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Designing an Integrated Undergraduate Disaster STEM Curriculum: A Cultural Shift in Higher Education Curriculum Development in Bangladesh

Kazi Shahidullah[1]
Bangladesh University of Professionals, Bangladesh

Md Rifat Hossain
University of Toledo, Ohio, USA

Abstract: The Department of Disaster and Human Security Management (DHSM) at Bangladesh University of Professionals (BUP) started its journey in 2015. This is one of the few programs at this university that began at the very beginning. At the onset, this study examined some of the existing undergraduate programs in Disaster Science and Management offered by various higher educational institutions around Bangladesh. Among these programs, a handful are well-organized and utilize an integrated curriculum responsive to the needs of the 21st century. Transforming the traditional undergraduate programs and curricula of Social Disaster Management into an integrated STEM program from policy to practice is a considerable challenge, and students have many expectations for this cutting-edge discipline. This study found that very few Bangladeshi academicians and professionals can develop dynamic suggestions regarding this matter and have the knowledge to design an effective program and curriculum for the future students of this discipline. As a result, certain challenges devising integrated STEM-based programs may jeopardize the development and implementation of disaster management programs at the university level. Hence, adequate qualified members, budget, laboratory, and equipment must implement a multidisciplinary STEM program. Moreover, an innovative STEM program requires additional support from diverse professional organizations to support projects and research. Very often, national higher education policy and regulatory institutions create obstacles. At the same, attempts are made to launch such innovative and integrated programs. This study recommends that a new integration be partially implemented, turning into a milestone of Bangladesh's 21st-century higher education reformation process.
Keywords*:* Integrated curriculum, STEM education, undergraduate curriculum, quality higher education, disaster management

Bangladesh is the eighth largest populated country worldwide and among the most densely populated countries. Often, Bangladesh has been headlined in international media as a disaster-prone country because of its geographical vulnerability, socio-economic vulnerability, natural calamity-prone areas, and urban disasters such as the Ready-Made Garments sector fire hazards

[1] Corresponding Author: Assistant Professor at the Office of the Evaluation, Faculty, and Curriculum Development, at Bangladesh University of Professionals. E-Mail: kazishahidullah@nevada.unr.edu

(Adnan et al., 2020; Ansary & Barua, 2015; Brammer, 1990; Chowdhury et al., 2022; Chowdhury & Hossain, 2019; Hossain et al., 2021; Paul, 1997). However, nowadays, Bangladesh is trying to cope with the adverse situation and making more preparations to deal with natural and man-made disasters (Barua et al., 2016). Different governments are currently developing coping mechanisms to reduce the loss of human life and property and stimulate the economy to improve from a least developed country to a developing country (Fakhruddin & Rahman, 2015).

Disaster management is an emerging profession both in this country and abroad. Like other emerging successful countries globally, Bangladesh has also taken the necessary initiatives to generate professional disaster management experts for academic, non-profit, and private organizations. Many universities offer undergraduate, graduate, and professional programs in disaster management. In this circumstance, the Bangladesh University of Professionals started the Department of Disaster and Human Security Management (DHSM) under the Faculty of Arts and Social Science (FASS) in 2011. This department initially offered only a master's program, but later an undergraduate program was launched.

Since 2015, the Bangladesh University of Professionals has been offering a Bachelor of Social Science degree in DHSM. However, the department has undergone several curriculum reformations in the last four years. Local and global disaster challenges and professional demand exist in the current job market, which will increase more due to the high frequency of natural and man-made disasters such as earthquakes, RMG (Ready Made Garments) sector-based fire hazards, climatic anomalies, unprecedented floods, and landslides. In this circumstance, DHSM has explored the significant challenges of the program based on market demand, research, contemporary innovation, and innovative practices in a disaster area, more specifically in developing countries. This study aims to examine and discuss critical challenges for the existing undergraduate programs in DHSM and recommend necessary amendments to achieve 21st century oriented academic excellence.

Background of the Study

The Office of the Evaluation, Faculty and Curriculum Development (OEFCD) of the Bangladesh University of Professionals is a unique entity to ensure the university's academic quality. In 2017, OEFCD took a ground-breaking initiative to review and update the academic curriculum of the Undergraduate Program of the Department of Disaster and Human Security Management. As a part of this initiative, several meetings and discussions with the current faculty members and university administration were arranged, and the necessary bureaucratic process was undertaken for modifying and amending the undergraduate curricula.

This study followed a participatory approach, and student feedback was gathered during the curriculum review process. Although the students were not very aware of the curricula development, their thoughts and views encouraged the researchers to search for an epistemological formation. Almost all students were seeking a Bachelor of Science degree rather than a Bachelor of Social Science degree. They also mentioned that most of the program courses were related to science. All the other universities in Bangladesh are awarding Bachelor of Science degrees instead of Bachelor of Social Science. Thus, DHSM graduates of BUP may be at a disadvantage in competing with other university graduates in the traditional job market. They further mentioned that many foreign universities prefer graduates with science degrees for disaster management-related higher studies (Masters and Ph.D.). Worldwide, scientific tools are commonly used to deal with disaster management (like Geographical Information System and Remote Sensing).

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Furthermore, the number of scholarships and funding opportunities are also higher in quant-based academic programs in disaster management, which will dominate in near future.

This study was done within a short period. There is a scarcity of experts in Bangladesh who could have guided the researchers. Very few renowned international universities offer disaster science and management programs at the undergraduate level, so the researchers have limited resources for effective practices in the international arena. There were limited opportunities to interact with international professionals and practitioners.

Currently, nine universities in Bangladesh offer a disaster management related degree at the undergraduate level. For reviewing and incorporating STEM in the new undergraduate program and curriculum of DHSM, all the curricula of these nine universities have been collected and reviewed. Among them, the curriculum of Dhaka University, Khulna University of Engineering and Technology, and Patuakhali University of Science and Technology are worth mentioning. However, they did not follow a scientific process of STEM during their curriculum development. So, the course of study at the Bangladesh University of Professionals is one of the first initiatives in Bangladesh to incorporate STEM-based courses scientifically into a disaster management program in the country.

Literature Review and Conceptual Framework

This study literature review focused on exiting disaster management curricula in the universities, academic program and curriculum design, integrated curriculum framework, and Outcome Based Education (OBE).

Disaster Management Curriculum in Bangladesh

Higher education in disaster management is very new in Bangladesh. Only a few undergraduate disaster management programs are up and running. All the departments/institutes offer science-based programs except for one. In general, the programs focus on both natural disasters and man-made disasters. The programs incorporate specific skills such as disaster risk reduction, resilience, intersectionality, GIS, and remote sensing, along with disaster-related concepts. Although all the programs focus on disaster management, programs are diverse based on the faculty members' backgrounds and advanced research. Therefore, while all are disaster undergraduate programs, their curriculum design and content have a certain level of uniqueness. Table 1 presents a list of program credit hours and program focus.

Academic Program and Curriculum Design

Academic program and curriculum evaluation is a continuous process. Usually, departments evaluate their academic programs every three to four years. There is very less systematic empirical research on STEM-based undergraduate program evaluation in Bangladesh. On the other hand, quality assurance in higher education is very new in Bangladesh. The University Grants Commission has established an Institutional Quality Assurance Cell (IQAC) in the universities to assure quality higher education. As part of this process, IQAC incorporates self-assessment tools to evaluate the quality of the academic programs.

Stark and Lattuca (1997) described curricula as academic plan in action, calling them—" A plan for any endeavor incorporating a total blueprint for action, including purposes, activities, and ways of measuring success". They added that the action plan also implies both intentional and

informed choices. However, they emphasized the sociocultural context—external influence and internal influence of the academic program. The action plan also comprises purposes, content, sequence, learners, instructional resources, instructional process, evaluation, and adjustment.

Table 1

Bachelor's Degree in Disaster Science in Different Universities of Bangladesh

Sl. No	Name of the University	Name of the Department	Faculty/ Institute	Degree	Credit Hours
1	University of Dhaka	Department of Disaster Science and Management	Faculty of Earth and Environmental Sciences	B.S. (Hons.)	160
2	University of Dhaka	Institute of Disaster Management and Vulnerability Studies	Institute of Disaster Management and Vulnerability Studies	BDM (Hons.)	137
3	Patuakhali Science and Technology University	Department of Disaster Risk Management	Faculty of Disaster Management	B.Sc. DM. (Hons.)	157
4	Bangladesh University of Professionals (BUP)	Department of Disaster and Human Security Management	Faculty of Arts and Social Sciences	BSS	130.5
5	University of Barisal	Department of Coastal Studies and Disaster Management	Faculty of Biosciences	B.Sc.	140
6	Noakhali Science and Technology University	Environmental Science and Disaster Management (ESDM)	Faculty of Science	B.Sc.	142
7	Begum Rokeya University, Rangpur	Department of Disaster Management	Faculty of Life and Earth Science	B.Sc.	141
8	Bangabandhu Sheikh Mujibur Rahman Science and Technology University	Environmental Science and Disaster Management	Faculty of Science	B.Sc.	160
9	Daffodil International University	Environmental Science and Disaster Management (ESDM)	Faculty of Science & Information technology	B.Sc. ESDM (Hons.)	130

Outcome-Based Education

Outcome-Based Education (OBE) is a student-centric approach where curricula and teaching-learning processes are evaluated based on student performance (Anala et al., 2015). Anala et al. (2015) mentioned that OBE measures students' performances by using tests, quizzes, projects, self-study, among others. After data collection and effective analysis, OBE assesses the gaps between the intentions of the program and the achievement of the students. This assessment ultimately demonstrates the successes and gaps of the programs.

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Integrated Undergraduate Curriculum Framework

> *A curriculum analysis is an attempt to tease a curriculum apart into its component parts, to examine those parts and the way they fit together to make a whole, to identify the beliefs and ideas to which the developers were committed, and which either explicitly or implicitly shaped the curriculum, and to examine the implications of these commitments and beliefs for the quality of the educational experience* (Posner, 1995, p. 14).

A curriculum framework, in general, is a complicated area to study and utilize knowledge. This study set of curriculum concepts to frame this undergraduate program includes academic programs and curriculum in higher education, integrated curriculum, and Outcome-Based Education (OBE). An integrated curriculum is a curriculum design based on a specific area or topic connected by different areas of study. It usually utilizes different subject matters and skills to achieve specific purposes. As a result, an integrated curriculum connects or unifies different disciplines to achieve a particular purpose. In other words, an integrated curriculum is a multidisciplinary, interdisciplinary, or transdisciplinary approach to achieve specific goals. There is a big challenge to implementing an integrated curriculum. An integrated curriculum requires appropriate learning outcomes to provide adequate learning experiences and measure effective student learning. As a result, it is challenging to engage appropriate resources and scholars to achieve those ends.

Jensen and Kirkpatrick (2019) focused on graduate job outcomes of disaster programs. They mentioned that emergency management programs should focus on six areas to fulfill employers' demands: (1) degree program features, (2) student education experience, (3) student professional development, (4) student network, (5) student job approach, and (6) student background characteristics. A wide range of disaster management curricula exist in the country and around the world. In general, these are science-based and social-science based programs. However, the programs cover more specific areas such as disaster management, human security, vulnerability, intersectionality, disaster, and emergency management. (Drabek & Evans, 2007; Jensen & Kirkpatrick, 2019; Jensen et al., 2019; Rivera & Miller, 2008; Yakubu & Jensen, 2019).

Problem Statement

Academic program and curriculum review is a regular duty of the departments. According to the Bangladesh University of Professionals Act (2009), all the departments review their academic programs after four years of operation. The undergraduate program of DHSM began four years ago. So, it was required to review the DHSM undergraduate program essentially.

The DHSM undergraduate program was a new program that groups of academicians and professionals formulated four years ago. After four years, a few changes are necessary, such as incorporating a statistics course to better understand the quantitative aspects and addressing students' needs for better writing skills for journals and research. The curriculum also has a certain amount of content repetition and redundancy that is outside of the program requirements. The DHSM undergraduate program has an integrated curriculum design based on a traditional integrated model. However, traditional integration has presented different challenges to achieving the program's vision and mission. For example, STEM has emerged as necessary to support academic and professional demands.

Research Questions

The study endeavored to answer the following research questions:

1. What are the challenges of revising a traditional undergraduate program into a STEM-based one?
2. What is the satisfaction level of the students in the current DHSM undergraduate program?
3. What would a current DHSM undergraduate program review have based on the students' and teachers' feedback entail?

Method

Research Design

Academic program and curriculum evaluation requires a very rigorous process to make appropriate changes. Therefore, appropriate curriculum design is important as well. In this aspect, this study utilized a mixed research design for this study. Creswell appropriately mentioned that "a mixed methods research design is a procedure for collecting, analyzing, and 'mixing' both quantitative and qualitative methods in a single study of studies to understand a research problem" (Creswell & Plano Clark, 2017), p.37; Johnson et al. p.123). The basic assumption is that the use of both quantitative and qualitative methods, in combination, provides a better understanding of the research problem and questions that method by itself. Creswell (2012b) mentioned that mixed method research is not simply collecting two distinct 'strands' of research—qualitative, and quantitative. It consists of merging, integrating, linking, or embedding the two "strands." In short, the data are "mixed" in a mixed methods study. There are several reasons for using a mixed methods design to conduct a study. Both quantitative and qualitative data and both types of data, together, provide a better understanding of your research problem than either type by itself.

Mixed methods research is a good design to use if you seek to build on the strengths of both quantitative and qualitative data. A mixed methods study is conducted when a single method (qualitative or quantitative) cannot address the research problem or answer the research questions.

The study incorporated a student survey among the existing students to understand their current DHSM undergraduate program progression. The study included qualitative data from the teachers' interviews, as well as interviews with individuals who have taught in this program and external experts and professionals in this subject. The data was then thematically evaluated in the research.

The study followed a quantitative research methodology with structured survey tools. Survey research design is a quantitative way to describe a certain population's attitudes, opinions, behaviors, or characteristics (Creswell, 2015). This study explored students' responses to current DHSM undergraduate program development, design, and practices. The focus of this study was DHSM undergraduate students' current self-reported responses.

Survey research is an umbrella term. There are various forms of survey for gathering information under this term (Andres, 2012). Considering the survey format(s), two different perspectives and precepts covering two competing goals; mixed more to enhance the response rates (Andres, 2012). On the other hand, the mixed methods approach utilizes more than one traditional survey method, which means that both quantitative and qualitative methods are used to overcome the survey barriers. Andres (2012) added that mixed methods survey research helps the researcher

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to utilize triangulations or sequential embedded design for more than one source of data to extend findings. The quantitative survey question in this research used a Likert scale rating system. The qualitative survey questions allowed respondents to explain their thoughts on the questions more fully and accurately, outside of the limitations of the Likert scale responses.

Participants and Sampling

This study considered only DHSM undergraduate students as the population. However, based on the discussion with the faculty members, only one third of the students were considered for collecting data. Participation in survey research typically requires a purposeful sampling of collected data. Participants in survey research typically require a purposive sampling of participants from the entire population. Babbie (1990) states that although a true random sample is desired, there are instances where a "purposive or judgmental sample, wherein potential respondents are chosen on the basis of their convenience and availability" (p. 120) may be the best course of action for the outcomes of the research. The student survey was administered among the DHSM undergraduate students. About 200 undergraduate DHSM students are the population size of this study. In other words, more than one-third of the population participated in the study. The study was not able to consider the alumni feedback since there were no graduates from this program. Ten faculty members and professional experts have also participated in the study. A set of open-ended questions were utilized for their interview.

Instrument

The study utilized a Likert scale for collecting the responses based on the research questions. The tool was adopted from the IQAC Self-Assessment Manual. The questionnaire was adopted from the Institutional Quality Assurance Cell (IQAC) student format that the University Grants Commission recommended. The survey tool considered seven different areas: (a) Program, Course, and Curriculum, (b) Instruction, (c) Assessment, (d) Teaching-Learning Facilities, (e) Academic Support for the Students, (f) Research Practice and Support, and (g) Faculty and Staff Support for the Students (IQAC, 2016). The study used a Likert-type scale with five response categories (1= Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree) (IQAC, 2014).

Data Analysis

The study used descriptive statistics to analyze the data. Microsoft Excel was the primary tool for data analysis. Since the mean (and standard deviation) are inappropriate for ordinal data, the study will use the median or mode as the 'measure central tendency' for its ordinal data.

Results and Findings

The study summarized the results and findings based on the responses of the participants, both the students, faculty members and experts. First, the survey was conducted among the students, and then faculty members and experts were interviewed. 74 undergraduate students were randomly selected for the survey. On the other hand, ten faculty members who participated were interviewed with an open-ended interview and they were all assured confidentiality. After both the survey and interview, the study organized the results and findings under seven categories:

Multidisciplinary Approach, Traditional Program Organization, Instruction and Laboratory Support, Teaching-Learning Support, Teaching-Learning Facilities, Academic Support for the Students, Research Practice and Support, Assessment, and Faculty and Staff Support.

Theme 1: Multidisciplinary Approach

A multidisciplinary approach is one of the primary attributes of the DHSM undergraduate program. Table 2 shows students' responses (Strongly Disagree- 4.05%, Disagree- 28.38%, Undecided- 8.11%, Agree- 50%, Strongly Agree- 6.75%, No Response- 2.70%) to the DHSM undergraduate program design. The data showed that the existing DHSM undergraduate program did not adequately reflect a STEM-based multidisciplinary approach. Half of the participants responded that the existing undergraduate program in DHSM, the curriculum, and the courses were not adequately multidisciplinary. However, more than one-third of the participants responded the opposite stating that the existing DHSM undergraduate program is multidisciplinary from all perspectives.

The faculty members, students, and academic experts recommended the transformation of the existing program into a multidisciplinary STEM program. Moreover, faculty members and experts recommended that the disaster management STEM program emphasized science, mathematics, and problem-solving skills.

Table 2

Responses on Program and Courses Design Based on Multidisciplinary Approach

Answer Choice	Frequencies and Percentages	
	No of Responses	Percentage (%)
Strongly Disagree	3	4.05
Disagree	21	28.38
Undecided	6	8.11
Agree	37	50.00
Strongly Agree	5	6.76
No Response	2	2.70

Theme 2: Traditional Program Organization

Study participants also noted that the existing undergraduate program mainly was based on textbooks, root memorization, PowerPoint Slides, and lectures. Indeed, more than 50% students stated that the topics of the courses were not organized and arranged strategically throughout the traditional program. The existing traditional DHSM program and courses are highly topic-based, which does not address the students; learning style and the structure of the academic discipline needed for the 21st century. For example, one of the survey statements was "The courses highly focused on theories and textbook memorization". The participants responses were "Strongly Disagree- 12.16%, Disagree- 4.05%, Undecided- 5.41%, Agree- 33.78%, Strongly Agree- 44.60%, No Response- 0%. Faculty members and experts have indicated that the undergraduate program within the social science faculty had limits in combining laboratory-based work. However, students

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with non-science academic backgrounds are frequently hesitant to use quantitative approaches in their research.

Table 3
Responses on Course Theories and Textbook Memorization

Answer Choice	Frequencies and Percentages	
	No of Responses	Percentage (%)
Strongly Disagree	9	12.16
Disagree	3	4.05
Undecided	4	5.41
Agree	25	33.78
Strongly Agree	33	44.60
No Response	0	0

Theme 3: Instruction and Laboratory Support

Adequate instructional and laboratory support for the DHSM undergraduate program was another focus of this study. The survey had three statements about the availability of instructional and laboratory support to implement the undergraduate program successfully. This study found that the students were not satisfied with the overall instructional and laboratory support. They stated that the programs and courses failed to incorporate innovative and creative courses for their advanced learning and related professions. For example, one of the survey statements was "*Additiona instructional and lab are required for enhanced learning environment"*. The participants responses were "Strongly Disagree- 35.13%, Disagree- 37.84%, Undecided- 10.81%, Agree- 12.16%, Strongly Agree- 4.05%, No Response- 0%. In contrast, faculty and experts believe that instructional and laboratory support is an ongoing process that requires time to implement in the undergraduate program.

Table 4
Responses on Adequate Instruction and Lab Support

Answer Choice	Frequencies and Percentages	
	No of Responses	Percentage (%)
Strongly Disagree	26	35.13
Disagree	28	37.84
Undecided	8	10.81
Agree	9	12.16
Strongly Agree	3	4.05
No Response	0	0

Theme 4: Teaching-Learning Support

The use of diverse teaching-learning methods and tools was another focus of this study. They study found that the existing teaching-learning methods did not support he students to enhance their learning and performance. For example, one of the survey statements was "*Teachers*

diverse teaching-learning methods enhanced and supported learning style". The participants responses were "Strongly Disagree- 12.16%, Disagree- 12.16%, Undecided- 5.41%, Agree-13.51%, Strongly Agree- 56.76%, No Response- 0%. Faculty members added in their response that besides having some curriculum designing issues, this failure was more about the scarcity of infrastructures like laboratory and equipment, expert faculty members, and a lack of real-life. As a result, teachers primarily focus on lecture-based teaching methods. Faculty members stated that inadequate laboratory infrastructure and lack of research data were their primary challenges. They noted that an effective memorandum of understanding with leading local disaster research and professional institutions or organizations like BUET-JIDPAS[2], IWFM[3], and AFD[4] could reduce instructional and laboratory scarcity issues. According to the experts, disaster management is a new area in Bangladeshi academia, and it needs more time to develop the resources for researchers and students. The experts addressed the need to include disaster management practitioners so that students may learn about current practices as well as real-life experiences and challenges in this field. Furthermore, they prioritized science-based studies because the donor organizations need more data-driven solutions in current days.

Table 5
Responses on Teaching-Learning Support

Answer Choice	Frequencies and Percentages	
	No of Responses	Percentage (%)
Strongly Disagree	9	12.16
Disagree	9	12.16
Undecided	4	5.41
Agree	10	13.51
Strongly Agree	42	56.76
No Response	0	0

Theme 5: Teaching-Learning Facilities

The availability of teaching-learning equipment in the classrooms is another focus of this study. The study found that half of the students said there was adequate teaching-learning equipment in the classroom, and the other half stated that PowerPoint slides worked as a primary tool in the teaching-learning process. Students rely mostly on slide-based higher education. However, students also think that this is unproductive for the undergraduate program in DHSM. For example, one of the survey statements was, "*Teachers utilized adequate teaching-learning equipment in the classroom to enhance teaching-learning.*". The participants' responses were: "Strongly Disagree- 8.11%, Disagree- 29.73%, Undecided- 9.45%, Agree-35.14%, Strongly Agree- 13.51%, No Response- 4.05%. Faculty and experts feel that the teaching and learning facilities in this program are adequate, however they concur that the faculty do not always use them.

[2] BUET-Japan Institute of Disaster Prevention and Urban Safety
[3] Institute of Water and Flood Management
[4] Armed Forces Division

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Table 6
Responses on Utilizing Equipment in the Classroom to Enhance Teaching-Learning

Answer Choice	Frequencies and Percentages	
	No of Responses	Percentage (%)
Strongly Disagree	6	8.11
Disagree	22	29.73
Undecided	7	9.46
Agree	26	35.14
Strongly Agree	10	13.51
No Response	3	4.05

Theme 6: Academic Support for the Students

Academic support for the students is another focus of this study. Most students said there was a lack of instructional materials in the library, like textbooks, supporting reading materials, and software for the undergraduate program. Because the program and university are new, challenges exist in providing such support for the students. The overall response from the faculty, students, and experts was that the university should consider all these challenges to inaugurate a cutting-edge program. For example, one of the survey statements was "*There were adequate textbooks in the library to support the courses and students learning*". The participants' responses were: "Strongly Disagree- 47.30%, Disagree- 28.38%, Undecided- 6.76%, Agree-6.76%, Strongly Agree- 10.81%, No Response- 0%. According to faculty and experts, there are several more avenues for increasing academic support; nonetheless, this is a continuous process for new academic institutions.

Table 7
Responses on Adequate Textbooks in the Library to Support

Answer Choice	Frequencies and Percentages	
	No of Responses	Percentage (%)
Strongly Disagree	35	47.30
Disagree	21	28.38
Undecided	5	6.76
Agree	5	6.76
Strongly Agree	8	10.81
No Response	0	0

Theme 7: Research Practice and Support

Disaster science is a cutting-edge discipline with considerable academic and professional research potential. This research focused on whether the program provides adequate undergraduate research support and practice opportunities. The study found that only half of the students thought the current program could provide adequate research opportunities. More than two-thirds of the

students responded that the funds provided by the university were inadequate for them to do their research smoothly.

The study has also explored whether the faculty members incorporated research-based instructional materials like articles into their courses. Less than half of the students responded that the program and the courses adequately incorporate research-based content in their courses and the program. For example, one of the survey statements was "*Current undergraduate program focused enough on research on DHSM related issues and problem*". The participants' responses were: "Strongly Disagree- 13.51%, Disagree- 20.27%, Undecided- 20.27%, Agree-33.78%, Strongly Agree- 12.16%, No Response- 0%. The faculty members and experts responded that the design posed significant challenges for incorporating such research materials. They argued that a social science undergraduate program is less likely to be focused on research-based content, instructions, and instructional materials.

Table 8

Responses on Research Practice and Support

Answer Choice	Frequencies and Percentages	
	No of Responses	Percentage (%)
Strongly Disagree	10	13.51
Disagree	15	20.27
Undecided	15	20.27
Agree	25	33.78
Strongly Agree	9	12.16
No Response	0	0

Theme 8: Assessment

This study considered assessment tools and assessment processes for reviewing this undergraduate program. One primary focus was on the students' assessment and grading system. The student's satisfaction level with this program was found bifurcated during the survey. Half of the students responded that the assessment system was adequate, but half did not. On the other hand, the students were highly satisfied with the assessment tools such as quizzes, class tests, midterms, and term finals.

Additionally, the study focused on the course assessment process—both formative and summative. Although the students were quite satisfied with the traditional assessment system, faculty members were dissatisfied because traditional assessment systems do not help the teachers' professional and academic growth. A few students said that the lower critical thinking in current methods hindered them and led them to memorize rather than apply concepts in a new context.

For example, one of the survey statements was "*Grading system reflected students' performance properly*". The participants responses were "Strongly Disagree- 13.51%, Disagree- 17.57%, Undecided- 20.27%, Agree-37.84%, Strongly Agree- 8.11%, No Response- 2.7%. However, faculty and professionals noted that the assessment systems are fair and welcoming, and that continuous improvement is being done based on student feedback.

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Table 9
Responses on Grading System and Students' Performance

Answer Choice	Frequencies and Percentages	
	No of Responses	Percentage (%)
Strongly Disagree	10	13.51
Disagree	13	17.57
Undecided	15	20.27
Agree	28	37.84
Strongly Agree	6	8.11
No Response	2	2.7

Theme 9: Faculty and Staff Support

The study also discussed the necessary faculty members and staff support for running such a multidisciplinary program. Because DHSM is a new program in the country as well as the university, there is a lack of experienced faculty members rather than in-house young faculty members. The students responded that they expect more from a veteran professor's expert teaching and research skills. For example, one of the survey statements was, "The course faculty members were skilled to teach the courses interns of classroom teaching performance." The participants' responses were: "Strongly Disagree- 9.45%, Disagree- 16.24%, Undecided- 10.81%, Agree- 43.24%, Strongly Agree- 18.91%, No Response- 1.35%. Experts and faculty believe that disaster management is a new field in academia, and that there is a significant shortage of competent faculty members in Bangladesh. Furthermore, this university is still in its early stages and will take more time to build resources that will attract scholars and researchers. However, they think that if the government and universities promote this department and give it more support and collaboration, this sector has immense potential to grow.

Table 10
Responses on Faculty and Staff Support

Answer Choice	Frequencies and Percentages	
	No of Responses	Percentage (%)
Strongly Disagree	7	9.45
Disagree	12	16.24
Undecided	8	10.81
Agree	32	43.24
Strongly Agree	14	18.91
No Response	1	1.35

Conclusion and Recommendations

There are seven thematic categories—Multidisciplinary Approach, Traditional Program Organization, Instruction and Laboratory Support, Teaching-Learning Support, Teaching-Learning Facilities, Academic Support for Students, Research Practice and Support, Assessment, and Faculty and Staff Support. Disaster science is one of the emerging academic and professional fields in the 21st century due to frequent man-made and natural disasters. Therefore, the DHSM undergraduate program has reviewed the existing program, curriculum, and courses. Although the DHSM undergraduate program has been offered under the Faculty of Arts and Social Sciences, the existing program design does not adequately reflect multidisciplinary approaches and STEM-based courses. Existing DHSM courses, faculty members' responses, and students' survey data also indicate that the undergraduate program needs necessary review and more focus on STEM-based multidisciplinary courses. This study found that half of the students responded that the existing DHSM undergraduate program, curriculum, and courses were not adequately multidisciplinary. On the other hand, more than one-third of the participants responded that the existing DHSM undergraduate program, curriculum, and courses are multidisciplinary. Moreover, faculty members, students, and academicians recommended that this undergraduate program be transformed into a multidisciplinary Bachelor of Science (BSc) program. The students also recommended that there should be a significant name for the program, which should be reflected in the courses.

Recommendations

1. The degree title should be Bachelor of of Science in Disaster Science and Management.
2. DHSM outcome-based program and curriculum should emphasis more on STEM-based multidisciplinary curriculum.
3. Higher Math or Statistics at the Higher Secondary level should be the prerequisite for getting enrolled in this program.
4. Although the DHSM undergraduate program has been offering FASS, the existing program design and structure was science-based, and the existing faculty members are also from science background. The department should make the necessary amendments based on professional needs, and a multidisciplinary approach could benefit the student in the future.

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Notes on Contributors

Kazi Shahidullah, PhD., is an Assistant Professor at the Office of the Evaluation, Faculty, and Curriculum Development, at Bangladesh University of Professionals. He earned his PhD in 2016 emphasized on Curriculum, Teaching, and Learning at the Faculty of College of Education, at University of Nevada, Reno, U.S.A. His research interests are academic program and curriculum development, professional development, quality assurance, and educational reformation in higher education. ORCID iD: 0000-0002-5784-666X

Md Rifat Hossain, is a lecturer in the department of Disaster and Human Security Management at Bangladesh University of Professionals and a final-year Ph.D. student in the Spatially Integrated Social Science (SISS) program at the University of Toledo. He completed his master's in disaster management from the University of Dhaka and his bachelor's in urban and regional planning from the Bangladesh University of Engineering and Technology. Mr. Hossain's work focuses on urban issues. He utilizes spatial analytical models and tools to address urban hazards and urban problems. Mr. Hossain has published five peer-reviewed journal articles and two book chapters so far. ORCID iD: 0000-0001-8909-9294