Crisis Leadership in Aeronautical Engineering Education: Lessons from the Pandemic

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***Abstract*: The COVID-19 pandemic introduced first-time challenges to Aeronautical Engineering education that required timely and effective crisis leadership to provide continuity in learning. The practical nature of the profession required that the faculty members and coordinators apply innovative responses to transition into remote and blended learning environments with no compromise in the quality of teaching and accrediting standards. The research aims to investigate the effects of crisis leadership to Aeronautical Engineering education. The significance of the study involves universities, coordinators and faculties, students, researchers, and future researchers. The scope of the study was to provide results from Holy Angel University offering the said courses in which the data's provided are used to determine the effects of crisis leadership. The limitations include faculties and coordinators only. The research design to be used is correlational research in which 2 variables are being correlated whether the effects are positive or negative. The research methods that be used are mixed methods to enhance integrity of the study by involving experience and numerical values. Populations are within universities offering the course and samples only revolve in faculties and coordinators. The research instrument will be via interview and the result will be translated by Microsoft Excel.**

***Keywords*: Aeronautical Engineering, Crisis Leadership, COVID-19, Aeronautical Education.**

1. Introduction

The COVID-19 pandemic caused significant upheaval in the global education landscape, posing challenges to conventional teaching methodologies and necessitating swift adjustments from educational institutions. Specialized fields, particularly those requiring hands-on experience like Aeronautical Engineering, were among the most affected, as practical training, laboratory exercises, and face-to-face collaboration are essential elements of their curriculum. In this scenario, the significance of leadership, especially in times of crisis, became evident as a crucial element in maintaining educational continuity, upholding academic standards, and providing support to both educators and learners during the turmoil. Crisis leadership is defined as the capacity to guide effectively amid uncertainty, disruption, and rapid transformation. In aeronautical engineering education, where accuracy, discipline, and safety are paramount, the expectations for crisis leadership are heightened. This study investigates the responses of academic leaders, administrators, and faculty in aeronautical engineering programs to the challenges introduced by the pandemic. It aims to uncover effective strategies, identify shortcomings, and derive essential lessons that can enhance future leadership approaches in emergencies. By analyzing the decisions and experiences during the pandemic, this research aspires to offer significant insights into leadership resilience, adaptability, and innovation in technical education. Ultimately, the outcomes will contribute to creating a more agile and prepared educational framework for aeronautical engineering students in crisis situations. This paper includes crisis leadership on how members of faculties initiate the leadership, university approach on how the institution makes its curriculum more accessible during pandemic, engineering education in which more crucial to initiate since different courses on laboratory works are used, and technological approach on how members of faculties utilizes the demands of students in terms of learning via technological approach.

2. The Problem and its Background

A. Background of Study

The COVID-19 pandemic had a diverse impact on schools worldwide, including the course of Aeronautical Engineering. With the complex curriculum of Aeronautical Engineering education that merely depends on lab work, simulations, and industrial partnership, academic coordinators were faced with unique challenges in ensuring instruction continuity during the pandemic. Crisis leadership was the most important factor in meeting these challenges, which demanded flexibility, resilience, and creative problem-solving measures (Boin et al., 2013). With the use of blended learning, the transition in the delivery of curriculum, and the emphasis on students' intellectual and emotional well-being became the primary concerns of instructors and coordinators.

Crisis leadership is characterized by the ability to make timely decisions under uncertainty, maintain stakeholder trust, and implement strategies that minimize disruptions (Northouse, 2021). Crisis leadership in Aeronautical Engineering education involved utilizing learning alternatives, reconfiguring laboratory experiments to the needs of remote and hybrid

learning environments and maintaining accreditation standards under governments parameter during the pandemic. The strategies employed in overcoming the challenges varied across institutions, and a further in-depth examination of the most effective leadership strategies employed during the crisis were taken into action.

Data on crisis leadership response to the pandemic are important in enlightening on how Aeronautical Engineering education flexibility can be improved. The crisis exposed the vulnerabilities of traditional methods of teaching while, at the same time, allowing innovative practices to be demonstrated. By analyzing how academic leaders managed challenges, this research seeks to identify key leadership lessons that were essential in ensuring educational quality and student performance under adversity (Bryman, 2015). The lessons can also be applied to future crisis management so that institutions can define similar interventions for future interruptions.

This research seeks to investigate the crisis leadership practices that were embraced by academic leaders, faculty, and coordinators in the context of Aeronautical Engineering education during the pandemic. By way of comparison of challenges faced, utilizing practices, and results achieved, this research adds to the general debate of educational leadership in a crisis. By way of critical analysis, this research shall be able to give practical recommendations for improving leadership models in Aeronautical Engineering education, thus ensuring preparedness and applicability to future crisis.

B. Objective of the Study

1) General Objective

The main objective is to study the effects of Crisis Leadership in Aeronautical Engineering Education during pandemic.

2) Specific Objectives:

- To determine the Action and Response of faculty members of Holy Angel University amidst pandemic.
- To identify the Evaluation and Learning on crisis leadership during the pandemic.
- To assess the Enabling Factors of pandemic to crisis leadership.

C. Significance of Study

The study entitled Crisis Leadership in Aeronautical Engineering Education: A Lesson from the Pandemic is being developed to provide more concrete results on how leaders disseminate different approaches during the pandemic without altering the course description of the curriculum. Universities. Different universities that offer Aeronautical Engineering courses will easily manage to implement different learning outcomes when crisis like Covid-19 emerges again. Coordinators and Faculties. It will help them to make an alternative but effective approach to leadership when similar crisis arouses in the future. Students. They will understand more and cooperate with leaders especially when the government declares lockdown due to similar events that happened in the past. Researchers. This study will be beneficialnot only to academic set up but also on researchers because it will contribute to their ability to cope up in such situation because they also work at the academe. Future Researchers. This study will be published and can be used by different researchers that seek more information on how Crisis Leadership stands within the era of pandemic.

D. Scope and Delimitation

The general intent of this study was to provide a conclusive result on how different universities cope up on Crisis Leadership in Aeronautical Engineering Education during pandemic. It also emphasizes the use of different educational alternatives for Aeronautical Engineering students during the said crisis.

The primary scope of this study was to identify the means of implementing crisis leadership to Holy Angel University that offers Aeronautical Engineering during the pandemic. The duration of the study will take at least 3 months to gather the necessary information on how Holy Angel University cope with Crisis Leadership during the pandemic. The limitation of this study only covers the members of faculty and coordinators present during the crisis. A limited budget and time schedule will be used to carry out the research.

3. Methodology

A. Research Design

The research design to be used by is Correlational Research. The researchers will use this non-experimental type of design in using a correlational study design, in which no variables are within the researcher's direct control or manipulation. Both positive and negative correlations are possible to rise. The study wants to correlate the variables of Crisis Leadership and pandemic. According to Curtis, Comiskey, and Dempsey (2016), Findings from correlational research can be utilized to establish transparency and correlations between variables and forecast events based on available information.

B. Research Method

This research employs a qualitative strategy to comprehensively examine Crisis Leadership in the context of Aeronautical Engineering Education amidst the COVID-19 pandemic. The employment of qualitative method ensures a systematic exploration of leadership reactions, actions, and their impacts. Descriptive Phenomenology was introduced for more detailed and unbiased description of the phenomenon as it appears in consciousness of the interviewee.

C. Population and Sample of the Study

The researchers used Purposive Sampling in which they select specific individuals based on their specific characteristics or expertise. For the specific characteristics that the researchers wanted to have datas, the individuals they are pertaining to are Aeronautical Engineering professors and coordinators.

D. Research Instruments

The research instrument to be used is via interview. Interviews are good for data gathering because they can collect in-depth and precise data. They can also provide experience based on their actual views during the pandemic. Furthermore, interviews can also provide more sense of data because the process itself is real time.

E. Data Collection Procedure

The researchers then make a request letter for interview with specified individuals involved in the study. The researchers will interview Aeronautical Engineering Professors and Coordinators for the questionnaires that the researchers will interpret via quantitative approach. A span of one (1) day will be used during the data collection period.

F. Statistical Treatment

This study will interpret the data collected using Data Analysis in which different qualitative datas are being interpreted and illustrated for more precise discussion. Thematical Analysis was used in the paper for identifying, analyzing, and interpreting patterns of meaning, known as themes, within qualitative data.

4. Review of Related Literature

Crisis Leadership - If we want to learn more about what makes pandemic responses effective, the research on pandemic leadership needs to be strengthened. Currently, it is still challenging to make definitive inferences about the explicit mechanisms that influence contextual elements or the impact of leadership qualities on results. In general, as more academics examine leadership qualities using empirical research methodologies and assessment techniques, the field of pandemic leadership will continue to develop. (Sriharan, Hertelendy, Holl, Palmer, Mitchell, Nigam, Gutberg, Rapp, Singer; 2022)

University Approach - One benefit of the pandemic is that it will motivate us to address the many worldwide educational issues sooner than any of us anticipated, as we are currently facing the biggest changes in education. The online live classes served as a "live guide" to encourage students during their learning process and provided psychological support during stressful times when they were subject to harsh limitations. While considering the relationship between technology and education as reciprocal, technology plays a crucial role in improving educational procedures and outcomes. (Stankovska, Gordana, Memedi, Imran, Grncarovska, Svetlana Pandilovska; 2021)

Engineering Education - A generation of students that are unprepared for their respective fields would be the most major result of inadequate online classroom styles. Students will spend more time learning things on their own if teachers do not put in extra effort to guarantee that they comprehend the subjects—the exact reverse of what good teaching should entail. Additionally, online education has the potential to delay the development of social skills that university students acquire. This means that in order to prevent students from being disinterested by the repetitive nature of many online lectures, professors need give special attention to putting in place activities that promote teamwork and creativity. (Niksiar, Millare, Sullivan, Integlia; 2022)

Technological Approach - A crucial first step in resolving these issues, improving transparency, and facilitating more efficient resource management is the switch to digital tools and processes. Appropriate resource allocation was found when financial management performance was assessed using the Balanced Scorecard viewpoint. It did, however, draw attention to inefficiencies in several crucial areas, such as funding for facilities, postponed maintenance, and uneven user-centered procedures. (Santos, Ramos, Mallari; 2025)

5. Results and Discussion

This research mainly focuses on the experiences and perspectives of faculty and coordinators. Results shown are based from the gathered data from the interview ang shows more systematic approach on Crisis Leadership. Discussions will further specify the reliability of the data gathered. Datas are from faculties and coordinators who experienced Crisis Leadership amidst of pandemic. Shown below are categories of different approach on datas in accordance of how faculties and coordinators implement Crisis Leadership.

A. Leadership and Decision Making

The COVID-19 pandemic necessitated effective crisis leadership in Aeronautical Engineering education, requiring leaders to make timely decisions under uncertainty, maintain stakeholder trust, implement strategies to minimize disruptions, and demonstrate adaptability. This emphasis on leadership and decision-making is central to the research, as it aims to investigate the effects of crisis leadership and explores the crisis management approaches, decision-making processes, and adaptive measures employed by academic leaders, as highlighted in the literature review and interviews with key stakeholders.

B. Challenges and Adaptations

The COVID-19 pandemic presented Aeronautical Engineering education with unique challenges, particularly due to its reliance on lab work, simulations, and industry partnerships, which necessitated innovative adaptations from faculty members and coordinators to ensure instructional continuity through remote and blended learning environments while maintaining quality and accreditation standards.

C. Support and Resources

The COVID-19 pandemic necessitated the examination of the support and resources available to faculty and coordinators in Aeronautical Engineering education, including technological infrastructure, training, and administrative support, to understand their effectiveness in facilitating the transition to

remote and blended learning and ensuring the continuity of quality education.

D. Impact and Reflection

The COVID-19 pandemic prompted an examination of the impact of the crisis on teaching, learning, and leadership in Aeronautical Engineering education, along with reflections on lessons learned and necessary adaptations for future crises, to foster more resilient and effective educational practices.

E. Future Preparedness

The COVID-19 pandemic gives us more understanding on the future preparedness of students and faculties on how they will execute the learning plan smoothly without altering or interrupting the class method. It was indeed a challenge on all of us but then future preparedness will somehow eliminate the factors affecting the Crisis Leadership.

Table.1.
Leadership and Decision Making

Point of Questionnaire	Top Frequency	Percentage (%)
Role (Problem Solver/Adaptor)	4	26.67%
Factors (Course Management)	4	26.67%
Decision (Academic Continuity)	5	33.33%
Quality and Standard (Effective Teaching and Assessment)	4	26.67%

Table.2.
Challenges and Adaptation

Point of Questionnaire	Top Frequency	Percentage (%)
Challenges (Course Management)	4	26.67%
Solutions (Technology Enhanced Instruction)	6	40%
Needs and Concerns (Well Being and Support)	6	40%
Relationships (Communication Frequency and Effectiveness)	4	26.67%

Table.3.
Support and Resources

Point of Questionnaire	Top Frequency	Percentage (%)
Lacking (Faculty Support and Resources)	6	40%
Effectivity (Technology Related Issues)	4	26.67%
Trainings (Issues with Training Delivery and Support)	5	33.33%

Table.4.
Impact and Reflection

Point of Questionnaire	Top Frequency	Percentage (%)
Perspective (Re-Evaluation of Teaching Methods)	5	33.33%
Impacts (Positive on Student Skills and Attributes)	7	46.67%
Vulnerabilities (Inadequate Student Support)	3	20%
Lessons (Empathy and Support)	4	26.67%

Table.5.
Future Preparedness

Point of Questionnaire	Top Frequency	Percentage (%)
Strategies (Planning and Preparedness)	5	33.33%
Preparation (Training and Professional Development)	7	46.67%
Curriculum Change (Increase Technology Integration)	5	33.33%
Enablement (Tools for Instruction and Delivery)	6	40%
Recommendations (Faculty Support and Development)	7	46.67%

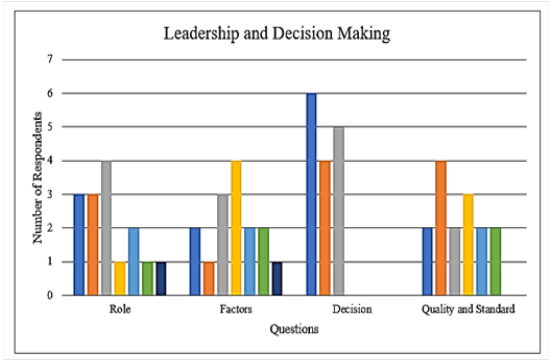

Fig. 1. A Leadership and Decision-Making tally summary showing ratings across 4 questions, based on responses from 15 participants.

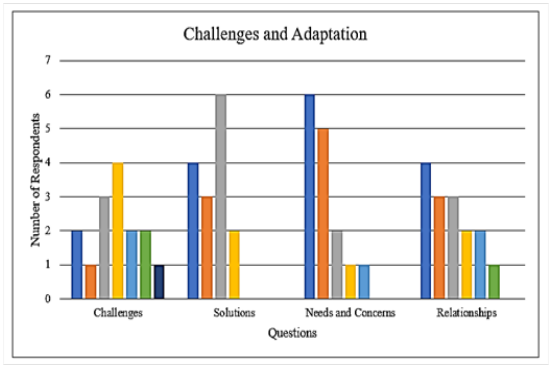

Fig. 2. A Challenges and Adaptation tally summary showing ratings across 4 questions, based on responses from 15 participants

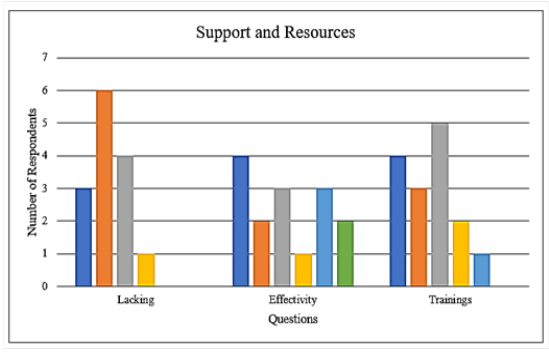

Fig. 3. A Support and Resources tally summary showing ratings across 3 questions, based on responses from 15 participants.

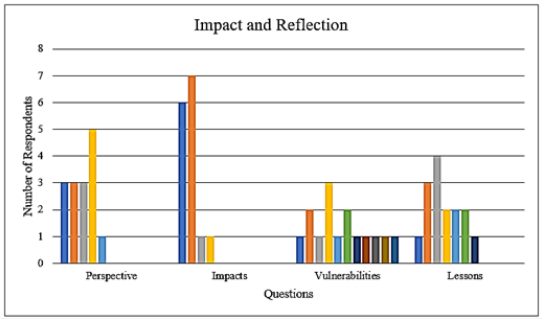

Fig. 4. An Impact and Reflection tally summary showing ratings across 4 questions, based on responses from 15 participants.

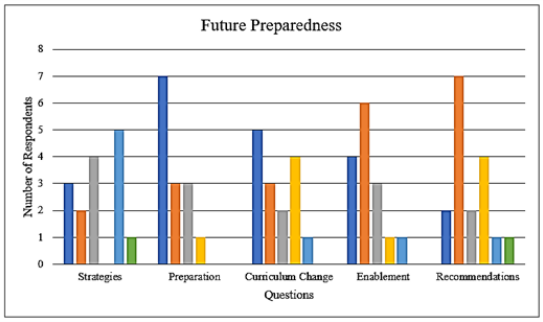

Fig. 5. A Future Preparedness tally summary showing ratings across 5 questions, based on responses from 15 participants.

6. Summary and Results

A. *Summary*

The research primarily centers on the experiences and viewpoints of faculty and coordinators in Aeronautical Engineering education during the COVID-19 pandemic. The results presented are derived from interview data, analyzed to reveal systematic approaches to crisis leadership. The discussion further elaborates on the reliability of the collected data, emphasizing that it reflects the experiences of faculty and coordinators navigating crisis leadership amidst the pandemic. The findings are organized into categories that represent different facets of how faculty members and coordinators implemented crisis leadership.

B. *Results*

The main results of the study are categorized into categories of different approach on data gathering:

1) Objective 1. Leadership and Decision Making:

Role (Problem Solver/Adaptor): The data indicates that a significant portion of faculty and coordinators (4 out of 15) most frequently cited "Problem Solver/Adaptor" as their dominant role in leadership and decision-making during the crisis. This suggests that adapting to the challenges and actively solving problems were key aspects of their leadership experience.

Factors (Course Management): Similar to the "Role" category, "Course Management" also had a top frequency of 4. This implies that managing the course, including its delivery, content, and logistics, was a primary factor influencing leadership and decision-making.

Decision (Academic Continuity): With a top frequency of 5, "Academic Continuity" stands out as the most frequent decision-making focus. This strongly suggests that the overriding concern for leaders was to ensure that education continued despite the disruptions, which drove their decisions and actions.

Quality and Standard (Effective Teaching and Assessment): "Effective Teaching and Assessment," with a top frequency of 4, demonstrates that maintaining the quality and standards of education was a major consideration in leadership and decision-making. Leaders were concerned with how to teach effectively and assess students fairly in the altered learning environment.

2) Objective 2. Challenges and Adaptation:

Challenges (Course Management): The data shows that "Course Management" was a frequently cited challenge (4 out of 15). This suggests that faculty and coordinators experienced significant difficulties in managing their courses during the crisis, which could involve issues with curriculum delivery, organization, and maintaining academic challenge.

Solutions (Technology Enhanced Instructions): "Technology Enhanced Instruction" has the highest frequency (6 out of 15) in this table. This strongly indicates that leveraging technology to enhance instruction was the most common solution adopted to adapt to the challenges. This reflects the shift towards online learning and the use of digital tools to continue teaching.

Needs and Concerns (Well Being and Support): Similar to "Solutions," "Well Being and Support" also has a top frequency of 6. This highlights that addressing the well-being and support needs of students and faculty was a major concern and focus during the crisis, acknowledging the emotional and practical difficulties they faced.

Relationships (Communication Frequency and Effectiveness): "Communication Frequency and Effectiveness" was cited by 4 respondents. This suggests that maintaining effective communication and managing the frequency of communication were important factors in how relationships were affected and adapted during the crisis.

3) Objective 3. Support and Resources:

Lacking (Faculty Support and Resources): The highest frequency in this category (6 out of 15) points to "Faculty Support and Resources" as the most prominent area of deficiency. This indicates that faculty and coordinators felt a significant lack of adequate support and resources, which could include funding, personnel, or materials necessary to navigate the crisis.

Effectivity (Technology Related Issues): "Technology Related Issues" being the top frequency (4 out of 15) suggests that problems related to technology were the primary concern when evaluating the effectiveness of support and resources. This could involve issues with access, reliability, or the usability of technology.

Trainings (Issues with Training Delivery and Support): With a top frequency of 5, "Issues with Training Delivery and Support"

highlights that the training provided was often problematic. This might include issues with the relevance, timeliness, format, or availability of training.

4) Objective 2. Impact and Reflection:

Perspective (Re-Evaluation of Teaching Methods)

The data indicates that "Re-Evaluation of Teaching Methods" was a frequent perspective shift (5 out of 15). This suggests that the crisis prompted many faculty and coordinators to reconsider their pedagogical approaches, likely moving away from traditional methods.

Impacts (Positive on Student Skills and Attributes)

With the highest frequency in this table (7 out of 15), "Positive on Student Skills and Attributes" demonstrates that a significant number of respondents observed positive impacts on students' skills. This implies that despite the challenges, students developed valuable skills and attributes.

Vulnerabilities (Inadequate Student Report)

"Inadequate Student Support" had a lower top frequency (3 out of 15) compared to other categories. However, it still signifies that the lack of sufficient support for students was recognized as a vulnerability exposed by the crisis.

Lessons (Empathy and Support)

"Empathy and Support" being a top lesson (4 out of 15) highlights the importance of empathy and support in navigating the crisis. This suggests that faculty and coordinators recognized the need to prioritize empathy and provide support to students and each other.

5) Objective 3. Future Preparedness:

Strategies (Planning and Preparedness)

"Planning and Preparedness" being a top strategy (5 out of 15) indicates that respondents emphasized the importance of proactive planning and preparedness for future crises. This suggests a recognition that having well-defined strategies in advance is crucial.

Preparation (Training and Professional Development)

With the highest frequency in this table (7 out of 15), "Training and Professional Development" stands out. This strongly suggests that respondents believe that providing adequate training and professional development for faculty is the most critical factor in future preparedness.

Curriculum Change (Increase Technology Integration)

"Increase Technology Integration" being a top curriculum change (5 out of 15) highlights the perceived need to incorporate more technology into the curriculum. This reflects the understanding that technology plays a vital role in flexible and resilient education.

Enablement (Tools for Instruction and Delivery)

"Tools for Instruction and Delivery" being a key enablement factor (6 out of 15) emphasizes the importance of providing faculty with the necessary tools and resources to deliver instruction effectively, especially in a crisis.

Recommendations (Faculty Support and Development)

Similar to "Preparation," "Faculty Support and Development" also has the highest frequency (7 out of 15). This reinforces the idea that supporting and developing faculty is seen as essential for future preparedness and effective crisis management.

C. Discussion

The research findings provide a detailed examination of crisis leadership in Aeronautical Engineering education during the COVID-19 pandemic, directly addressing the study's general objective to analyze the effects of such leadership. The data reveals that faculty and coordinators predominantly adopted the role of "Problem Solver/Adaptor" (26.67%), indicating their active engagement in addressing the immediate challenges posed by the crisis. This proactive stance is further emphasized by the focus on "Course Management" (26.67%), highlighting the significant effort dedicated to maintaining and adjusting instructional delivery. The primary decision-making driver was ensuring "Academic Continuity" (33.33%), demonstrating a commitment to minimizing disruptions to students' education. Crucially, the concern for "Quality and Standard" through "Effective Teaching and Assessment" (26.67%) underscores the dedication to upholding educational integrity throughout the crisis. These findings collectively answer the first specific objective by illustrating how faculty and coordinators utilized crisis leadership, emphasizing adaptability, instructional management, continuity, and quality assurance.

The study also identifies the significant challenges encountered and the adaptations implemented, providing insights into the effectiveness of crisis leadership (second specific objective). "Course Management" (26.67%) emerged as a key challenge, reinforcing its centrality in the crisis response. "Technology Enhanced Instruction" (40%) was the most frequently adopted solution, demonstrating the pivotal role of technology in adapting to the altered educational landscape. The considerable emphasis on "Well Being and Support" (40%) highlights the recognition of the crisis's impact on stakeholders' emotional and practical needs, prompting proactive support measures. Furthermore, "Communication Frequency and Effectiveness" (26.67%) were crucial for maintaining connections and ensuring information dissemination. These adaptations showcase the multifaceted nature of crisis leadership, requiring not only instructional adjustments but also a focus on technology integration, stakeholder support, and effective communication.

The findings also shed light on the critical role of support and resources in enabling effective crisis leadership, while also pointing out the shortcomings. The data reveals a significant "Lacking" of "Faculty Support and Resources" (40%), indicating a potential impediment to effective crisis response. The "Effectivity" of support was closely linked to "Technology Related Issues" (26.67%), underscoring the importance of robust technological infrastructure and support. Moreover, "Issues with Training Delivery and Support" (33.33%) suggest deficiencies in the preparation and assistance provided to faculty and coordinators. These results contribute to the evaluation of crisis leadership effectiveness (second specific

objective) and provide valuable insights for universities to enhance their support systems for future crises (third specific objective).

Furthermore, the study examined the broader impact of the crisis and prompted reflection on lessons learned, contributing to the third specific objective of providing recommendations for future crises. The crisis spurred a "Re-Evaluation of Teaching Methods" (33.33%), demonstrating a shift in pedagogical approaches. Notably, there were "Positive Impacts on Student Skills and Attributes" (46.67%), suggesting that the crisis also fostered valuable student development. However, "Inadequate Student Support" (20%) was identified as a vulnerability, highlighting an area needing improvement. The emphasis on "Empathy and Support" (26.67%) as a key lesson underscores the importance of these qualities in navigating crises.

Finally, the research culminates in recommendations for future preparedness, directly addressing the third specific objective. "Planning and Preparedness" (33.33%) and "Training and Professional Development" (46.67%) are identified as crucial strategies. "Increase Technology Integration" (33.33%) and providing "Tools for Instruction and Delivery" (40%) are emphasized to enable effective responses. Consistently, "Faculty Support and Development" (46.67%) is highlighted as a top recommendation, reinforcing its importance for future resilience.

In conclusion of discussion, this research provides a comprehensive analysis of crisis leadership in Aeronautical Engineering education during the pandemic. The findings effectively detail how faculty and coordinators utilized crisis leadership, assess its effectiveness, and offer actionable recommendations for universities, thus fulfilling the study's general and specific objectives.

7. Conclusion and Recommendations

A. Conclusion

In conclusion, this study reveals the significant impact of the COVID-19 pandemic on Aeronautical Engineering education, necessitating a dynamic and adaptive form of crisis leadership from faculty and coordinators. Their primary focus was on ensuring the uninterrupted continuation of learning and maintaining educational standards amidst unprecedented challenges.

The transition to remote and blended learning environments was largely facilitated by the integration of technology and a heightened awareness of the well-being of both students and educators. However, the study also highlights areas where support and resources were perceived as lacking, particularly in terms of adequate faculty support and effective technological infrastructure. The crisis prompted a fundamental re-evaluation of traditional teaching methodologies, leading to pedagogical shifts and, surprisingly, the development of certain positive student attributes.

Key lessons emerged regarding the importance of empathy, support, and proactive planning for future disruptions. Moving forward, the findings underscore the critical need for institutions to prioritize comprehensive planning and preparedness, invest in robust training and professional development for faculty, strategically integrate technology into the curriculum and instructional delivery, and consistently support the professional growth and well-being of their educators to foster a more resilient and student-centered educational system capable of navigating future crises effectively.

B. Recommendations

Based on the findings of this study, the following recommendations are proposed:

1) Proactive Crisis Preparedness

Universities offering Aeronautical Engineering programs should prioritize the development of comprehensive crisis preparedness plans that integrate flexible teaching methodologies and robust technological infrastructure. This aligns with the study's significance by providing universities with actionable strategies to navigate future crises effectively, ensuring learning continuity.

2) Faculty Empowerment and Development

Universities must invest in continuous professional development and provide resources that empower faculty to be agile and innovative in their teaching approaches, recognizing their crucial role as "Problem Solvers/Adaptors" and their focus on "Course Management." This directly supports the study's significance for coordinators and faculty by equipping them with effective leadership approaches for future crises.

3) Student Support and Communication

To support students and foster their cooperation during crises, universities should implement clear communication channels and support systems that address students' academic and emotional well-being during disruptions. This recommendation aligns with the study's significance for students, promoting understanding and cooperation during challenging times.

4) Knowledge Sharing and Collaboration

Given the study's relevance to researchers and future researchers, universities should establish platforms for sharing best practices and lessons learned from crisis situations. This will contribute to a broader understanding of effective crisis leadership in education and facilitate ongoing improvements in institutional resilience, directly benefiting the research community.

The study recommends that universities prioritize proactive planning, faculty empowerment, student support, and knowledge sharing to enhance crisis preparedness in Aeronautical Engineering education.

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