Student Leadership in Volatile, Uncertain, Chaotic, and Ambiguous Business Environment: Experiment from the Complexity Leadership Theory

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Abstract

Purpose: Student leadership has become an increasingly critical issue over time. Despite the progress in some areas, the Volatile, Uncertain, Chaotic, and Ambiguous (VUCA) world still significantly hinders students' ability to lead in social, economic, and political spheres.

Methods: An explanatory research design was employed in this study. Convenience sampling is used to select participants, and a self-administered questionnaire is utilized. The questionnaire has been modified to align with the study's objectives. Data collection is conducted using the Kobo Toolbox in the Kathmandu Valley, and data analysis is performed using SmartPLS 4.0, which applies both descriptive and inferential data analysis techniques.

Findings: The findings indicate that most respondents are aware of and knowledgeable about VUCA. In the VUCA business environment, managing people and delegating work are considered significant challenges. The study identifies major solutions to address these issues, including providing hands-on experience learning opportunities and emphasizing the importance of soft skills. The research reveals that enabling, operational, and entrepreneurial leadership influence VUCA skills, benefiting researchers, future students, educational institutions, governments, and other business organizations.

Conclusion: The findings highlight that most respondents are familiar with VUCA and recognize managing people and delegation as the key challenges. The study suggests that enhancing VUCA skills through hands-on experience, soft skills training, and effective leadership can benefit various stakeholders, including researchers, students, and organizations.

Keywords: VUCA, Student leadership, Complexity Leadership Theory, SEM

JEL Classification: C21, C83

1. Introduction

The surroundings of our living environment in the 21st century have been marked by what is commonly referred to as the "new normal". The rate and breadth over which our lives are disrupted by exploding technical breakthroughs, extreme demographic expansion, immigration, ecological calamities, and geopolitical tendencies are only increasing. These conditions, which have been exacerbated by globalisation, are referred to as VUCA (Hadar et al., 2020). Volatility is defined as changeable, unforeseen, and the deviation from the expected, which best characterises the present era. Uncertainty signifies a lack of definite methodologies or answers to a problem (Yaccob et al., 2023). Chaos and interdependent forces generally present in an organisation are referred to as its complexity. Ambiguity refers to the difficulty in separating issues, the haziness of reality, and the various potential interpretations of the circumstances influencing businesses (Horstmeyer, 2019). Many information and practice networks are the source of complexity. Each component of these networks is interrelated and might be diverse, intricate, or even chaotic.

Over the years, organisational environments have often been characterised by the acronym VUCA, representing volatility, uncertainty, complexity, and ambiguity (Taskan et al., 2024). The terrorist attack on the World Trade Center on September 11, 2001, the advent of mobile internet and mobile devices (smartphones) in 2007, and the beginning of the economic recession in 2008, have brought about a break in continuity. These disturbances have introduced a transition, which marked the end and the beginning of distinct periods of relative stability and coherence, with balanced conditions and gradual change (Postma & Yeoman, 2020). A recent study of 15,787 leaders indicated that VUCA is the greatest challenge facing leaders in this century, and developing the next generation of leaders is the top challenge for the year ahead (Development Dimensions International, 2021). The business environment is rapidly changing, requiring academics to adapt their research, frameworks, and tools. This dynamic context, described as Volatile, Uncertain, Complex, and agile (VUCA), is also common in crises across various fields, as they all involve human reactions to rapid change and uncertainty (Kaiser et al., 2022). In addition to a complex operating environment, VUCA leadership necessitates a new set of competencies and techniques. Therefore, it is necessary to equip higher education institutions with a focus on quality teaching, research, administration, consulting, and student employability as learning organisations (Chawla & Lenka, 2018).

According to the CLT paradigm, complexity leadership includes three components: operational, entrepreneurial, and enabling leadership (Bäcklander, 2019). Entrepreneurial leadership—improving products and learning via explorations; operational leadership—improving administrative efficiency through exploitation (Uhl-Bien & Arena, 2018). While AI has been effectively supporting operational functions by improving performance, the real challenge for organisations today is transitioning AI from the operational level—focused on outperforming competitors in routine tasks—to the strategic level, where it can help deliver a unique value proposition to customers and create a competitive advantage (Biloslavo et al., 2024). Rosenhead et al. (2019) state that enabling leadership is "a new way of thinking evolving in response to complexity".

Using advanced technology in education has made it possible for people worldwide to learn in the open and online. Online learning has recently become more prevalent in Nepal (Khanal et al., 2021). Higher education institutions are increasingly seen as places where social changes, which meet essential community needs, can occur. Their most important goal is to help students develop integrity and strength of character to prepare them for leadership, citizenship, and community involvement in the future (Soria et al., 2019). In developed and Western countries, much research has been done on how educational leadership is set up, how it works, and what problems it faces. There has been less research in less developed, developing, and low-income countries like Nepal (Khanal et al., 2021).

Overall, the motivation for this research stems from the significance of encouraging effective

leadership among students and providing them with the knowledge and attitude needed to successfully traverse the complicated and constantly changing business environment in the Kathmandu Valley. The analysis focuses on determining whether students possess the necessary leadership qualities to function effectively in a VUCA environment. From every conceivable point of view, the business environment's volatile, uncertain, complex, and ambiguous nature is intrinsically tied to the Nepalese economy. According to the World Bank (2020), the COVID-19 epidemic has caused more than 1.6 billion children and young people in 161 countries to be absent from school. This accounts for nearly 80% of the world's enrolled pupils in educational institutions. A considerable number of Nepalese labour migrants and students could not return to their destinations overseas from Nepal, causing significant disruption (Poudel & Subedi, 2020). This highlights the requirement for an empirical study to measure the fundamental leadership abilities required for enabling leadership, entrepreneurial leadership, and operational leadership in this VUCA context.

The potential research avenues encompass assessing the status of student leadership, exploring the connection between student leadership and VUCA, identifying challenges faced by Nepalese student leaders in a VUCA world, and examining managerial solutions to promote student leadership in Kathmandu Valley. The research aims to investigate and comprehend how student leadership can flourish and contribute to the dynamic business environment in Kathmandu Valley, Nepal. The study seeks to identify approaches, best practices, and frameworks to improve student leadership growth and equip them for success in the VUCA business environment. Policymakers and other stakeholders can determine the most effective strategies to encourage student leadership by studying various types of leadership, such as entrepreneurial leadership, operational leadership and enabling leadership.

2. Methods

Conceptual Framework

This study incorporates various conceptual models and theories related to leadership in complex and uncertain environments. Dawson et al. (2018) emphasise the importance of leaders identifying common causes within institutions to facilitate the adoption of learning analytics (LA). They also examine why such processes are not more accessible in their work on rethinking learning analytics adoption through complexity leadership theory. Schophuizen et al. (2022) explore how leaders within higher education institutions balance top-down coordination and bottom-up emergence to foster innovative capacity, underlining the significance of collaboration, facilitation, and trust in achieving effective governance. The research by Deepika and Chitranshi (2021) delves into the leadership skills of Generation Z (those born after 1997), employing an unstructured questionnaire and multiple linear regression analysis to study the relationship between VUCA skills (as a dependent variable) and enabling, entrepreneurial, operational, and architectural leadership (as independent variables). Their findings highlight the critical nature of these leadership factors for effectively navigating a Volatile, Uncertain, Complex, and Ambiguous (VUCA) business environment. Lotrecchiano (2010) proposes a model within the framework of complex adaptive systems (CAS) in transdisciplinary (TD) contexts, emphasising the role of enabling properties, dynamic interactions, and the creation of a knowledge feedback loop that supports the emergence of new insights. The conceptual framework for this study is adapted from the work of Deepika and Chitranshi (2021).

Figure 1

Conceptual Framework
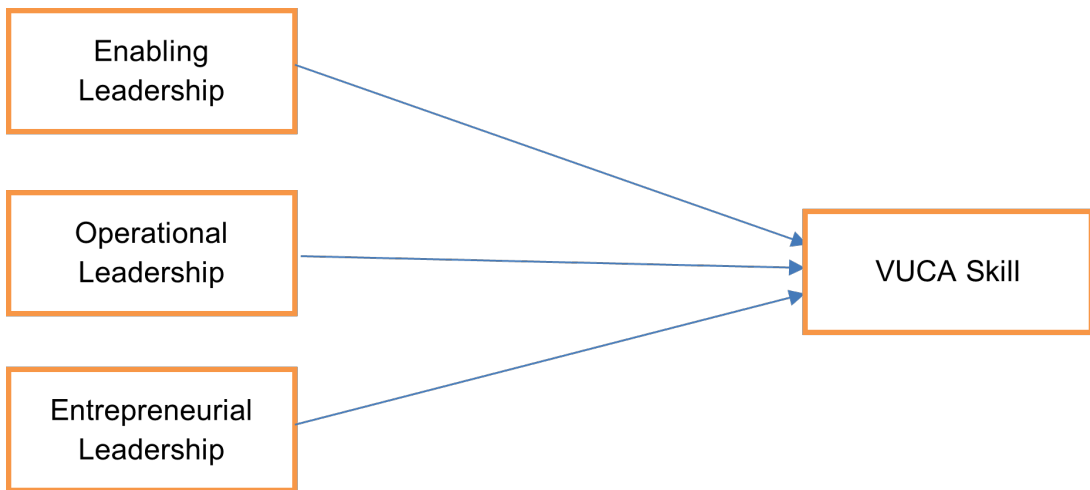
Source: Adapted and modified from Deepika and Chitranshi (2021)

Enabling Leadership and VUCA Skills

Enabling leadership promotes innovative thinking, learning, and adaptation (Martiskainen, 2017). Frequently, enabling leaders behave more like coaches or mentors than a traditional supervisor would, and they may not even be the formal manager of the individual they are coaching). They are more likely to ask questions rather than provide explicit directions. Enabling leadership requires significant effort to maintain a comprehensive understanding of emerging opportunities and changes in the external environment, which is achieved through disseminating information (Ancona & Backman, 2019).

H1: There is a significant relationship between enabling leadership and VUCA Skills.

Operational Leadership and VUCA Skills

Typically, operational leadership addresses issues associated with ongoing activities and processes. Several characteristics of operational leadership include low-to-moderate ambiguity, low uniqueness, procedural in nature, functional purpose, short-to-medium term, group management, and moderately low external orientation (Norzailan et al., 2016). It is frequently employed and encouraged in the military. The exercises they conduct to maintain the command's effectiveness explain why it is utilised on the military territory. As the stages become more technically advanced, the leadership shifts and strategic competency involves operational rather than other competencies. The emotional quotient must be more tightly regulated, and operational leadership is the proper equipment on the battlefield or in any situation where tactical problem-solving is required (Deepika & Chitranshi, 2021). The characteristics of operational leadership are activities that promote accountability and the establishment of success and failure metrics (Tsai et al., 2019).

H2: There is a significant relationship between operational leadership and VUCA Skills.

Entrepreneurial Leadership and VUCA Skills

Entrepreneurial leadership exists at the crossroads of leadership and entrepreneurship, where leadership translates the process of influencing, and entrepreneurship represents both the entrepreneur and the entrepreneur's interaction with their surrounding prospects (Al Mamun et al., 2018). Entrepreneurial leadership is the ability to sustain innovation and adaptation in high-velocity, uncertain contexts. Other scholars emphasise entrepreneurial leaders' capacity to discover and capitalise on opportunities and solve complex business, social, and environmental challenges (Bagheri & Harrison, 2020). An

entrepreneurial leader is a transformational leader who interacts with a highly dynamic market that presents opportunities and challenges and is characterised by skills such as clarity, communication, consistency, caring, creating opportunities, self-confidence, power need and its use, and vision. Sousa (2018) mentioned that an entrepreneurial leader is a transformational leader who interacts with a highly dynamic market that presents opportunities and challenges and is characterised by skills such as clarity, communication, consistency, caring, creating opportunities, self-confidence, power need and its use, and vision.

H3: There is a significant relationship between entrepreneurial leadership and VUCA Skills.

Study Area and Population and Sampling

This study utilises a causal framework to validate the interrelationships among the selected variables, as delineated in Table 1, substantiating the associations between the variables under examination. This study's primary audience is the students of the Kathmandu Valley located in Nepal. Nepal geographically lies between 260 and 310 N latitudes and 800 and 890 E longitudes (Paudel & Devkota, 2020). The Kathmandu Valley was chosen as the research area since it is home to most schools and colleges (Adhikari et al., 2021). Another compelling reason to choose this place is that data collecting is more convenient and cost-effective. Kathmandu Valley lies in the Bagmati Province of Nepal. There are 77 districts in Nepal, and among them, three districts located in the Bagmati province and the Kathmandu valley, i.e., Kathmandu, Lalitpur and Bhaktapur, were chosen as the subject area for this research (Mohanty, 2020). The valley stretches from latitudes of 27°49′4″ to 27°31′42″ and 85°11′19″ to 85°33′57 a longitude that accounts for a 721 km^2 total area (Adhikari et al., 2024; Mesta et al., 2022). It is home to some of Nepal's most prestigious schools and colleges. As a result, the Kathmandu Valley is likely to have the highest concentration of students in Nepal. This could provide access to relevant information and insights. The study's population includes students from all schools and colleges of Kathmandu Valley.

A prudent approach was employed during the sampling process to ascertain the pertinence and representativeness of the acquired data. A non-probability sampling technique was chosen for this study since the study's population is unknown. The study uses convenience sampling (Singh et al., 2024), which is obtained from a source that is easily accessible to us. The sampling formula (Magar et al., 2023) is employed to derive the sample size. The standard tabulated value for a 5% level of significance (Z) is set at 1.96, where p represents the prevalence or proportion of an event (50% or 0.50), and q is the complementary proportion (1 - p = 0.50). The allowable error (e) is specified as 5%. The total population for the study is calculated to be 384.16. Considering a non-response error of 5% (i.e., 384.16 multiplied by 0.05), which is 19.20, the final sample size for the study is determined by adding the non-response error to the initial calculated value: 384.16+19.20, totalling 403 individuals.

Research Instrument and Data Collection

The structured questionnaire with an interview is the primary research tool utilised to collect data for this study. A structured questionnaire has been established and devised for data collection to conduct a survey and get primary data for research of students' opinions on student leadership in the VUCA business environment in Kathmandu Valley. The survey questionnaire includes closed-ended questions to address the study's subject. Following the creation of the study questionnaire, structured questionnaires are administered for data collection utilising the KOBO toolbox form (Bhandari et al., 2021).

The KOBO toolset is used to manage the structured questions created for data collection. The researchers linked surveys to achieve the study's varied objectives. Once the questionnaire is included in the KOBO toolbox, a trial survey of a few sample items is conducted to ensure that the instrument is reliable and consistent. Closed-ended questions were devised to collect data. The organisation agreed

to the data collection.

Variables and Definitions

This section deals with the variables used for the study. The study's variables have been discovered and defined, which are listed below:

Table 1

Variable Construct

Construct	Observed Variables	Indicators	Explanation
Enabling leadership (Deepika & Chitranshi, 2021)	Adaptability	EL1	Adjust well to new situations.
	Decision making	EL2	Capability of figuring out how to solve problems and making decisions.
	Persuade	EL3	Ability to influence the opinions of other people.
	Risk taker	EL4	Ability to take risk.
	Learning	EL5	Constantly looking forward to improving skills.
	Creative	EL6	A mentality that is open to new ideas.
Operational leadership	Communication	OL1	An excellent communicator.
	Diversity and equality	OL3	Place a strong value on inclusivity and treating men and women equally.
	Journey and development.	OL3	Value everyone's journey and am therefore concerned with their development.
	Relationship Maintenance	OL4	Relationships should not only be developed but also cultivated and nurtured.
	Teamwork	OL5	Ability to lead and manage groups and teams.
	Permission	OL6	Instead of attempting to rule, decisions are made by listening and obtaining everyone's consent.

	Self-discipline	ENL1	Actions are guided by self-discipline.
Entrepreneurial Leadership	Strive for goals	ENL2	Put much effort into achieving goals.
	Observe	ENL 3	Conscious of the surroundings.
	Mental development	ENL4	Constantly trying to take care of mental development.
	Leadership Skill	ENL5	Possessed the leadership skills required in today's environment.
	Self-discovery	ENL6	Self-discovery is the goal.
VUCA Skills	Solve problems	VS1	Turn difficulties or issues into advantages.
	Learn by experiencing unfamiliar situations.	VS2	One can learn from unfamiliar environments by immersing oneself in those circumstances.
	Nurturing Creation	VS3	Taking advantage of the desire to build and grow things.
	Change of mind	VS4	One can change one's mind quickly.
	Sense of disorder.	VS5	Have the capacity to make sense of disorder.
	Adoption and innovation	VS6	Incorporate innovation rapidly.
	Handle difficult situations and resolve conflicts.	VS7	Deal with difficult situations and engage in constructive conflict resolution.
	Encourage change through print and social media.	VS8	Use print and social media to make and encourage change.
	Environmental awareness	VS9	Be aware of the surrounding environment.
	Cognitive empathy	VS10	Demonstrate cognitive empathy.

Data Analysis Technique

Data analysis is an iterative process of manipulating and interpreting numbers to find meaning (Mertens et al., 2016). Data were analysed using descriptive and inferential methods. Microsoft Excel is utilised for data entry and research tallying, while SmartPLS 4.0 is utilised for data analysis. Descriptive analysis utilises Microsoft Excel, bar graphs, charts, and tables, while inferential analysis utilises Structural Equation Modeling (SEM) and measurement models.

3. Results

Socio-Demographic Characteristics

The Socio-Demographic variables of the surveyed are included in this section. Data is collected from 410 respondents. In this part, gender, marital status, age, education level, income level, and location of banking employees are presented in a tabulated form, which helps to interpret them clearly.

Table 2

Socio-Demographic Characteristics

Title	Category	Number	Percentage
Gender	Male	227	55.61%
	Female	182	44.39%
Age	16-20	4	0.98%
	20-30	260	63.41%
	30-40	129	31.46%
	40-50	17	4.15%
Level of education	SLC	3	0.73%
	Intermediate	63	15.37%
	Bachelors	215	52.44%
	Master's and above	129	31.46%
Profession	Private Sector	175	42.68%
	Government Sector	87	21.22%
	Industrial Sector	41	10.00%
	Self Employed	50	12.20%
	Unemployed	54	13.17%
	Others	3	0.73%

Source: Field Survey, 2023

Table 2 showcases the distribution of participants based on gender, age, level of education, and profession. Out of 410 respondents in this survey, 55.61% were male, and 44.39% answered questions about student leadership in the VUCA business environment. In terms of gender, the data reveals that out of the total participants, 55.61% were male, while 44.39% were female. In contrast to the study of Aycan and Shelia (2019), female participants comprise the majority of the male participants. This indicates a slightly higher representation of males in student leadership within the VUCA business environment in Kathmandu Valley. Regarding age, most participants, accounting for 63.41%, fell within the age range of 20-30. This suggests that young individuals are actively engaging in student leadership roles in the VUCA business environment.

Additionally, 31.46% of participants were between 30 and 40 years old, highlighting the involvement of individuals with more experience and maturity. Regarding education, the data shows that 52.44% of participants held a bachelor's degree, indicating a significant emphasis on higher education among student leaders. Furthermore, 31.46% had pursued a master's level education or above, reflecting the importance of advanced education in preparing individuals for leadership roles in the VUCA business environment. This aligns with the findings of Seow et al. (2019), who found that bachelor-enrolled students comprise the majority of students. Regarding the profession, the largest group consisted of

individuals working in the private sector (42.68%), followed by the government sector (21.22%). This indicates that student leaders in the VUCA business environment actively engage in private and public sectors, bringing diverse perspectives and experiences to their leadership roles. The industrial sector accounted for 10.00% of the participants, while 12.20% were self-employed. Notably, 13.17% were unemployed.

3.1.1 General Understanding regarding VUCA.

This section primarily provides general knowledge or information on student leadership in the VUCA business environment. As per the data, all the participants think leadership is an important quality. Based on the provided data, out of the respondents who answered the question, 362 individuals (88.30%) expressed that they feel their college provides adequate skills to equip them for a competitive workplace. Conversely, 48 individuals (11.70%) responded negatively, indicating they do not feel adequately equipped by their college for the competition. The study finds that most respondents (86.82%) are aware of the term VUCA, while only 13.17 per cent are unaware of the term VUCA.

Figure 2

Types of Preferred Leadership style
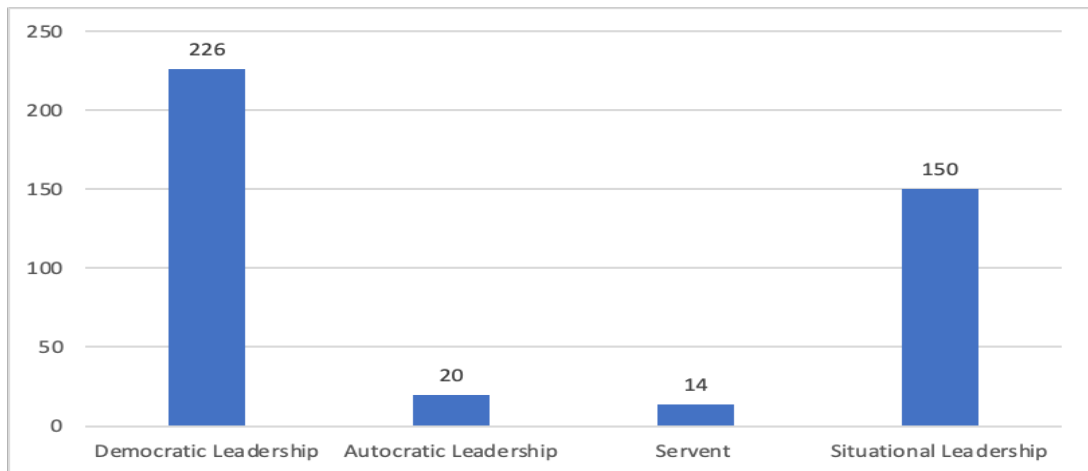
Source: Field Survey, 2023

Figure 2 reveals the preferences of individuals regarding different leadership styles. Among the respondents, the highest level of appreciation is observed for democratic leadership, with 226 individuals (48.94%) expressing their preference for this style. The second most preferred leadership style is situational leadership, which is appreciated by 150 individuals (32.49%). Among the respondents, the second most preferred is observed for situational leadership, with 150 individuals (32.49%) expressing their preference for this style. Autocratic leadership, which adopts a more directive and authoritarian approach, is appreciated by fewer respondents (4.33%). Lastly, servant leadership, which focuses on serving the needs and growth of followers, is appreciated by 14 individuals (3.03%). These findings suggest that within the context of student leadership in the VUCA business environment, individuals value leadership styles that are adaptable, inclusive, and empower followers. Caillier (2020) also stated that respondents assigned lower ratings to autocratic over democratic leadership.

Table 3

Characteristics of an ineffective leaders

Ineffective Leadership Qualities	Frequency	Percentage
Poor communication skill	279	68.05
Poor character	264	64.39
Lack of performance	245	59.76
Indiscipline	175	42.68

Source: Field Survey, 2023

The most common perception among respondents is that ineffective leadership results from poor communication skills. This is mentioned by 279 individuals, accounting for 68.05% of the respondents. Two hundred sixty-four individuals (64.39%) recognised poor character as a quality that renders a leader ineffective. The data reveals that 245 respondents (59.76%) identified a lack of performance as a quality that hampers a leader's effectiveness. The data shows that 175 individuals (42.68%) viewed indiscipline as a quality that diminishes a leader's effectiveness. According to a similar study, researchers found that poor communication skills are a significant quality of an ineffective leader (Kukreja, 2019).

Challenges for Student Leadership

This section deals with identifying existing challenges, the difficulties' severity, and where the challenges have arrived in Kathmandu Valley. According to the data provided, a significant majority of respondents, three hundred and ninety-two individuals (95.61%), perceive challenges for student leadership in the VUCA business environment of the Kathmandu Valley. Conversely, only 18 individuals (4.39%) believe that this business environment does not present challenges for student leadership. The percentages indicate the level of significance attributed to each challenge. Managing people is the top challenge, with 65.37% of respondents acknowledging its importance. This implies that student leaders struggle with effectively leading and motivating individuals within their teams. Delegating work follows closely at 53.41%, highlighting the difficulty in distributing tasks and responsibilities efficiently. Tough decision-making is another significant challenge, with 51.46% of respondents recognising the complexity of making critical choices in a VUCA environment. Adapting to change and limited resources are also substantial hurdles, identified by 50.98% and 49.27% of respondents. Coping with competition, leading diverse teams, achieving tasks, maintaining resilience, and processing large amounts of information are other notable challenges, although to a lesser extent. These findings suggest that student leaders in the Kathmandu Valley face a range of difficulties when navigating the VUCA business environment.

Figure 3

Challenges faced by students in the VUCA Environment
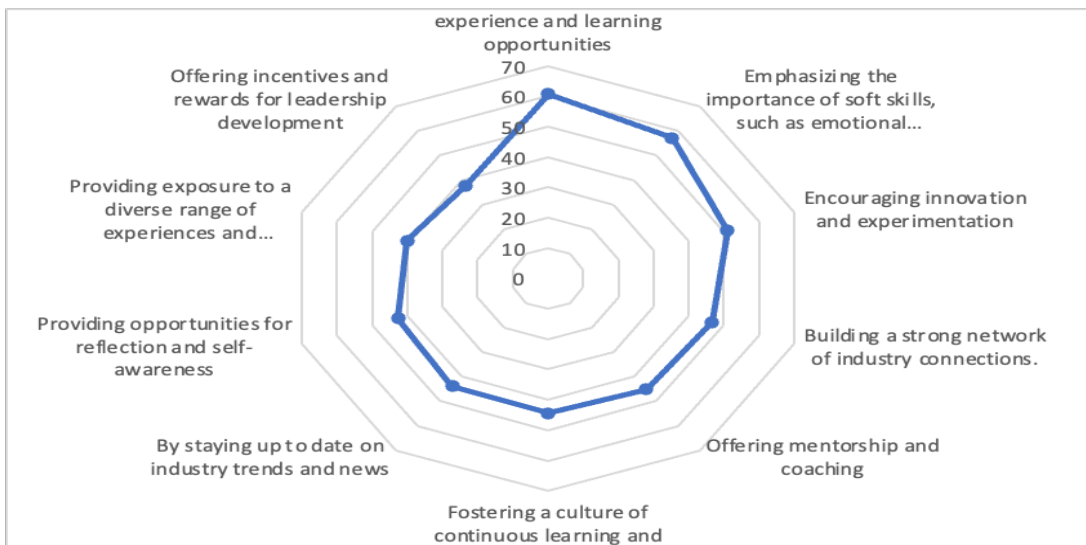
Source: Field Survey, 2023

According to the respondents, the most significant challenges are technological advancements and globalisation, with 71.71% and 69.02% of respondents recognising their impact, respectively. Demographic shifts and geopolitical instability are also recognised as significant challenges by 46.83% and 46.34% of respondents. These factors introduce uncertainty and complexity into decision-making processes, requiring student leaders to adapt and respond to changing circumstances. Lastly, environmental factors, as identified by 30.73% of respondents, further add to the challenges by highlighting the importance of sustainability and environmental responsibility. The respondents were likely asked to rate the severity of the challenges on a scale. According to the data, 52.93% of the respondents perceive the challenges as "Very severe," indicating a high level of seriousness and impact.

Additionally, 36.83% of respondents rated the challenges as "Extremely severe," further emphasising the significant nature of these obstacles. Another 9.51% of respondents considered the challenges "moderately severe," suggesting a moderate level of impact. Only a small percentage, 0.73%, viewed the challenges as "Slightly severe," indicating a lower severity level. These ratings highlight the gravity and urgency of the challenges faced by student leadership.

Managerial Solutions

According to the data, 97.07% of the respondents believe that preparing students to be leaders in the VUCA business environment requires a clearly defined managerial strategy. While a minority of 2.93% disagreed, the overwhelming support for a clearly defined managerial strategy emphasises its significance in preparing students to become influential leaders in the VUCA business environment.

Figure 4

Managerial Solution

Source: Field Survey, 2023

Figure 4 provides several crucial managerial strategies to foster student leadership in the VUCA business environment. The top-ranked strategy identified by 60.73% of respondents is providing hands-on experience and learning opportunities. Additionally, emphasising the importance of soft skills, such as emotional intelligence and communication, is considered crucial by 57.07% of respondents.

Encouraging innovation and experimentation, which garnered support from 50.98% of respondents, is another crucial strategy. Building a solid network of industry connections (46.59%) and offering mentorship and coaching (45.12%) are also essential strategies for student leadership development. Furthermore, fostering a culture of continuous learning and development (44.39%), staying up to date on industry trends and news (43.90%), providing opportunities for reflection and self-awareness (42.68%), and exposure to diverse experiences and perspectives (40%) are considered valuable approaches for enhancing student leadership capabilities in the VUCA environment. Lastly, offering incentives and rewards for leadership development is mentioned by 37.8% of respondents. Most respondents consider it very important (52.68%) or extremely important (42.68%) for organisations to have a well-defined managerial strategy for developing leader readiness in students in the VUCA business environment.

Inferential Analysis

Measurement Model Assessment

The measurement models were validated using convergent and discriminant validity tests, following the methodological framework suggested by Acheampong and Cugurullo (2019). These models evaluate the relationship between theoretical constructs, which are not directly measurable, and their respective observable variables, expressed through a linear combination.

Internal consistency reliability was assessed using **Cronbach's alpha** and **composite reliability (CR)**, widely accepted methods in reliability testing. According to Khadayat et al. (2024), a statistical value of **0.70 or higher** indicates good internal consistency. CR scores between **0.60 and 0.70** are considered acceptable for exploratory research, while scores ranging from **0.70 to 0.90** are deemed satisfactory to sound, as per Hair et al. (2019). Values above **0.95**, however, may indicate item redundancy, lowering construct validity (Amatya et al., 2023; Ursachi et al., 2015).

In this study, Cronbach's alpha values ranged from **0.80 to 0.90**, indicating an excellent level of reliability, while composite reliability scores fell within the range of **0.70 to 0.90**, confirming

satisfactory internal consistency without redundancy issues. This aligns with findings from previous research, where similar thresholds have been successfully applied to validate internal consistency and reliability (Vaske et al., 2017; Ongena et al., 2020).

Table 4

Internal Consistent Reliability

Constructs	Cronbach's Alpha	Composite Reliability
Enabling Leadership	0.926	0.942
Entrepreneurial Leadership	0.927	0.943
Operational Leadership	0.918	0.936
VUCA Skills	0.939	0.948

Table 4 shows internal consistency (CA and CR) reporting in empirical investigations. In this case, Cronbach's alpha (CA) criterion. As mentioned by Lawaju et al. (2024), the data that have Cronbach's alphas and composite reliability of the constructs greater than 0.7 are considered to have adequate internal consistency, and the table now shows that the CA and CR are above 0.7, therefore the internal consistency is met.

Convergent Validity

Loading is a numeric value that specifies the strength of the association between a latent variable (structure) and an obvious variable (index) during the path analysis process (Keshavarz et al., 2018). According to Campbell and Fiske, the factor loadings for each item should be more significant than 0.7, and any item with loadings less than 0.7 should be eliminated from the construct's structure and loadings of less than 0.4 must be deleted (Almaiah et al., 2016; Wasiuzzaman & Nurdin, 2019). According to Hair et al. (2014), the accepted value of the outer loadings to be considered is at least 50% of the explainable latent variance, more than or equal to 0.708 (outer loadings 0.708). The average variance extracted (AVE) for all items on each construct is the metric used to assess a construct's convergent validity. The loading of each indicator on a construct must be squared to get the mean value, which is then used to calculate the AVE. The construct must explain at least 50% of the variation of the items that make up the construct for the AVE to be considered acceptable, which must be at least 0.5 (Hair et al., 2019).

Table 5

Convergent Validity

Constructs	Items	Loadings	Average Variance Extracted
Enabling Leadership	el1	0.853	0.73
	el2	0.86	
	el3	0.866	
	el4	0.871	
	el5	0.844	
	el6	0.832	
Entrepreneurial Leadership	enl1	0.845	0.733
	enl2	0.867	
	enl3	0.878	
	enl4	0.866	
	enl5	0.846	
	enl6	0.834	
Operational Leadership	ol1	0.827	0.709
	ol2	0.845	
	ol3	0.845	
	ol4	0.843	
	ol5	0.859	
	ol6	0.831	
VUCA Skills	vs1	0.811	0.645
	vs10	0.761	
	vs2	0.82	
	vs3	0.818	
	vs4	0.837	
	vs5	0.834	
	vs6	0.84	
	vs7	0.767	
	vs8	0.766	
	vs9	0.775	

Table 5 explains how empirical investigations report convergent validity. In this study, indicators have AVE values less than 0.5, and constructs have factor loadings more than 0.7. The extracted average variance (AVE) is greater than the critical value of 0 (.5 AVE > 0.5), convergent validity (Asmelash & Kumar, 2019; Shmueli et al., 2019). Therefore, it has been demonstrated that the construct satisfies the criteria for convergent validity.

Discriminant Validity

Discriminant validity was assessed using the HTMT ratios and the Fornell-Larcker criterion. Table 6 indicates that the HTMT criteria are satisfied, as all HTMT ratios fall below the threshold of 0.9, consistent with the guidelines established by Henseler et al. (2015). The Fornell-Larcker criterion

(1981) was also applied to confirm discriminant validity by comparing each construct's square root of the Average Variance Extracted (AVE) with the correlations among latent constructs. A construct must explain its indicators' variance better than it explains the variance of other constructs to establish discriminant validity. This requires the square root of the AVE for each construct to exceed its correlations with other constructs, as demonstrated in Table 7, which meets this criterion (Hair Jr et al., 2021).

Table 6

Heterotrait- Monotrait ratio (HTMT) Results

	el	enl	ol	vs
El				
enl	0.689			
Ol	0.79	0.863		
Vs	0.694	0.733	0.723	

Table 7

Fornell- Larcker Criterion Results

	el	enl	ol	vs
el	**0.854**			
enl	0.639	**0.856**		
ol	0.728	0.795	**0.842**	
vs	0.647	0.685	0.672	**0.803**

Goodness of fit

According to Worthington and Whittaker, an SRMR score of 0.10 or less indicates a strong model fit (Taasoobshirazi & Sinatra, 2011). The SRMR value for the model is 0.045, which is less than 0.1. Therefore, it is determined that this research study's model fit is generally reasonable.

Structural Model Assessment: The structural model's path coefficients and the coefficient of determination (R2) will be measured (Al-Maroof & Al-Emran, 2018). R^2 represents the combined effect of exogenous variables on endogenous variables (Almansoori et al., 2021). R^2 values vary from 0 to 1, with higher values suggesting greater explanatory power. R^2 values of 0.75, 0.50, and 0.25 are considered substantial, moderate, and weak, respectively (Sarstedt et al., 2021). According to the endogenous variables, "VUCA Skills" has an R^2 value of 0.552, which means that 55.2% of the variation in dependent variables, i.e., VUCA Skills, is explained by independent variables, i.e., enabling leadership, operational leadership, and entrepreneurial leadership. The VIF of el is 2.175, enl is 2.776 and ol is 3.5 which is less than 5. Thus, there is no problem of multicollinearity (Hair et al., 2019).

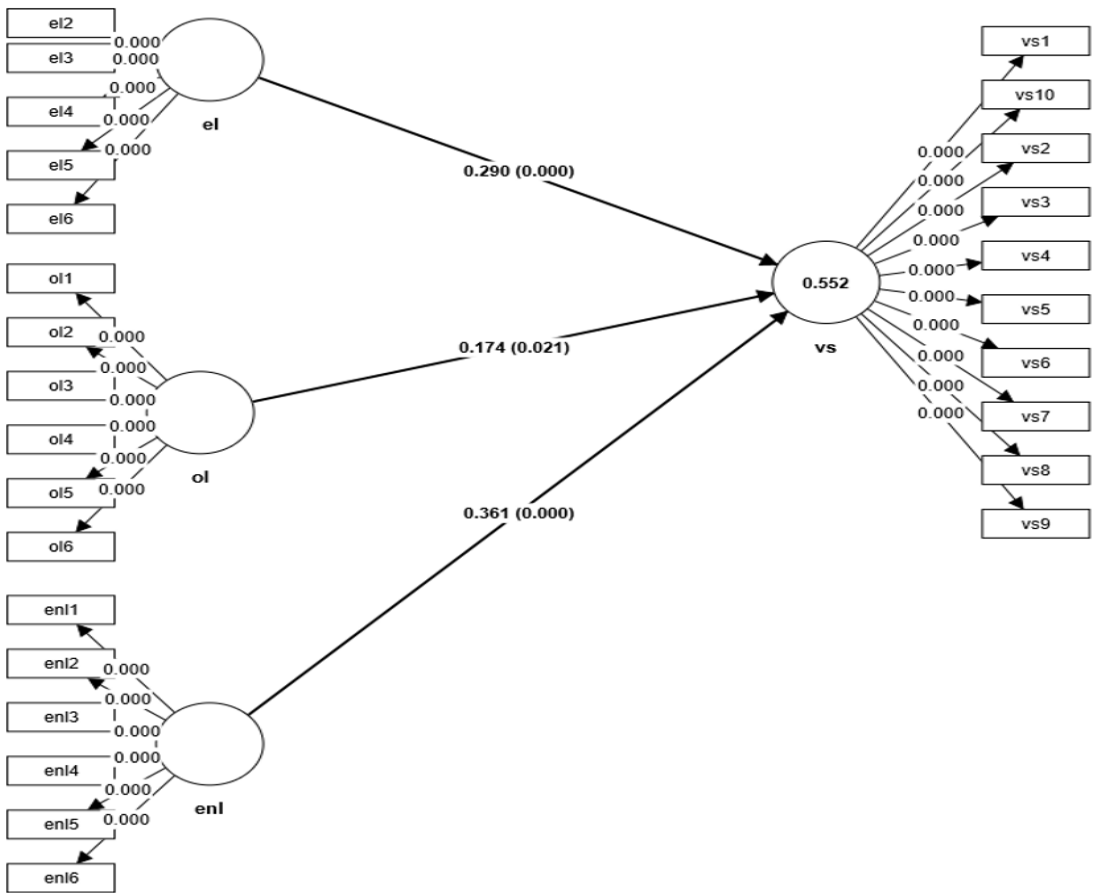## Figure 5

Path Analysis

Figure 5 displays the path analysis that is generated with the help of Smart PLS 4.0. This analysis comprises four constructs, each with a separate set of items. This model is used to determine whether there is a significant association between the variables by using bootstrapping with a sample size of 10000. There are four different constructs, and all of them are significant.

Table 8

Hypothesis Test

Hypothesis	Relationship	β	Standard deviation (STDEV)	P values	Confidence Interval		Decision
					LL= 2.5%	UL= 97.5%	
H1	el -> vs	0.417	0.29	0.067	0.000	0.154	Accepted
H2	ol -> vs	0.327	0.174	0.075	0.021	0.029	Accepted
H3	enl -> vs	0.5	0.361	0.071	0.000	0.221	Accepted

Note: We use a 95% confidence interval with a bootstrapping of 10,000

Hahn and Ang proposed combining criteria such as effect sizes, confidence intervals, and p-values (Almansoori et al., 2021). P value results are deemed ''statistically significant'' if P lies at or below a threshold (typically 0.05) and ''nonsignificant'' otherwise (Greenland et al., 2016). Table 9 presents

the results of hypothesis testing for the relationships between Enabling Leadership, Operational Leadership, Entrepreneurial Leadership, and VUCA Skills. The critical observation is that the p-values associated with all three hypotheses are less than 0.05. A p-value below 0.05 is a standard threshold used in statistical analysis to determine the significance level. In this case, the p-values indicate that the observed relationships between the leadership styles (Enabling, Operational, and Entrepreneurial) and VUCA Skills are statistically significant.

Beta coefficients are commonly used in regression analysis to measure the relationship between independent variables and a dependent variable. The result is considered significant when the beta value falls within the confidence interval (Du Prel et al., 2009). In this case, the beta coefficients represent the relationship between different types of leadership (enabling, entrepreneurial, and operational) and VUCA (Volatility, Uncertainty, Complexity, Ambiguity) skills.

A beta coefficient of 0.29 suggests that VUCA skills are expected to increase by 0.29 units for every one-unit increase in enabling leadership, assuming all other variables are held constant. A beta coefficient of 0.361 indicates that VUCA skills are expected to increase by 0.361 units for every one-unit increase in entrepreneurial leadership, assuming other variables remain constant. The beta coefficient of 0.174 implies that for every one-unit increase in operational leadership, VUCA skills are expected to increase by 0.174 units, assuming all other variables are held constant.

Discussion

This study examines student leadership in a VUCA business environment in the Kathmandu Valley. The study results suggest that enabling leadership, operational leadership, and entrepreneurial leadership have a significant relationship with VUCA (Volatility, Uncertainty, Complexity, and Ambiguity) Skill in Kathmandu Valley. Hypotheses 1, 2 and 3 are accepted as their p-values are below 0.05, meaning there is a relationship between the variables. The study found a significant link between these leadership styles and VUCA Skills, supporting Hypotheses 1, 2, and 3.

Hypothesis 1 is accepted, stating that enabling leadership with VUCA skills has a significant impact. This suggests that enabling leadership significantly influences VUCA skills in the context of Kathmandu Valley. Enabling leadership creates an adaptive space where VUCA tensions are innovatively integrated and responded to through transformation (Rimita et al., 2020). By fostering an environment of empowerment, collaboration, and adaptability, enabling leaders contribute to the ability of individuals and teams to navigate and thrive in volatile, uncertain, complex, and ambiguous business environments. Additionally, Hypothesis 2 and Hypothesis 3 are accepted, which shows that both operational leadership (OL) and entrepreneurial leadership (ENL) have significant relationships with VUCA skills. Supporting the result, the study conducted by Deepika and Chitranshi (2021) also found a significant relationship between entrepreneurial leadership and VUCA skills, which aligns with the current study's findings. In the VUCA world, entrepreneurial leadership can guide one to thrive, consistent with the findings (Saksa, 2021). Individuals who exhibit entrepreneurial leadership traits have a notable impact on developing and enhancing VUCA skills.

These results highlight the importance of enabling, operational, and entrepreneurial leadership styles in developing and enhancing VUCA skills. The cited study supports the significant relationship between enabling leadership and VUCA skills, further strengthening the current study's findings. However, it is essential to consider the study's limitations and the need for further research to validate these relationships in different contexts and populations.

The study explores the changing dynamics of organisations and the need for a new kind of leadership that fosters growth on a global level. The study focuses on enabling leadership, entrepreneurial leadership, and operational leadership, aiming to understand the mindset of students in response to these leadership styles. It delves into the importance of student leaders in shaping the business

landscape and emphasises their ability to effect positive change and innovation. First and foremost, students must be flexible and adapt to the VUCA business environment's dynamic environment. This entails being adaptable, quick to act on changing trends, and able to accept novel ideas and approaches. The study identified managing people as a significant challenge in student leadership roles. Because of this, educational institutions and corporate organisations must offer instruction and assistance in subjects like team management and effective communication. Policymakers should also consider integrating leadership development programs into the academic curriculum to give students the skills and knowledge they need to succeed in leadership roles within the VUCA business environment. In Nepal, schools are still behind in the use of practical education. For practical education, the concerned parties should provide opportunities for hands-on learning experiences.

The scope of this study is limited to the Kathmandu Valley, which restricts its applicability to other contexts. Expanding the research area would allow other researchers to conduct more extensive analyses of VUCA business. Another notable limitation is the time constraint, as data collection is conducted within a limited timeframe and relies on convenience sampling. This research could have obtained more responses if given more time. There are several opportunities for improvement to enhance the study, such as increasing the sample size, analysing additional variables, and exploring different geographic locations to acquire more representative data for analysis.

Conclusion

This study investigates students' leadership skills in a VUCA (Volatile, Uncertain, Complex, and Ambiguous) environment in the Kathmandu Valley. Using a combination of empirical methods, the research identifies the status of student leadership, examines the relationship between leadership practices and VUCA skills, outlines the challenges faced by student leaders, and proposes practical solutions to address these challenges. The results reveal that enabling, operational, and entrepreneurial leadership significantly influence the development of VUCA skills. This suggests that educational institutions should incorporate experiential learning programs and soft skills training to equip students with the capabilities to lead effectively in a complex environment.

Furthermore, the study highlights that poor communication skills are a prevalent barrier to leadership effectiveness, emphasising the need for targeted training and coaching to strengthen communication competencies. The challenges identified include managing teams, delegating tasks, decision-making under uncertainty, adaptability, and resource management. Addressing these challenges through innovative strategies, such as mentorship programs, industry partnerships, and continuous professional development, is crucial for student leaders to navigate and excel in a VUCA context.

The findings offer valuable insights for stakeholders, including higher education institutions, academic policymakers, and student leadership organisations. These insights stress the importance of fostering a culture of continuous learning, promoting practical training opportunities, and developing networks that support leadership growth in uncertain and dynamic conditions. Educational institutions should prioritise creating environments that encourage resilience, collaboration, and adaptability among students.

There are some limitations to this study. The research is contextually focused on the Kathmandu Valley, which may limit the generalizability of the findings to other regions in Nepal. Readers should exercise caution when applying these results to different geographic and educational settings. Additionally, as the analysis is cross-sectional, there is potential for omitted variable bias. Expanding the scope of constructs in future research could mitigate this limitation. Future studies could explore new variables and approaches, such as longitudinal research designs or the inclusion of diverse participant samples, to enhance understanding. Further research could also investigate the direct collection of participant data to improve the depth of analysis and explore the influence of leadership training frequency on VUCA skills development. Conducting comparative studies to assess the effectiveness of proposed solutions in different educational contexts would also be a valuable contribution to the field.

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