Development of Disaster Risk Management and Mitigation Extension Program for School-Aged Children in the Province of Bukidnon

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Abstract

Existing and emerging disaster-risks for school-aged children served as the primary consideration for the conceptualization of this study. Using the Sendai Framework for Disaster Risk Reduction 2015-2030, this study analyzed the needs of the clientele, designed, and developed a DRRM extension program for school-aged children, and implemented and evaluated the program. The study involved school administrators, teachers, parents and their school-aged children in five landslide and earthquake-prone barangays in Bukidnon. Data were gathered through questionnaires, interviews, and FGDs. The needs were the basis for the design and development of the DRRM extension program for school-aged children. The training program included lessons on introduction to DRRM; DRRM in school, child-centered DRRM and CEPC, conduct of drill, and, managing emergencies and disasters.

*Keywords and phrases :*school-aged children, risk management, mitigation, disaster-risks, extension program

Introduction

The development of disaster-risk management and mitigation (DRRM) extension program hopes to systematically address existing and emerging disaster risks for school-aged children. The academe needs to be aware of the possible disaster risks and is responsible for developing programs to deal with the impact of disasters on children.

The urgency of downstreaming DRRM is emphasized in the paper of Matsuoka and Shaw (2014). It cited the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) that noted the Philippines as being affected through increased frequency of severe El Niño and La Niña events, deadly and damaging typhoons and other severe storms, floods, flash floods, landslides, drought, forest fires, etc. (Virola, Domingo, Talento, Amoranto, & Lopez-Dee, 2008).

In a report from the 2014 International Strategy for Disaster Reduction of the United Nations (UNISDR, 2014), which consolidated voluntary HFA progress reports from countries in the 2009/11 and 2011/13 cycles, it cited "the need to strengthen local capacities to implement DRM through establishing local level mechanisms and risk assessments", "poor coordination between stakeholders, and a lack of information sharing… with respect

to risk assessment, disaster response…", and "insufficient levels of implementation" (p. xi). Translated to this study's context, there are policies in place in the Philippines for the DRRM. However, in reference to the UNISDR report, the same challenges are found. For example, the insufficient levels of implementation are seen in the one-time information drive to stakeholders, especially among the locals. This may prove barely helpful for the locals who are specifically affected by disasters. This fact points to the need of this study where training one group of vulnerable stakeholders is conducted so that they stay safe or can respond to disasters when they happen.

Robas (2016) specified in his recommendations to incorporate in schools disaster risk reduction and encourage multi-sectoral participation in DRR-DRM program and activities, including the schools. These recommendations put into the place the value of training the school-aged children on disaster risk reduction and mitigation.

This study developed an extension program for DRRM specifically the hazard exposure and vulnerability of school-aged children and DRRM mechanisms in flood and landslide vulnerable areas in the province. It is this aspect where a program was developed based on the concerns of the study dependent on the analysis of hazard exposure and vulnerability of school-aged children in disaster-prone areas in the province of Bukidnon. State Universities and Colleges (SUCs) are mandated by the Commission on Higher Education (CHED) to perform the four-fold functions, namely: instruction, research, extension, and production. Each of these functions is complementary to each other. Instruction is enhanced by research and extension, while production is the outcome of both research and extension.

In light of the recent spate of natural calamities, the Department of Education (DepEd) has urged school authorities to reiterate disaster preparedness measures to minimize risks and ensure learners' continued access to education. The Undersecretary for Regional Operations Rizalino D. Rivera emphasized that adequate preparedness can mitigate the effects of disasters in schools, personnel, and learners. He said, "If we are prepared, we can collectively reduce the exposure of learners and school personnel to danger, the risks of schools suffering from damages, and the disruption to education".

Bukidnon State University (BukSU), as an institution, seeks "to develop competent professionals who are committed to building a sustainable life for all" through the four-fold functions. It has a vital role in responding to the needs of the community it serves. The locale where the institution is founded has posed a need for Bukidnon to empower its civilians to be capable of fending for themselves and aid one another in times of disasters.

BSU has an extension unit staffed by the extension director. The director is assisted by the college extension coordinators. Each college identifies its extension projects. The activities conducted are in line with the college's expertise. These colleges have always responded to the need to assist the community in improving their quality of life.

The Framework of the Study

The study takes its basis on the Sendai Framework for Disaster Risk Reduction 2015-2030 which stipulates seven targets and four priorities: (i) understanding disaster risk; (ii) strengthening disaster risk governance to manage disaster risk; (iii) investing in disaster reduction for resilience and; (iv) enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation, and reconstruction.

Collaboration in the context of disaster risk management means a close working together of government and non-government organizations to address the issues of disasters and calamities. Adhering to Executive Order No.159, series of 1968, BukSU takes steps to respond to the mandate that disaster control organizations

be established in all government units. This was further reinforced by Presidential Decree No.1566 of 1978 that underscored the urgent need to direct, control, and coordinate all resources to mitigate the impact of both natural and human-induced hazards.

The second principle maintains that early warning is relayed to individuals and groups to shield them from the effects of disasters. This entails providing information regarding the existence, prevention, and mitigation of disasters. Government agencies are tasked to provide warnings to the general public. Subsequently, the suspension of classes is declared. Administrative Order No. 196 (2007) empowered the secretary of the Department of National Defense and concurrent chairman of the National Disaster Coordinating Council to suspend classes in coordination with the Local Government Units (LGUs), Department of Education (DepEd) and the Commission on Higher Education (CHED).

Another guiding principle holds that local knowledge is crucial to disaster reduction. This necessitates information dissemination campaigns on essential concepts for all hazards, their causes, preventive measures, and consequences. As specified in DepEd Memorandum No. 55, series of 2007, it is imperative to mainstream these concepts in the school system through curricular integration and capability-building activities. Other strategies include providing information on disaster risks and means of protection, especially in disaster-prone areas, developing or strengthening community-based disaster risk management programs, and coordinating with the local media in disaster risk reduction awareness activities.

To reduce the causal risk factors, there is a need to build local resilience in school communities. Measures include locating/ relocating schools away from hazard-prone areas, such as flood plains, earthquake fault lines, etc, following standards for resilience for building schools and facilities to withstand the impacts of hazards; conducting reforestation and protection of wetlands; and implementing the provision of Clean Air Act.

At the core of disaster reduction management is the level of preparedness. This requires that school communities should develop, plan, allocate resources, and establish procedures to save lives and prevent damage to school wards and properties. Preparedness activities may include development and regular testing of contingency plans; appropriation of the calamity fund to support preparedness; development of coordinated approaches in all levels for effective disaster preparedness; regular dialogues and efficient coordination with various disaster response groups; drill exercises like earthquake drill, fire drill, and evacuation drills.

Applying the Sendai Framework to the current study, the disaster risk reduction and management mechanisms are treated as a bottom-up process, i.e., they should originate from the local level – school and barangay. Various DRRM initiatives have been undertaken at the national and international levels, but they do not involve the local education authorities and local officials. Moreover, the DRRM projects are mostly focused on the general population and less on school-aged children who have been identified as the largest group in the populace most vulnerable to disaster risks (UNICEF, 2011). Given the children's susceptibility during calamities, the UNDR underscores that child protection must be a priority before, during, and after a disaster (UNDR, 2011).

The Commission on Higher Education (CHED) has stipulated in its CMO No. 8 s. 2010 that Higher Education Institutions (HEI) must provide relevant measures and responsive to the needs of the community and society. To do so, the integrated extension program shall include five (5) components, one of which is the community outreach activities that the study aims to develop.

This study also takes into account the ADDIE model, by which the extension

program was conceptualized: analysis, design, development, implementation, and evaluation, as illustrated in the upper box in Figure 1. The lower box shows the designed BukSU Extension Program, which is a by-product of the linkage of the school and the Local Government Unit. The ADDIE model's processes are similar to the four core processes of the university that are conceptualization, design and development, implementation, and evaluation, and thus taken as a framework of the study.

The *needs analysis* stage comprises the analysis of the situation and the clientele in terms of training, knowledge gaps, resources, and the like. These are crucial to the succeeding steps of the model.

The *design* process considers all the information taken from the first phase to influence and make practical decisions for the program design. It is in this phase where the strategy, delivery methods, structure, time frame, and assessment are carefully planned out.

The *development* phase involves the creation of the program and all that needs to be used. It is also specific to the actual materials and assessment tools necessary for the program to be appropriately implemented and evaluated. The formative evaluation of the program and its components happen in this stage.

The *implementation* stage is where the actual conduct of the program is done. This phase's goal is the effective and efficient delivery of the program, promoting the achievement of the program objectives.

The *evaluation* phase is the measure of effectiveness and efficiency of the program conduct. Evaluation should actually occur throughout the entire instructional design process - within phases, between phases, and after implementation. The evaluation may be formative or summative.

Finally, the notion of Lopez (2014) on extension agenda as to how the communities may be helped through an informed process of situation analysis, gaps identification, consensus building, as well as the orchestration of the purposive collaborative efforts to execute the agenda.

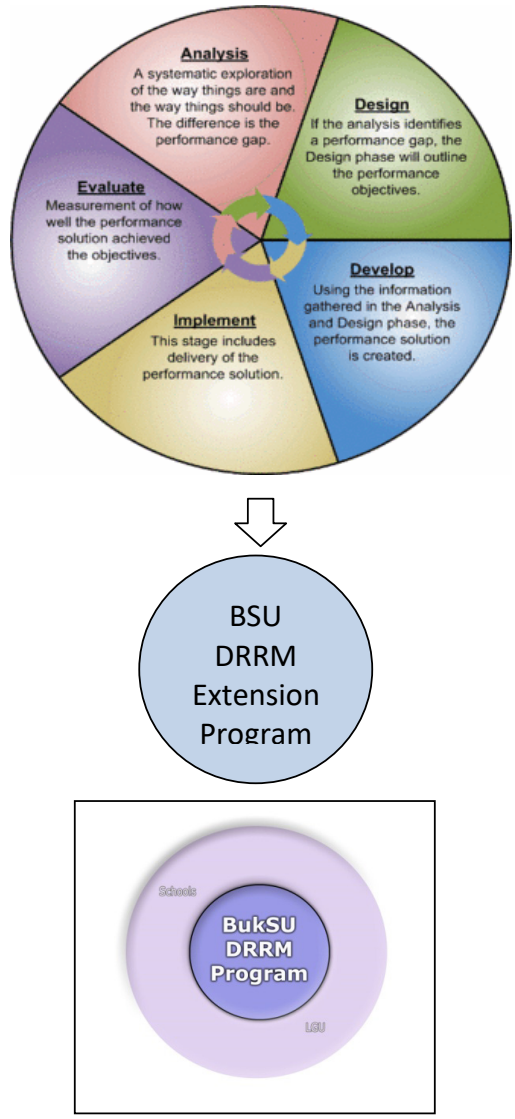

Figure 1. The schematic diagram showing the parameters of the study

Objectives of the Study

This study developed an extension program on DRRM for school-aged children. This was undertaken during the SY 2019-2020. Specifically, this research was guided by the following specific objectives:

1. analyze and design the disaster-risk reduction and mitigation extension program for school-aged children; and,

2. develop an extension program on DRRM for school-aged children.

Literature Review

The concept underpinning the DRRM is consistent with the prevailing international agenda on DRR. Disaster reduction, education, and youth were introduced during the UN World Disaster Reduction Campaign in 2000 (UN, 2000). This priority has become integral to the 2015-2030 Sendai Framework for Disaster Risk Reduction, focusing on the "use of knowledge, innovation,and education to build a culture of safety and resilience at all levels (UNISDR, 2005).

Domingo (2017) cited the passing of the Climate Change Act of 2009 (RA 9729) and the National Disaster Risk Reduction Management Act of 2010 (RA 10121); and the ratification of the Hyogo Framework (2005-2015), Sendai Framework (2015-2030), and the Paris Agreement on Climate Change (2015) which have "augmented and reinvigorated efforts toward disaster resiliency among sectoral stakeholders and local communities" (p. 3). In his study, he emphasized the importance of policy research related to DRRM.

Mohammed (2018) noted in his study the disaster-prone characteristics of the Philippines. He cited the fact that the Philippines is one of the countries all over the world which often is affected by "earthquake, volcanic eruption, typhoon, tsunami, drought, and flooding, among others" (p. 1). This fact brings up the urgency of streamlining DRRM in local settings. In his study, it was emphasized that one activity pertaining to disaster preparedness is the conduct of trainings on disaster preparedness and response, and also on the conduct of simulation exercises at the local level, which includes the schools.

DepEd Order No. 55, s. 2007 prioritizes the mainstreaming of disaster-risk management in the school system and implementation of programs and projects. Building schools, nations, and communities which are resilient to disasters is one of the objectives of Sendai Framework for Disaster Risk Reduction, which is now considered as a priority policy for implementation by the Department. The Sendai Framework for Disaster Risk Reduction is a global blueprint for disaster-risk reduction efforts that aims to reduce losses of lives, properties, social, economic, and environmental assets to communities and countries until year 2030.However, as cited by Catangui (2020), "not all schools adopt and implement the legal basis or policy structure, which somehow creates an encouraging atmosphere for all DRR educators and the school, and guides them towards the mainstreaming of DRR concepts. To support the national, regional and divisional trends, these will allow schools to develop DRRM policies and programs" (p. 1).

In 2011, a Children's Charter: An Action Plan for Disaster Risk Reduction for Children by Children was developed (UN Plan of Action on Disaster Risk Reduction for Resilience, 2014). One of the priority areas that the children identified was meaningful child participation. With the idea that with the provision of DRRM Act, the children are encouraged to become proactive members of the community on DRR and sustainable development (*Sunstar* Pampanga, 2018).

Since 2009, research in a variety of areas, including health education and road safety education, has shown that when the content of a safety message is sensitive to age-related changes and perspective and the delivery of the message capitalizes on the prevailing influences within the social context, the child's ability to understand and assimilate that message is significantly enhanced and the adoption of preventive strategies increases (SDERA, 2009). In this context, the impact of extension depends on an appropriate message, delivered with an understandable extension method, although is

not always that simple (Stone, 2007).

The extension is one of the many mandates of universities. Lopez (2009) outlined that the role of the university's faculty and staff is to collectively and creatively share their knowledge and resources to local communities and to share in the journey out of poverty and into a life of improved chances and happiness.

Basic to extension programs is community organizing. Dreier (1996) identified factors that lead to successful community organizing. Community organizing, community-based development, and community-based service provision are distinct community empowerment strategies. Community organizing centers on mobilizing residents to address common problems. Leadership development, strategic planning, and network building are necessary to mobilize people to solve their common problems. The major obstacle to successful community organizing is the lack of training in leadership development and organizational capacity building. The primary strategy recommended for overcoming this obstacle is to help community organizations take advantage of intermediary organizations such as organizing networks and training centers that have emerged during the past several decades.

Laverack (2001) acknowledged that while community empowerment is central to community development and yet making this concept operational in a program context remains elusive. He identified and interpreted nine organizational domains for community empowerment. These organizational domains are not absolutes; rather, they serve as a point of departure for further discussion about straightforward ways to define and measure community empowerment as a process. This paper is seen as a step toward clarifying and making this concept operational to guide practitioners who wish to apply and measure community empowerment in a program context. The implications for community development and research are discussed. In 2006, he reviewed the literature on how empowerment can lead to an improvement in the health status of an individual, group, or community in the following empowerment domains: (1) participation; (2) community-based organizations; (3) local leadership; (4) resource mobilization; (5) asking 'why'; (6) assessment of problems; (7) links with other people and organizations; (8) role of outside agents; and (9) program management.

Shatkin (2000) found out that in recent years, the Philippine government has undertaken several reforms for decentralizing urban governance and increasing the role of community-based organizations (CBOs) and non-governmental organizations in urban policy and program development and implementation. He argued that decentralization reflects the interests of a variety of politically powerful social groups, including not only organizations of civil society, but also local political families and international and domestic business interests. Also, lack of local government capacity in many cities and municipalities and the existence of powerful economic interests at the local level that competes with civil society organizations for influence continue to inhibit meaningful civil society participation.

Racelis (2000) clarified that the development and maintenance of viable urban poor communities advance most effectively when people participate and exercise significant control over the decisions affecting their lives. Through effective community organizing, drawing on the support of active NGOs, and alliances with experienced people's organizations, urban poor communities are able to plan, carry out wide-ranging local improvements, and articulate their ideas. This corresponds to accepted management theory and practice that those closest to the problem are best able to solve it.

Research Methods and Design

This study follows the ADDIE model that includes analysis, design, development, implementation, and evaluation. In the analysis phase, the gaps identified in the study

of Abejuela et al. (2020) on the hazard exposure and vulnerability of school-aged children in disaster-prone areas in the province of Bukidnon were analyzed. These gaps were the bases for the design of the extension program. It is this analysis that the clientele, limitations or opportunities, or other important points useful in the design process were identified.

The design process was used as the brainstorming step. The information obtained in the analysis phase was used to create the extension program to meet the needs of the identified clientele. In this phase, the objectives of the extension program and how these would be met were outlined. These included specific objectives for each session and the performance objectives for the entire program. It is also in this stage where the tools to be used to gauge performance, lesson or topic analysis, planning, and resources set. The focus was on learning objectives, content, subject matter analysis, exercise, lesson planning, assessment instruments used, and media selection.

The development phase focused on building the outcome of the design phase. This included various steps, such as initial drafts of the program, reviews, and re-writes. Included in this stage was the crafting of Task Analysis Blueprint (TAB) and modules, outlining of activities for the sessions. The data gathered from the Analysis and Design stages were utilized to make the DRRM Extension Program which would link the items that need to be taught to participants. It is also in this phase where the production of tools/modules was done, which would be used in the actual implementation of the extension program. Also, the initial evaluation of the program was conducted, including the materials, resources, and the performance of those involved in the program.

It was during the implementation stage when the continuous revision of the program was done. This was to ensure optimal efficiency and positive outcomes. The extension team conducted the designed extension program to the target population. With that, the team was able to secure feedback regarding the program and improved it. Included in the modification were on the delivery, time allotment, and budget allocation.

The evaluation phase reflected much of the discoveries found in the analysis process. These discoveries include the objectives and expectations. It subjected the program and all its composites to final testing on its topics, procedure, objectives, time frame, and the entire program's accomplishment, or even, and sometimes, more valuable, non-accomplishment. It is in this phase that the team determined if the goals of the program had been met and what had to be done to improve and accomplish them.

Results and Discussions

This section provides the data gathered and the analysis and interpretation. The discussion follows the sequence of the problem stipulated in the early section of this paper: needs of the school-aged children and the design and development of the DRRM extension program.

The Needs of School-aged Children on Disaster Risk Reduction and Mitigation

Taken from the previous study of Abejuela et al. (2020), there were items found to have not been substantially achieved, and thus were labeled as Priorities for Actions. Table 1 summarizes these items.

Items that were not substantially achieved under Priority for Action 1 *(Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation)* enabled Abejuela et al. to identify gaps, one of which is on the disaster rescue materials and logistics. On this gap, they specified plans of maintaining close coordination with local DRRM Council in conducting preparedness activities and in response needs, and the like, as well as providing capacity-building activities for teachers, non-teaching staff and learners on DRRM, among others.

Table 1.
Progress of School-Based DRRM Program

Priority Actions of School-Based DRRM Program	Existence		Extent of Achievement		
	Yes	No	Mean	SD	QD
Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation					
1. Community participation and decentralization are ensured through the delegation of education authorities at the local levels	85	9	3.12	0.71	Not substantial achievement
2. A national multi-stakeholder platform for disaster risk reduction is functioning in the education	74	20	2.87	0.66	Not substantial achievement
Identify, assess, and monitor disaster risks to schools and enhance early warning for all learning environments					
3. National and local risk assessments based on hazard data and vulnerability information are available to education authorities and school	83	10	2.87	0.70	Not substantial achievement
4. Systems are in place to monitor, archive and disseminate data on school structural, infrastructural, and environmental vulnerabilities	80	12	2.88	0.77	Not substantial achievement
5. Early warning systems for major and local hazards reach schools, and schools have the opportunity to participate in early warning systems	78	15	3.14	0.74	Not substantial achievement
Use knowledge, innovation, and education to build a culture of safety and resilience through curricular and co-curricular activities in schools					
6. School curricula, educational material and relevant trainings include disaster risk reduction and recovery concepts and practices	74	20	2.63	0.71	Not substantial achievement
7. Countrywide public awareness strategy exists to stimulate a culture of disaster resilience, with outreach to urban and rural communities, including child-centered and child-led elements	80	14	2.77	0.63	Not substantial achievement
Reduce the underlying risk factors					
8. DRR is an integral objective of environment related policies and plans, including site selection, design, construction and maintenance of schools	85	6	3.37	0.79	Not substantial achievement
9. School disaster management policies and plans are being implemented to reduce the vulnerability of children in and out of school	86	7	3.39	0.95	Not substantial achievement
10. Educational continuity plans are in place to reduce disruption of the school year, and protect individual attainment of educational goals	83	10	2.92	0.68	Not substantial achievement
11. Planning management of school facilities incorporates DRRM elements including processes in the education sector	86	7	3.12	0.81	Not substantial achievement
12. Disaster risk reduction measures are integrated into post disaster recovery and rehabilitation processes.	79	13	2.86	0.68	Not substantial achievement
13. Procedures are in place to assure that every new school is a safe school.	84	8	2.98	0.64	Not substantial achievement
Strengthen disaster preparedness for effective response at all levels					
14. Strong policy, technical and institutional capacities and mechanisms for disaster risk reduction perspective are in place in the education sector	85	8	2.77	0.63	Not substantial achievement
15. Disaster risk preparedness plans and contingency plans are all in place at all administrative levels in the education sector and regular training drills and rehearsals are held to test and develop disaster response capacity programs	82	1	3.06	0.69	Not substantial achievement
16. Insurance and contingency mechanisms are in place to support effective response and recovery when required	75	17	2.76	0.58	Not substantial achievement
17. Procedures are in place to exchange relevant information during hazard events and disasters, and to undertake post-event reviews.	82	12	2.79	0.44	Not substantial achievement

Legend: 5.00-4.21 Comprehensive achievement; 4.20-3.41 Substantial achievement; 3.40-2.61 Not substantial achievement; 2.60-1.81 Relatively small or incomplete; 1.80-1.00 No achievement at all

Items that were on Priority for Action 2 *(Identify, assess, and monitor disaster risks to schools and enhance early warning for all learning environments)* enabled the researchers to determine the gap of inconsistency in extending projects and programs. They noted the various processes and levels and the corresponding evaluation and monitoring forms that the concerned offices are required to use. However, they surmised that the information taken from these may not have been cascaded to the lower-level offices or concerned individuals, or those directly in the field and those who are directly involved in these DRRM tasks or activities.

Needed in Priority for Action 3 *(Use knowledge, innovation, and education to build a culture of safety and resilience through curricular and co-curricular activities in schools)* is on the use of knowledge, innovation, and education to build a culture of safety and resilience through co-curricular activities in schools. However, the participants in their study, particularly the teachers, claimed that the resources to answer this need do exist. Gaps identified from the items not substantially achieved are on the lack of training for parents and other people in the community on the importance of being safe at all costs. Also, education materials on DRRM were claimed to be limited for the students. The researchers, therefore, argued for constant training of all those concerned, for the whole year.

For gaps that need Priority for Action 4 *(Reduce the underlying risk factors)*, two of these are the nonchalant compliance of learners in doing drills and the few numbers of teachers to undergo disaster risk management training. The researchers estimated a six out of thirty six teachers attending related training. They averred for provision of seminars for the safety and preparedness of teachers and pupils.

Priority for Action 5 *(Strengthen disaster preparedness for effective response at all levels)* items identified gaps in terms of only limited training for teachers, and not only coordinators. This is for the strong implementation of the program. Also, they noted insufficient communication devices for the program and the risk reduction management work as disasters strike.

The seemingly insufficient implementation of the DRRM in the local scenario shows that the intended policy of its down streaming to the community as cited by Domingo (2017) is not achieved. With the policy that is supposedly empowering the local units to be proactive in the DRRM measures, the results in Table 1 show a discrepancy in its implementation.

Also, the urgency of including schools at the center of DRRM as emphasized by Mohammed (2018) is found to have not been sufficiently answered in this result. This means that there is still a need to strengthen the role of local authorities and the schools in DRRM policy implementation.

Table 2 specifies the items that were somewhat adequate in terms of Disaster Prevention Mechanism. These items are on DRRM networking and Capability training for stakeholders. The researchers attributed DRRM networking as only somewhat adequate to the necessity of common available time for consultation, meetings, and other networking activities. As for the capability training for stakeholders, this one requires a budget and common time among stakeholders.

Table 2.
Extent of Adequacy in Terms of Disaster Prevention Mechanism

DRRM Mechanisms	Existence		Extent of Achievement		
	Yes	No	Mean	SD	QD
1.DRRM Networking	74	18	2.40	0.72	Somewhat Adequate
2.Capability training for stakeholders	65	28	2.21	0.45	Somewhat Adequate

Legend: 5.00-4.21 Very adequate; 4.20-3.41 Adequate; 3.40-2.61 Fairly adequate; 2.60-1.81 Somewhat adequate; 1.80-1.00 Inadequate

The result on DRRM networking as somewhat inadequate may cause a repetition of the outcomes in typhoons Washi in 2011 and Haiyan in 2013. Enriquez (2013) claimed that the coordination of tasks during these typhoons were unclear, specifying that there still existed shortages of satellite phones and

tents in the first few days after typhoon Yolanda (Haiyan). These were sourced by the NDRRMC from other agencies. In the study of Jovita et al. (2018), it was found that "the disaster management networks in Region X failed to respond effectively during Typhoon Washi in 2010 because of significant reasons" (p.3).

Table 3 is on the extent of adequacy in terms of Disaster Preparedness Mechanism. Four items were found to be somewhat adequate only. The researchers attributed item 1 to be overlooked because the occurrence of typhoons and other calamities is unpredictable most of the time, and the means of communication is not yet well-established in remote areas. They also cited a problem in the allocation of budget for supplies and equipment reserve, provision of communication systems; and, establishing DRRM networks of emergency respondents.

Table 3.
Extent of Adequacy in Terms of Disaster Prevention Mechanism

	DRRM Mechanisms	Existence		Extent of Achievement		
		Yes	No	Mean	SD	QD
1.	Issuance of timely and effective early warning	75	18	2.45	0.44	Somewhat Adequate
2.	Supplies and equipment reserve	66	27	2.49	0.45	Somewhat Adequate
3.	Provision communication systems	74	18	2.25	0.48	Somewhat Adequate
4.	DRRM networks of emergency responders	77	15	2.44	0.47	Somewhat Adequate

Legend: 5.00-4.21 Very adequate; 4.20-3.41 Adequate; 3.40-2.61 Fairly adequate; 2.60-1.81 Somewhat adequate; 1.80-1.00 Inadequate

Table 4 presents the lone item that has the lowest mean but still was somehow adequate in extent. This is on the *improvement of disaster resilience programs.* The researchers noted the uniform response of the participants, specifically that the process in the conduct of these programs involves bureaucracy and red tape. This may be the reason for the assessment as the lowest, and with the somewhat adequate extent.

Improving disaster resilience programs is also seen as difficult to achieve overnight. In the study of Parker (2020), an emphasis is put on resilience as a science. This calls for a paradigm shift, from resilience as a mere quality, to an approach which stems from science. This is the same notion forwarded by the Environment Agency, England's flood risk management agency, which advocated a national strategy that aimed to move from the concept of protection to resilience (Environment Agency, 2019). This strategy apparently relies on a resilience approach to flood and coastal erosion risk management working properly. With a resilience framework and measurement method, anchored in theory and practically applicable, the strategy is deemed effective.

Table 4.
Extent of Adequacy in Terms of Post Disaster Prevention Mechanism

DRRM Mechanisms	Existence		Extent of Achievement		
	Yes	No	Mean	SD	QD
Improvement of disaster resilience programs	60	29	2.08	0.40	Somewhat Adequate

Legend: 5.00-4.21 Very adequate; 4.20-3.41 Adequate; 3.40-2.61 Fairly adequate; 2.60-1.81 Somewhat adequate; 1.80-1.00 Inadequate

The Design and Development of Disaster-Risk Reduction and Mitigation Extension Program for School-aged Children

The discussion in this section is based on the processes in the instructional systems design adapted in this study, specifically the ADDIE model. The model has the following phases: needs analysis, design, development, implementation, and evaluation. However, the data for needs analysis is already presented in the preceding section as an answer to problem number one. Hence, this section focuses on the design, development, implementation, and evaluation of the extension program.

The Extension Program Design

The design stage covers the learning objectives, assessment instruments, activities, session planning, and materials, and media selection. In this study, the learning objectives for the extension program are based on the

results of the needs analysis of the data from pupils, their parents, and their teachers and administrators.

With the learning objectives in mind, the team decided on the Task Analysis Blueprint (TAB) that served as a guide in carrying out the extension program. The TAB consisted of columns on Session, Topics, Activities, Objectives, Strategies, and Assessment. The Session is divided into five lessons, labeled as Lessons 1 through 5. For each lesson, there are specified Topics, with the number varying, depending on those that belong under the Lesson's overarching topic. The specific topics are those that address the needs of the school-aged children based on the data from the needs analysis conducted.

Lesson 1 has the overarching topic of Introduction to DRRM, where there are two specific topics. Lesson 2 is on the DRRM in School, with three specific topics. There is one specific topic for lesson 3, whose overarching topic is Child-Centered DRRM and CEPC.

In lesson 4, the actual conduct of the drills is done. There are two specific topics for this overarching topic on the Conduct of Drill. Finally, in lesson 5, the overarching topic is Managing Emergencies and Disasters. It has three specific topics.

Each of the specific topics has outlined activities as well as specific objectives which are answered by the activities done. Also, the strategies for each topic are given, with the

Table 5.
The Task Analysis Blueprint

Session	Topics	Activities	Objectives	Strategies	Assessment
Lesson 1	Introduction to DRRM				
	A. Basic Concepts	• Disaster Profiling • Identifying disaster perspective of disaster • Risk-Hazard-Vulnerability-Capacity (RHVC) assessment scoring • Designing evacuation plan • Developing a school/family communication plan	1. Explain the meaning of disaster, key concepts, principles and elements of DRR ; 2. Explain how and when an event becomes a disaster; 3. Analyze disaster from the different perspectives (physical, psychological, socio-cultural, economic, political, and biological). 4. Discuss different school-based practices for managing disaster risk to specific hazards; 5. Develop an individual, a family and a school preparedness plan; 6. Prepare survival kits and materials for self, for the family and for the workplace (school).	• Lecture • Discussion	• Paper test • Reflection writing • Critiquing of evacuation plan • Critiquing of school and family communication plan
	B. Exposure, Vulnerability & Hazard	• Plotting vulnerabilities in schools • Updating Hazard Maps • Hazard Impact Analysis	1. Define hazard, vulnerability and exposure; 2. Explain the impact of various hazards on different exposed elements. 3. Enumerate elements exposed to hazards; 4. Identify the elements that are exposed to a particular hazard; 5. Recognize vulnerabilities of different elements exposed to specific hazards; and 6. Differentiate among hazards, exposure, and vulnerabilities and give examples from actual situations.	• Lecture • Discussion • Review of school's hazard/ vulnerability map	• Critiquing of Hazard/ vulnerability maps

Lesson 2	DRRM in School							
	A.	R.A. 10121 & DepEd DRRM Programs	● Identifying mandates of DepED in the 4 thematic areas of R.A. 10121 ● Assessment of LGU (Barangay or Municipality) DRRM project or activity	1. Identify salient features of Republic Act 10121; 2. Explain DRR-related laws and policies; 3. Avail of existing DRR-related services, programs and projects; and 4. Abide by public policies on DRRM.	● Lecture ● Discussion & sharing	● Paper test (identification)		
	B.	DRRM Structure	● Completing the Incident Command System (ICS) structure of the school	1. Assign people in school specific roles and responsibilities in planned events and disaster events. 2. Create a functional DRRM team in the school that can function in planned events and during disaster events.	● Group work (3 to 5)	● Critiquing of the school's ICS structure		
	C.	Program and Activities	● Plotting of activities according to the 4 thematic areas	1. Priorities DRR and DRRM activities base on the hazards and risk present in the school.	● Group work (3 to 5)	● Critiquing of the school's ICS structure		
Lesson 3	Child-Centered DRRM and CEPC							
	A.	R.A. 10821 also known as Comprehensive Emergency Program for Children (CEPC)	● Identifying schools CEPC compliant activities	1. Identify the salient features of R.A. 10821 2. Differentiate child protection from child safeguarding	● Lecture	● Critiquing of the school's CEPC activities		
Lesson 4	Conduct of Drill							
	A.	Planning and preparation	● Preparing the Incident Action Plan for Planned Event	1. Identify the standard procedures in evacuation, shelter-in-place and lock-down drills; 2. Localize procedures base on the terrain, building, population and resources of the school; and 3. Execute operational and tactical decisions in a simulation exercise as Incident Commander (SDRRM Coordinator) and/or as a Responsible Officer (School Administrator).	● Lecture & Simulation	● Rubric using OCD's drill evaluation form		
	B.	Conduct and Evaluation	● Role-playing (table top drill)		● Simulation exercises by the whole group			
Lesson 5	Managing Emergencies and Disasters							
	A.	Basic Life Support	● Compression only lecture & demonstrations	1. Strengthen the school's capacity to respond to life-threatening emergencies with timely and appropriate response. 2. Develop capacity of individuals and schools to prepare, respond and cope with emergencies and disasters	● Lecture ● Demonstration (individual)	● Modified Rubric (DOH)		
	B.	Managing Emergencies in schools	● Simulation exercises	1. Make a list pre-hospital care skills and technical know-how in managing emergencies; and 2. Apply in simulation exercises practical skill in first aid and emergency management.	● Lecture ● Problem solving thru simulation	● Modified Rubric (DOH)		
	C.	Water safety	Simulation exercises on: ● swift water survival ● River crossing	1. Value the importance of water safety and knowledge on the element of swift, flood, sea and still water; and 2. Identify survival tips in protecting oneself from flood and drowning incidents.	● Lecture ● Hands-on (single, pair, team)	● Demonstration ● Reflection-writing		

considerations of the suitability of the strategy to the activities, objectives, facilities and materials, and the learners.

The last column of the TAB is the outlined assessment. The assessment has varied forms, depending again on the appropriateness of the topic, activities, objectives, and learners. Table 5 is the Task Analysis Blueprint.

The implementation of the extension program involves the development and production of materials, training delivery, and summative evaluation. For this study, the team was able to produce the materials and validate them. These materials include the modules, lecture notes, and media. Also, the program was evaluated and was improved based on the feedback of the clientele and the teachers who used the materials and did the conduct of the program.

Table 6 presents the specific indicators for each of the Priority Actions and the corresponding lessons which answered these needs.

Table 6.
Gaps and Lessons That Addressed the Priorities

Progress of School-Based DRRM Program	Lesson Number
Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation	
1. Community participation and decentralization are ensured through the delegation of education authorities at the local levels	Lesson 2
2. A national multi-stakeholder platform for disaster risk reduction is functioning in the education	Lesson 2
Identify, assess, and monitor disaster risks to schools and enhance early warning for all learning environments	
3. National and local risk assessments based on hazard data and vulnerability information are available to education authorities and school	Lessons 1, 4
4. Systems are in place to monitor, archive and disseminate data on school structural, infrastructural, and environmental vulnerabilities	Lesson 2, 5
5. Early warning systems for major and local hazards reach schools, and schools have the opportunity to participate in early warning systems	Lesson 2
Use knowledge, innovation, and education to build a culture of safety and resilience through curricular and co-curricular activities in schools	
6. School curricula, educational material and relevant trainings include disaster risk reduction and recovery concepts and practices	Lesson 3
7. Countrywide publica awareness strategy exists to stimulate a culture of disaster resilience, with outreach to urban and rural communities, including child-centered and child-led elements	Lessons 3, 4, 5
Reduce the underlying risk factors	
8. DRR is an integral objective of environment related policies and plans, including site selection, design, construction and maintenance of schools	Lessons 1, 2, 3
9. School disaster management policies and plans are being implemented to reduce the vulnerability of children in and out of school	Lessons 1, 2, 3
10. Educational continuity plans are in place to reduce disruption of the school year, and protect individual attainment of educational goals	Lessons 2, 4
11. Planning management of school facilities incorporates DRRM elements including processes in the education sector	Lessons 2, 4
12. Disaster risk reduction measures are integrated into post disaster recovery and rehabilitation processes.	Lessons 1, 2, 3, 4, 5
13. Procedures are in place to assure that every new school is a safe school.	Lessons 1, 2, 3, 4, 5
Strengthen disaster preparedness for effective response at all levels	
14. Strong policy, technical and institutional capacities and mechanisms for disaster risk reduction perspective are in place in the education sector	Lessons 2, 3, 4
15. Disaster risk preparedness plans and contingency plans are all in place at all administrative levels in the education sector and regular training drills and rehearsals are held to test and develop disaster response capacity programs	Lessons 2, 3, 4
16. Insurance and contingency mechanisms are in place to support effective response and recovery when required	Lessons 2, 3, 4, 5
17. Procedures are in place to exchange relevant information during hazard events and disasters, and to undertake post-event reviews.	Lessons 4, 5

Disaster Prevention Mechanisms	
1. DRRM Networking	Lesson 2
2. Capability training for stakeholders	Lesson 3, 4, 5
Disaster Preparedness Mechanisms	
1. Issuance of timely and effective early warning	Lesson 2
2. Supplies and equipment reserve	Lesson 2
3. Provision communication systems	Lesson 2
4. DRRM networks of emergency responders	Lesson 2, 4
Post Disaster Stage Mechanism	
1. Improvement of disaster resilience programs	Lesson 2

The assessment instrument for evaluating the extension program was, *criteria for evaluating extension program*, was adapted taken from the ACCUP Survey Instrument. Items modified in the instrument include the title, tailored to this extension program. It has the title *Evaluating the Disaster Risk Management and Mitigation Extension Program for School-Aged Children in the Province of Bukidnon*. Its indicators are answered by checking the evaluator's answer from the scale of 1 to 5, with 1's QD as Strongly Disagree, and 5 as Strongly Agree. The modified instrument underwent validation.

The instrument has three sections: Section 1 is on the conceptualization, design, and development of the program. Section 2 contains indicators for the implementation phase. The third section is the monitoring and evaluation of the extension program.

The summative evaluation yielded a result of 5, signifying that the evaluators strongly agreed that the program in terms of conceptualization, design, and development of the program; implementation; and the monitoring and evaluation of the extension program was very effective.

Conclusion

This paper accomplished the objective of designing and developing a DRRM extension program for school-aged children. The needs were the basis for the design and development of the said program. The program was evaluated as very effective. Thus, it can be drawn that an extension program that is based on the analyzed needs of the clientele can be very effective, also considering that the program followed the various phases of the instructional systems design of ADDIE – needs analysis, design, development, implementation, and evaluation.

Recommendations

Based on the findings and conclusions of the study, the following recommendations were drawn:

1. To test the effectiveness of the program, it can be implemented to other areas of similar disaster risks as in the present study.
2. Other risks may be included in future extension programs.
3. Sustainability of the extension program may be studied.

References

Administrative Order No. 196 (2007). Empowering the secretary of national defense and concurrent chairman of the National Disaster Coordinating Council to declare the suspension of classes in times of disasters or calamities.

Catangui, M.J. (2020). Customizing school-based disaster risk reduction and management capability. *Journal of Critical Reviews*, *7*(11). http://www.jcreview.com/fulltext/197 1590730470.pdf

DepEd Order No. 55, s. 2007. Prioritizing the mainstreaming of disaster risk reduction management in the school system and implementation of programs and projects

Domingo, S. (2017). *Institutional issues on disaster risk reduction and management*. Philippine Institute for Development Studies. Discussion Paper s. 2017-50.

Dreier, P. (1996). Community empowerment strategies: The limits and potential

of community organizing in urban neighborhoods.

Environment Agency. (2019*). Draft national flood and coastal risk management strategy for England*. Bristol.

Executive Order No. 159, s. (1968). A plan of action and effective implementation thereof through coordination by a central body within an agency is deemed vital to avoid loss of lives, limbs and property during the occurrence of said calamities.

Lopez, M. (2014). The extension framework for SUCs environmental scanning management study guide environmental scanning.

Hyogo Framework for Action. (2005-2015). International strategy for disaster reduction international strategy for disaster reduction building the resilience of nations and communities to disasters.

Jovita, H., Nurmandi, A., Mutiarin, D., & Purnomo, E. (2018). Why does network governance fail in managing post-disaster conditions in the Philippines? *Jamba*. doi: 10.4102/jamba.v10i1.585 at https://bit.ly/2I8o4AO

Laverack, G. (2001). An identification and interpretation of the organizational aspects of community empowerment.

Lopez, M. (2009). *E-HELP: CNU's integrated community extension program*. In EHELP: Protecting the poor from pressures of poverty. Unpublished brochure. Cebu Normal University.

Matsuoka, Y. & Shaw, R. (2014).Community, environment and disaster risk Management. *Hyogo Framework for Action and Urban Disaster Resilience, 16 Disaster Risk Reduction Approaches. 10.1108/ S2040-7262201416(), 89–122.*doi:10.1108/ S2040 726220140000016017.

Mohammed, M. (2018). *Disaster risk reduction and management of Tarlac City*. 7th International conference on building resilience: Using scientific knowledge to inform policy and practice in disaster risk reduction, ICBR2017-27-29 November 2017, Bangkok, Thailand. Retrieved from https://bit.ly/3lzzzPw

Parker, D. (2020). Disaster resilience – a challenged science. *Environmental Hazards*, 19(1), 1-9, DOI:10.1080/1747789 1.2019.1694857.

Presidential Degree No. 566 of 1978. Strengthening the Philippine disaster control, capability, and establishing the national program on community disaster preparedness.

Robas, R.J. (2016). *Flood disaster risk reduction and risk management of Pasig City*. Retrieved from www.researchgate.net

Shatkin G. (2000) Obstacles to empowerment: Local politics and civil society in Metropolitan Manila, Philippines. *Urban Studies*, 37, pp. 2357-2375

School-based disaster risk reduction. (2012, December 5). *Sunstar Pampanga*. Retrieved from https://bit.ly/3g1ca8m

United Nations. (2000). *World disaster reduction campaign to focus on disaster prevention, education, and youth.* Retrieved from https://www.un.org/press/en/2000/20000725.iha714.doc.html

UN Plan of Action on Disaster Risk Reduction for Resilience. (2014, November). *Education sector position paper*. (Second version prepared for the prepcom of the WCDRR 17-18). Retrieved from https://bit.ly/3lEvUjm

UNISDR. (2014). Retrieved from https://bit.ly/3olOXk6