Disaster Risk Reduction and Management among Local Universities and Colleges in Central Luzon, Philippines

Kristin Joy A. Mendoza

Tarlac State University, Philippines/Gordon College, Philippines

DOI: https://dx.doi.org/10.47772/IJRISS.2025.90400168

Received: 07 April 2025; Accepted: 15 April 2025; Published: 03 May 2025

ABSTRACT

Colleges and universities are key players in implementing the disaster risk reduction and management (DRRM) agenda of the government. This study investigated DRRM among local universities and colleges (LUCs) in Central Luzon, Philippines focusing on philosophy, policies, programs, practices, and processes (5Ps) and level of implementation in the four thematic areas - disaster prevention and mitigation, disaster preparedness, disaster response, and disaster recovery and rehabilitation. The study also examined the relationship between the 5Ps and level of implementation of DRRM and their differences. A descriptive-correlational research design was employed with 123 respondents from 12 LUCs. A self-structured questionnaire was utilized to gather data. The 5Ps were rated as Evident with Philosophy receiving the highest rating. The level of implementation in the four areas was described as Implemented with Disaster Response receiving the highest mean. Strong positive correlations were found between the 5Ps and the level of DRRM implementation with Processes and Programs exhibiting the strongest positive correlation to level of implementation. Significant differences among the institutions in these two variables were also found, which implies that some scored higher compared to the rest. Based on the findings, various measures were proposed such as the integration of DRRM into the vision, mission, goals, and objectives of the institution, development of a manual of operations and institutional plan, integration in instruction, research and extension, enhancement of current programs and practices, institutional benchmarking among colleges and universities, and the utilization of the 5Ps framework to identify gaps and areas for improvement. Implications of the study to local and national DRRM strategies were also presented.

Keywords: Disaster Risk Reduction and Management; Local Universities and Colleges; 5Ps of DRRM; Level of Implementation of DRRM; Central Luzon, Philippines

INTRODUCTION

The interrelation between social and economic development and disaster risk reduction has long been established. The impact of disasters is not limited to the loss of lives, injury, disease but also the loss of livelihood for many affected families. Educational institutions and businesses are forced to pause or limit their operations which leads to learning gaps, job losses and economic setbacks not to mention the long-lasting and often unseen emotional and psychological effects of disasters on survivors. Disasters also put a strain on government funds as the latter is expected to mobilize financial and human resources for reconstruction and rehabilitation.

Disaster risk reduction and management cuts across various United Nations Sustainable Development Goals. Specifically, Goal 11 of the United Nations Sustainable Development Goals is to make cities inclusive safe, resilient and sustainable and targets “by 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations”. Other goals that are addressed by DRRM are SDG 1 No Poverty, SDG 2 Zero Hunger, SDG 3 Good Health and Well-being, SDG 4 Quality Education, SDG 6 Clean Water and Sanitation, SDG 9 Industry, Innovation, and Infrastructure, and SDG 17 Partnership for the Goals among others.

In the Philippines, various plans and guidelines were formulated to support DRRM such as the National Disaster Risk Reduction and Management Plan (NDRRMP) 2020-2030, Guidelines for Mainstreaming Disaster Risk

Reduction (DRR) and Climate Change Adaptation (CCA) in the Comprehensive Development Plan. There are also the Local Disaster Risk Reduction and Management Plans for local government units. In addition, the acceleration of climate action and strengthening of disaster resilience is set as one of the country's priorities in the Philippine Development Plan (PDP) 2023-2028.

Statistics show the significant increase in deaths due to disasters globally. Reference [35] revealed that over the past decade, the average death from natural disasters is around 45,000, comprising to approximately 0.1% of global deaths. From 2000 to 2019, there were 7,348 reported disaster occurrences that claimed 1.23 million lives, impacting 4.2 billion people (many on more than one occasion), and causing around US$2.97 trillion in global economic losses [44]. The Philippines is very susceptible to natural disasters such as floods, cyclones, droughts, earthquakes, tsunamis, and landslides. In 2024, World Risk Index reported that the Philippines ranks first among 193 countries with the highest disaster risk worldwide followed by Indonesia, India, Colombia and Mexico. Furthermore, Global Risks Report 2023 by the World Economic Forum [47] further revealed that in the next two years, the country's top risks would be natural disasters and extreme weather events among others. The PDP 2023-2028 notes that in terms of expenses, the Philippines allocated an annual average of PHP20 billion between 2016 to 2021 as part of the National Disaster Risk Reduction and Management Fund (NDRRMF), which was mainly used for post-disaster activities such as cash assistance, resettlement, and quick response funds of agencies.

It is apparent from the statistics of casualties and the expenses associated with disasters that more attention must be given to disaster risk reduction and management. Reference [17] asserted that relevant policies must be reconsidered, institutional arrangements should be evaluated, and resource mobilization issues should be addressed.

The NDRRMP fulfills the requirements of Republic Act 10121 or the Disaster Risk Reduction and Management Act of 2010, which provides the legal foundation for disaster-related policies, plans, and programs. It is anchored on the vision of a Philippines that is "safer, adaptive and disaster-resilient Filipino communities towards sustainable development". It addresses four thematic areas: (1) Disaster Prevention and Mitigation, (2) Disaster Preparedness, (3) Disaster Response, and (4) Disaster Rehabilitation and Recovery. RA 10121 defines these areas as follows: disaster prevention and mitigation pertains to the outright avoidance, lessening, or limitation of adverse impacts of hazards and related disasters; disaster preparedness pertains to the knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from the impacts of likely, imminent, or current hazard events or conditions; disaster response refers to the provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety, and meet the basic subsistence needs of the people affected; and disaster recovery and rehabilitation refers to the measures that ensure the ability of affected areas to restore their normal level of functioning by rebuilding livelihood and damaged infrastructures, and increasing the organizational capacity of communities.

RA 10121 provides in its declaration of policy under Section 2 (g) that it shall be the policy of the State to "mainstream disaster risk reduction and climate change in development processes such as policy formulation, socioeconomic development planning, budgeting, and governance..." in education among other areas. Also provided under Section 14, is the integration of DRRM education in the curricula of tertiary level education including the NSTP. This highlights the crucial role that educational institutions play in disaster risk reduction and management. Thus, colleges and universities are key players in implementing the DRRM agenda through research, theory and model building, capacity building and participation in local, national and international initiatives. They also play a key role in reducing the impact of disasters [5]. These roles fall under the trifocal functions of instruction, research, and extension of higher education institutions.

Given the integral role that the academe plays, this study investigated disaster risk reduction and management (DRRM) in the context of higher education institutions, specifically, local universities and colleges (LUCs) in Central Luzon, Philippines, vis-a-vis the four thematic areas - disaster prevention and mitigation, disaster preparedness, disaster response and disaster rehabilitation and recovery. LUCs are created by and operate under local government units and serve as one of its arms in the implementation of the local DRRM agenda.

The study is also anchored on the 5Ps framework as applied in DRRM. This framework formulated by Schuler in 1992 was intended to analyze and manage the human capital in organizations through five key dimensions - Philosophy, Policies, Programs, Practices, and Processes. and guide decision-making. In relation to DRRM, philosophy refers to the organization's core values and beliefs which can be seen through the incorporation of disaster preparedness, response, and recovery in the philosophy of the organization which should be communicated to all stakeholders, including faculty, staff, and students, to ensure that everyone understands its value in the organization. Policies refer to established guidelines and rules that translate the institution's philosophy into concrete actions and guide decision-making in the organization. These policies outline the institution's approach to disaster preparedness, response, and recovery. Programs refer to specific initiatives and activities that support the organization's policies such as training programs and other disaster resilience programs. Practices refer to the day-to-day activities and actions to implement the policies and programs such as the regular conduct of emergency drills. Processes pertain to systematic procedures and workflows and example of which is the communication mechanism with stakeholders during emergencies.

The above framework is useful in examining DRRM among LUCs and can serve as a model in developing and implementing effective programs and practices. While numerous studies have been conducted in this area in basic education and higher education, especially in state and private universities and colleges, relevant studies in local colleges and universities seem to be lacking. Thus, the study sought answers to the following:

1) How may the 5Ps of DRRM of LUCs in Central Luzon be described in terms of philosophy, policies, programs, practices and processes?

2) How may the level of implementation in DRRM of LUCs in Central Luzon be described in terms of the four thematic areas - disaster prevention and mitigation, disaster preparedness, disaster response and disaster rehabilitation and recovery?

3) Is there a significant relationship between 5Ps of DRRM and the level of implementation of DRRM of the LUCs?

4) Are there significant differences among the LUCs in terms of the 5Ps of DRRM and the level of implementation?

5) What measures may be proposed to enhance disaster risk reduction and management among the LUCs?

METHODOLOGY

The study utilized a quantitative descriptive-correlational research design. A total of 123 respondents from 12 LUCs participated in the study selected through a mixed or hybrid sampling method, i.e. cluster sampling and purposive sampling which combines different sampling techniques to improve the coverage and increase the number of respondents [18]. The respondents consisted of the members of the DRRM committee, and other college officials and personnel who are involved in DRRM planning, implementation, monitoring and evaluation.

Data was gathered mainly through a self-structured questionnaire which was validated by four (4) experts in the field. The comments of the validators were incorporated in the questionnaire and the revised questionnaire was pilot tested in a local college. Cronbach Alpha was used to determine internal consistency. The general rule of thumb is that a Cronbach's alpha of .70 and above is good, .80 and above is better, and .90 and above is best. The lowest score is on the items under Process (.883) while the highest is Disaster Rehabilitation and Recovery (.991). In general, the items received ratings that is described as "better" (.80 and above) and "best" (.90 and above). The questionnaire was distributed through both online and in print. A total of 29 respondents answered the online form while 94 respondents answered the printed form.

Mean was used to analyze the responses for the 5Ps and level of implementation of DRRM which were categorized using an appropriate Likert scale. Pearson R was used to gauge the relationship between the said variables. On the other hand, Analysis of Variance (ANOVA) was used to examine the differences in the 5Ps of

DRRM and level of implementation of DRRM across the institutions. In testing the hypothesis, if the probability value is equal or less than 0.05, the null hypothesis was rejected in favor of the research hypothesis; and if the probability value is greater than 0.05, the null hypothesis was not rejected.

The succeeding tables present the results of the study organized vis-à-vis the statement of the problem.

RESULTS AND DISCUSSION

Philosophy, Policies, Programs, Practices and Processes (5Ps) of DRRM of the LUCs

As shown in Table I, DRRM philosophy attained an average of 4.07 or Evident. This demonstrates that the LUCs recognize the importance of DRRM in their philosophy as an organization. Reference [10] asserts that the institution's mission, vision, and philosophy act as a foundation for developing the organization's objectives and goals, offering a clear roadmap that everyone is expected to follow. Thus, it is cascaded to the organization's way of life or its organizational culture as is shown in the highest rated statement of 4.24 "the institution is committed to promoting a culture of safety and preparedness". The philosophy of the organization is also manifested in other areas such as organizational communication, thus, the statement "the institution communicates its commitment to DRRM to students, faculty, and staff" obtained a similar high rating of 4.23.

Table I 5ps of Disaster Risk Reduction and Management in Terms of Philosophy

Statement	Mean	Adjectival Description
The institution is committed to promoting a culture of safety and preparedness.	4.24	Evident
The institution communicates its commitment to DRRM to students, faculty, and staff	4.23	Evident
DRRM principles are incorporated into the curriculum and academic programs.	4.11	Evident
The principle of DRRM is aligned with the institution's core values.	3.98	Evident
DRRM is integrated into the institution's vision, mission, goals, and objectives (VMGO).	3.80	Evident
Mean	4.07	Evident

In addition, the Evident rating given to the integration of DRRM in the curriculum and academic programs may be attributed to the mandate of RA 10121 that DRRM should be integrated in the National Service Training Program, thus, is included in the syllabus. Other higher education institutions in the country offer undergraduate, master's, and diploma programs which are approved by the Commission on Higher Education [13]. Multiple studies highlight the imperative for DRR content to be integrated into existing curricula across various disciplines, particularly in geography and environmental sciences ([16], [41]). Reference [4] reveal that a curriculum that actively includes DRR concepts empowers students to identify their own risks and develop strategies for mitigation. Additionally, initiatives focused on creating engaging pedagogical approaches are necessary to enhance student participation and understanding of disaster-related concepts [49].

The higher scores on commitment and communication suggest strong awareness and advocacy for DRRM. The alignment of DRRM principles with institutional core values scored slightly lower but still Evident while the lowest-rated statement relates to DRRM integration into the institution's vision, mission, goals, and objectives (VMGO). This implies that while the LUCs believe in its importance, this is not necessarily articulated in their VMGOs.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume IX Issue IV April 2025

Table II shows that DRRM policies were rated as Evident which indicates that the LUCs have established policies but there could be varying levels of implementation and awareness.

The highest-rated statement (4.08) affirms that DRRM policies in the LUCs are aligned with the National Disaster Risk Reduction and Management Framework which indicates compliance with national standards. Reference [49] after a systematic review of disaster education initiatives in disaster-prone areas revealed that successful programs often align with national policies and emphasize local community involvement.

Table II 5ps of Disaster Risk Reduction and Management In Terms Of Policies

Statement	Mean	Adjectival Description
There are DRRM policies in place in the institution aligned with the National Disaster Risk Reduction and Management Framework.	4.08	Evident
DRRM policies are crafted with the involvement of stakeholders (students, staff, community, LGU-DRRMO etc.)	3.89	Evident
The members of the academic community are aware of the specific policies the institution has in place for DRRM	3.85	Evident
DRRM policies are reviewed and updated.	3.67	Evident
There is a DRRM manual of operations being used in the institution.	3.66	Evident
Mean	3.83	Evident

The implementing rules and regulations (IRR) of RA 10121 provides that it is the policy of the state "to institutionalize the policies, structures, coordination mechanisms, and programs with continuing budget appropriation on disaster risk reduction from national to local levels towards building a disaster-resilient nation and communities" [35]. In relation to this, CHED under CMO No. 9 series of 2013 or the Enhanced Policies and Guidelines on Student Affairs and Services set relevant guidelines under Section 28 - Safety and Security Services. Under this order, higher education institutions are mandated to have mechanisms to address DRRM to include persons with disabilities (Sec. 28.2), to conduct regular earthquake and fire drills involving majority of teaching and non-teaching personnel and students (Sec. 28.3), and to have a contingency plan for each campus (Sec. 28.4).

Stakeholder involvement in crafting policies and awareness of these policies among the academic community were also rated Evident. The involvement of stakeholders is an integral part of RA 10121 and its implementing rules and regulations. The NDRRM framework is community-based which means that the communities which are at risk are expected to be actively involved in the identification, analysis, treatment, monitoring and evaluation of disaster risks to reduce their vulnerabilities and enhance their capacities, and where the people are at the heart of decision-making and implementation of disaster risk reduction and management activities. Stakeholders who are likely to engage with disaster situations have a responsibility to develop their capacity to prepare, mitigate, respond, and recover [42]. Reference [30] noted that effective disaster risk management necessitates clear definitions of stakeholders' roles and responsibilities.

The review and updating of policies had a lower mean (3.67) while the statement with the lowest mean of 3.66 concerns the use of a manual of operations. These areas may be considered for improvement by higher education institutions.

Table III shows that DRRM programs garnered a mean of 3.70 but still Evident which is the lowest rating among the 5Ps. This indicates that the LUCs implement DRRM programs but may still need enhancement especially in relation to the conduct of researches by faculty, staff and students which is the only indicator described as Moderately Evident across all indicators.

Table Iii 5ps Of Disaster Risk Reduction and Management in Terms of Programs

Statement	Mean	Adjectival Description
Orientation and cascading of DRRM policies are part of the orientation programs for new faculty, staff, and students.	3.94	Evident
DRRM is included in the faculty and staff development program.	3.94	Evident
There is an institutional DRRM plan.	3.76	Evident
The institution allocates funding for DRRM initiatives.	3.59	Evident
Faculty, staff, and students conduct research studies on DRRM.	3.25	Moderately Evident
Mean	3.70	Evident

The Evident rating is reflected in the provision for faculty, staff, and student orientation programs and faculty and staff development programs. Reference [21] concluded in their study on knowledge management in disaster preparedness that the transfer of knowledge needs to be more enhanced for more communities to participate and conduct disaster preparedness training and simulations as it can be effectively used by the community before, during, and after a disaster. Reference [24], on the other hand, emphasized the key role that the school plays in education and development of fundamental skills to face any disaster. Training and capacity building develops the ability of students and school communities in making the right decisions during a disaster. Moreover, disaster management instills the right attitude in responding to a disaster.

The presence of an institutional DRRM plan and the allocation of funding for DRRM initiatives were given lower ratings but still categorized as Evident. As noted earlier, the use of a manual of operations also obtained the lowest rating under policies. This may denote that the LUCs may be strong in terms of their practices but will still have to work on formalizing and documenting their practices.

The statement on the conduct of research on DRRM by faculty, staff, and students is the only indicator that was rated Moderately Evident among all indicators across the 5Ps. This suggests that research efforts in this field are limited and may require further encouragement. Research is one of the trifocal functions of higher education institutions and among the ways by they can contribute to the achievement of the United Nations Sustainable Development Goals. Thus, the inclusion of DRRM in the research agenda of the colleges and universities may be considered considering that it cuts across various Sustainable Development Goals as noted earlier.

Table IV shows that DRRM practices received a mean of 3.89 or Evident. All indicators were described as Evident with the conduct of regular emergency drills and simulations obtaining the highest mean.

Table Iv 5ps Of Disaster Risk Reduction and Management in Terms of Practices

Statement	Mean	Adjectival Description
The institution conducts regular emergency drills and simulations.	4.19	Evident
The institution engages with the local community in DRRM initiatives.	3.94	Evident
There are facilities available for DRRM such as evacuation areas, early warning devices, and the likes.	3.86	Evident
The institution provides adequate training and resources on DRRM for students and staff.	3.82	Evident

DRRM is incorporated in the curricula and syllabi.	3.65	Evident
There is a DRRM Unit/Office with enough personnel and equipment.	3.59	Evident
Mean	3.84	Evident

The highest-rated statement is the conduct of regular emergency drills and simulations. This is in consonance with CMO No. 9 series of 2013 which mandates the regular conduct of earthquake and fire drills to involve majority of students and teaching and non-teaching personnel (Sec. 28.3).

Community engagement is also Evident. As earlier noted, DRRM is a community-based process, thus, as [23] concluded in their study, community participation in various stages of disaster management is vital for successful implementation.

The availability of facilities (such as evacuation areas and early warning devices) while training and resource provision for students and staff were given lower ratings but still Evident. Reference [46] emphasizes the economic rationale for investing in resilience, noting that every US$1 allocated to risk reduction and prevention has the potential to yield savings of up to US$15 in post-disaster recovery efforts.

In terms of training and capacity building, [24] stated that school plays a key role in education and development of fundamental skills to face any disaster. Training and capacity building develops the ability of students and school communities in making the right decisions during a disaster. Moreover, disaster management instills the right attitude in responding to a disaster. In contrast, [15] found that the student-respondents had difficulty in implementing DRR activities due to a lack of training in several areas of DRRM and limited equipment, reading materials and supplies.

The second lowest-rated statement concerns the integration of DRRM in curricula and syllabi, suggesting that while disaster preparedness is part of the academic framework, it may not be consistently emphasized across all programs. It can also mean that the institutions integrate the topic in the NSTP program since it is mandatory but not necessarily in other academic programs. A study on disaster preparedness and awareness among university students by [31] show that 65% of the students perceived that both theoretical and practical DRR education is significant and 38% for high awareness of survival techniques and rescue kills which are essential during a disaster. The study revealed that the integration of DRR education in the university has a significant impact on the student's level of disaster awareness. This is supported by the findings in several studies. The systematic review of literature by [2] found that the integration of disaster prevention education is significant in increasing the effectiveness of preparedness while [27] noted the value of DRRM education in reducing the vulnerability of people to natural and human-induced disasters. Reference [28] added that the integration of disaster education in school plays a key role in ensuring that learners have essential knowledge and preparedness for disaster mitigation. Reference [26] stated that the knowledge and understanding of students particularly on hazards, hazard maps, disaster preparedness, awareness, adaptation, mitigation, preparation, resiliency, and adaptation can be due to the efficiency and impact of integration of DRR education in the senior high school curriculum.

Finally, the lowest-rated statement is the presence of a DRRM unit/office with enough personnel and equipment. Most of the LUCs do not have a dedicated office or unit in their organizational structure, however, they form a Committee in which personnel are assigned in a part-time capacity or as additional assignment for existing personnel. This may be attributed to the earlier finding on budget allocation. In addition, it should also be noted that the LUCs operate under local government units which are mandated to have their own DRRM Office, thus, the LUCs especially those who have a smaller population (student and employees) avail of the services of the local DRRM Office.

Table V shows the results on DRRM in terms of processes with an overall mean score of 3.78 or Evident which suggests that the LUCs have established processes but may require further refinement in execution and monitoring.

Table V 5ps of Disaster Risk Reduction and Management In Terms Of Processes

Statement	Mean	Adjectival Description
There is a communication and information protocol before, during, and after emergency situations.	3.95	Evident
There is a procedure for vulnerability assessment in the institution.	3.81	Evident
There is a procedure in conducting hazard mapping in the institution.	3.80	Evident
There is a procedure in the inventory of DRRM resources and services.	3.70	Evident
There is a system for rapids needs assessment in areas affected by disasters.	3.66	Evident
Mean	3.78	Evident

The statement with the highest rating (3.95) indicates that the LUCs have established communication and information protocols before, during, and after emergency situations. Reference [45] highlights the importance of communication protocols which facilitate the communication of messages and information prior, during or following a disaster, thus mitigating potential damage and health risks. The research of [20] which aimed to understand disaster risk communication in Lasallian schools in the Philippines, focusing on preparedness, mitigation, response, and rehabilitation revealed distinctive communication processes, influenced by inflexible systems, outdated frameworks, and lack of training. Thus, the study proposed model was developed for disaster risk communication model for school-initiated DRRM interventions.

Other indicators such as the presence of a vulnerability assessment procedure, hazard mapping procedures and inventory of resources and services were also Evident. The lowest-rated statement (3.66) concerns the presence of a system for rapid needs assessment in disaster-affected areas but still Evident. While these indicators obtained an Evident rating, the need to capacitate personnel is still apparent.

Reference [5] stated that DRRM practices are heavily reliant on the processes and systems established by education institutions towards DRRM programs that are school-based and suggested that all higher education institutions should establish a functional DRRM program. In addition, the establishment of emergency procedures has a direct impact on the student's level of preparedness [31].

In summary, all the 5Ps – philosophy, policies, programs, practices, policies and processes obtained a descriptive rating of Evident. Philosophy obtained the highest rating while Programs obtained the lowest. This implies that an institutional framework is already in place and being implemented as shown in the findings. However, these are not yet highly evident, thus, they need further enhancement.

Level of Implementation of DRRM of the LUCs

The LUCs were also assessed based on the level of implementation in terms of four pillars - disaster prevention and mitigation, disaster preparedness, disaster response and disaster rehabilitation and recovery.

Table 6 presents the results on the level of implementation of DRRM in terms disaster prevention and mitigation. The overall mean score of 3.82 or Implemented indicates that the LUCs have successfully integrated disaster prevention and mitigation measures but may need to strengthen funding and assessment mechanisms.

Table VI Level of Implementation of Drrm In Terms Of Disaster Prevention and Mitigation

Statement	Mean	Adjectival Description
Evacuation maps and signages are available.	4.04	Implemented

Disaster risk reduction and management is included in the institution's development plans.	3.97	Implemented
Potential hazards and hazard-prone areas in the institution are identified, mapped out and posted for everyone's information.	3.81	Implemented
A vulnerability analysis is being done.	3.69	Implemented
Budget is allocated for DRRM annually.	3.59	Implemented
Mean	3.82	Implemented

Based on the results, emergency preparedness measures (maps, signage, and hazard mapping) are well-established, ensuring that students, faculty, and staff have access to vital safety information. However, budget allocation is the weakest area, which could impact the sustainability and effectiveness of disaster prevention efforts.

The statement with the highest rating (4.04) confirms that evacuation maps and signages are described as Implemented. This confirms the earlier finding on the availability of facilities (such as evacuation areas and early warning devices) which was also rated as Implemented. Inclusion of DRRM in institutional development plans was also rated Implemented and received the second highest rating. This reflects the institutional commitment to promote a culture of safety which was earlier confirmed as Evident under DRRM philosophy.

Identification and mapping of hazard-prone areas and vulnerability analysis were rated Implemented. These results mirror the previous results in terms of DRRM processes specifically on the presence of a vulnerability assessment procedure and hazard mapping procedures which were both rated Evident. Reference [37] emphasized the importance of having a vulnerability assessment framework (VAF) for disaster risk reduction. They noted that with the availability of vulnerability information, institutions can properly develop and carry out programs that can be applied before, during, and after a disaster. The findings of [14] show that frequent inspections of equipment and assessment of asset vulnerabilities are among the practices in the strong implementation of disaster prevention and mitigation practices.

The lowest-rated statement concerns the annual budget allocation for DRRM but still Evident. Reference [19] also identified budget allocation among the weaknesses in his study of DRRM in higher education institutions.

Table VII shows the evaluation of the level of implementation of DRRM related to disaster preparedness. The overall mean score of 3.95 or Implemented indicates that the LUCs have established disaster preparedness mechanisms, with regular drills and external partnerships being the strongest areas.

Similarly, the findings [19] on the disaster management program of seven higher education institutions in Cavite, Philippines identified the strengths which included earthquake and evacuation drills, but weaknesses were budget allocation and evaluation. The study of [22] emphasized the importance of formal education in promoting disaster preparedness especially on individuals with no disaster experience. They added that formal education plays a significant role in taking up preparedness actions.

Table VII Level of Implementation of Drrm In Terms Of Disaster Preparedness

Statement	**Mean**	**Adjectival Description**
Earthquake and fire drills are regularly conducted	4.48	Implemented
The institution partners with government and non-government institutions for disaster preparedness in the institution.	4.15	Implemented

Contingency plans, in case of disasters, are in place.	4.02	Implemented
A disaster response plan has been developed and cascaded to the community.	3.95	Implemented
Information dissemination through orientation, development and distribution of IEC materials are being done for community awareness and understanding of DRRM.	3.91	Implemented
Capacity building activities are being conducted for the officials, faculty, and staff of the institution.	3.85	Implemented
Asset inventory is being conducted.	3.67	Implemented
There is a pool of Incident Command System (ICS)-trained personnel.	3.54	Implemented
Mean	3.95	Implemented

From the table, it may be gleaned that information dissemination, contingency planning, and capacity building are present but may need enhancements in execution and monitoring. The availability of ICS-trained personnel and asset inventory systems are the weakest areas, which could affect emergency response efficiency and resource management. Reference [8] assessed the capacity of secondary public schools in Benguet province for disaster risk reduction and management. The results show moderate resource capacity, with most schools having evacuation and contingency plans. However, there are still gaps in DRRM capacity, affecting performance in providing a safe environment. As such, the study recommended that public institutions examine their systems and enhance their implementation of different thematic areas of DRRM. Implementing effectively ensures continuity of education and safety for students and faculty.

In terms of the specific ratings received, the statement that received the highest rating (4.48) confirms that earthquake and fire drills are regularly conducted. This statement received the highest rating among all indicators in the four pillars. Again, this is in consonance with Section 28.3 of CMO No. 9 series of 2013 which requires the regular conduct of earthquake and fire drills. This finding runs contrary to [30] which found only an average level of implementation of HEIs on student's role in school safety. It was found that there was a low implementation of emergency drills and exercise which can possibly be because of the lack of training on triage and first aid, impracticality of life jackets for the whole population of the school, financial considerations in the fire-fighting equipment during drills, and the absence of clear chain of command.

Partnerships with government and non-government institutions for disaster preparedness received a high mean of 4.15. In a qualitative study by [30], one participant from a university confirmed the presence of personnel from various government agencies such as PNP, Red Cross, Bureau of Fire Protection, and others to monitor and evaluate their drills. This is a common experience across various academic institutions especially during the conduct of national earthquake drills.

On the other hand, the presence of contingency plans in case of disasters was described as Implemented which is consonance with CMO no. 9 series of 2013 which requires higher education institutions to have a contingency plan in case of disasters. The development and dissemination of disaster response plan was also described as Implemented which indicates that the assessed colleges have structured response mechanisms but may need to enhance accessibility and awareness.

Information dissemination through orientations and IEC materials and capacity-building activities for officials, faculty, and staff were also rated Implemented suggesting that institutions provide training but may need to increase frequency or depth. The 2022 study of [25] on disaster preparedness and readiness of Filipinos based on ergonomic factors found that among the most significant factors influencing the preparedness and readiness of Filipinos during disasters are - access to media and other sources of information and being informed on the evacuation plan. Reference [14] in their study on DRRM awareness and practices of universal banks in Bacolod

City, found that employees are highly aware of DRRM, thus, in terms of their DRRM practices, majority of the practices have the highest results under disaster prevention and mitigation. Moreover, [43] found that the status of DRRM program implementation is significantly associated with the level of capabilities among school administrators. This necessitates the conduct of capacity building activities not only for school administrators but also for teaching and non-teaching personnel.

Asset inventory practices and the presence of ICS-trained personnel were the lowest-rated aspects but still described as Implemented, indicating that tracking resources and specialized emergency response training require improvement. In contrast, [14], earlier cited, found that the banks undertake frequent inspections of their equipment, as well as the exposure and vulnerability of their assets and procedures, which employees ranked the highest.

Table VIII evaluates the level of implementation of DRRM strategies related to disaster. The overall mean score of 4.00 or Implemented suggests that the institutions assessed have well-established disaster response mechanisms, particularly in evacuation procedures, damage assessment, and information sharing. However, results also show that, response efficiency, rapid needs assessment, and institutional coordination mechanisms could be further optimized to improve real-time disaster management.

Table VIII Level of Implementation of Drrm In Terms Of Disaster Response

Statement	**Mean**	**Adjectival Description**
The evacuation protocol is being implemented.	4.13	Implemented
Damage assessment is conducted in the affected areas.	4.05	Implemented
Timely, accurate and reliable information is provided to concerned authorities before, during and after disasters.	4.01	Implemented
Rapid needs assessment is conducted in the affected areas.	3.92	Implemented
There is an institutional mechanism for disaster response operations.	3.89	Implemented
Mean	4.00	Implemented

Among the four areas, disaster response received the highest score. Reference [33] in their study of coastal communities in Camarines Sur which revealed that disaster response is the only indicator that was described as “implemented” indicating local officials are only active in the occurrence of a disaster. The three indicators: disaster prevention and mitigation, disaster preparedness, disaster rehabilitation and recovery, were found to be not implemented.

The highest-rated statement (4.13) indicates that evacuation protocols are effectively implemented. This is aligned with the earlier findings that earthquake and fire drills are regularly conducted and are evident. As [49] emphasized, hands-on training and simulation exercises are crucial for a practical understanding of disaster response mechanisms, enhancing both individual and community resilience in times of crisis.

The lowest-rated statement (3.89) concerns the institutional mechanism for disaster response operations. Reference [40] discussed how policy frameworks like the Philippine DRRM Act of 2010 lay the groundwork for effective response mechanisms in schools, mandating the training of staff and students in emergency protocols. Reference [1] illustrated the urgency of integrating DRRM into school policy, emphasizing that effective disaster response plans significantly augment a school's ability to manage crises when they arise. The said literature emphasizes the need for disaster response mechanisms to be institutionalized. As shown in the results of the study, there is a need to enhance institutional mechanisms for disaster response which means that this must be integrated into the systems, operations and even the culture of the institutions.

Table IX shows the assessment of the level of implementation of DRRM in disaster rehabilitation and recovery in the LUCs assessed. The overall mean score is 3.82 or Implemented which is also the mean rating obtained in the area disaster prevention and mitigation. Both these areas received the lowest means among all the four thematic areas.

Table IX Level of Implementation of Drrm In Terms Of Disaster Rehabilitation and Recovery

Statement	Mean	Adjectival Description
The LUC has the capacity to conduct psychosocial interventions.	3.93	Implemented
There are psychosocial care providers, from within or outside the institution, who can assist faculty, staff, and students in times of disasters.	3.90	Implemented
A system of support and communication is in place for faculty, staff, and students.	3.88	Implemented
There is a debriefing protocol for faculty, staff, and students after disasters.	3.80	Implemented
The institution has a Public Service Continuity Plan or PSCP (mechanism of the LUC to go back to normal operations).	3.77	Implemented
A post-disaster assessment tool is available.	3.65	Implemented
Mean	3.82	Implemented

As posed by [12], in a study focusing on the extent of implementation of DRRM in the third District of Negros Oriental, “people are more proactive in preventing disasters than recovering from them”. They also attributed the poor performance to a lack of expertise and resources.

The highest-rated statement (3.93) indicates that LUCs have the capacity to conduct psychosocial interventions, suggesting that institutions recognize the importance of mental health and emotional recovery after disasters. The presence of psychosocial care providers (internal or external) was described as Implemented highlighting the availability of support networks for faculty, staff, and students. A system of support and communication scored was also described as Implemented indicating that institutions maintain mechanisms for post-disaster updates and assistance. This is an important finding since community well-being is “provides a picture of the level of stability, security and trust among the individual community members [11]. As part of the psychosocial interventions, debriefing protocols for faculty, staff, and students was also rated Implemented. The findings indicate the need for standardization of psychosocial interventions in the institutions.

The presence of a Public Service Continuity Plan (PSCP) scored 3.77 or Implemented. The PSCP is a tool that ensures that the government continuously functions and delivers essential functions regardless of disruption to normalcy during an emergency or disaster. It comprises an agency or institution's internal capacities, recovery requirements, and strategies. This is a requirement for all government agencies under Memorandum Order No. 33, s. 2018 issued by the National Disaster Risk Reduction and Management Council.

The lowest-rated statement (3.65) concerns the availability of a post-disaster assessment tool. The results suggest that there are established disaster rehabilitation and recovery mechanisms, with psychosocial support and communication systems being the strongest areas. However, post-disaster assessment and structured recovery planning remain areas for enhancement to ensure a comprehensive and effective recovery process.

As shown, all four areas were rated as Implemented, with disaster response receiving the highest mean while both disaster prevention and mitigation and disaster rehabilitation and recovery having the lowest mean. This indicates the need for further enhancement of DRRM in the assessed colleges.

Correlation between the 5Ps of DRRM and the Level of Implementation

Table X presents the results on the correlation analysis between philosophy, policies, programs, practices, and processes and the level of implementation of DRRM among the LUCs assessed. The Pearson correlation coefficient (r) and p-values indicate the strength and significance of these relationships.

Table X Correlation between 5ps of Drrm and Level of Implementation

Component	Pearson *r*	*p*-value	Result	Decision
Philosophy	0.803	0.000	Significant	Reject Ho
Policies	0.836	0.000	Significant	Reject Ho
Programs	0.860	0.000	Significant	Reject Ho
Practices	0.838	0.000	Significant	Reject Ho
Processes	0.861	0.000	Significant	Reject Ho

From the table, it may be gleaned that all components of the 5Ps show strong positive correlations with the level of implementation, as indicated by Pearson r values ranging from 0.803 to 0.861. The range of the computed r ranging from 0.70 to 0.99 indicates a strong or high relationship between the two variables. In addition, all corresponding probability or p-values are 0.000, indicating statistical significance at the 95% confidence level. This means that the relationship between the 5Ps and DRRM implementation are highly significant, leading to the rejection of the null hypothesis (Ho), which assumes no correlation.

The strong positive relationship essentially implies that the more established the institution's philosophy, policies, programs, practices and processes are in DRRM, the better the level of implementation in the four areas.

Furthermore, Table X shows that the highest correlation is observed in Processes (r = 0.861) and Programs (r = 0.860) vis-à-vis level of implementation. This suggests that institutions with well-established processes and structured programs tend to have higher levels of DRRM implementation. A study by [5], earlier cited, evaluated the DRRM programs in 27 HEIs in the Caraga Region of the Philippines, emphasizing the significance of structured programs and processes in enhancing disaster preparedness and resilience.

Practices (r = 0.838) and Policies (r = 0.836) also exhibit strong correlations with level of implementation, indicating that adherence to policies and actual disaster risk reduction practices significantly contribute to effective DRRM implementation. The UNDRR underscores the importance of integrating DRRM into development planning and budgeting, highlighting that effective policies and practices are essential for building disaster-resilient communities.

Philosophy (r = 0.803) has the lowest correlation among the components but still exhibits a strong or high positive relationship with level of implementation. This implies that while institutional commitment (through mission, values, and curriculum integration) is important, its direct impact on implementation may be slightly less pronounced compared to other factors. This suggests that institutional commitment, reflected through mission statements, values, and curriculum integration, sets a foundational basis for effective implementation. The Sendai Framework for Disaster Risk Reduction emphasizes the role of educational institutions in fostering a culture of disaster resilience, highlighting that a strong philosophical commitment is vital for sustainable implementation.

The findings confirm that the 5Ps framework plays a crucial role in the successful implementation of DRRM in HEIs. The strongest relationships are observed in Processes and Programs, emphasizing that having structured procedures and well-developed DRRM programs leads to a more effective disaster management system. While Philosophy shows a slightly lower correlation, it remains a significant factor, suggesting that institutional values

and commitments to DRRM set the foundation for effective implementation but need to be reinforced through concrete actions.

Differences in the 5Ps of DRRM and Level of Implementation of DRRM among LUCs

Table XI indicates that there are significant differences in philosophy, programs, policies, practices and processes (5Ps) among the LUCs assessed. The F-value (5.146) and p-value (0.000) indicate that the differences in DRRM among the LUCs are statistically significant at the 95% confidence level. Since the p-value is less than 0.05, the null hypothesis (Ho), which assumes no significant difference in the 5Ps of across the LUCs, is rejected.

Table XI Difference in the 5ps of Drrm among Lucs

	Sum of Squares	df	Mean Square	F	Sig.	Result
Between Groups	28.261	12	2.355	5.146	.000	Significant
Within Groups	50.345	110	.458			
Total	78.606	122				

This implies that there are LUCs with more established philosophy, policies, programs, practices and processes compared to the others which is shown on Table XII.

Table XII show that LUC-P3 (Mean = 4.7550) and LUC-Ba1 (Mean = 4.6316) reported the highest levels of 5Ps, with low standard deviations, indicating consistency in their practices. Institutions such as LUC-Bu2 (Mean= 3.9673), LUC-Bu4 (Mean = 3.8962), and LUC-Bu1 (Mean = 3.8933) and demonstrate a moderate level of 5Ps in DRRM, with mean scores close to 4.00. LUC-P4 (Mean = 2.3550) and LUC-P2 (Mean = 2.9725) had the lowest DRRM implementation levels, suggesting potential gaps in policies, programs, or resources.

Table XII Descriptives (5ps Of Drrm)'

LUC	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
LUC-P1	8	3.2063	.80473	.28452	2.5335	3.8790	2.10	4.23
LUC-P2	4	2.9725	.27342	.13671	2.5374	3.4076	2.73	3.32
LUC-Bu1	6	3.8933	.47154	.19250	3.3985	4.3882	3.22	4.60
LUC-Bu2	11	3.9673	.65397	.19718	3.5279	4.4066	2.88	5.00
LUC-Z1	14	3.6950	.62673	.16750	3.3331	4.0569	2.54	4.70
LUC-P3	2	4.7550	.34648	.24500	1.6420	7.8680	4.51	5.00
LUC-Z2	18	3.7689	.86540	.20398	3.3385	4.1992	2.03	5.00
LUC-Ba1	19	4.6316	.25301	.05804	4.5096	4.7535	4.19	5.00
LUC-P4	2	2.3550	.71418	.50500	-4.0616	8.7716	1.85	2.86
LUC-Bu4	13	3.8962	.72520	.20113	3.4579	4.3344	2.41	5.00
LUC-Bu3	8	3.7679	.60632	.24753	3.6470	4.9196	3.41	4.93
LUC-Z3	18	3.5461	.78022	.18390	3.1581	3.9341	1.45	4.75
Total	123	3.7046	.80269	.07238	3.7023	3.9889	1.45	5.00

The total mean score of 3.7046 suggests that on average, LUCs have a fairly high level of 5Ps in DRRM, but the variation in scores highlights differences in institutional approaches and capacities. The results imply that some LUCs are more advanced in terms of 5Ps. This means that these LUCs are likely to have stronger policies, better funding, and more structured DRRM processes. The results align with findings from similar studies. For instance, [32] assessed the DRRM capabilities of State Universities and Colleges (SUCs) in Iloilo, Philippines, and found significant differences in disaster preparedness, response, prevention and mitigation, and rehabilitation and recovery when classified by institution. These differences were statistically significant, indicating that some institutions are better equipped in their DRRM capabilities than others.

These differences in the 5Ps may be attributed to organizational characteristics of the LUCs. Organizational demographic characteristics, such as type, location, sector, and size, are pivotal to the success of managing disasters and shaping disaster management practices [3], 2023). These characteristics can influence an organization's vulnerabilities, available resources, and capacity to respond to and recover from disasters ([9], [38] cited in [3]).

On the other hand, LUCs with lower implementation levels may require additional resources, policy adjustments, or training programs to improve their DRRM. This is consistent with the role of higher education institutions in advancing disaster risk knowledge and building local risk capacity, as they are pivotal in reducing the impact of disasters through education, research, and community engagement [39].

Table XIII shows whether there are significant differences in the four pillars of DRRM among the LUCs assessed. The F-value (5.417) and p-value (0.000) indicate that the differences among the LUCs are statistically significant at the 95% confidence level. Since the p-value is less than 0.05, the null hypothesis (Ho), which assumes no significant difference in the four pillars of DRRM across the LUCs, is rejected. This means that at least one institution's mean score is statistically different from the others. Furthermore, the sum of squares (between groups) = 28.205 is considerably large compared to within groups = 47.731 which supports that differences exist across institutions.

Table XIII Difference in the Level of Implementation of Four Pillars of Drrm among Lucs

	Sum of Squares	df	Mean Square	F	Sig.	Result
Between Groups	28.205	12	2.350	5.417	.000	Significant
Within Groups	47.731	110	.434			
Total	75.936	122				

As shown in Table XIV, institutions with the highest means scores are LUC-P3 (4.7550) and LUC-Ba1 (4.6868) which suggests that they have a higher level of implementation compared to the other institutions. Interestingly, these are the same institutions which also have the highest 5Ps rating. This confirms the findings on the strong positive correlation of these two variables – the higher the 5Ps, the higher the level of implementation.

Table XIV Descriptives (Level of Implementation of the 4 Pillars of Drrm)

LUC	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
LUC-P1	8	3.4275	.59665	.21095	2.9287	3.9263	2.55	4.29
LUC-P2	4	3.0150	.26839	.13420	2.5879	3.4421	2.74	3.26
LUC-Bu1	6	3.8250	.68146	.27821	3.1098	4.5402	3.06	5.00
LUC-Bu2	11	4.0364	.63142	.19038	3.6122	4.4606	2.88	5.00
LUC-Z1	14	3.7800	.68581	.18329	3.3840	4.1760	2.14	4.70
LUC-P3	2	4.7550	.34648	.24500	1.6420	7.8680	4.51	5.00
LUC-Z2	18	3.9228	.83377	.19652	3.5082	4.3374	2.18	4.94
LUC-Ba1	19	4.6868	.27411	.06288	4.5547	4.8190	4.24	5.00
LUC-P4	2	2.1250	.79903	.56500	-5.0540	9.3040	1.56	2.69
LUC-Bu4	13	3.8900	.65088	.18052	3.4967	4.2833	2.23	4.71
LUC-Bu3	8	3.8617	.69111	.28214	3.4581	4.9086	3.36	5.00
LUC-Z3	18	3.5222	.76262	.17975	3.1430	3.9015	1.26	4.43
Total	123	3.7373	.78894	.07114	3.7561	4.0377	1.26	5.00

LUC-Bu2 (4.0364) and LUC-Bu3 (3.8617) also have relatively high scores. LUC-P4 obtained the lowest mean (2.1250), significantly below the overall average together with LUC-P2 (3.0150), both of which have been noted to have the lowest ratings in terms of 5Ps as shown in Table XII. Institutions with lower scores may need improvements in DRRM implementation while institutions with high scores can serve as benchmarks for best practices.

This is consistent with the study of [31], earlier cited, which assessed the DRRM capabilities of SUCs and LGUs in Iloilo, Philippines, and found significant differences in disaster preparedness, response, prevention and mitigation, and rehabilitation and recovery. Again, organizational characteristics of the LUCs may also play a role in these differences.

CONCLUSION

This study highlights the significant role of the 5Ps—philosophy, policies, programs, practices, and processes—in shaping the disaster risk reduction and management (DRRM) framework within local universities and colleges. The findings indicate that while all dimensions are evident in the LUCs, Philosophy and Policies emerged as the most prominent, reflecting a strong institutional commitment to fostering a culture of safety and

preparedness. However, Programs, particularly in terms of faculty, staff, and student engagement in research, exhibited the lowest rating, indicating an area for improvement.

The level of implementation in LUCs was consistently rated as Implemented across the four thematic areas of disaster prevention and mitigation, preparedness, response, and rehabilitation and recovery. Notably, disaster response recorded the highest mean, while disaster prevention and mitigation, along with rehabilitation and recovery, received the lowest ratings. These findings suggest that while the institutions are proactive in emergency response, there is room for enhancement in long-term risk reduction strategies and recovery efforts.

A strong positive correlation was observed between the 5Ps and the level of DRRM implementation, with Processes and Programs demonstrating the most substantial relationships. This connotes that the better the 5Ps especially programs and processes, the better the level of implementation on DRRM of the institution. While Philosophy obtained a slightly lower correlation, it remains a crucial factor. Additionally, significant variations in implementation were identified, with some institutions exhibiting stronger DRRM than others. This may suggest disparities differences in institutional capacities, resource allocation, and commitment.

The study emphasizes the necessity for continuous improvement in DRRM policies and programs within the colleges and universities. Given the results of the study, several measures may be considered:

1) Integration of DRRM as part of the vision, mission, goals, and objectives of the institution, thus, ensuring its inclusion in development and strategic plans.

2) Integration of DRRM in the trifocal function of instruction, research and extension.

3) Development of a manual of operations and institutional plan for DRRM with the participation of stakeholders such as faculty, staff, students, parents, alumni, industry partners, local officials and other stakeholders including its regular dissemination and review.

4) Allocation of more funding to include budget on equipment, training, research, and personnel for DRRM.

5) Offering additional courses beyond the National Service Training Program, developing diploma or degree programs or incorporating disaster resilience concepts in the curricula and collaborating with the local DRRM Office in curriculum development to ensure program relevance may also be considered.

6) Enhancement of current practices since the level of implementation is already rated Implemented.

7) Review of disaster prevention and mitigation and disaster rehabilitation and recovery programs and activities since these obtained the lowest mean to identify areas for improvement.

8) Given the strong correlations between the 5Ps and level of DRRM implementation, “programs” and “processes” may be refined since these exhibited the strongest relationship to the level of implementation.

9) Acknowledging the significant differences among the institutions, benchmarking among colleges and universities to adopt best practices will be helpful in enhancing DRRM strategies.

10) Further research may be undertaken focusing on policy coherence, financial sustainability, governance models, stakeholder engagement, and capacity-building to enhance DRRM in local universities and colleges.

11) Utilization of the 5Ps framework to identify gaps and areas for improvement.

The above findings also carry several implications to local and national strategies in cultivating a culture of disaster preparedness and resilience. Primarily, an emphasis on embedding DRRM into the core framework of institutions, including government agencies – through their philosophy and policy - may be considered to enhance overall disaster preparedness. The need to recalibrate efforts to ensure balanced focus, commitment and investment across the four pillars of disaster management whereby priority is given to long-term risk reduction strategies that emphasize sustainable resilience-building rather than solely focusing on reactive measures is also

given emphasis. The low rating for DRRM-related research highlights the need for engagement in this area, thus, the need for more academic support and funding and encourages collaboration with government agencies to drive innovation in the development of strategies. Furthermore, the study suggests the need to ensure adequate financial support for initiatives especially for equipment, training, research, and personnel—not only in educational institutions but also in local government and communities as this will have long-term benefits in minimizing the impact of disasters. Stronger multi-sectoral partnerships among academic institutions, local governments, businesses, and non-government organizations to promote a more cohesive and community-driven approach to disaster risk reduction is also advocated. The variations in implementation across different institutions suggests a need for a standardized framework to guide the uniform implementation of DRRM. Finally, the 5Ps model provides a structured framework for evaluating and strengthening DRRM implementation and may be utilized as a tool to assess existing policies, identify gaps, and develop targeted improvements in local and national strategies.

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