importance of the school curricula is a major component of education's contribution to resilience. In the Philippines, the directive to integrate DRR in education finds a legal basis in Republic Act 10121 as mentioned earlier. In this law, Section 2, Declaration of Policy contains the instruction to mainstream disaster risk reduction and climate change adaptation and mitigation in educational development. Subsequently, Rule 10, Sec. 1 of the Implementing Rules and Regulations of R.A. 10121 mandates the inclusion of DRRM in the school curriculum in secondary and tertiary education.

In relation to the provisions mentioned above, the national government through the Commission of Higher Education issued Memorandum Order (CMO) Number 30, Series of 2004. Article V, Sec. 7 of this CMO contains the Revised Policies and Standards for the Undergraduate Teacher Education Curriculum which emphasizes the need to prepare professional teachers for practice in primary and secondary schools in the Philippines. The curriculum features various components and skills needed by a practicing professional teacher should possess. It includes General Education (63 units) knowledge and skills; Professional Education (51 units) methodological skills and experiential knowledge, ethical values and Specialization/ Major (60 units) (CHED, 2004). The Eastern Visayas State University implements this policy through its teacher education programs namely: Bachelor of Secondary Education (BSEd) and Bachelor of Secondary and Industrial Education (BSIEd). This curriculum is the subject of this study, particularly concerning how DRRM can be integrated into it.

Analyzing how EVSU integrates DRRM will require consideration of an approach that will show how schools can embark on similar initiatives thereby revealing essential elements that ensure significant strides regarding the steps that can be adopted to achieve favorable outcomes. Also, to be studied are the views of teachers about their progress along this endeavor so that the faculty can use these perceptions in improving the process. It would also be useful to monitor the progress of the integration by looking at improvements in the way DRR is taught to and understood by

students. This step will help determine how to further enhance the integration. These concerns may be analyzed based on the experience of the College of Education of EVSU which initiated curricular innovations in the teacher-education programs specifically in BSEd and BSIEd starting 2015. After a series of activities spanning two years, the progress of this initiative can now be assessed through research that examines the process and content of curricular innovations that feature DRRM integration. Specifically, this study attempts to:

1. Determine the applicability of the steps followed in introducing the curricular innovations integrating DRRM into different subjects and thereby contribute to building students' resiliency;
2. Verify the impact of the strategies for curricular infusion on the faculty-implementers; and
3. Develop an approach to enhance resiliency building through changes in the curriculum designed to integrate DRRM and applicable across Colleges and the university's five External Campuses.

METHODOLOGY

To obtain an in-depth examination of the curriculum innovation procedure on integrating DRRM in BSEd and BSIEd programs, the researcher collected data through mixed methods research approach (Doorenbos, 2014) that included a combination of questionnaires, interviews, and evaluation of policy documents. The researcher also employed purposive sampling in this study to focus on the faculty-implementers (members of the faculty who are implementing the integration of DRRM into their subjects) who underwent training and proceeded to execute curricular infusion. Fifty-two (52) Teacher Education Faculty-Implementers from the Secondary Education and Industrial Education Departments of the College of Education of EVSU, Tacloban City, Leyte, Philippines participated in the mandatory training in Resiliency and Capacity Building. The training was organized by the Office of the Dean of the College of Education, with the technical inputs from Save the Children Philippines, a non-government organization that helps develop capabilities of communities to avert the loss of lives during a disaster. The training was not a regular activity, but a pilot-test being done in the College of Education for the first time. Technical experts from Save the Children Philippines served as Resource Persons in the capacity building activities.

The researcher prepared and presented a draft questionnaire to DRRM experts from Save the Children Philippines for additional inputs and improvement. The questionnaire consisted of 15 open-ended questions about the applicability of the training to their respective classes and the impact of the training on the faculty. Ten (10) faculty implementers of the Elementary Education Department of the College, who were not participants in this study, were the respondents in the pilot-testing of the questionnaire. The researcher used the inter-rater method in determining the reliability of the questions (Armstrong, Gosling, Weinman & Marteau, 1997; Stemler, 2004). Consequently, questions on content were modified based on the suggestions of the experts who arrived at a consensus that the items showed a high level of reliability.

The researcher requested an approval from the Dean of the College of Education to administer the questionnaires. After securing the approval, the researcher administered the questionnaires to the respondents. Using purposive sampling covering 76 percent of the faculty-implementers, the researcher requested the forty (40) participants coming from the two programs identified earlier to answer the questionnaires.

The researcher was a participant in the training but was not a respondent. It took 15 minutes for the participants to finish answering the questions. To provide more insights into the curriculum integration and to validate the responses, ten (10) of the respondents were selected for an interview since they have developed DRRM modules and would be able to provide more insights on the curriculum integration and innovations. To triangulate the respondents' answers, the researcher analyzed relevant documents such as the Implementing Rules and Regulations of RA 10121, OBE syllabi, teaching guides, journals, Minutes of the meetings of the faculty. Also analyzed were outputs of school work done by students in the College of Education such as Hazard Maps, DRRM comics, and DRRM e-apps to verify the integration experience of the College.

Table 1 contains the respondents' profile specifically their age, sex, length of service in the College of Education and their educational attainment.

The faculty–implementers' range from 24 (42%) to 61(10%) years old. Most of them were male (63%). A sizeable number (42%) have been in the service for less than ten years. Forty- four percent (44%) are Master's degree holders. Shown in Figure 1 are the different subjects where the teacher-implementers integrated DRRM in General Education arrived at by using the Outcomes-Based Education (OBE) Syllabi. Figure 2 shows integration in Professional Education subjects and Figure 3 shows the situation in the Major /Specialization in BSEd.

The curriculum Integrates DRRM in four subjects, namely: Basic Economics, Filipino, Computer (Word processing) and English (Thinking Skills).

The curriculum also features integration in Professional Education particularly in Educational Technology 1 & 2, Child and Adolescent Development, Social Dimension, Facilitating Learning, Methods of Teaching and Principles of Teaching 1 & 2.

Table 1. Profile of teacher–education DRR faculty implementers

Variable	Teacher –Education Faculty Implementers	
Age	Frequency	%
24-35	16	40
36- 45	16	40
46-55	4	10
56-65	5	10
Gender		
Female	15	38
Male	25	62
Length of Service (years)		
Less than 10	17	42
11-20	15	38
21-30	5	12
31- 40	3	8
Educational Attainment		
Doctoral degree	5	10
With Doctoral units	15	29
Masters' degree	23	44
With Masters Units	9	17

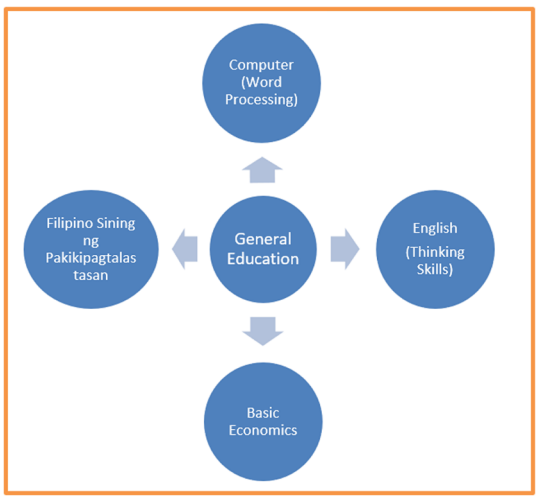

Figure 1. General Education subjects in EVSU where DRR are integrated.

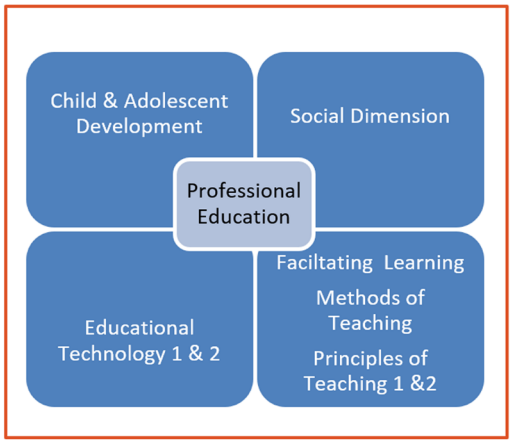

Figure 2. Professional Education subjects in EVSU where DRR is integrated

RESULTS

This section discusses findings from the data collected. Three major findings were identified:

1. The applicability of the curricular innovation process on integrating DRRM into different subjects.

The first objective of this study is to determine the applicability of the curricular innovation process on integrating DRRM into different subjects to develop students' resiliency. The responses of participants on the process of curricular innovation revealed the dominant view that the innovations could be used in actual classroom settings. The data gathered in this study revealed that 80% of the participants perceived the process of curricular innovations adopted in the EVSU as recognized and appreciated by the faculty-implementers. They considered the approach as opening their minds to the possibilities of teaching the concepts of DRRM in all subjects. This approach is similar

BACHELOR OF SECONDARY EDUCATION (BSED)

PHYSICAL SCIENCE
- Physical Science
- Astronomy & Meteorology
- Geology and Hydrology
- Physical and Earth Science
- Environmental Chemistry Waves and Sounds
- Field Investigatory Exploratory
- Science, Technology, Society and Environment

PHYSICAL EDUCATION
- Art Education
- Human Anatomy and Kinesiology
- Fundamentals in Teaching Sports
- Strategies and Methods in Teaching Physical Education
- Preventive, Rehabilitation of Athletic Injuries and Reflexology

MATHEMATICS
- Contemporary Mathematics
- Fundamentals of Mathematics
- Elementary Statistics

BIOLOGICAL SCIENCE
- Biological Science
- Anatomy and Physiology
- Human Health Care
- Field Investigation and Exploration
- Science,
- Technology and Society and Environment

BACHELOR OF SECONDARY INDUSTRIAL EDUCATION (BSIEd)

CLOTHING TEXTILE AND RELATED ARTS
- Basic Clothing
- Tailoring 1 & 2
- Horticulture

CIVIL TECHNOLOGY
- Carpentry
- Masonry
- Building Construction Management-Estimates and Planning
- Basic Welding
- Furniture, Designing and Production

FOOD TECHNOLOGY
- Food Processing and Preservation
- Food Product Development

ELECTRONIC TECHNOLOGY
- Digital Electronics
- Radar System
- Industrial Electronics
- Television and Video System

DRAFTING TECHNOLOGY
- Architectural Drafting
- Architectural Models
- Computer Drafting
- Photography

ELECTRICITY, REFRIGERATION AND AIR CONDITIONING (ERAC)
- Car Air Conditioning
- Building Wiring Installation

INDUSTRIAL ARTS
- Automechanics and Metalworks
- Electricity
- Electronics

Figure 3. BSEd and BSIEd Major Subjects where DRR is integrated

to one that featured local capacity building and mobilized people in performing their task in resiliency building (Alllen, 2006). This effort is also in line with the observation that training in DRRM education is essential and should be made a component of the higher education programs to form part of the professionalism of teachers (Amri, Bird, Ronan & Towers, 2016).

In addition, the faculty –implementers learned to integrate key messages and concepts in the discussion of different hazards and after evaluating their Outcomes-Based syllabi (OBE). They also viewed positively the revisit of the OBE syllabi of the various subjects which enabled them to identify entry points important in effective integration and consistent implementation and as a way of strengthening the integration. They viewed this activity to be essential in determining which part of the OBE syllabi can DRRM key messages be properly integrated. Thus, they realized that there is a huge opportunity for integrating DRRM into their respective subjects.

On the matter of replicating the process adopted at EVSU, the answers to the questionnaire and the follow-up interviews revealed the effective practices of the college need to be known by and shared with others. Also, according to the faculty-implementers, this process is relevant to the individual, family and community understanding of DRR. They consider the steps they went through and their use of DRR in their subjects as leading to resiliency in times of disaster considering that hazards abound and adopting the process will help achieve zero casualties.

The faculty-implementers valued the effects of their DRR integration efforts on the students' understanding of DRR. In their view, this extended to their families because of the opportunity to share their knowledge with the members of their households. The spread to the DRR concepts and practices are expected as students conclude that community awareness is essential to disaster preparedness and mitigation.

2. Impact of the curricular innovations to the faculty-implementers.

From the interviews, the faculty-implementers viewed the impact of the innovations as helping them become aware of potential hazards and of boosting their knowledge and confidence that enabled them to engage their students in various activities such as: hazard mapping, assessing different risks in the school and community using a child participatory approach, familiarization with safety measures in the university campus and in the proper conduct of multi-hazard drills essential in resiliency building. Moreover, faculty-implementers stated that the approach employed by the college made them more knowledgeable and empowered members of a community ready to act before, during and after a disaster. Thus, enabling them to develop DRR Modules such as on topics about wellbeing, DRR legal mandate, environmental management, use of social media and technology in Risk Reduction, DRR local structures and mechanisms, school disaster manual and family preparedness plan. This initiative led to the formation of a student organization known as Youth Organization for Disaster Risk Reduction and Management (YODRRM) which has already hosted a Youth for DRRM summit attended by one hundred students coming from various organizations in EVSU. This organized student action is consistent with the strategy of involving Filipino youth in related activities in their communities primarily through Youth Councils (known locally as Sangguniang Kabataan) (Fernandez & Shaw, 2013). In addition, other organizational modes are available to Filipino youth such as science clubs which empower the youth to establish a link with their school as well as their homes and their communities. This membership in clubs can help

the youth in spreading awareness and knowledge about preventing disasters and being adequately prepared and ready to respond through the learning that occurs inside and outside of the school (Fernandez & Shaw, 2015).

2. Customized approach to enhance resiliency building through curriculum innovations.

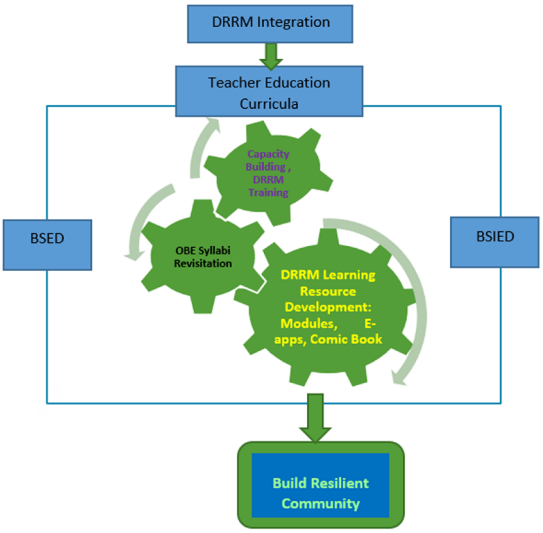

Figure 4. Pilot approach in Resilience –building in EVSU Teacher Education

Figure 4 depicts the pilot approach in resiliency building as undertaken in the College of Education in EVSU particularly on integrating DRRM in the BSED and BSIED curriculum. The components of this approach are identified as (a) Capacity building to broaden the understanding and development of DRR skills integration into various subjects; (b) Syllabi revisits to identify in the portions of the syllabi that can have DRRM integration; (c) Crafting teaching-learning resource materials such as DRRM modules that supplement the ability of the faculty-implementers to carry out effective pedagogical innovations. The modules were on the following topics: (a) well-being; (b) disaster risk reduction legal mandate, environmental management; (c) use of social media and technology; (d) Sendai framework for DRR 2015-2030, (e) disaster risk reduction strategies; (f) DRR local structures and mechanisms; (g) DRR capacity building; (h) school disaster manual; and (i) family preparedness plan.

The approach also built up the appreciation of students as evidenced, among others, by the programming of electronic-applications (DRR games) downloadable into gadgets and the preparation of illustrations by way of DRR Comic Books in *Waray-Waray* (the local dialect) and English versions. These learning resource materials depict key messages on reducing risk from six hazards namely; fire, earthquake, floods, storm surge, typhoon, and landslide. These activities conform with an approach commonly adopted called infusion or permeation which features DRRM themes and topics embedded in the curriculum (Mangione, Capuano, Orciuoli, Ritrovato, 2013) and taught learners about hazard and disasters (Rambau, Beukes & Fraser, 2012).

DISCUSSION

The finding on the applicability of the curriculum innovation process is similar to the concept propounded by Van Canh and Barnard (2009) where curricular innovations are seen as having two distinct kinds: 1) Intended innovation which viewed advanced instruction, and 2) realized innovation, which is applied in the teaching arena. In the same vein, Waters (2009) theorizes innovation as involving the examination of the process, characteristics, background, structure and organizing role of each stakeholder for successful implementation. It is likewise necessary to determine the pedagogical programs that contribute to successful teaching-learning process (Bai, 2003) as well as the prospective chances for scholastic innovation and to enforce

curricular conformity (Lubienski, 2003).

As revealed in a study, there are several ways by which schools in the Philippines integrate DRRM. These modes include: (a) integration in the curriculum (particularly in two subjects: science and the environment); (b) establishment of clubs focusing on DRRM; (c) identification of class mayors who are expected to provide leadership in disseminating DRRM-related information to classmates; and (d) organization of committees which are school-community based and features a mix of stakeholders (Venton & Venton, 2012). In addition to these methods, stand-alone courses may be offered which can be done in partnership with non-government organizations. Under this method, there can be curriculum integration which will feature stand-alone modules which can be integrated into existing curricula. Another way is school-based curriculum infusion which refers to the use of examples to explain DRRM concepts in the entire curricula reflected as done through specific sentences woven into paragraphs coupled with examples and problems (Petal, 2008). In the elementary and secondary levels in the Philippines, infusion is the most frequently used approach to DRR Integration (UNESCO, 2012). To cite an example, the education sector in Sri Lanka has integrated school disaster safety in all levels of education while emphasizing knowledge of multi-hazards and safety skills (Bitter, 2015).

In this study, the EVSU College of Education employed curriculum integration into existing teacher education programs and the developed stand-alone subject (DRRM and Education in Emergencies) to be taken by students in the fourth year level as Special Topics. The subject is a 1-unit course, equivalent to 17 hours per semester.

This approach is consistent with the strategy of conducting activities that alleviate vulnerability by determining DRRM related competencies which fit specific subjects (Allen, 2006); it is also similar to the view that a structured capacity and resilience-building must be adopted to enhance understanding and appreciation for sustainable development (Folke, Carpenter, Elmqvist, Gunderson, Holling, & Walker, 2002). The faculty-implementers also believed that the approach would enable the students and community to be equipped with necessary concepts they can apply in times of the occurrence of natural hazard. It also introduces a trail-blazing effort in integrating DRRM to teacher education curricular offerings thereby enhancing teachers' awareness of DRRM concepts before they integrate DRRM to their subjects.

In addition to the above views, it can also be contended that in integrating DRRM into university education, it is essential to promote critical thinking and problem-solving in a way that will empower groups threatened or affected by disasters. This should include holistic interdisciplinary and innovative approaches to learning that will significantly contribute to the creation of resilient communities (Rathod, 2013).

Relatedly, the so-called pilot implementation approach is a way of developing new learning materials as well as new pedagogies. In many countries, this pilot project strategy has been practiced by international non-government organizations such as in Turkey, Madagascar, and France (Yilmaz, 2014). Faculty–implementers expressed the belief that this approach will help the students build resiliency in their communities.

CONCLUSION

Education is regarded as an effective way of reducing risks and empowering local communities in improving their awareness, knowledge, and skills (Yilmaz, 2014). The College of Education of EVSU was able to adopt a process of empowering faculty in the substantial infusion of DRRM into most subjects. This approach used

by EVSU is recognized to be acceptable and can be successfully replicated in various programs across colleges and external campuses of the university and in other disaster-prone areas to promote resiliency among students and their communities.

The next critical steps that the university can take would be to offer stand-alone subjects on DRR in different degree offerings and subsequently, as faculty competence is developed, to offer a degree program on DRRM, and possibly a graduate level specialization on DRRM. A feasibility study has to be prepared before such an offering can be opened but based on the positive observations made in this study, the future looks bright for the eventual leveling up of the university into one that will offer a degree program in DRRM and a graduate level specialization on DRRM.

However, to further advance the integration towards resiliency building there is a need to conduct follow-up colloquia and workshops with inputs from experts representing different fields of specialization to guide the faculty–implementers in strengthening their DRRM skills, especially in highly technical areas. Also, these strides in content can be supplemented by organizing a DRRM Integrated Circle among faculty- implementers to constantly monitor and evaluate the actual conduct of integration.

Future research can include a longitudinal study that will examine how the faculty-implementers improve on the curricular changes over time as new sources and updated technologies provide inputs to innovation.

References

Aldunce, P., Beilin, R., Howden, M., & Handmer, J. (2015). Resilience for disaster risk management in a changing climate: Practitioners' frames and practices. *Global Environmental Change, 30,* 1-11.

Alexander, D. E. (2013). Resilience and disaster risk reduction: an etymological journey. *Natural hazards and earth system sciences, 13*(11), 2707-2716.

Allen, K. M. (2006). Community based disaster preparedness and climate adaptation: local capacity building in the Philippines. *Disasters, 30*(1), 81-101.

Amri, A., Bird, D. K., Ronan, K., Haynes, K., & Towers, B. (2016). Disaster risk reduction education in Indonesia: challenges and recommendations for scaling up. *Natural Hazards and Earth System Sciences, 2016*, 1-1.

Armstrong, D., Gosling, A., Weinman, J., & Marteau, T. (1997). The place of inter-rater reliability in qualitative research: an empirical study. *Sociology, 31*(3), 597-606.

Bai, J. (2003). Making multimedia an integral part of curricular innovation. *Journal-Chinese Language Teachers Association, 38*(2), 1-16.

Bitter, P. (2015). How the Tsunami Disaster Triggered a Change Process in the Education Sector of Sri Lanka: Lessons Learnt for Introducing Disaster Safety Education. In *Recovery from the Indian Ocean Tsunami* (pp. 451-467). Springer, Tokyo.

Ciurean, R. L., Schröter, D., & Glade, T. (2013). Conceptual frameworks of vulnerability assessments for natural disasters reduction. In *Approaches to disaster management-Examining the implications of hazards, emergencies and disasters.* InTech.

Coles, E., & Buckle, P. (2004). Developing community resilience as a foundation for

effective disaster recovery. *Australian Journal of Emergency Management, The, 19*(4), 6.

Commission on Higher Education (CHED) Memorandum Order No. 30 s. 2004. Retrieved from http: www.ched.gov.ph/cmo - 30-s-2004.

Doorenbos, A. Z. (2014). Mixed Methods in Nursing Research: An Overview and Practical Examples: *Kango Kenkyu. The Japanese Journal of Nursing Research, 47(3), 207-217.*

Dufty, N. (2014). Opportunities for disaster resilience learning in the Australian curriculum. *Australian Journal of Emergency Management, The, 29*(1), 12.

Fernandez, G., & Shaw, R. (2013). Youth Council participation in disaster risk reduction in Infanta and Makati, Philippines: A policy review. *International Journal of Disaster Risk Science, 4*(3), 126-136.

Fernandez, G., & Shaw, R. (2015). Youth participation in disaster risk reduction through science clubs in the Philippines. *Disasters, 39*(2), 279-294.

Folke, C., Carpenter, S., Elmqvist, T., Gunderson, L., Holling, C. S., & Walker, B. (2002). Resilience and sustainable development: building adaptive capacity in a world of transformations. *AMBIO: A journal of the human environment, 31*(5), 437-440.

Ru Gwee, Q., Shaw, R., & Takeuchi, Y. (2011). Chapter 2 Disaster Education Policy: Current and Future. In *Disaster education. Emerald Group Publishing Limited, 7,* 23-44.

Holloway, A. (2015). Strategic mobilisation of higher education institutions in disaster risk reduction capacity building: Experience of Periperi U. *Global Assessment Report on Disaster Risk Reduction,* 49-72.

Israel, D. C., & Briones, R. M. (2012). *Impacts of natural disasters on agriculture, food security, and natural resources and environment in the Philippines* (No. 2012-36). PIDS discussion paper series.

Izadkhah, Y. O., & Hosseini, M. (2013). The evolution of school earthquake education in Iran.

Lubienski, C. (2003). Innovation in education markets: Theory and evidence on the impact of competition and choice in charter schools. *American educational research journal, 40*(2), 395-443.

Mangione, G. R., Capuano, N., Orciuoli, F., & Ritrovato, P. (2013). Disaster Education: a narrative-based approach to support learning, motivation and students' engagement. *Journal of e-Learning and Knowledge Society, 9*(2).

Mayunga, J. S. (2007). Understanding and applying the concept of community disaster resilience: a capital-based approach. *Summer academy for social vulnerability and resilience building, 1,* 16.

McPherson, M., Counahan, M., & Hall, J. L. (2015). Responding to Typhoon Haiyan in the Philippines. *Western Pacific Surveillance and Response Journal, 6*(Suppl 1), 1-4.

Mutch, C. (2015). The role of schools in disaster settings: Learning from the 2010–2011 New

Zealand earthquakes. *International Journal of Educational Development, 41,* 283-291.

Mutsau, S., & Billiat, E. (2015). Leveraging Schools Systems as a Locus for Disaster Risk Reduction in Zimbabwe. *Journal of Education and Practice, 6*(29), 163-169.

Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F., & Pfefferbaum, R. L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American journal of community psychology, 41*(1-2), 127-150.

Oktari, R. S., Shiwaku, K., Munadi, K., & Shaw, R. (2015). A conceptual model of a school–community collaborative network in enhancing coastal community resilience in Banda Aceh, Indonesia. *International journal of disaster risk reduction, 12,* 300-310.

Peek, L. (2008). Children and disasters: Understanding vulnerability, developing capacities, and promoting resilience—An introduction. *Children Youth and Environments, 18*(1), 1-29.

Petal, M. (2008). Disaster prevention for schools. *Guidance for education sector decision-makers. Consultation version.*

Beukes, L. D., Fraser, W., & Rambau, T. S. (2012). Disaster Risk Reduction through school learners' awareness and preparedness. *Jàmbá: Journal of Disaster Risk Studies, 4*(1), 1-11.

Rathod, D. D. S. (2013). Education for Sustainable Development (ESD). *Education, 2*(6).

Ronan, K. R., Alisic, E., Towers, B., Johnson, V. A., & Johnston, D. M. (2015). Disaster preparedness for children and families: a critical review. *Current psychiatry reports, 17*(7), 58.

Ronan, K. R., Haynes, K., Towers, B., Alisic, E., Ireland, N., Amri, A., ... & Petal, M. (2016). Child-centred disaster risk reduction: Can disaster resilience programs reduce risk and increase the resilience of children and households?. *Australian Journal of Emergency Management, The, 31*(3), 49.

Republic Act 10121. "Philippine Disaster Risk Reduction Management Act of 2010." Retrieved from http://www.ndrrmc.gov.ph/attachments/article/45/Republic_Act_10121.pdf

Sakurai, A., & Sato, T. (2016). Promoting education for disaster resilience and the Sendai framework for disaster risk reduction. *Journal of Disaster Research, 11*(3), 402-412.

Selby, D., & Kagawa, F. (2012). Disaster risk reduction in school curricula: case studies from thirty countries.

Shiwaku, K., & Shaw, R. (2016). Introduction: Disaster Risk Reduction and Education System. In *Disaster Resilience of Education Systems* (pp. 1-10). Springer, Tokyo.

Stemler, S. E. (2004). A comparison of consensus, consistency, and measurement approaches to estimating interrater reliability. *Practical Assessment, Research & Evaluation, 9*(4), 1-19.

Takahashi, K., Kodama, M., Gregorio Jr, E. R.,

Tomokawa, S., Asakura, T., Waikagul, J., & Kobayashi, J. (2015). School Health: an essential strategy in promoting community resilience and preparedness for natural disasters. *Global health action, 8*(1), 29106.

UNESCO, U. (2012). Disaster Risk Reduction in school curricula: Case studies from thirty countries. *United Nations Educational, Scientific and Cultural Organization and United Nations Children's Fund,* 209.

UNICEF. (2014). *Towards a learning culture of safety and resilience: Technical guidance for integrating disaster risk reduction in the school curriculum.* UNESCO.

Van Canh, L., & Barnard, R. (2009). Curricular innovation behind closed classroom doors: A Vietnamese case study.

Venton, C. C., & Venton, P. (2012). Disaster risk reduction and education: Outcomes for children as a result of DRR activities supported by EEPCT programme Case study: DRR outcomes for children in the Philippines. *United Nations Children's Fund,* New York.

Waters, A. (2009). Managing innovation in English language education. *Language Teaching, 42*(4), 421-458.

World Bank (2005). *Natural disaster risk management in the Philippines – reducing vulnerability,* Washington, DC: World Bank.

World Bank (2005). *Philippines- Natural disaster risk management in the Philippines- enhancing poverty alleviation through disaster risk reduction.* Washington, DC. World Bank.

Yilmaz, E. (2014). *School-based Disaster Education Through Curricular and Extra-Curricular Activitries: A Comparative Case Study* (Doctoral dissertation, Middle East Technical University).

Yumul Jr, G. P., Cruz, N. A., Servando, N. T., & Dimalanta, C. B. (2011). Extreme weather events and related disasters in the Philippines, 2004–08: A sign of what climate change will mean?. Disasters, 35(2), 362-382.