A Study on *Killa* (Impurity) and Its Social Usage

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Introduction

Killa is a concept observable in the indigenous Buddhist social structure. The notion of *killa,* believed to have arrived in Sinhala Buddhist society along with Hindu cultural influence, has since been integrated into Buddhist and theistic practices. An ancient verse describes the origins of *killa* or impurity as follows:

"Prathamaharṭhavan dvādasam prasūthe, trishan maithacha
Mūrtha doshe, trīnī māse anyāstu snāna mevacha"

(A Sinhala medical palm-manuscript)

Accordingly, the *killa* associated with menstruation lasts twelve days, postpartum *killa* thirty days, and death-related *killa* three months. Monthly menstruation requires ritual bathing. These indicate the types and durations of *killa*. The term *killa* conveys the meaning of impurity or pollution. It is a concept that designates physical or environmental uncleanliness, which acts as a religious restriction and reveals the deeper meaning of *killa*.

Killa is a prominent notion in Sinhala society, especially within religious duties related to deities. It is largely recognized as an issue linked to women, given the increased likelihood of women being considered "impure." Monthly menstruation is viewed as *killa,* with bleeding symbolizing impurity according to Sinhala cultural norms. Entry into temples, shrines, or sacred spaces while under *killa* is discouraged. A strong cultural association also exists between the concept of *killa* and the goddess *Pattini*. *Pattini* is revered as a symbol of purity, and any rituals related to her emphasize avoidance of *killa*. In this context, *killa* appears to function as a form of social restriction.

The core research question of this study is whether *killa* functions as a social prohibition within local society. The objectives are to examine how *killa* is conceptualized and experienced in relation to women's social participation, to determine whether it acts as a social restriction in indigenous society, and to investigate whether the broader understanding of *killa* leads to social exclusion.

Methodology

This study is based on a Qualitative Research Approach with the objective of obtaining a deep understanding and a contextual interpretation of the research subject. The research was conducted under three main steps: (1) Data Collection, (2) Analysis, and (3) Reporting.

1. Data Collection Methods

The data collection process utilized a form of Data Triangulation (or multiple data sources):

A. Library Study and Documentary Data

A comprehensive library study was conducted to establish the theoretical background of the research. Pre-existing research (theses, research articles), scholarly texts, and historical documents relevant to the topic were identified and their content was examined. This documentary data helped in identifying the limits of the current knowledge base regarding the subject matter and confirming the fundamental concepts required for the fieldwork.

B. In-Depth Interviews

The primary method for collecting qualitative field data was conducting Semi-Structured Interviews. Key Informants with authentic and live experience regarding indigenous traditional knowledge were selected, specifically a Buddhist Monk and a Local Traditional Physician. This selection was based on the authenticity and expertise of their knowledge. The main objective of conducting these interviews was to gather deep interpretations and personal experiences about how this knowledge is put into practice and its context, complementing the library information.

2. Data Analysis

The collected data was analyzed using a Thematic Analysis Approach. Firstly, after transcribing the interviews, the data was organized and subjected to coding. Subsequently, the common patterns and relationships among these codes were identified to establish main themes and sub-themes.

3. Theoretical Framework

The Context Analysis Theory was employed to construct the theoretical framework of the research. The application of this theory aimed to investigate traditional knowledge, not merely as a collection of facts, but by analyzing it within the social, cultural, and economic context where it was created, disseminated, and is utilized. This approach allowed for a deeper study of the value of indigenous knowledge and the external factors influencing its persistence.

Results and Conclusions

The empirical findings demonstrate that *killa* continues to function as a socially recognized state of impurity, but its influence varies across different life events and social domains.

Gendered Experience of *killa*

The data confirm that *killa* disproportionately targets women. Childbirth, menstruation, and puberty are key biological processes through which women are marked as "impure." During these periods they are excluded from shrines, the Sri Maha Bodhi precinct, and other sacred sites. From a theoretical perspective, Mary Douglas's concept of "matter out of place" helps explain this exclusion: menstruation and childbirth blur the boundaries between life and death, inside and outside, and are therefore culturally coded as dangerous (Douglas, 1966,123).

Environmental and Communal Dimensions

Death-related *killa* extends beyond the individual to encompass the household and even the wider village. This collective restriction reinforces Émile Durkheim's idea of ritual as a mechanism for social cohesion. By observing communal impurity, villagers reaffirm their shared moral order and collective respect for the sacred (Durkheim, 1912/1995,22).

Social Control and Self-Regulation

The persistence of *killa* shows how traditional beliefs operate as informal social controls. Drawing on social control theory, the internalization of these restrictions—especially by women—creates a form of "soft regulation." Individuals police themselves to avoid ritual contamination, ensuring conformity without the need for formal enforcement (Black, 1998,102 ; Foucault, 1977,44).

Negotiating Modernity

Interviews reveal a tension between modern education and enduring tradition. While many participants intellectually reject *killa*, they continue to observe related practices when visiting shrines or participating in *shānti karma* (rituals for peace). Symbolic interactionism helps explain this ambivalence: people modify their behavior to protect social identity, signaling respect for cultural expectations even when they privately doubt the belief (Goffman, 1959,55 ; Blumer, 1969,78).

Residual Symbolism

Although technological and educational progress has diminished strict adherence to agricultural taboos and birth-related restrictions, the symbolic

association between purity and divine favor remains strong. Participation in healing rituals or deity invocations still demands a state of purity, indicating that *killa* survives as a "cultural residue" rather than an obligatory legal code (Obeyesekere, 1984,147-149; Kapferer, 1997,22).

Conclusion

Analyzed through the lenses of Douglas's purity framework, Durkheim's ritual theory, and social control models, *killa* emerges as more than a set of outdated customs. Historically, it functioned as a ritual technology of order—protecting the sacred by separating pure from impure and reinforcing gendered social boundaries. Modernization has undeniably weakened these practices: educational attainment and scientific rationalism have eroded the literal fear of contamination, and urban lifestyles have shortened or eliminated seclusion periods. Yet, the symbolic logic of purity persists. Women still voluntarily refrain from approaching the Sri Maha Bodhi or entering shrines during menstruation, and entire households continue to observe mourning-related restrictions. This persistence demonstrates that *killa* now operates primarily as a cultural signifier of respect rather than a compulsory taboo. It allows individuals to negotiate the demands of modern life while maintaining a connection to ancestral values. In this sense, *killa* exemplifies how ritual concepts can adapt and endure, shaping social behavior long after their original religious imperatives have faded.

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A pragmatic study of the effectiveness of artificial intelligence as a technological application within the creative wearable art design process. (Creative wearable art project-based study)

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Introduction

This is a practical- oriented research based on a creative wearable art project done by the researcher. Accordingly, by this research aimed to investigate the effectiveness of the AI as technological application within the creative design process based on practically implemented design project done by the researcher. the problem of this research was that how does Al technology effect for the subjective approaches such as artistic applications in creative wearable art designing process". As an applied art product, combination of the art and technology (science) is the base of wearable art designing process (Earnshaw, 2015). It has emphasized that combination of subjective and objective attributes are important within the creative wearable art design process. Accordingly, a creative project based on this study has been done using an AI approach and also human integration. And it has been evaluated to identify that effective way according to the stages of the creative design process. Under existing knowledge related to the field, there are many scholarly works can be identified in the global literature related to implementation of AI technology in to the wearable art design field including fashion design though various perspectives. Cao, Y., Wang, H., & Lee, Y. (2023) mentioned that how to adapt AI technology through merging performance of wearable devices in creative and innovative way. Qian, Z., Tan, J., & Liu, F. (2024) Also explored LLMs model in creative wearable art design related to technological devices. According to Zhang, Z., & Liu, Y. (2025), AI-driven system using GANs (generative adversarial networks) and CNNs (convolutional neural networks) has been presented by this study related to concept development and aesthetic evaluation of the visual design including Wearable art design, and also mentioned several challenges using AI in creative process. Nwankpa, C., & Uzoka, M. F. (2025) also examined applicability of AI in creative product design process by the study and proved the potential to apply Ai as assistant to solve problems in creative designing collaboratively by using different type of methodologies. Zhu et al. (2018) also explored that AI can effectively assist to the designers within the creative ideation process by generating images in fashion design field.

Key Words - *AI, Empirical, Subjective, creative design, wearable arts, Soulfulness.*

Methods and Methodology

This research belongs to mix method because the data related to research are in both subjective and objective manners. And Pragmatic approach made the solid ground to conduct the research in an effective way. Accordingly, data related to this study is generated by the practical designing process and concept development process (Dharmawardana, 2024) have been applied in both ways such as AI based approach and Human oriented approach. Observation, testing, AI generation, Photography and illustration have been used as research method for data collection and artistic formalism has been used as analytical methodology within the study. Accordingly, activities belong to creative design process related to creative wearable art project have been done by using relevant AI tools such as ChatGPT, *ImageFx*, Gemini AI, and also using manual way by human involvement (By the researcher) gradually stage by stage of the particular process. And visual data gathered by particular activities have been analyzed by using artistic formalism and evaluated the effectiveness and relevancy within the creative designing. Designer oriented ideation process has been done before the AI based ideation for avoiding inspire by the AI.

Result

Result section of this study has consisted with the data gathered by the practical activities of concept development process related to particular creative Wearable art project done by AI mode and human involvement. And also arranged them according to the particular stages of the concept development process as mentioned in table 01 (Dharmawardana, 2024).

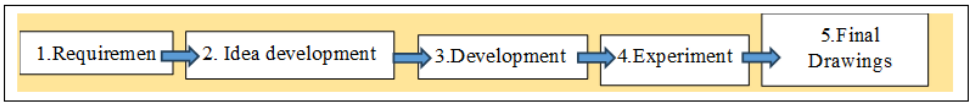

Table 01 (creative design process based on concept development process)

According to the above-mentioned creative design process stage 01 was the identifying the social requirement of particular social context. In this stage AI given many information in a sort time period, and researcher spent more time to arranged the data and information manually for the same task. And selected contextual requirement is “Deform the existing structure and make pleasure on the human body”. The second stage is ideation, or idea development. According to concept development process, concept and inspiration identification and development belong to the ideation stage. In it, concept identification is based on imagination through dreaming, and it is still in an intangible mode, and it should be visualized the identified concept using suitable inspiration. Accordingly, AI-oriented ideation and human-oriented ideation both were applied simultaneously to develop suitable ideas as stage 2 of this practical project and generated data has been mentioned below in table No. 02.

Requirement / Purpose	Concept originated by human approach	AI generated Concepts
Deform and make pleasure on human body with naturalistic form	Blooming	Photosynthetic Flutter
		Ephemeral Glitch
		Dither Coat

Table 02 (Concept identification)

And the next step of the idea development was how to visualize the identified concept, and Blooming was selected concept because AI also justified that Blooming is the most relevant among the concepts generated by both AI and human-oriented approaches. Accordingly, images generated by AI for the AI-generated concepts and designer selection have been mentioned in the figures below.

Figure 01 (I-IV AI Generated Inspirations: Gemini AI)

Figure 02 (Inspiration Generated by the human)

The next steps were developments and experiments before the relevant drawings and final production. In that stage, AI directly provided designs without any development. In that case, minimum time consumption can be identified. AI tools such as Gemini AI and ImageFX could generate many designs within a few minutes. And AI-generated images related to concept and inspiration are mentioned in figure No. 03. And also, human-generated design has been presented in figure No. 04. In it,

images of the final product have been applied for easy comparison within the study.

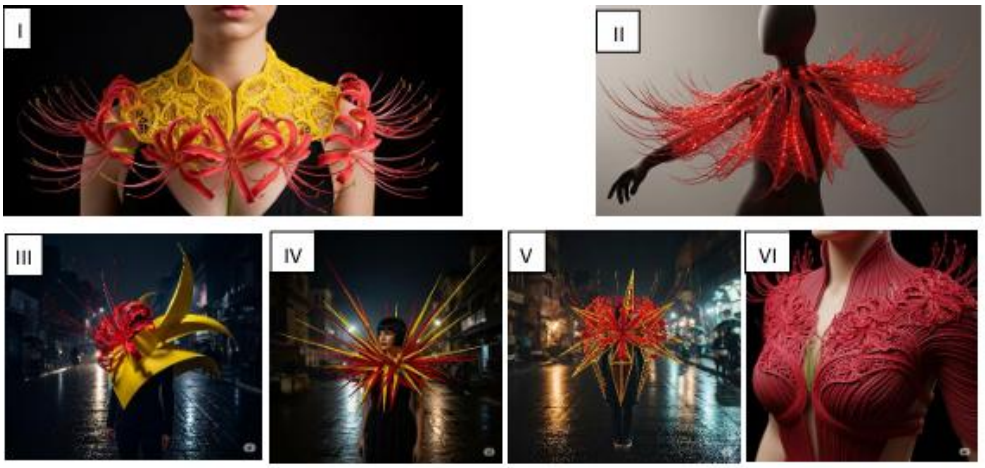

Figure 03 (I-VI, Designs generated by AI: ImageFX & Gemini AI)

Figure 04 (I-III, Different angles of the design generated by man-made approach)

Through this creative design process specially in the development and experiment stage, these two opposite dynamics can be identified. In AI approach is mostly based on visual rendering, but real materials could be used in practical activities related to stage 3 and 04 in the human skill based approach. And the final production process is mostly possible due to the craft skill of the designer because AI support was limited up to visualization in this study.

Analysis and Discussion

According to the result of the study, the potential of AI and human skill in the creative design process can be identified comparatively in order step by step, from requirement to final creative product of the particular wearable art project. Accordingly, identifying the social requirement is mostly effective within the designer's approach, because the designer can contextually involve the subject matter as a human being even though AI provided data and information empirically in

objective mode, and also AI cannot involve itself in the subject matter subjectively with a sense of contextual values. But AI shows high potential in information and data processing, and information generation is unlimited in AI; that is a huge advantage in this matter. But the human-based approach taken more time for gathering data and processing information in the 1st stage, and the amount of data gathered was limited. It was a considerable disadvantage of the manual process that can be identified when comparing with AI tools such as ChatGPT and Gemini AI. But better focus could be identified in the human approach related to ideation stage because of contextual sense. According to the result, AI tools provided several concepts within a few minutes related to the requirement in stage 02 of the creative design process. And the designer identified the blooming as a concept, and it consumed more time when comparing AI concept generation. And the researcher asked AI, that what is the best selection among all the concept generation by AI and the designer both. And Ai gave the following answer.

"Based on your needs for a nature concept that evokes a feeling of pleasure, the Blooming concept is overwhelmingly the most suitable choice." (Gemini AI pro)

However, AI has given many options within a short duration, and the designer consumed a considerable time slot to identify the concept, but designer selection was more appropriate than AI generation in this case even though AI generated more. Then both AI and the designer selected the inspirations, and the results were presented in figure 01, and the designer's selection has been depicted in figure 02. According to the AI, all the inspirations are better selections and are fitted for visualizing the concept, but it would depend on the contextual purposes. According to the design basis, the designer's selection was better than the other inspiration considering visual and overall dynamics related to the concept. Because all the attributes of that are uncommon and perfectly fitted with the concept and the purpose of the creative project as per the design perspective. stage 3 and 4 are also vital parts in the creative design process, but the designer can do different developments and experiments by using real materials and different kinds of tools. But it was difficult to do by AI tools because contextual and real material experience couldn't be brought out through AI even though AI could visualize the visual forms of development and experiments in a visual mode. Therefore, by the designer's involvement created stages 3 and 4 more effectively, even though AI created many verities of designs as per figure no.03. Because as a human being, a designer could approach subjectively in to the design process with contextual sense which is impossible in AI. Because art is a major part of creative design products belonging to the applied art stream (Earnshaw, 2015). And also, usually art has subjective attributes in a qualitative manner. Therefore, the designer's thoughts and also soulfulness impacted on the creative product subjectively other than the AI approach, even though AI created more visual samples as developments and experiments. But

the advantage of applying AI was that it generated many images of the final product, as mentioned in figure no. 03 without a development process or experiments. It is a significant advantage in AI-based designing. Stage 5 is the final production stage, and it has been done by using the designer's craftsmanship based on a predesigned way. Therefore, stage 5 was used to just show the final product of the human-based creative design process and to provide a visual sample of human creation (figure no. 04) to compare with the AI-generated creative products mentioned in figure no. 03. According to this study, the potential of the AI technology in creative design sub-controlled contexts and also the designer's potential within the creative design process, in particular the creative wearable art project, are proven under five stages of the creative design process.

Conclusion

In conclusion, there are many advantages that can be identified in the creative design process that has used AI. Providing more data and information within a short time, generating many ideas within a short period and generating images instantly are major advantages of AI in the creative design process, and also the creative potential of the AI is also adorable. AI technology is a tool that is providing data in an empirical manner, because it works on data processing without any emotional engagement with context. But those empirical data created output according to the sense of the person who input the prompt. Therefore, the AI output depended on the designing sense of a particular human. According to the finding, this study explored that the designer's imagination was more impactful with a sharp focus within the particular creative design process, even though more time has been consumed. Because, it caused to make subjective and emotional values by using empirical data and converted the expected object into the creative applied art product by keeping the soulfulness of the creation as an art-based creation. And the use of AI technology in the creative design development process is caused to increase efficiency and also the creativity of the particular creative design path and avoid unnecessary time consumption also. But the designer's subjective involvement can be identified as a significant factor in this creative project because contextual changes can be done effectively within the creative development process with the real experience of the sense and the materials, which is impossible through the AI technology.

Limitations

As a critical application, the output of AI applications can be varied according to the given prompt, and different output can be generated with the same prompt in next time. And it has been applied limited amount of AI tools and selected AI tools based on the requirements of the study only.

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"Healing or Hedonism? Unpacking the Socioeconomic and Cultural Triality of the Spa Industry in Sri Lanka"

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Introduction

The spa industry, originally rooted in healing, relaxation, and spiritual well-being, has evolved under the influence of India, Thailand, and Japan, shaping the Sri Lankan spa culture over time. In India, spa traditions emerged from Ayurveda and yoga-based therapies such as panchakarma and herbal treatments, forming the basis for modern Ayurvedic wellness tourism. In Thailand, traditional Thai massage, influenced by Buddhist healing and Indian practices, laid the foundation for the modern Thai spa industry that grew rapidly in the late 20th century while preserving its traditional essence. Likewise, in Japan and East Asia, hot-spring bathing (onsen) and public baths (sento) served as therapeutic and social spaces that evolved into today's resort and thermal-spring spas. Across Asia, spas were once sanctuaries of natural therapy and spiritual rejuvenation, but globalization and commercialization have transformed them into elements of the modern wellness and tourism sector.

Over the past twenty years, the SPA industry in Sri Lanka has grown quickly, becoming an important part of the country's wellness services and tourism sector. SPAs are often advertised as places for healing, relaxation, and rejuvenation. However, behind this attractive image, there are deeper issues involving how people view spas, how they operate economically, and what they mean within Sri Lankan culture.

Although SPAs are presented as healthy spaces for both body and mind, in Sri Lanka they are also linked with moral concerns and pleasure-seeking behavior. This confusion becomes even clearer when we refer to the profile of therapists who works in these places mainly young women from rural and poor backgrounds (Ilangasingha, 2023). In Sri Lankan culture, women are expected to follow läjja-baya, a traditional idea that women should behave modestly and avoid shameful actions (Hewamanne, 2008; Jayawardena, 2015). Obeysekera refers to "läjja-baya refers to shame and the fear of ridicule. There is, it is implied, a minimum dyad in a shame relationship: a person who is shamed and another who causes shame. Ontogenetically speaking, the "shamer" is a parent representing the "generalized others" (i.e., society) who inculcate in the child sensitivity to Iajja-baya "(1984: 506). Because of this, working in SPAs can be seen both as a way for women to earn a living and at the same time as something socially frowned upon.

This research focuses on an important issue: even though the SPA industry is growing, there is little academic understanding of how Sri Lankans really see and

use SPA services, especially in a society where traditional cultural values are still strong. Some people think of SPAs as proper places for health and wellness, while others see them as expensive or even morally questionable. These mixed opinions have caused confusion and misunderstanding about what the SPA industry truly is. Cultural beliefs, economic roles, and trust in the industry often seem to be in conflict.

Research Problem and objectives:

Despite the rapid expansion of the SPA industry in Sri Lanka, there is still limited academic insight into how the general public perceives and experiences SPA services within a society shaped by deep-rooted cultural traditions and shifting economic dynamics. While some individuals view SPAs as centers of healing and wellness, others associate them with luxury, consumerism, or even moral controversy. These mixed perceptions highlight a deeper conflict between traditional cultural values, evolving economic roles, and the social meanings attached to SPAs areas that have not been sufficiently explored.

The current study addresses this gap indicated above by examining how Sri Lankans interpret and engage with SPA services. It investigates five core areas: public awareness and individual experiences; social perceptions and the tension between wellness and moral ambiguity; socio-cultural impacts such as shifts in gender roles and community values; the economic importance of the SPA industry in employment and tourism; and public opinions on regulation and ethics.

The study uses social constructionist theory which emphasizes in anthropology that many aspects of human experience and social realities are not fixed or biologically determined but are created, maintained, and transformed through social interactions and cultural practices. Using this perspective this study explores how Sri Lankan society collectively builds and negotiates meanings around SPAs whether as places of healing or as spaces of hedonistic behavior. This perspective allows for a deeper understanding of how cultural norms, media narratives, and social interactions shape public opinion and behavior. Ultimately, the study highlights the need for balanced regulation, public education, and cultural sensitivity to support a more ethical, inclusive, and professional SPA industry in Sri Lanka that aligns with both traditional values and modern wellness demands.

Methods and methodology

This study aims to uncover how perceptions are socially constructed, how stigma affects both consumers and service providers, and what implications this holds for the future of the SPA industry in Sri Lanka.

A mixed-methods approach was adopted to comprehensively capture public sentiment. Data was gathered through a structured electronic questionnaire distributed via platforms such as WhatsApp, Facebook, and institutional

communication channels like OULMS. This allowed the research to reach diverse participants from various age groups, employment statuses, education levels, and geographic regions, with a final sample of 200 respondents. Quantitative data, such as demographics, SPA usage rates, and awareness levels, were analyzed using descriptive statistical tools to detect general trends. Qualitative data, derived from open-ended responses, were processed through thematic analysis to uncover deeper narratives related to morality, stigma, cultural meaning, and regulatory concerns.

Research findings and Discussions

This paper is based on the data collected through an electronically circulated questionnaire. The findings reveal that the majority of respondents fall into the middle-aged category, with men (64.2%) representing the bulk of participants. A significant 83.2% reported being aware of SPA services, but only 20% had ever visited one. This discrepancy between awareness and usage suggests the presence of social or psychological barriers. Interestingly, 71.7% expressed a willingness to use SPA services in the future, highlighting a latent interest that is hindered by broader societal pressures.

Among the most prominent barriers to SPA access were social stigma, familial expectations, and misconceptions about the purpose of SPAs. While many clients expect massage therapy, Ayurvedic treatments, and stress relief, 18.9% acknowledged an expectation for sexual services revealing a striking moral duality. A parallel thematic analysis of responses to the question “What does SPA mean to you?” showed that over 36% of participants associated SPAas with some form of sexual service. These findings point to a serious issue of branding ambiguity and cultural misunderstanding, which deeply affects the legitimacy and public trust in the industry.

Notably, SPA services are often viewed through a moral lens. Participants highlighted that the lack of clarity in the industry’s purpose, combined with unregulated practices and occasional media reports of misconduct, fosters a narrative of distrust. Approximately 51.2% of respondents believe that SPA services are not accepted by society, and only 28.5% felt they were socially legitimate. The rest were unsure, indicating a broader uncertainty within the public discourse.

From the service providers’ perspective, the social stigma is even more profound. Workers in the industry often female therapists face moral judgment, harassment, and workplace insecurity. This is compounded by the absence of legal protections or professional recognition. The blurred boundaries between wellness and illicit activities not only undermine the credibility of the SPA profession but also subject service providers to systemic exploitation and public scrutiny.

The study identifies several structural gaps that perpetuate these issues. A lack of standardized training, regulatory oversight, and ethical guidelines has allowed unprofessional practices to flourish. Respondents strongly indicated the need for institutional regulation, with government involvement in the form of licensing, certification, and ethical codes of conduct. Moreover, the demand for incorporating traditional Ayurvedic methods points to an opportunity for rebranding SPAs as culturally rooted wellness spaces rather than commercial or morally suspect venues.

Economic challenges were also apparent, with many viewing SPA services as luxury items rather than necessities. This perception hinders broader access, especially among low-income groups. In addition, trust deficits around hygiene, pricing, and service quality were noted, making it clear that professionalization is essential if the industry is to serve a wider segment of the population. Clients reported concerns related to safety, privacy, and transparency factors that must be addressed through staff training and ethical service provision.

Ultimately, the research highlights that the SPA industry in Sri Lanka sits at a complex intersection of health, culture, commerce, and morality. It reflects broader societal tensions between modernity and tradition, bodily autonomy and cultural taboos, and economic opportunity and social scrutiny. While there is undeniable potential for SPAs to contribute positively to public health and employment, this potential is severely hampered by societal stigma, regulatory lapses, and the absence of public education on holistic wellness.

A multi-pronged approach is required to reframe the SPA industry within Sri Lankan society. This includes regulatory reforms, educational campaigns, professional development pathways, and active efforts to distinguish legitimate wellness services from exploitative or unethical operations. Public institutions, particularly those related to health, education, and tourism, must collaborate to develop an integrated framework that supports service providers while ensuring client safety and cultural sensitivity.

In conclusion, the SPA industry in Sri Lanka stands as a contested space oscillating between healing and hedonism. This study's findings call for an urgent re-evaluation of the industry's structure and public image. By critically analyzing how socioeconomic and cultural dimensions intersect in shaping perceptions, the research offers a valuable foundation for policymakers, practitioners, and scholars interested in developing a more inclusive, ethical, and professionally credible wellness sector in Sri Lanka.

Keywords: SPA industry, public perception, Socio cultural and economic impact, Social Stigma

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Weaving Minds in the Cloud: A Metaphorical Framework for Smart Education in the Age of Intelligent Nations

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Abstract

In the ever-evolving symphony of technological innovation, the classroom has transformed from chalkboards and textbooks into a dynamic arena of digital exploration. Smart education—more than a buzzword—is a paradigm shift that is redefining how knowledge is consumed, constructed, and applied in the 21st century. Learners now navigate digital landscapes using smart devices as their compass, supported by wireless networks that dissolve the walls of traditional education. This study explores the emerging contours of smart education through a conceptual and architectural framework, anchored at the Sri Lanka Institute of Tourism and Hotel Management (SLITHM). Beyond theory, the research demonstrates how smart learning has been applied in practice: case insights include the integration of interactive e-learning platforms into hospitality training, data-driven assessments that have improved learner performance tracking, and collaborative digital tools that enhanced student engagement during pilot classroom implementations. The study proposes a four-tier pedagogical model and a tri-level technological architecture, drawing from interdisciplinary sources, global best practices, and local evidence from SLITHM's digital initiatives. The pedagogical framework emphasizes differentiated instruction, collaborative engagement, individualized learning trajectories, and generative mass learning, while the technological blueprint integrates smart computing to deliver interactive, adaptive, and data-informed education. Ten defining characteristics of smart learning environments are identified, reinforced by early outcomes observed in blended learning modules, digital simulations, and student feedback analytics. While the framework offers a visionary scaffold for innovation, it also highlights challenges such as infrastructural disparities and the need for contextual adaptation to ensure equitable access. This paper contributes not only a metaphor-rich, multidimensional framework for smart education but also an evidence-enriched perspective that connects theory with practice. For educators, policymakers, and technologists, it offers both a conceptual lens and a pragmatic guide for cultivating agile, empowered learners—future-ready citizens poised to thrive in an intelligent society.

Keywords: *Digital Learning, Pedagogical Framework, Smart Computing, Smart Education,*

Introduction

Despite numerous global smart education initiatives, there remains no unified framework to guide the implementation of smart education in specialized vocational institutes like SLITHM, which play a critical role in advancing industry-relevant, technology-integrated learning in Sri Lanka's tourism and hospitality sector. Existing studies lack a comprehensive, adaptable framework that synthesizes global smart education models for application in vocational contexts, particularly within developing countries like Sri Lanka.

The rapid advancement of digital technologies has transformed numerous sectors, including education, ushering in the era of smart education. This paradigm shift, characterized by interconnected, intelligent, and learner-centered environments, has garnered global attention. The integration of advanced technologies such as data mining, artificial intelligence, and smart computing is increasingly shaping educational landscapes, much like their role in transforming fields such as entrepreneurship and digital marketing (Krivokuća et al., 2024). Despite the growing number of smart education initiatives such as Malaysia's Smart School Implementation Plan (Chan, 2002), Singapore's iN2015 Master Plan (Hua, 2012), and similar efforts in Australia (IBM, 2012), South Korea (Choi & Lee, 2012), Finland (Kankaanranta & Mäkelä, 2014), and the United States (New York Smart Schools Commission Report, 2014)—a clear, unified conceptualization and framework for understanding smart education remains elusive.

While previous studies have documented national and institutional efforts to adopt smart education technologies, there is a noticeable gap in synthesizing these efforts into a comprehensive framework that defines the scope, structure, and technological underpinnings of smart education systems. This research seeks to address that gap by proposing an integrated conceptual and research framework that builds upon global best practices while highlighting their shared principles and contextual differences. The significance of this study lies in its potential to clarify the core components of smart education, such as technological architecture, smart computing, and user-driven learning design, thereby offering valuable insights for educators, policymakers, and developers. Unlike many existing works that focus on isolated case studies or implementation strategies, this research emphasizes a holistic perspective grounded in systems thinking and interdisciplinary design. However, the scope of this study is limited to an analytical synthesis of existing smart education models and does not include primary empirical validation across diverse educational settings. Nonetheless, the study offers a foundational framework that can inform future empirical research and practical development efforts in the evolving field of smart education.

Objectives

I. To define the multifaceted nature of smart education by synthesizing educational theory and digital innovation relevant to 21st-century learning environments.

II. To design a pedagogical framework that supports personalized, collaborative, and generative learning experiences in smart educational contexts.

III. To propose a technological architecture that facilitates seamless, adaptive, and learner-centered interactions through smart computing and data-informed systems.

IV. To develop an integrated conceptual and architectural framework for smart education based on global best practices and interdisciplinary insights, tailored to the context of the Sri Lanka Institute of Tourism and Hotel Management (SLITHM).

Methodology

This study adopts a conceptual and design-based methodological approach to propose a research framework for smart education. Drawing upon a synthesis of international smart education initiatives and the evolving definition of "smart" in educational contexts, the framework integrates technological and pedagogical dimensions to support learner development in the digital era. Building on Zhu and He's (2012) perspective—where smart education is characterized as the creation of intelligent learning environments through smart technologies that enable personalized pedagogies and learner empowerment—the framework outlines three core components: smart environments, smart pedagogy, and the smart learner. These components are interrelated: smart environments, driven by technological infrastructure, are shaped by the implementation of smart pedagogical strategies. In turn, both the environment and pedagogy collaboratively contribute to the development of the smart learner—an individual equipped with higher-order thinking skills, value-oriented reasoning, and empowered behaviour. The framework conceptualizes smart pedagogy as a methodological focus, smart environments as a technological focus, and smart learners as the intended outcome. By aligning these elements, the study offers a holistic model that reflects the transformative potential of smart education and serves as a foundation for future empirical validation and practical application.

Results

This research presents a comprehensive framework for smart education by merging pedagogical innovation with advanced computing technologies. At its core,

the study introduces a four-tier pedagogical model designed to promote differentiated instruction, collaborative engagement, individualized learning paths, and generative mass learning. It also outlines a tri-level smart computing architecture—comprising cloud, fog, and swarm computing—that supports real-time, adaptive learning through key intelligent functions: awareness, analysis, alternatives, actions, and auditability. Together, these systems establish ten key features of smart learning environments, enabling seamless integration of data, devices, and learning content to support a dynamic and responsive educational experience. Empirical strategies and case studies further demonstrate the framework's practical viability. Pilot projects such as the flipped classroom in North China enhanced students' self-regulated learning and problem awareness, while teachers improved their focus on personalized instruction. Another initiative, the Online J-Classroom, employed micro-videos and learning analytics to support precision teaching, offering tailored instruction based on student performance data. These implementations, backed by large-scale national projects and standard-setting collaborations, validate the framework's potential to revolutionize learning by fostering agile, empowered learners who are equipped for intelligent societies.

Discussion

The findings of this study highlight the transformative potential of smart education as a convergence of pedagogical innovation and technological advancement. By proposing a four-tier pedagogical framework alongside a tri-level technological architecture, the research bridges existing gaps in the traditional education system, particularly within institutions like the SLITHM. Unlike previous approaches that focused narrowly on either infrastructure or pedagogy, this framework presents a holistic and adaptive model. The integration of differentiated instruction, collaborative learning, and generative pathways aligns with contemporary calls for more learner-centered and context-responsive education, thus expanding the scope of what smart learning environments can achieve.

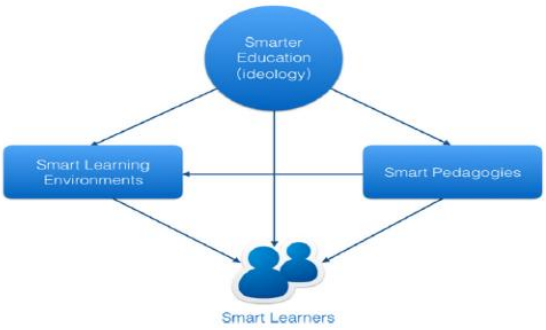

Figure 01: Research framework of smart education

Furthermore, the inclusion of smart computing—comprising cloud, fog, and swarm technologies—offers a new understanding of how educational content and learner data can be processed, delivered, and optimized in real-time. The model's ability to support awareness, analysis, alternatives, actions, and auditability provides a comprehensive foundation for precision teaching and personalized learning. This framework underscores the significance of intelligent systems in shaping responsive educational experiences and lays the groundwork for future research and policy design. By merging metaphorical insight with practical strategy, the study advances the discourse on smart education from aspirational rhetoric to actionable blueprint, poised to inform national strategies for cultivating digitally empowered, future-ready citizens.

Conclusion

In conclusion, this study establishes that smart education is not merely a technological advancement but a transformative paradigm fostering lifelong, personalized, and seamless learning. Despite its potential to reduce cognitive load, enhance collaboration, and support holistic development, significant challenges remain concerning pedagogy, infrastructure, and leadership. As smart education increasingly aligns with the broader vision of smart cities, the urgency to design interoperable, data-driven, and learner-centered systems intensifies. This research offers a foundational framework to guide these developments, underscoring the importance of strategic design in preparing future-ready learners. These insights resonate with global dialogues, including the 11th H&Z Service Round-Table 2024 (https://hz.group/insights/events/11th-h-and-z-service-round-table), where service innovation and educational transformation remain central themes.

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The Role of the Ramakrishna Mission in Shaping Education under British Colonialism in the Eastern Province of Sri Lanka

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Introduction:

During the 19th century, modern education had a significant impact on the Tamil-speaking communities in the Eastern Province. The indigenous community had a primitive (basic education system) style of education that had been passing down knowledge through generations via oral traditions. Later the missionaries introduced a system of modern education which paved way for the evangelization of education. During the period under review, the Ramakrishna Mission played a significant role in shaping the educational landscape of the Eastern Province during British colonial rule. Especially established as a spiritual and social reform movement rooted in the teachings of Sri Ramakrishna Paramahamsa Gurudev, the Mission extended its influence to the Eastern regions, particularly through its emphasis on moral, religious, and secular education. This paper analyzes how the Ramakrishna Mission shaped education during the British colonial administration in the Eastern Province.

Objective:

The objectives are to identify the influence of the Ramakrishna Mission on the development of education in the Eastern Province during the British colonial rule. This study examines the challenges encountered on the path of nurturing spiritual and socio-cultural ethos. It also explores how these struggles contributed to the revival of Hindu identity, cultural resistance, and empowerment during the period.

Problem of Research:

During the British colonial rule, the Eastern Province faced multiple challenges. The Christian missions dominated the education sector by often sidelining the indigenous traditions and cultures. In response, the Ramakrishna Mission promoted Hindu-based education, especially among Tamil-speaking Hindus. However, its specific role in shaping education and the Hindu identity in the Eastern Province remains to be studied meticulously and there is a research gap in understanding its impact during the colonial period.

Methodology:

Historical Methodology was applied. The data collection has been done from the various institutions such as Ramakrishna Mission, Mission schools, Mission Libraries, and National Archives. Further information was gathered through interviews. Later, based on the primary and secondary data, this study has been carried out as using the qualitative method to analyze the role played by the Ramakrishna Mission in shaping the education of the Eastern province during the British colonial rule.

Results and Discussion:

The Public Vernacular Schools in the Eastern Province during the British administration

Swami Vivekananda, the founder of the Hindu spiritual organization known as Ramakrishna Mission, was actively engaged in philanthropic endeavors and spiritual activities not just within India but also across the globe throughout the 19th century. In Sri Lanka, the Ramakrishna Mission extended its reach to cities like Colombo and Kandy. The Batticaloa branch of the Ramakrishna Mission championed religious tolerance and service to humanity, resisting colonial administration without discrimination against the Tamil-speaking communities.

According to colonial records, the public vernacular schools in the Eastern province during the British period primarily focused on the districts of Batticaloa and Trincomalee. There were 2,359 boys and 98 girls enrolled in Addalachenai, Eravur, Kattankudi and Maruthamunai under the Batticaloa district. The records provide details of the financial aspects which indicating a total gross expenditure of Rs. 9,299.29 for the above-mentioned school. Though they collected fees as a specific amount, the net cost was not provided to the government.

It reflects the diversity in enrollment that varies in the number of students. Katankudy had the highest number of boys which amounted to 365. It is notable that a school for weaving in Batticaloa focus especially on certain vocational skills. Schools in Trincomalee, Gomarasankadawe, Kiliveddi, Madawachchi, Perikakinniyai, and others contributed to the overall statistics.

Name of the District	**Name of the School**	**Number of Pupils**		**Total Gross Expenditure Rs. c**	**Amount recovered by Fees & c.**	**Nett Cost to Government**
		Boys	**Girls**			
Boy's Vernacular Schools - Batticaloa	Addalachenai	208	-	760.00	-	760.00
	Eravur	221	10	637.15	-	637.15
	Irrakkamam	72	-	277.11	-	277.11
	Kattankudi	365	3	1263.79	-	1263.79
	Do (Weaving)	-	-	58.6	-	58.6
	Maruthamunai	200	14	794.7	-	794.7
	Marangala	38	-	248.0	-	248.0
	Oddamaivadi	215	-	621.75	-	621.75
	Oluvil	134	-	263.33	-	263.33
	Sainthamaruthu	164	18	638.75	-	
	Sammanthurai	204	-	732.61	-	
	Batticaloa (Weaving)	-	-	125.00	-	
Boy's Vernacular Schools - Trincomalee	Gomarasankadawe	14	4	246.53	-	246.53
	Kiliveddi	26	11	279.00	-	279.00
	Madawachchi	19	14	248.00	-	248.00
	Periyakinniyai	189	-	566.10	-	566.10
	Pulmoddai	57	-	327.50	-	327.50
	Toppur	116	-	769.11	-	769.11
	Nindur	117	14	443.43	-	443.43
Total in Eastern Province		2359	98	9299.29	-	9299.29
Source: The Ceylon Blue Book: 1921, M12 and M13						

Table 01: List of Public Vernacular Schools in the Eastern Province

The following chart compares the religious-based schools between 1918 and 1923 in the Eastern Province. Especially during this period, there were significant changes in religious schools in the region. Hindu schools experienced the most growth, increasing from 9 to 11 schools and attracting more students, particularly boys. This indicates that the Hindu community was becoming more active and dedicated to education during this time. In contrast, Church of England and Roman Catholic schools had fewer students, with Roman Catholic schools experiencing the largest decline. Wesleyan schools remained the largest group but also faced a slight decrease. Across all schools, boys attended more than girls, although Roman Catholic schools saw a small rise in the number of girls. Overall, this period highlights the increasing importance of Hindu schools in education within the Eastern Province.

Eastern Province	Schools 1918	Schools 1923	Pupils: 1918		Pupils: 1923	
			Boys	Girls	Boys	Girls
Church of England	9	8	559	101	422	78
Hindu	9	11	704	206	1004	241
Roman Catholic	39	38	2297	826	1562	785
Wesleyan	103	97	5445	1594	5314	1260
Source: The Ceylon Blue Books, 1918:L17 and 1923:M24						

Table 02: The comparison of the Religious vize schools between 1918 and 1923 in the Eastern Province

Hindu Revival Movements with Education under the Ramakrishna Mission

The native people and teachers had gradually converted to Christianity due to getting an education and holding administrative positions. The Hindu-based schools were operated under the Ramakrishna Mission, such as Kallady Shivananda School, Vivekananda School, Bt/Anaipanthi RKM Girls School, RKM School in Araiyampathy, and RKM School in Mandur. Additionally, there were institutions like Karaithivu Saradha Vidyalayam and Hindu College in Trincomalee. Furthermore, through the community's involvement, homes for girls and boys were established, along with other Hindu-related cultural activities.

The Mission engaged in activities in line with the declared policy and precepts of the Mission, with commitment and missionary zeal. The activities of the Mission have centered around the following: religious and spiritual upliftment of the masses, promotion of arts and culture, education, social service, running orphanages, relief and resettlement work, and resource development. The schools managed by the Mission, student homes, and Sunday schools were practicing centers of the Mission's religious activities. The children obtaining the knowledge and understanding of Hinduism participated in the religious observations of all religions like Deepavali, Christmas, Ramzan, and Wesak. For the first time, Hindu children could observe Hindu culture and practices in the educational institutions started by the Mission. A great impetus to the Mission's educational activities was given after Swami Vipulananda donned the robes of the Ramakrishna order in 1924. Most of the schools were taken over or opened in the Eastern Provinces. The Mission was managing twenty-six schools at the time of takeover—19 in Batticaloa, 2 in Jaffna, 3 in Trincomalee, 1 in Vavuniya, and 1 in Lunugala. These schools provided primary and secondary education in both the Tamil and English medium. These schools were a real boon for the children of these areas. For the first time, Hindu children were able

to get their education in a Hindu Religious and Cultural atmosphere. The ideals of the Mission of bigger schools like Shivananda Vidyalaya in Batticaloa, Hindu College in Trincomalee, and Vydeeswara Vidyalaya in Jaffna accommodated children of all races. No religious or racial bias was shown. Many Muslim students received their education in these schools. Swami Vipulananda, an educationist par excellence, played a leading role in the educational activities of the Mission and the educational advancement of the Eastern Province.

Under the Ramakrishna Mission, the three pioneering schools in the Eastern Province are the Bt/Shivananda School, Anaipanthi School in Batticaloa and the R.K.M. Sri Koneswara Hindu College in Trincomalee.

Bt/Shivananda School: The first pioneer school was the Bt/Shivananda School, which was inaugurated on 1st May 1929 with an initial enrollment of 27 students. Notably, Tamil and Muslim pupils were educated without discrimination during that period. Particularly, individuals such as Mr. A. Panchatsaran, Mr. M.I.M. Abdulsalam, Mr. K.O.V. Namasivayam, Mr. M.A. Abdul Najith, and Mr. K.O.V. Kathirgamathamby were among those who received education at the school (75th Anniversary Journal of Shivananda School, 2007:03).

The following principals had served at Shivananda School: Mr. A. Balasubramaniyam (1929), Mr. Shanmugam (1929), Mr. P. Ramachandran (1931), Swami Vipulananda (1931), Mr. M. Menan (1932), and Mr. S. Ampalavanar (1937) (75th Anniversary Journal of Shivananda School, 2007:15). In those days, Shivananda teachers wore the traditional Tamil dress code, known as pure cotton Vesti for men and sarees for women. For instance, individuals such as Mr. V.C. Kanthaiya, Mr. Kugathasan, Mr. Sivalingam, Mr. Kanapathipillai, and Mr. Rajasingam adhered to this dress code, despite being proficient English speakers (Interviewed person: M. Sivalingam, retired English teacher, Shivananda School).

Anaipanthi School: Further, the Anaipanthi School in Batticaloa, a local Hindu established a temple-based school in 1920 to provide Western-style education while preserving Hindu values. The simple structure was built with the help of community pioneers like Vaithiyalingam and Markandu.

In 1925, Swami Vipulananda of the Ramakrishna Mission assumed leadership, significantly shaping the school's growth. He was supported by Swami Abishananda, who also contributed to its development. Initially a mixed school for children from nearby villages like Kalladitheru, it was reorganized into a boys' and girls' section in 1936. The community support played a major role, with Mr. K.V. Markandu donating the Vivekananda Hall and Mr. S.T. Arasu funding additional infrastructure. Under the leadership of principals like Mrs. K. Bhupathi and Mrs. Thirunavukarasu, the school became a bilingual institution in 1945 and an English-medium girls' senior secondary school by 1948.

R.K.M. Sri Koneswara Hindu College: In Trincomalee, the R.K.M. Sri Koneswara Hindu College was established in 1897 by prominent Hindus and initially managed by a Board of Management. In 1922, it transitioned into a government primary school. However, on 1st June 1925, the Board of Management handed over the administration of the school to the Ramakrishna Mission. Swami Vipulananda oversaw the school's affairs on behalf of the Mission. By 1932, the school had attained senior secondary status, and it further progressed to become a Grade One school in 1952. (Koonai Natham:2018, Trinco R.K.M Sri Koneswara Hindu College Old Students Association).

The school provided education without discrimination, welcoming Muslim pupils as well. For example, notable individuals like L. Abdul Majeed, a Sri Lankan politician and Member of Parliament, received education at both Sivananda Vidyalayam in Batticaloa and Trincomalee Hindu College. Similarly, Mohamed Ehuttar Hadjiar Maharoof, another Sri Lankan politician and Member of Parliament, also attended Trincomalee Hindu College during a certain period of his education (Daily Mirror: 21 September 2012).

The following schools, which had been administered by the Ramakrishna Mission under British rule during the colonial period.

1. J/Vaidyeshwara Vidyalaya Mixed Senior Secondary English School
2. J/Kokuvil Senior Secondary Tamil Mixed School
3. T/Trincomalee Hindu School
4. T/Primary Tamil Boys' School
5. T/Tambalagamam Tamil Mixed School
6. V/Thandikulam Tamil Mixed School
7. BD/Lunugala Junior Secondary Tamil Mixed School
8. Bt/Akkaraipattu Senior Secondary Tamil Mixed School
9. Bt/Karaitivu Senior Secondary Tamil Mixed School for Boys
10. Bt/Karaitivu Senior Secondary Tamil Mixed School for Girls
11. Bt/Kalmunai Senior Secondary Tamil Mixed School
12. Bt/Mandur Senior Secondary Tamil Boys' School
13. Bt/Mandur Girls' Tamil School
14. Bt/Kaluthawalai Senior Secondary Tamil Mixed School
15. Bt/Palugamam Senior Secondary Tamil Mixed School
16. Bt/Kokkatichcholai Junior Secondary Tamil Mixed School
17. Bt/Araipattai Senior Secondary Tamil Mixed School
18. Bt/Eachanthivu Junior Secondary Tamil Mixed School
19. Bt/Kallady- Uppodai Senior Secondary Tamil Girls' School
20. Bt/Shivananda Vidyalaya Residential Senior Secondary Boys' English School

21. Bt/Anaipanthi Residential Senior Secondary Girls' English School
22. Bt/Anaipanthi Junior Secondary Boys' Tamil School
23. Bt/Sittandy Senior Secondary Tamil Mixed School
24. Bt/Morokkottanchenai Junior Secondary Tamil Mixed School
25. Bt/Karadithottam Tamil Mixed School
26. Bt/Veeramunai Tamil Mixed School

(Ramakrishna Math and Ramakrishna Mission: Platinum Jubilee Celebration 2007)

Furthermore, several other native schools were established. For instance, Kovilporativu Vivekananda Maha Vidyalaya (1878), Muravodai Shakthi Vidyala (1891), Manapitiya Tamil Maha Vidyalaya (1895), Ampilanthurai Kalaimahal Vidyalayam(1883), Sri Shanmuga Hindu Ladies College in Trincomalee (1923), Valaichchenai Hindu College (1926), Vellavely Kalaimahal Vidyalayam (1927), Nashivanthivu Government Tamil Mixed School (1936), Thambiluvil Saraswathi Vidyalayam (1944), Sri Ramakrishna College, a national school in Akkaraipattu (1944) and Batticaloa Hindu College (1946).

Overall, during the period under the Ramakrishna Mission's guidance, the Tamil schools were run under three types: Senior Intermediate Tamil School, Senior Intermediate School, and Primary School. Akkaraipattu, Karaithevu, Kalmunai, Mandur, Kaluthawalai, Palugamam, Kallady-Uppodai, Aaraiyampathy, Sittandy, and Thampalagamam were the locations where Senior Intermediate Tamil Schools were run. Kokkaddicholai, Mankikaddu, Echanthivu, Navatkadu, Aanaipanthi, and Murakoddansenai were the places that had Senior Intermediate Schools. Primary Tamil Schools were run in Karaitheevu, Karadithoddam, and Trincomalee Konesar Vidyalayam.

The Mission not only served the people through its education in schools, but also preserved the Hindu culture and Tamil tradition in the Eastern Province. Overall, it acted as a pillar of support for Tamil Hindu society. (Selvarajah.M., Former Dean, Eastern University, Sri Lanka). Later, in the year 1962, the government took over the schools. At present, these schools have grown into Vidyalayas, Maha Vidyalayas, secondary schools, and even National Schools. These institutions still maintain good relationships with the Mission for community development and traditional programmes. There were orphanage centers run by the Mission in Kallady-Uppodai, Karaithevu, and Trincomalee.

The Hindu Religious Renaissance through the Magazines and Newspapers:

Sri Ramakrishna Vijayam, a spiritual monthly magazine in Tamil language, has been published by Sri Ramakrishna Mission's Chennai Branch, since 1921. Swami Vipulananda of Batticaloa served as its Chief Editor from 1922 to 1925.

The newspapers also raised awareness of Hindu revivalism during the middle of the 19th century. The Hindu Organ,' published every other Wednesday, stood as the sole newspaper in Ceylon catering to the Hindu community. Established on September 1st, 1889, it boasted the widest circulation. Throughout its pages, stories relevant to Hindus, religious texts, and discussions on the Renaissance among Tamil-speaking communities were prominently featured.

Pandit S.M. Natesa Sastri's elegant and well-written Tamil translation of the Srimad Valmiki Ramayanam was showcased as a must-have for every Tamil home and school library. Consisting of Balakandam (244 pages), Ayodhyakandam (501 pages), Aranyakandam (254 pages), Kishkindakandam (226 pages), Sundarakandam (260 pages), and Yuddhakandam (702 pages), the combined set of six Kandams was priced at Rs.12.08. (The Hindu Organ: 13.01.1919).

The Hindu-based Libraries and published reading materials

Based on the Ceylon Blue books 1929, 1930 and 1931 t the Sri Sivananda reading room library had run under the Ramakrishna Mission.

Table:03 The library functioned under the Ramakrishna Mission

Name of Library	**Members**			**Subscription**
	1929	**1930**	**1931**	
Sri Sivananda reading room	91	91	111	Donations and people's contributions

Source: The Ceylon Blue Books: 1929, 1930, 1931

Additionally, under colonial administration had established libraries and reading rooms were supported to educate the communities. Especially in Trincomalee, there were Two Libraries, such as Trincomalee Pettah Library and Fort Library. (The Ceylon Blue Books 1929, 1930). Additionally, the Fort Library of Trincomalee had 600 books as reading materials (Ceylon Almanac and Annual Register, 1854).

The Ramakrishna Mission published printed materials and issued them every month as guides for human life. For instance, the title Ramakrishna Vijayam was printed in more than 1,500 copies each month. From time to time, the Ramakrishna Mission conducted book exhibitions in Batticaloa, Trincomalee, Kalmunai, Karaitheevu, Aaraiyampathy, Akkaraipattu, Thampiluvil, Periya Kallaru,

Chenkalady, and the Eastern University. The above-mentioned schools cordially invited Ramakrishna Missionary Swamijis to deliver special speeches or lectures on special occasions.

The Community Impact Through education by the Ramakrishna Mission

The Ramakrishna Mission has provided a wide range of services that contribute to both educational upliftment and holistic community development. Such as Educational, Social Welfare, Religious and Cultural and Community Development Initiatives. Especially through educational services, schools and Tuition Centers, Scholarships and Educational Aid, Value-Based Education and Vocational Training. The Social Welfare Services are Disaster relief and Rehabilitation and Medical Camps. Through Religious and Cultural Services, the spiritual guidance, celebrating traditional festivals and organizing cultural activities to preserve Tamil Hindu heritage and foster social unity. The Community development initiatives Youth and Women Empowerment Programs, Counseling and Support and Library and Reading Rooms

The findings highlight how the Mission's schools have improved literacy rates, provided access to quality education for underprivileged children, and promoted value-based learning. Beyond formal education, the Mission has contributed to social cohesion, moral development, and cultural preservation among Tamil-speaking communities affected by colonial legacies and conflict.

Conclusion

In summary, the British colonial administration introduced modern education, through education, the Christian missionaries took advantage to promote the colonial tradition, language, culture and diplomatically converted people to their religion as well. During the period, Hindu revivalism contributed to the Northern and Eastern parts of Sri Lanka in various forms, including Arumuganavalar and the Navalar Press publications. In the Eastern Province, the key role was highlighted under the Ramakrishna Mission, which made great efforts despite multiple challenges to protect the Hindu religion and traditions of the native Tamil-speaking communities. The mission also encouraged Hindu education but did not exclude the Muslim communities; Muslim schoolchildren also benefited from the Ramakrishna Mission's educational activities.

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Digital Resurrection: Using AI to Preserve and Recreate Cultural Heritage

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Abstract

In an era when Artificial Intelligence (AI) is transforming diverse fields, its application in preserving and reconstructing cultural heritage represents a cutting-edge advancement. The integration of AI with the humanities particularly in the reconstruction, interpretation, and conservation of historical artifacts has opened unprecedented opportunities for historians, curators, artists, and the public to engage with the past in innovative ways. This study explores how AI technologies are being employed to digitally restore cultural artifacts that have been lost or destroyed, while examining the implications and limitations of these interventions. It further investigates how digital reconstruction influences our collective conception and construction of history. The research highlights that AI-assisted restoration offers both technological promise and philosophical challenges, calling for ethically grounded and culturally sensitive approaches to digital preservation

Keywords: *Artificial Intelligence, Cultural Heritage, Digital Preservation, Reconstruction, Ethics, Art History, Virtual Reality*

Introduction to the Study

Cultural heritage including architectural ruins, paintings, manuscripts, monuments, crafts, and intangible traditions constitutes the memory of civilization (CORDIS, 2025). Over centuries, wars, colonization, natural disasters, and environmental degradation have contributed to the loss or damage of countless cultural assets. AI technologies such as machine learning, neural networks, and computer vision are now being developed to digitally conserve and reconstruct these endangered cultural resources, enabling both virtual and, in some cases, physical restorations (Ye et al., 2020; MoralAndrés et al., 2022). The concept of 'digital resurrection' refers to the process by which AI recreates lost or damaged cultural artifacts by fusing diverse data sources, including photographs, blueprints, and written descriptions (Musion, 2024). AI algorithms can fill missing visual and structural gaps with remarkable precision, allowing for new modes of visualizing, interpreting, and even experiencing the past through immersive technologies like Virtual Reality (VR) and Augmented Reality (AR) (Times of India, 2025).

Significant examples include the digital reconstruction of the ancient city of Palmyra in Syria, as well as Sri Lankan initiatives such as the Digital Art Conservation Project at Sudarshanaramaya Temple, Kiribathgoda, which aims to document frescoes and wall paintings at over 800 historic temples. Similarly, the 3D Visualization of Jetavanaramaya, Anuradhapura project integrates architectural data, satellite imagery, and computer modeling tools to recreate one of the world's tallest ancient stupas (Archaeology.lk, 2025). These initiatives reflect the growing intersection of technology, heritage, and identity in the digital age (Kaplan et al., 2015).

Methods and Methodology

This study adopts a qualitative research design supported by case-based and interpretive methods to examine the intersection between AI and cultural heritage conservation. Data were gathered through a review of existing literature, including scholarly articles, project reports, and digital archives (Ye et al., 2020). Primary sources included interviews with digital artists, restoration specialists, and animators involved in AI-based cultural reconstruction. Case studies such as the Digital Documentation of Artifacts at the Dutch Museum, Colombo, and the Venice Time Machine Project provided empirical grounding for the analysis (Kaplan et al., 2015). Additionally, a structured questionnaire was administered among art historians and heritage professionals to gauge broader perceptions of AI's role in shaping historical understanding. Thematic analysis was used to identify recurring patterns, focusing on authenticity, ownership, and inclusivity in AI-mediated reconstructions (Lindenwood University, 2025).

Research Findings and Discussion

The Technological Promise of AI in Cultural Reconstruction:

AI demonstrates extraordinary potential to analyze and restore degraded cultural artifacts. Through tools such as 3D scanning, generative modeling, and neural networks, missing parts of manuscripts, sculptures, and paintings can be reconstructed with high accuracy (Jaramillo & Sipiran, 2024). Programs trained on art datasets can predict an artwork's original appearance before deterioration, enabling new interpretive insights into ancient craftsmanship and aesthetics (MoralAndrés et al., 2022).

Digital Resurrection and Virtual Experience:

AI's 'digital resurrection' capability has redefined how individuals engage with cultural memory. Virtual museums, AR reconstructions, and holographic projections enable audiences to experience lost heritage interactively, fostering educational and emotional connections with history (Musion, 2024; Times of India, 2025). These technologies democratize access to cultural resources but also raise

questions about authenticity and the boundaries between reconstruction and invention (Wired, 2019).

Ethical and Philosophical Challenges:

Despite its benefits, AI-based restoration poses serious challenges. Reconstructions depend on the accuracy and neutrality of the training data; incomplete or biased datasets may result in misleading or speculative outcomes. The authenticity of AI-generated artifacts remains debatable what constitutes 'truth' when part of the artifact is algorithmically imagined? Ethical concerns also arise around ownership, authorship, and digital rights (Lindenwood University, 2025; CORDIS, 2025).

Postcolonial and Decolonial Implications:

AI can contribute significantly to postcolonial reclamation of history by virtually restoring cultural assets that were destroyed, looted, or altered during colonization. Through digital reconstruction of temple murals, precolonial textiles, or indigenous scripts, AI empowers communities to reclaim erased narratives and challenge Eurocentric historical interpretations (Praxis, 2025).

Educational and Cultural Impact:

AI-assisted cultural reconstruction offers profound educational value. Virtual heritage environments are increasingly used in classrooms, museums, and heritage institutions to teach art history, archaeology, and anthropology. They enhance public engagement and promote cultural empathy, particularly among younger generations (Times of India, 2025). Furthermore, such reconstructions can play a therapeutic role in post-conflict societies where the restoration of collective memory is crucial for reconciliation (Wired, 2019).

Conclusion

The integration of AI into heritage conservation marks both a technological advancement and a cultural responsibility. It enhances the visualization, interpretation, and preservation of historical artifacts, yet simultaneously demands careful ethical reflection regarding authenticity, representation, and ownership (Lindenwood University, 2025). Digital reconstruction does not merely restore the past it reshapes how society remembers and interprets it. The study concludes that sustainable collaboration between historians, technologists, and ethicists is essential to ensure that AI-driven heritage projects remain inclusive, culturally sensitive, and historically accurate (Ye et al., 2020). As we advance toward a future of 'digital resurrection,' it is imperative to balance innovation with integrity to use AI not only

to recreate what was lost but also to reimagine how humanity connects with its collective heritage (Musion, 2024).

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The Use of Artificial Intelligence Tools in Storyboard Development: Enhancing Creativity and Efficiency in Film Pre-Production

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Abstract

This study examines how Artificial Intelligence (AI) tools are transforming storyboard development within the film industry. It investigates their impact on creative workflows, visual planning, and production efficiency, with a particular focus on tools such as Boords, Storyboarder, Canva AI, Midjourney, and DALL·E. Using a qualitative case study design with filmmakers, storyboard artists, and animators, the research finds that AI tools significantly enhance speed, accessibility, and cost efficiency. However, they also raise concerns regarding creativity, cultural authenticity, and emotional depth. The study recommends a hybrid approach in which AI supplements, rather than replaces, human creativity, ensuring artistic integrity while maximizing efficiency in film pre-production.

Keywords: *Artificial Intelligence; Storyboard Development; Film Pre-production; Creative Workflow; Human-AI Collaboration*

Introduction

Storyboarding functions as a visual narrative map in film pre-production, bridging the gap between scriptwriting and visual realization. It enables filmmakers to pre-visualize sequences of shots, camera angles, character positioning, and emotional tone prior to filming. Traditionally, storyboards were created manually by artists collaborating with directors and writers. However, the emergence of Artificial Intelligence (AI) technologies has introduced new opportunities and challenges for visual storytelling.

AI-based platforms such as Boords, Storyboarder, Canva AI, Midjourney, and DALL·E allow automated image generation, template-based structuring, and prompt-driven visualization. These innovations promise to accelerate production timelines, reduce costs, and democratize access for independent filmmakers. Nevertheless, they also prompt critical debates concerning authorship, originality, cultural sensitivity, and the preservation of emotional depth in visual narratives.

This research explores how AI tools reshape storyboard development in film pre-production. It assesses whether these technologies merely assist artists or fundamentally alter creative collaboration and aesthetic outcomes. The study further

evaluates implications for storytelling authenticity and coherence in contemporary filmmaking.

Research Problem

Although AI-based creative tools are increasingly popular in film and media, limited empirical research addresses their application in storyboard development. This study therefore seeks to answer the following question:

To what extent do AI tools influence the quality, creativity, and efficiency of storyboard development in film pre-production?

Objectives

- To explore the integration of AI tools in storyboard creation.
- To evaluate the influence of AI on creative decision-making and artistic control.
- To assess the benefits and limitations of AI in storyboard workflows.
- To recommend practices for the ethical and effective use of AI in film pre-production.

Scope of the Study

The research focuses on AI-assisted storyboarding within independent filmmaking and digital media production, particularly in Sri Lanka and South Asia. It examines the experiences of directors, animators, and visual artists who employ AI tools in short films, advertising, and animation.

Literature Review

The integration of AI into creative practices, particularly in storyboarding, is receiving growing academic and industry attention. Hart (1999) identifies the storyboard as a foundational pre-visualization tool in filmmaking, while McCloud (1993) highlights the importance of panel transitions and spatial composition—concepts now encoded into AI systems.

Manovich (2020) argues that computational aesthetics are reshaping artistic expression, while Elgammal et al. (2017) demonstrate how Creative Adversarial Networks (CANs) can generate stylized artworks. Oppenlaender (2023) further illustrates how platforms such as DALL·E and Midjourney accelerate visual prototyping. At the same time, McCormack et al. (2019) raise critical concerns about authorship, authenticity, and intentionality in AI-generated art.

From a design perspective, Gero (2022) situates AI within computational creativity and cognition studies, providing a theoretical lens for understanding design processes. In the Sri Lankan context, Kodithuwakku (2016) examines visual grammar and semiotics in media narratives, while Wijesundara (2019) identifies the potential of AI adoption in film education. Abeysekera (2021) highlights the growing role of

AI in Sri Lankan animation, emphasizing its influence on regional production workflows.

Together, these studies suggest that AI tools enhance accessibility and efficiency in storyboarding but also generate debates concerning creativity, authenticity, and cultural integrity.

Research Methodology

This study employed a qualitative research design using a case study approach. An interpretive framework was adopted to capture participants' lived experiences and perspectives. Data were collected through semi-structured interviews, workflow observations, and the comparative analysis of AI-generated and manually created storyboards.

Population

The research population comprised professionals involved in storyboard creation, including filmmakers, storyboard artists, animators, and production designers working within South Asia's creative industries.

Sample

A purposive sample of 12 participants was selected based on prior experience with AI-based storyboard tools.

Sample Composition

- 4 storyboard artists
- 3 independent film directors
- 3 animators
- 2 visual designers

The sample included both student-level creators and established professionals.

Data Collection Procedure

- Semi-structured interviews conducted via Zoom and in person.
- Observation of real-time AI storyboard generation.
- Collection and analysis of AI-generated and manually created storyboard samples.

Findings

- AI tools substantially accelerated storyboard production.

- Prompt-based scene generation was especially valued for pitching and planning.
- AI outputs often lacked symbolic depth and emotional nuance, limiting their effectiveness for complex narratives.
- Many professionals adopted AI as a supportive sketching tool, refining the results manually.

Discussion of Respondents' General Information

Participants ranged in age from 22 to 45 years. Most possessed moderate digital literacy and had between three and twelve months of experience with AI storyboard tools. Younger respondents valued AI for speed and experimentation, whereas more experienced professionals expressed reservations about its limitations in narrative depth and authenticity.

Discussion and Conclusion

The findings indicate that AI storyboard tools offer clear advantages in terms of efficiency, accessibility, and cost reduction. However, their reliance as complete substitutes for human creativity risks diminishing emotional richness, cultural nuance, and artistic intent.

The study advocates a hybrid model where AI serves as a supportive tool for early visualization, while human creators retain final artistic control. This balance ensures both efficiency and authenticity. Furthermore, ethical and educational frameworks are recommended to guide the responsible adoption of AI in film pre-production.

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Digital Transformation and Development Perspectives: A Case Study in Higher Education

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Introduction to the Study

This extended abstract presents a comprehensive case study of the digital transformation initiatives undertaken at the Faculty of Philosophy, University of Banja Luka (Bosnia and Herzegovina). The central research question asks: How can a traditional humanities and social sciences faculty navigate the opportunities and constraints of digital transformation within a resource-limited context? In an era defined by rapid technological advancements and the increasing integration of artificial intelligence (AI) into various sectors, higher education institutions face immense pressure to adapt and innovate (Luckin, 2018; Khatun et al., 2024). Digital transformation in academia is not merely about adopting new technologies; it encompasses a holistic shift in institutional culture, pedagogical approaches, research methodologies, and administrative processes (Selwyn, 2016).

This study explores the strategic planning, implementation, and initial outcomes of the digital transformation efforts at the Faculty of Philosophy, highlighting both the successes achieved and the obstacles encountered within its specific cultural, economic, and institutional context. The primary objective is to provide a detailed account of how a traditional humanities and social sciences faculty navigates the complexities of digitalization, offering valuable insights for similar institutions embarking on or progressing through their own transformation journeys (Castillo-Martínez et al., 2024).

The Faculty of Philosophy, University of Banja Luka, recognized the imperative for digital transformation to enhance educational quality, foster research innovation, and improve administrative efficiency. The strategic planning process, initiated on June 18, 2025, involved a dedicated Working Group for Digitalization and ICT Development, comprising faculty members and administrative staff. This collaborative approach underscores a commitment to internal capacity building and stakeholder engagement (Faculty of Philosophy, University of Banja Luka, 2025). The transformation plan aims to leverage digital tools and AI to create a more dynamic, accessible, and globally competitive academic environment (Mustafa et al., 2024). This case study contributes to the broader discourse on digital transformation in higher education by examining a real-world implementation in a specific regional context, providing empirical evidence of the challenges and opportunities inherent in

such ambitious undertakings (Bond et al., 2021). It reflects on contextual enablers and barriers in a culturally rich but economically constrained setting, and highlights the importance of participatory planning and capacity-building as foundations for sustainable innovation.

The transformation aims to foster educational quality, research innovation, administrative efficiency, and alignment with responsible AI use, as framed by the University Senate's official recommendations adopted on December 26, 2024 (University of Banja Luka, 2024).

Methods and Methodology

The study employed a structured qualitative case study methodology. Data were drawn from official institutional documents, minutes of strategic planning workshops, and internal analyses. A participatory process was conducted in June 2025, involving faculty, administrative, and technical staff. The methodology combined SWOT analysis, collaborative goal setting, and group validation. By triangulating data across different stakeholder groups, the study ensured reliability and reduced bias. The analytical focus was on identifying enabling and constraining factors of digital transformation and examining their implications for institutional change. The strategic planning resulted in five core objectives and action plans for each goal. In formulating activities involving the use of AI, particular attention was given to the general recommendations on the use of generative tools adopted at the University level (University of Banja Luka, 2024).

Research Findings and Discussion

The findings highlight both opportunities and challenges. Strengths included motivated staff, baseline digital literacy, and partial infrastructure. Weaknesses included outdated equipment, insufficient technical staff, and lack of advanced competencies. Opportunities such as international funding and collaboration were identified as key drivers, while threats such as cybersecurity risks and resistance to innovation required careful planning (Bond et al., 2021). The rapid growth of AI technologies underscores the need for a proactive institutional strategy (Mustafa et al., 2024).

Five strategic goals were developed: (1) infrastructure development, (2) digital transformation of teaching and learning, (3) support for research and scholarly communication, (4) enhancement of digital competencies, and (5) digital outreach. Activities included the creation of an internal LMS, hybrid classrooms, AI-integrated pilot courses, and training for AI-supported literature reviews and data analysis. A unique proposal, the 'Filobot' AI assistant, symbolized innovation and institutional identity.

Ethical considerations were central to this process. The Faculty aligned its strategy with the University Senate's official guidelines for responsible AI use, adopted on December 26, 2024 (University of Banja Luka, 2024). These require transparency, data protection, and declarations of AI involvement in student assignments. By embedding ethics and governance into practice, the case illustrates that digital transformation is not only technical but also normative.

Critically, the evaluation of outcomes suggests that while early progress was achieved in infrastructure and awareness, long-term sustainability remains constrained by funding limitations, skill gaps, and dependence on external partnerships. The case demonstrates that successful digital transformation requires more than tools: it depends on participatory governance, adaptive strategies, and alignment with ethical frameworks.

Conclusion

The case of the Faculty of Philosophy, University of Banja Luka, illustrates how even traditional humanities and social sciences institutions in resource-limited contexts can embrace a strategic and ethically grounded digital transformation. The Faculty's model emphasizes participatory planning, responsible AI integration, and institutional resilience, offering a scalable and culturally sensitive framework for other institutions seeking to modernize while preserving academic values and inclusivity (Selwyn, 2016). Yet, despite a well-defined plan, significant challenges remain—such as addressing infrastructure deficiencies, ensuring continuous staff training, and mobilizing additional personnel. These realities underscore that digital transformation is not a one-time intervention but an ongoing, dynamic process that requires sustained commitment, adaptive strategies, and substantial resource investment. Ultimately, this case highlights that successful digital transformation is not merely a technological upgrade but a profound organizational and cultural shift, driven by strategic vision, ethical governance, and collaborative effort (Castillo-Martínez et al., 2024; Bond et al., 2021).

Keywords*: Digital transformation, development, case study, higher education, AI in education, strategic planning.*

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Understanding Disengagement from Campus Recreation: An Exploratory Study among Fresh Entrants to Undergraduate Programs

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Abstract

Higher education is not only enabling a student to be a work-ready person. It also teaches the students about blending with others, working together, understanding other's traits, showing off talents, exploring hidden talents. Students should focus on their studies but also need to engage in extracurricular activities. Higher educational institutions experience low student engagement in campus recreation events. This study will explore and categorize reasons not/lack participation in college events of fresh entrants. The study will formulate the reasons based on studies done by A.W Austin (1984), V Tinto (1993) & B Magolda (2004). The objective of pursuing this study is to propose effective events that will surge the student's participation. The organizers can curtail on promotional budgets and have an effective ROI and participation. The study will select 200 student samples from a reputed institution resides in Colombo, which provides foundation and diploma courses. The research design formulates an impression-based questionnaire to collect data. The study expects to categorize the reasons for lack of participation into internal, external and non-related factors.

Keywords*: Fresh Entrance, Recreational activates, Low engagement, promoting events*

Introduction

College is learning about life, people, organizations, communities and cultures. Different types of cultures and individuals will intercept, and fusion of celebrations and event creation will add color to the college. The event succeeds only if participation is fulfilled. Events such as sports events, cultural events, social activities, engagement events and fun events such as games are some of the common events organized at colleges. Such events play a pivotal role in promoting student's wellbeing, promoting student retention and feed the essence of social integration. Recognition and performance have negative and positive sides, despite participation cultivating good deeds in student's thinking. Events will teach you about handling pressure, adjusting to a situation, controlling a situation, transforming thoughts.

Event organizers after planning and deciding the dates and place will publish the event in promotional media. But it has come to understanding the participation

for events, despite free entrance having considerably declined. Even these events are not intercepting any academic deadline and classes are also not operating during the event date. There are no significant issues with the promotional methods used to promote the event. Organizers are visiting classes, talking with students, giving early bird discounts, but the problem exists. Still the communication doesn't pass out to the correct target group. Other assumed reasons might be students don't feel like participating in events or lack of interest in the idea of the event. The reason might be the organizers might not have taken the consent of majority of the students before designing the idea of the event.

The study will explore and attempt to categorize reasons for students not participating in events. There are limited studies conducted in this area and they have a wide range of researchable space for exploration.

Problem Statement

Campus students are disengaged in recreational events organized. Even if the event is planned carefully, not selecting dates such as examinations, other academic events or any other study related submission date it is observed during the event is planned carefully. This is a challenge for organizers to meet the required number of participants for such events. Especially when the event is organized with the assistance of sponsors, it is expected to be the least number of crowds for them to arrange assistance.

Focusing only on studies will eventually narrow the overall student experience, limiting opportunities for social interaction, stress relief, leadership development, and the holistic growth that higher education aims to provide. Sharing social thoughts and thinking and coping with people will be missing. Such Graduates finds it's challenging to cope up in the industry when they start working in corporate.

The disengagement of students from recreational activities reflects a concerning trend of overemphasis on academics at the expense of holistic development.

Research Aim & Objectives

How, the three variables Campus & Events, Students' Workload & Culture & Peer Pressure related to students engaging in the campus recreational events. The study was conducted using freshers from all students on the campus.

Objectives

There are few objectives that this study would like to fulfill after completing the analysis.

1. Formulate a relationship between the independent variables to the dependent variable, that a strategy can implement to have the best marketing strategies to increase the participation.
2. Identifying the best timeline (avoiding key dates for studies), venues, food/drinks and best motives to organize an event.
3. Find out what kind of events that students would like to have during their studies.
4. Identifying reasons for students to have less interest in events, and finding out the external environmental reasons for disengagement, such as money, parent's perceptions, traveling restrictions.
5. Propose best marketing-mix strategies for event's success.

Hypothesis

It is expected that the independent variables will show significant relationships with the dependent variable, student engagement in recreational activities. Specifically, academic workload is anticipated to negatively influence participation, while peer/group motivations and communication/awareness are expected to positively influence participation. If the findings reflect alternative relationships, these will be considered as directions for future research. It is expected that the independent variables will show significant relationships with the dependent variable, student engagement in recreational activities. Specifically, academic workload is anticipated to negatively influence participation, while peer/group motivations and communication/awareness are expected to positively influence participation. If the findings reflect alternative relationships, these will be considered as directions for future research.

- **Null Hypothesis (H_0):** Academic workload, peer/group motivations, and communication/awareness have no significant relationship with student participation in recreational activities.
- **Alternative Hypotheses (H_1):**

  H_1a: Academic workload negatively influences student participation in recreational activities.

  H_1b: Peer and group motivations positively influence student participation in recreational activities.

  H_1c: Communication and awareness positively influence student participation in recreational activities.

The academic workload expected to have a negative relationship with participation for extracurricular activities. When students have more academic workload, they intend to engage less in other activities. It is inevitable that most of the students are focused on their studies than other activities in terms of college life.

But the extracurricular activities are designed in terms of minimizing the academic workload stress. But that would be another concept to discuss, hence we focus only on academic workload.

The peer pressure and the social group motivations will have a relationship with the extracurricular activities. It is possible a negative or positive in terms of the nature of the activity organized. As an example, the participation for a Christmas party from Muslim or Hindu people. Because, at Christmas parties it is expected to serve liquor, pork or beef. According to the culture and group pressure Muslim and Hindu students will have a negative perception on participating to such events. Likewise, it will have a different perceptive of people for participating events in terms of their relation to a peer or a social group.

Lastly, the awareness is related to a marketing related term. The concept of awareness building is a marketing activity, and it is highly related to the title. We would like to take the theory of Diffusion of Innovations Theory – Everett Rogers (1962). The effectiveness of communicating a new product is always challenging and compelling. But a well formulated strategy of communication will have a positive ROI (return on investment). Hence, we assume that effective communication of the extracurricular activity will have a positive relationship. The variables will be tested in the Methodology section to determine the effectiveness in incorporating as a hypothesis to determine the variables. If the Methodology propose a different variable the variables would be replaced.

Concept Scaffolding

The conceptual frameworks for this study will be based on three main theories denoted above such as physiological and psychological needs must be sufficiently understood based on the needs of the students (Booth, J., 2016, rev.). The need to achieve the esteemed need is the primary objective of any student. Hence, if academic workload becomes overwhelming, students may disengage from recreational activities because their cognitive and emotional resources are redirected toward satisfying more urgent academic or security-related needs. Achieving academic needs are superior to achieving any other need where it reflects a hierarchical trade-off, where students prioritize academic demands over leisure, which they may perceive as non-essential.

As the second variable the peer and social group, the theory of academic and social integrations a key determinacy of the student retention (Chrysikos, Ahmed, & Ward, 2017). The concept covers the areas of first year student's academic integration, initial commitments, and external pressures are critical influences of persistence. Hence variables will be considered as an important variable for studying the impact for participating extracurricular activities.

Lastly, the theory of effective communication will be considered as the final variable in deciding the participation for extracurricular activities.

Campus & Events

Campus and events are two interconnected terms that have a link. Campuses can't stand solely the courses offered. Student wellbeing and stress reduction are important in the campus environment (Ariza & Zimmerman, 2021). Support for mental health is essential in the campus structure. Improving student engagement in campus activities is important, as low engagement predicts lower belonging and persistence and recommends equity-targeted interventions (UNC Charlotte, 2023). Most students who are less interested in engaging have lower interactions, and vice versa. In genuine cases where students are unable to participate in recreational activities, such as students with disabilities, institutional communication and representation significantly impact how welcome or excluded students feel in campus recreation spaces (Bruning et al., 2020). None of the above cases covers the students' side of the story, which our study will address. Cultural disparities among students play a pivotal role in participation in extracurricular events.

Students' Workload

Student workload is a key deciding factor for participation in extracurricular activities. Especially in programs with many assignments, students find it difficult to cope with other commitments. Academic priorities may limit students' ability or willingness to participate in recreation and lead them to perceive time spent on recreation as conflicting with study time (Zegre et al. (2020) discusses the usage of recreational facilities. Despite being largely about individual commitment, Gilman (2001) addresses psychological or emotional effort through the exploration of Structured Extracurricular Activity (SEA) participation and life satisfaction among adolescents. The article discusses the relationship between effective utilization of SEA and balancing studies with engagement in suitable activities. However, it lacks in providing reasons for lack of participation and disengagement. Another aspect of excessive workload is the amount of stress placed on students' lives. Reduction in social gatherings and recreation suppresses students' peace of mind and increases stress levels (Kausar (2010) discuss how motivation reduces perceived workload: intrinsic interest in topics makes learning feel less burdensome. Motivation is another pivotal factor in determining workload perception.

Culture & Peer Pressure

The culture of the university and the influence of friends, groups, and cliques have a positive effect on participation in extracurricular events. Negative influences such as socioeconomic background, time pressures, disabilities, lack of belonging, and online learning fatigue are often intensified by culture and peer influences (Gulko et al. (2024) explains that enthusiastic students join clubs, services, and recreation activities, and shows how social class, cultural capital, and financial constraints

determine whether students participate or disengage from the campus "experiential core." In cases where students are working and funding their studies, they may not feel obliged to participate in such events. A mismatch between institutional expectations and student backgrounds also explains why some students withdraw from co-curricular life.

Methodology

The population size is undetermined due to the large number of students who will be there in the interested study. The first-year students of any program can be put into this category. From generalize the study will take a sample of 200+ students from a leading private degree awarding campus located in Colombo. The campus offers both Foundation and Diploma courses for students who are indenting to go to Australia as their aspired study destination. They will study in the relevant programs for more than 8 months. Since that is a considerable amount of time for a student to do their studies along with recreation activities. The campus has encountered hardships in participating in students for recreational activities in the past. Students are less eager to join recreational activities but are more focused on studies. The samples will be collected from the Foundation and Diploma students who are studying different programs.

Determining the Sample

As determined in the above section the sample size is undetermined. Hence determine the sample size following calculation will be used. We assume to keep other factors constant.

- n= sample size
- N= population size
- e= margin of error (e.g., 0.05 for 90% confidence)
    - 90% confidence level, the commonly accepted margin of error is 0.065 (6.5%).

$$n = \frac{N}{1 + Ne^2}$$

Population size	N=10,000N = 10,000N=10,000
Confidence level	= 90%
Margin of error	e=0.065e=0.065e=0.065

$$n = \frac{10{,}000}{1 + 10{,}000.0.065^2}$$

$n \approx 231$

The sample size for the student population would be 231. The samples will be collected from all the 1st year students who study Foundation and Diploma courses in the second teaching period of the college.

Discussion

Data for this study were collected through two complementary methods, a structured questionnaire and a focus group discussion which was conducted as a Q&A face to face session. Out of 231 email recipients the questionnaire captured 193 responses, 90% of which are first-year students(fresher). A Google Form was used to collect data and keep the responders anonymously. The questionnaire took 6 minutes to complete. The questionnaire was designed as an impression analysis where emojis were used to capture the impression for a given statement. It was not distributed as printed format to save time re-entering the responses.

The focus group was conducted during a Diploma in Health Science class and involved 16 participants (6 males and 10 females) who were seated in the same class. Open-ended and closed-ended questions were used to encourage both breadth and depth of responses, and informed consent was obtained from all participants. The curator made sure that all the participants were actively involved in the responding session. Some of the responses were displayed on the whiteboard also. Notes were taken during the discussion, but the discussion was not audio recorded.

By conducting the study with the combination of these two approaches we believe that it will provide an insight for the disengagement from campus recreation, with quantitative patterns supported by qualitative insights. Notes from the focus group were systematically recorded to ensure accuracy and transparency in the analysis.

Selecting the Sample

The target population consisted of first-year students enrolled in Foundation and Diploma programs at a private higher education institution in Colombo. Using Krejcie and Morgan's (1970) formula, a sample of 231 students was determined as sufficient, although 193 complete responses were ultimately received through questionnaires. Additionally, a focus group discussion was held with 16 randomly selected students (6 males, 10 females). There were no specific method (non-probability) of collecting the sample, for the focuss group it is simple random sampling method. Overall the sampling method can be stated as the "Purposive Conveninve Sampling" for this study.

Data Collection

Two complementary methods were used,

Questionnaire (Google Forms/Online) — 11 demographic items and three thematic silos aligned to the independent variables; Academic Workload, Peer & Culture, and Effective Communication/Awareness. Questions were designed as Likert-scale (without neutral midpoint) impression based, statements were used to produce a clear responses.

Focus Group Discussion (FGD/Inperson) — Conducted in a classroom with open-ended guiding questions on preferences, motivations, and barriers to event participation. Consent was obtained, and notes were documented. Overall 10 descriptive questions were asked during the study.

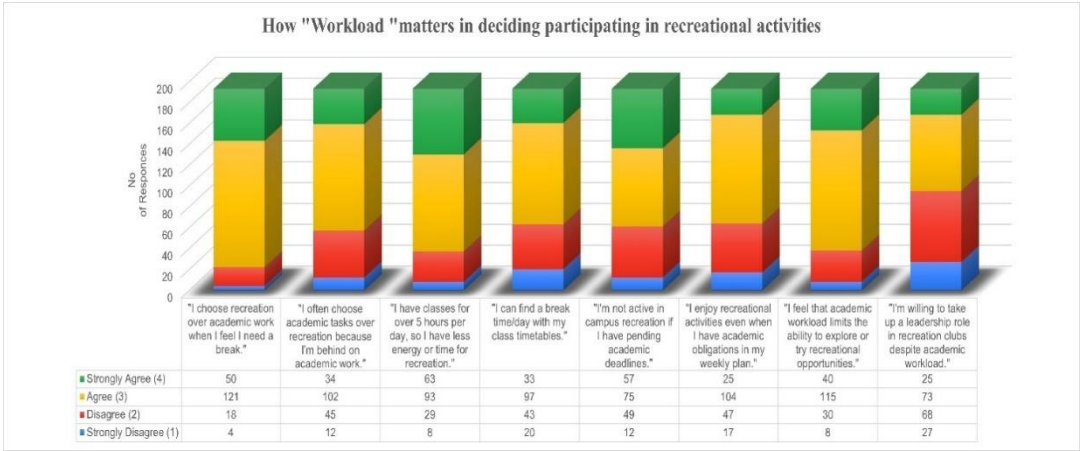
Data Analysis

The data collected from the questionnaires were analyzed by grouping responses into patterns of agreement and disagreement, while the focus group discussion provided richer, contextual explanations of these trends. The combination of these two sources created a form of methodological triangulation, strengthening the validity of the findings. We object to bind together these insights which will allow constructed around how each independent variable academic workload, peer and cultural influences, and communication/awareness shaped the dependent variable, student engagement in campus recreation.

Determining applicability of theories

To facilitate the formulation of the alternative hypotheses and to understand student disengagement from recreational events, this study draws on three theoretical lenses: Maslow's Hierarchy of Needs (1943) and Rogers' Diffusion of Innovations (1962). Together, these theories provide a scaffold for analyzing why students either engage or withdraw from extracurricular life. According to Maslow, students may prioritize academic or security-related needs over recreation when workload pressures are high, thus limiting participation. In contrast, Rogers highlights the importance of how effectively an idea or event is communicated within a social system, suggesting that participation depends on the credibility of the messenger and the attractiveness of the message. Within this framework, each independent variable academic workload, peer and cultural influence, and communication/awareness is positioned as a key factor in shaping the dependent variable, student participation in recreational activities.

*A*cademic Workload and Maslow's Hierarchy of Needs



	"I choose recreation over academic work when I feel I need a break."	"I often choose academic tasks over recreation because I'm behind on academic work."	"I have classes for over 5 hours per day, so I have less energy or time for recreation."	"I can find a break time/day with my class timetables."	"I'm not active in campus recreation if I have pending academic deadlines."	"I enjoy recreational activities even when I have academic obligations in my weekly plan."	"I feel that academic workload limits the ability to explore or try recreational opportunities."	"I'm willing to take up a leadership role in recreation clubs despite academic workload."
Strongly Agree (4)	50	34	63	33	57	25	40	25
Agree (3)	121	102	93	97	75	104	115	73
Disagree (2)	18	45	29	43	49	47	30	68
Strongly Disagree (1)	4	12	8	20	12	17	8	27

Figure 1. Academic Workload and Maslow's Hierarchy of Needs

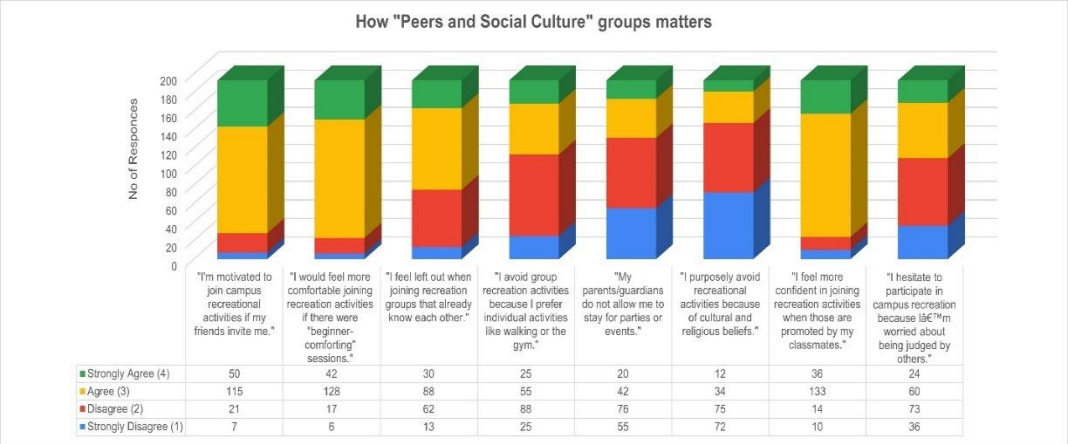
Maslow's in his model explains "physiological and security" needs matter before higher-order growth such as belonging or self-actualization. We here assume that for students, academic performance and success is closely tied to both security (future career stability) and esteem (recognition of achievement). When workload intensifies long classes, back-to-back assignments, or high-stakes exams students naturally prioritize these "essential" needs over recreational engagement.

Objective of this study therefore hypothesizes that academic workload has a negative relationship with participation in recreation. Eventhough that the recreational events reduce stress, they are often assumed as "non-essential" in the hierarchy of student needs, unless explicitly framed as supportive of academic success. Global research confirms this pattern. For instance, Kyndt et al. (2014) showed that students under high workload consistently deprioritized leisure, while Kausar (2010) found that coping strategies often displaced recreational outlets. In Sri Lanka's exam-driven culture, the trade-off is likely sharper, as students and parents equate academic performance with long-term security.

The questionnaire responses strongly reinforced this hypothesis. A clear majority of students agreed that academic tasks take precedence over recreation, with more than 70% indicating that they often choose studies over extracurricular activities. Similarly, over two-thirds reported disengaging from recreation when deadlines were pending, and a comparable proportion highlighted that long class schedules left them too exhausted to participate. While some students (around 55%) acknowledged that they still enjoy recreation despite workload, the overall trend demonstrates that workload functions primarily as a barrier. These findings confirm that in practice, students prioritize academic security over recreation, aligning closely with Maslow's framework. As most of the students have agreed and being positive

in taking up additional responcibility as a Leader in such recreational socity, may be which will lead to esteem need.

Peer and Cultural Influence in Tinto's Retention Model



	"I'm motivated to join campus recreational activities if my friends invite me."	"I would feel more comfortable joining recreation activities if there were "beginner-comforting" sessions."	"I feel left out when joining recreation groups that already know each other."	"I avoid group recreation activities because I prefer individual activities like walking or the gym."	"My parents/guardians do not allow me to stay for parties or events."	"I purposely avoid recreational activities because of cultural and religious beliefs."	"I feel more confident in joining recreation activities when those are promoted by my classmates."	"I hesitate to participate in campus recreation because Iâ€™m worried about being judged by others."
Strongly Agree (4)	50	42	30	25	20	12	36	24
Agree (3)	115	128	88	55	42	34	133	60
Disagree (2)	21	17	62	88	76	75	14	73
Strongly Disagree (1)	7	6	13	25	55	72	10	36

Figure 2. Peer and Cultural Influence

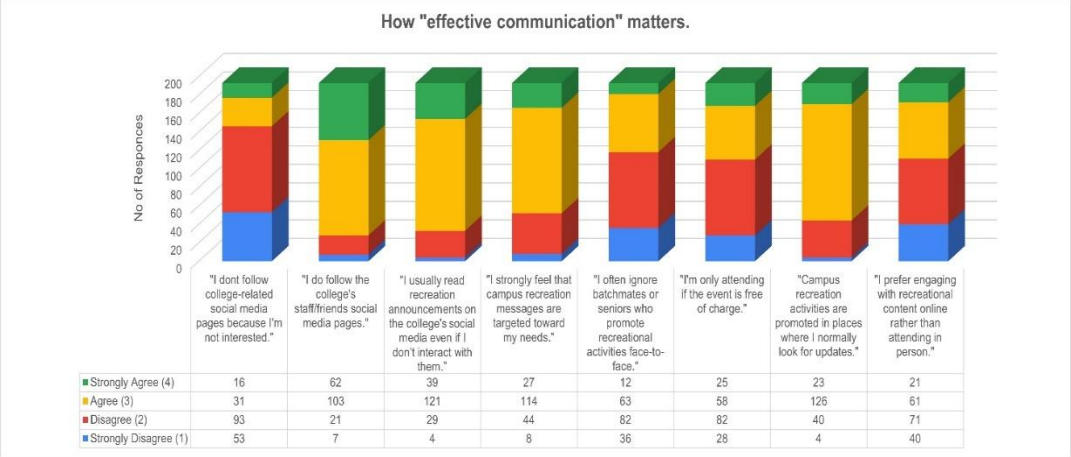
The study results confirms as directed in concept scaffolding that the "peer motivation" is one of the most decisive factors influencing student participation in recreational activities. Majority of students indicated that they are more motivated to attend events whent they are invited by peers or collegeuse, with over 80 percent agreeing or strongly agreeing to this statement. The mean value of peer influence is a strongest motivator. Students are most motivated when friends invite them (3.08), classmates promote the event (3.01), or when beginner-comforting sessions are available (3.07). Similarly, almost nine out of ten students reported that they feel more comfortable joining recreational activities when classmates promote them. These findings reconfirm that peer encouragement and classmate involvement create a supportive environment that reduces hesitation and increases willingness to participate.

At the same time, the data also reveal that feelings of exclusion remain a concern. Around six out of ten students admitted that they often feel left out when joining groups that are already established. This suggests that while peer networks can be powerful motivators, they can also act as barriers for students who find it difficult to integrate into existing social circles. The issue of confidence was also evident in the responses, approximately 40 to 45 percent of students reported that they avoid or hesitate to join recreational activities because they do not feel confident in group settings. Cultural and parental restrictions appeared to be less influential overall. Only about one-third (82/193 are females respondence) of respondents said their parents prevented them from staying late for events, while the majority

disagreed. Likewise, less than one-quarter reported avoiding events for religious reasons, with most students rejecting this as a barrier. Although cultural and parental concerns cannot be ignored, the overall evidence suggests that they play a secondary role compared to peer influence.

Taken together, these reflections indicate that students' participation in campus recreation is shaped far more by peer dynamics than by cultural or family restrictions. Peer networks are the strongest driver of engagement, providing both motivation and confidence. However, when students experience social anxiety or feel excluded from established groups, these same networks can become barriers. The findings suggest that creating inclusive entry points and encouraging peer-led promotion are crucial to strengthening participation.

Effective Communication and Awareness in Rogers' Diffusion of Innovations



	"I dont follow college-related social media pages because I'm not interested."	"I do follow the college's staff/friends social media pages."	"I usually read recreation announcements on the college's social media even if I don't interact with them."	"I strongly feel that campus recreation messages are targeted toward my needs."	"I often ignore batchmates or seniors who promote recreational activities face-to-face."	"I'm only attending if the event is free of charge."	"Campus recreation activities are promoted in places where I normally look for updates."	"I prefer engaging with recreational content online rather than attending in person."
Strongly Agree (4)	16	62	39	27	12	25	23	21
Agree (3)	31	103	121	114	63	58	126	61
Disagree (2)	93	21	29	44	82	82	40	71
Strongly Disagree (1)	53	7	4	8	36	28	4	40

Figure 3. Effective Communication and Awareness

According to the arguments developed by Rogers (1962) of new ideas depends on five elements, "the innovation, communication channels, time, social system, and the characteristics of adopters". Applied to campus recreation, the "innovation" is the event itself, while communication channels range from official social media to peer-driven (face to face) messaging. Students in the focus group confirmed that they follow (social media) announcements, however, participation appears to be more strongly shaped by the credibility of the messenger than by the mere presence of announcements. The questionnaire findings strongly support this interpretation. While just over half of the students admitted they do not follow official college-related social media pages (mean = 1.96), a much larger majority reported following staff and friends' social media (mean = 3.16). Similarly, most students said

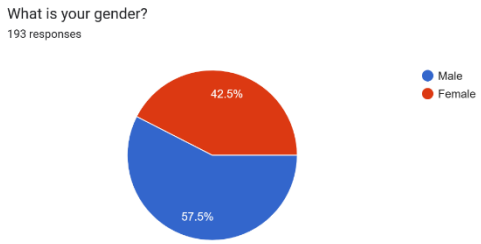
they usually notices/read announcements on the college's official social media pages (mean = 3.02), suggesting awareness exists but is "selective". Importantly, students strongly agreed that they feel campus recreation messages are targeted at them (mean = 2.93), yet the impact is shaped by the messenger. For example, nearly half indicated they often ignore promotions from batchmates or seniors (mean = 2.14), while "trust" was higher when messages came from an internal staff or a close friends.

Cost and accessibility also appeared in the responses. About 43 percent said they only attend if the event is free of charge (mean = 2.39), showing some rationale for less participation as financial considerations can reduce effectiveness of communication. Majority agreed that activities are promoted in the channels they already use (mean = 2.87) but students also emphasized that announcements must appear in the right places. Finally, while some students said they prefer engaging with recreational content online (mean = 2.35), most still showed a preference for in-person participation. All the above narrow down that effective communication has a positive relationship with participation. Awareness alone is insufficient, the "credibility" of the messenger (friends, classmates, staff) and the motivational framing (celebrity guest, workshop, fun/surprise elements) are decisive. Students are not unaware of events, but they respond more when information comes from trusted peers and is presented in motivating formats. Studies from US campuses (Scott, 2014; Zegre et al., 2020) highlight how effective recreation marketing improved retention and engagement. However, the Sri Lankan findings add nuance, while students do not lack awareness, they place greater trust in peer-to-peer and staff communication than in official or student senior promotion. This adapts Rogers' theory to a collectivist cultural setting where messenger credibility outweighs institutional branding.

Findings: Demographic Profile and Initial Insights

A total of 193 valid responses were collected from first-year students at the institution. This demographic profile is important because it helps explain the context in which recreational disengagement occurs and points to sub-groups that may face unique challenges.

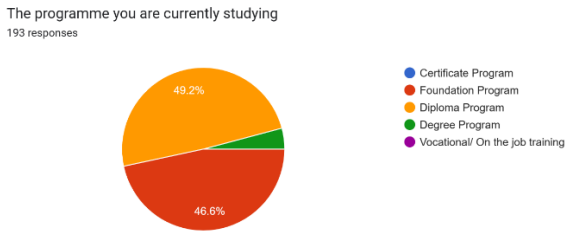
Gender Distribution



Out of the 193 respondents, 110 were male and 83 were female, reflecting the male-majority enrollment structure of the institution. This gender composition has implications for recreation planning. Globally, previous studies have noted that males are more likely to participate

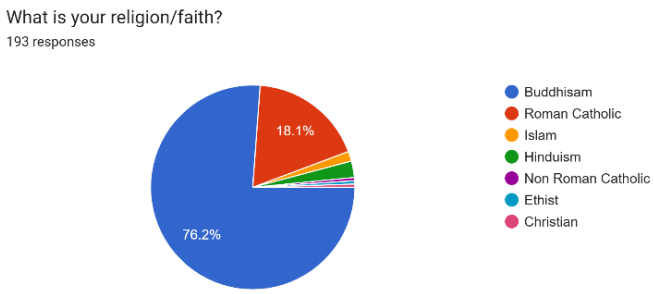
in physically competitive or outdoor activities, while females often prefer social, cultural, or wellness-oriented events (Wilson, 2022). This aligns with the focus group, where female students showed discomfort with alcohol-related events, while some male students were more open to them. The gender imbalance therefore means that activity design risks being male-oriented unless inclusive programming is consciously considered.

Academic Program



The participants were almost equally distributed between Foundation and Diploma programs, both of which are feeder pathways for overseas study (mainly Australia). Strikingly, 90% of respondents identified as Foundation-level students, meaning that the dataset strongly represents fresh entrants in their first semester of higher education. This is important because first-year students are in the process of academic and social transition (Tinto, 1993). Their heavy dependence on structured routines and their limited familiarity with the campus environment might make them more vulnerable to disengagement, this study dosent support that. The demographic weight of Foundation students in this study therefore highlights the criticality of supporting recreation at the very beginning of the student journey, when habits of participation are being formed.

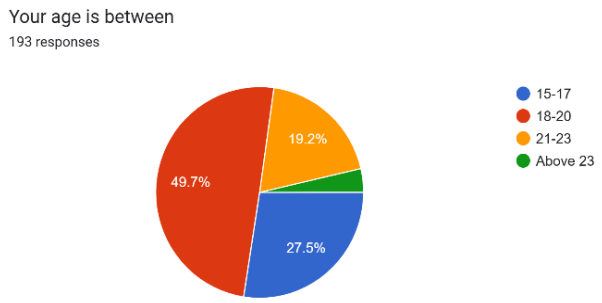
Religious Affiliation



Over 70% of respondents identified as Buddhist, with the remainder distributed across Hindu, Muslim, and Christian faiths. While religion was not the central variable of the study, cultural expectations and religious norms emerged indirectly in the focus group for example, *concerns about alcohol service at parties or the scheduling of events during religious periods*. Global research suggests that religious minorities often experience a "mismatch" between

institutional recreation offerings and their personal values (Gulko et al., 2024). In this Sri Lankan case, the strong Buddhist majority means cultural sensitivity is less about exclusion of minority groups and more about ensuring inclusivity (e.g., avoiding alcohol, pork, or late-night events) so that all groups can participate comfortably.

Age Groups

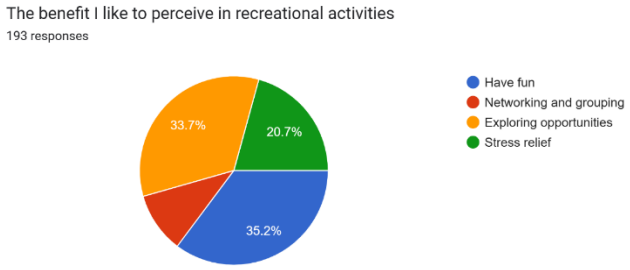


The majority of respondents were aged 18–20, followed by 21–23 and a smaller group of 15–17 year-olds. Age matters because maturity and independence affect decision-making. Students in the 15–17 category are often under stronger parental supervision, which was confirmed in the focus group where some participants stated that making events "compulsory" would make it easier to obtain parental consent. By contrast, students aged 21–23 reported more autonomy in their choices. This mirrors global findings that younger students are more affected by family expectations, while older students weigh recreation against career-building priorities (Scott, 2014). Thus, event organizers in this context face a dual challenge, designing recreation that appeals to both the younger, dependent group and the older, career-focused group.

Residence and Transportation

Residence and transport emerged as significant constraints. Many students commute long distances daily, often using public transportation. This reality discourages attendance at late-night or weekend events, as students prefer to travel home after classes, dispite long distance. The focus group emphasized "weekday, daytime" activities for this reason. Internationally, similar barriers have been documented, with commuting students being less engaged in campus life compared to those living in hostels or dormitories (Sevic & Eskiler, 2020). In this institution, the absence of a strong residential culture intensifies the reliance on daytime, on-campus scheduling if participation is to be improved.

Perceived Benefits of Recreation



When asked what benefits they expected from recreation, students most frequently selected "Having Fun" (35%), followed closely by "Exploring Opportunities" (34%), with networking/grouping and stress relief also identified. This suggests that students see recreation not only as leisure but also as a pathway for personal growth and peer connection. Interestingly, stress relief was not the dominant theme, even though workload was later described as a key barrier. This points to a paradox, students are aware of their stress but may not immediately see recreation as a formal coping strategy. Global evidence supports this paradox, as students often underestimate recreation's contribution to mental health, focusing instead on its social value (Wilson, 2022; Kausar, 2010).

Limitations

- **Sample Size and Scope**

The study draws on around 190+ freshers from one private institution in Colombo. This limits generalizability to all Sri Lankan higher education institutions, particularly public universities or other private providers.

- **Population Focus (Freshers Only)**

By focusing only on first-year entrants, the study excludes perspectives of senior students whose engagement behaviors might differ as they adapt to campus life over time.

- **Cultural and Institutional Specificity**

Findings are shaped by the unique culture, policies, and demographics of the selected campus. Results may not reflect broader cultural, religious, or institutional differences across Sri Lanka.

- **Temporal Limitations**

The study captures responses at a single point in time (cross-sectional). Students' engagement patterns may evolve over semesters, but this study cannot capture longitudinal changes.

- **Event Diversity Not Fully Considered**

Recreational events differ (sports, cultural, social). Grouping them together may overlook the nuances of why students might engage in one type but not another.

- **External Environmental Variables**

Money, parents' perceptions, and transport restrictions, these are not measured in depth, which could leave gaps in understanding the full external context.

Conclusion

Organizing recreational events within an educational environment presents consistent challenges, as students often prioritize academic responsibilities over extracurricular activities. The findings of this study highlight that participation is strongly shaped by timing, communication, and cultural sensitivity. Events scheduled without regard to students' academic workload are likely to experience reduced turnout, underscoring the importance of aligning activities with students' free periods and preferred formats. Important is the mode of communication, students respond more positively to peer- and staff-driven promotion than to formal institutional announcements. Cultural considerations, such as respect for religious practices and personal values, also play a role in determining levels of engagement. Practical measures such as collecting student feedback before event planning and organizing informal pre-event meetups can foster a sense of inclusion and comfort, thereby improving participation. Overall, effective recreational programming requires careful integration of timing, communication, and cultural awareness, ensuring that students feel both respected and motivated to engage.

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Public Perception of Artificial Intelligence Adoption for Sustainable Tourism in Weralugasthanna, Matale District, Sri Lanka: A Socio-Cultural and Environmentally Valuable Emerging Tourist Destination

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Introduction to the Study

Artificial Intelligence (AI) has become a powerful tool in tourism. It facilitates for personalized travel experiences, uses resources more effectively, and promotes sustainable destination management. Urban and well-developed tourist areas have increasingly adopted AI systems like chatbots, predictive analytics, and smart destination management. In contrast, rural areas often fall behind. This is due to limited awareness, infrastructure issues, and socio-cultural barriers (Ivanov & Webster, 2019).

Weralugasthanna is in the Rattota Divisional Secretariat Division of the Matale District and is part of the Knuckles Mountain Range. This area is a UNESCO World Heritage site, recognized for its rich biodiversity and cultural importance (Pathirana, De Silva, & Warnakula, 2025).

Among the villages in the area, Weralugasthanna holds significant importance due to its rich cultural heritage. It is especially known for traditional agricultural practices, the use of indigenous seeds, traditional foods, and its natural environmental heritage. Additionally, the area is home to abundant Heen Bovitiya (Osbeckia octandra), which grows naturally. The Moragalu Oya flows between Weralugasthanna and Madakubura villages, enhancing the region's ecological value. The community sustains a traditional economic system and is particularly renowned for its Kithul industry, producing Kithul treacle and jaggery. Other notable agricultural products include cloves, pepper, and cardamom. Furthermore, the residents possess extensive knowledge of traditional fertilizer preparations. Collectively, these factors make Weralugasthanna an area of considerable socio-cultural, agricultural, and environmental significance.

However, the construction of the Moragahakanda Reservoir has resulted in increased rainfall in the region, negatively affecting the harvests of cloves, pepper, and cardamom. The climate has shifted from seasonally dry to consistently rainy conditions. Pine cultivation has suffered due to reduced groundwater availability. In a nearby area of the upper midlands close to Weralugasthanna village, the tea estate

has decreased from 650 acres to 450 acres, and the local tea factory has been deactivated. These changes have contributed to a decline in both local and foreign currency earnings for the villages.

Tourism is beginning to develop, with visitors attracted by the natural environment, traditional Helmalu (cascade) practices, and authentic village life experiences. However, only two houses currently offer indigenous food for tourists, and there are no hotels in the village.

The Moragalu Oya is also famous for a unique fish therapy that can be promoted as a tourist attraction. Near the river, there is an ancient shrine dedicated to God Bandara, as well as an old cable bridge crossing the river. The area contains four ambalamas, which are resting places historically used by pilgrims, traders, and travelers during their journeys. Ancient villages such as Laggala and Pillagema are located near Weralugasthanna. The Sinhala Buddhist people from these villages traditionally traveled to Kandy and Mahiyanganaya, using the ambalamas around Weralugasthanna as resting points along their routes. Hence, this village holds significant importance as a center of ancient travel routes.

Despite its high potential for ecotourism and community-based tourism, the use of AI in this area has not been explored. Understanding how the public views these rural areas is key to creating adoption strategies that are culturally appropriate and financially sustainable.

Literature Review

AI applications in tourism have grown a lot in the past ten years. They have improved both how businesses operate and how satisfied customers are (Li et al., 2018). Tools like AI recommendation systems, automated translation services, and predictive tourist flow management work well in cities. However, their use in rural tourism is low. This is often because of the digital divide, a lack of awareness among stakeholders, and the belief that AI is not relevant to local situations (Buhalis & Sinarta, 2019).

Public perception is important for adopting technology. The Technology Acceptance Model (TAM) shows that how useful and easy people find new technologies affects their willingness to use them (Davis, 1989). In rural tourism areas, perceptions are influenced by socio-economic conditions, trust in technology, and exposure to digital platforms (Koutsou et al., 2014). Additionally, community-based tourism projects rely a lot on how ready local stakeholders are. This makes studying perceptions vital for sustainable AI use (UNWTO, 2022).

Research on AI in sustainable tourism also suggests that technology can improve environmental monitoring, help with resource allocation, and provide data-driven insights for policy-making. However, without community support, such innovations risk being underused or rejected (Fatema et al., 2024).

Methods and Methodology

This study adopted a descriptive survey to explore how public perception of artificial intelligence adoption for sustainable tourism in Weralugasthanna. The sample consisted of residents aged 18 years and older. A total of 169 respondents were selected based on the Krejcie and Morgan table from a population of 304 families. Respondents were chosen through snowball sampling.

Collection of Data

A semi-structured interview schedule was employed in the data collection process. Open-ended, closed-ended, and Likert-scale questions were used to cover the key thematic areas of socio-cultural value, environmental significance of the area, awareness of tourism, general AI awareness, tourism-related AI awareness, perceived risks and benefits, and willingness to use AI-enabled tourism solutions.

Data Analysis

To find and understand local attitudes, views, and perceptions regarding the application of AI in sustainable tourism, thematic narrative analysis was employed to examine the primary data. This method made it possible to identify the Weralugasthanna community's underlying cultural values, economic expectations, and concerns about the use of AI in their tourism practices.

Results and Discussion

The study area demonstrates significant tourism potential due to its rich natural environment, the rural livelihoods of its inhabitants, and its distinctive traditional cuisine. At present, there is currently an absence of accommodation facilities and other essential infrastructure to support tourism-related activities. This lack of infrastructure has acted as a deterrent for both tourists and researchers, despite the area's remarkable socio-cultural and environmental uniqueness. According to public perception, the construction of the Moragahakanda Reservoir has brought about notable climatic changes, with the region reportedly transitioning from a seasonally rainy climate to one experiencing rainfall throughout the year. In exploring possible strategies to overcome these challenges and enhance tourism potential, the study also examined the awareness and attitudes of the community toward the integration of emerging technologies, particularly Artificial Intelligence, into local tourism development.

The findings indicate that a majority of respondents do not possess a general awareness of Artificial Intelligence, with only 20.71% demonstrating such awareness and almost none being familiar with its potential applications in tourism. Respondents generally perceived AI as something distant and associated more with urban or

foreign contexts than with their own rural tourism development. Concerns were expressed regarding the potential erosion of traditional hospitality values, possible job losses due to automation, and doubts about the capacity of local residents to effectively use AI technologies.

Nevertheless, 62.13% of villagers expressed a willingness to accept AI-based tools despite their limited knowledge of them. Respondents indicated openness to adopting such tools if they were introduced in ways that respect local traditions and generate employment opportunities. This suggests that while awareness remains low there is potential for AI adoption in sustainable tourism development. However, targeted educational and capacity-building initiatives will be essential to ensure that the introduction of AI is culturally sensitive and clearly communicates tangible benefits to the community.

Conclusions

The study shows that Weralugasthanna has high tourism potential due to its socio-cultural significance, natural environment and rural livelihoods. The absence of accommodation, lack of infrastructure, less awareness of AI, and recent climatic changes perceived to be linked to the construction of the Moragahakanda Reservoir are key challenges to tourism growth. Further, community awareness of Artificial Intelligence is low, with only 20.71 percent of respondents showing general awareness and very few knowing its applications in tourism. However, 62.13 percent of villagers are willing to accept AI-based tools if they are introduced in a way that respects cultural traditions and creates jobs. This shows there is potential for AI adoption in sustainable tourism if it is supported by culturally sensitive education and training.

Recommendations

- Provide education programs to increase awareness of AI and its benefits for sustainable tourism.
- Promote the Kithul industry with government support.
- Improve roads that connect Weralugasthanna to other tourism sites.
- Involve local people in planning and using AI technologies.
- Offer training to develop skills for using and managing AI tools.
- Start small pilot projects to show practical uses of AI in rural tourism.
- Build accommodation facilities for tourists.
- Improve internet access in the area.
- Develop infrastructure to support tourism.

Keywords: *Artificial Intelligence, Public Perception, Sustainable Tourism, Weralugasthanna, Rural Tourism Development*

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Environmental pollution by Multinational Companies in Sri Lanka: A Case Study of the Pelwatta Sugar Company

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Introduction:

Pollution of the environment has become a severe problem around world irrespective of developed or developing countries. I can be categorized as Water Pollution, Air Pollution, Soil (land) Pollution, Noise Pollution and Radioactive Pollution etc. In the processes of Producing sugar, using sugarcane, releases large amount of waste water and effluents, suspended solids, organic matters, press mud and bagasse to the environment (Muthusamy, et, al. 2012). This study critically analyzes the environmental pollution caused by Pelwatta Sugar Company; a large scale Multinational Sugar Company (MNC), in Buttala, Moneragala District. Objectives of this study are to assess what are the ways of pollutions, how natural water sheds has been affected due to the effluents and to investigate how common public face the difficulties due to the environmental pollution as well as in which ways rural community has been enforced to find the solutions to the hazardous situation they faced.

Methods and Methodology:

This research study has launched on a Multinational Agro Industry established in Moneragala District. The company is consisted of nearly twelve thousand hectares of sugarcane cultivation as well as a factory of producing sugar. The study area of this study is the factory premises of Sugar Company, nearby villages, and the two rivers close to the sugar factory where Sugar Company has released effluents. The researcher uses the court case and the verdict of the same, has been filed by the villagers against the Pelwatta Sugar Company, requesting a court order to stop the pollution. This research study is based on Case Study research design of qualitative research approach. According to (Merriam 2001), Case Study researches are richly descriptive, because they are grounded on deep and varied source of information. In a case study, research data is collected through the evidence. In order to collect evidence the researchers must use documents, records, conduct interviews, conduct detached observations, participants observations, as well as physical artifacts. (Gillham, 2000).

For this study the researcher uses only the document of the court case and the statements, finding by the court at the field visit and the verdict etc. Key consideration of sampling in a case study can be purposeful, informative, strategic, theoretical,

situation, case boundaries or documentation. (Yin, 2018). Explanation building technique of case study research method is used for the analyzing of data of this study.

Research Findings and Discussion:

Ten villagers of a surrounding area to the Pelwatta Sugar Company have filed the case under the Section 98(01) of the Code of Criminal Procedure, No. 15 of 1979. In their petition they have mentioned that the emission of Pelwatta Sugar Company, such as factory waste, effluents, chemicals, smoke and ashes have become a threat to the lives of common public who live in the area. Also they have emphasized that the villagers who live in the area are unable to use the water of Kuda Oya, Kukurampola Stream and Manik Ganga for bathing, drinking as well as for the agricultural purposes. According to the request of the villagers the Magistrate has decided to visit the surrounding villages and the factory premises before the verdict given. The researcher has uses the observation of the judge as well as the evidence given by the witnesses on the field visit has been mentioned in the court case.

Case No. 59779/95: Proceedings & Judgment

By considering the points presented by both parties, Mr. R.M.S.K. Rathnayake, the District Magistrate of District court, Moneragala, has decided to arrange a field inspection in the related area on 26th, November, 1998. In his visit, the Magistrate has observed that effluent water of the sugar factory has released to the nearby Kuda Oya and this situation has become a threat to the villagers who live in surrounding villages. Ashes emitted from the chimney of the factory, has spread in the area causing serious health and environment problems. Human wastes removed from the toilets of the residents, in the premises of the sugar company, have dumped in the pits nearby Manik River. The wastes have been mixed with the water of the river. (Verdict of the Case 1999).

In his verdict the Judge has mentioned that the respondents must take action to stop releasing effluents from the Pelwatta Sugar Factory to the Manik River, Kuda Oya, and Kukurampola Stream and they must take action to control the emitting of the ashes from the chimney of the factory to the environment within a period of two months. If the court order fails to be executed, the respondents are liable to punishment in accordance with Section 100, Sub-section 02 of the Code of Criminal Procedure, No. 15 of 1979. (Verdict of the Case 1999).

Legal and Regulatory Framework:

At the United Nations General Assembly, held in December, 2015 it was accepted that a set of 17 Sustainable Development Goals (SDG) to succeed the Millennium Development Goals. As Multinational Companies are majour actors in

the global economy, it has emphasized that engaging with SGDs is crucial to ensure the long term sustainability in host countries. (United Nations 2023)

In Sri Lanka, there are comprehensive environmental legislations, which are however weak in implementation. National Environmental (Protection & Quality) Act No. 47, which was law in 1980 and gives a basis or a legal framework that governs the environment in Sri Lanka.

The main provision, which is Section 23, is a strict prohibition to any person, establishment or enterprise to discharge, deposit or emit wastes that contain potential pollutants into inland water, the sea, the atmosphere or onto land unless a valid license is issued against it by the Central Environmental Authority (CEA, Government of Sri Lanka, 1980). Further, the original 1980 National Environmental Act was amended by promulgation of the National Environmental (Amendment) Act No. 56 of 1988 with the objective of reinforcing the former statute by stipulating tougher effluent-discharge standards and enhancing enforcement.

According to the 2023 technical guidelines of the CEA, the sugar processing industries like Pelwatte Sugar Company are required to follow a set of clearly laid down effluent and emission limits to safeguard the aquatic and downstream air quality. The effluent into the receiving waters should have a maximum biochemical oxygen demand (BOD 5) and total suspended matters (TSS) of 100 mg/L and 150 mg/L, respectively, which are also adjusted to avoid oxygen depletion and solids settling in waters (Central Environmental Authority 2023). The local authorities are entitled to inspect, monitor and issue the permits according to the provision of National Environmental Act.

Discussion and Recommendations:

According to the requests of the petitioners of the case number 59779/95, they have not mentioned any laboratory report or scientific measures on the environmental pollution. By conducting a field visit at the factory premises and the affected villages the district magistrate has issued court order according to the facts based on the inspection without any laboratory test of chemicals or effluents. Pelwata Sugar Company, as the respondent, has agreed to take necessary actions to stop environment pollution. Citizen-based monitoring of local communities has the capacity to complement the formal initiatives when they occur, and the ability to promote environmental stewardship. Projects involving community- based water quality monitoring (in places as diverse as the Yukon River Basin and the river Meki in Ethiopia) have demonstrated that data can be collected competently by trained volunteers and to standards of data quality as those collected by professionals. The formation of the “river guardian” community around the Kirindi Oya with straightforward protocols and occasional training would get the people at the grass

roots to generate evidence of any impending pollution activity so as to warn the regulators.

It is imperative to compel increased use of pollution-control technologies, to avoid such releases in the future. The Pelwatte Sugar Company and other similar plants must be compelled to implement zero-liquid discharge (ZLD) systems--where all of the process water is recycled and untreated wastewater releases are absent--as already shown by Indian sugar mills attaining a status of no discharge by reusing the effluents in an integrated manner and through valorization of the by-products.

Simultaneously, any emission of any boiler should be filtered through high-efficiency bag-house or wet-scrubber filtration up to and beyond the 150 mg/Nm 3 particulate standard established by the CEA, guaranteeing the regulation and community healthy safety.

Lastly, a statutory polluter pays fund ought to be created to internalize the cost of pollution and allocate funding to where it might be remediated to manage legacy pollution. Under this arrangement, each of the industries prescribed would pay an annual levy relative to their patterns of emission, the money to be used in restoring ecosystems and in health related community programmes. Also it is crucial to implement a proper feasibility study before establishing large scale agro industries in environmentally sensitive countries like Sri Lanka. Local authorities as well as the community based organisations must be empowered in the country to be vigilant on the protection of the environment. Freedom of government institutions or officers must be ensured to take necessary legal actions against such illegal acts.

Keywords: *Pollution, enforcement, Equipment, landmark, Community. Valorization, Guardian*

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Pressured to Perform: Institutional Pressures and Organizational Responses in Non-State Higher Education Institutes in Sri Lanka

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Abstract

Due to restricted admissions capacity of state universities, non-state higher education institutions (NSHEIs) have grown in significance in Sri Lanka. Although these institutions have given students new options, they function in a context where meeting several, occasionally contradictory institutional expectations is crucial to their survival and expansion. This study examines how these pressures influence organizational procedures and how NSHEIs manage the difficulties they face. This qualitative study applied the multiple case approach and data collection methods are review of institutional records, interviews with academics and administrators. The analysis is conducted based on institutional logics, which identifies three primary forms of pressure. Regulations and accreditation procedures create coercive pressures by forcing organizations to adhere to externally specified norms. Expectations about the goal and caliber of higher education from professional associations, and society at large give rise to normative pressures. NSHEIs are encouraged by imitation pressures to model themselves after reputable local and foreign universities in an effort to strengthen their market position and legitimacy. Governance and strategy are directly impacted by these pressures, especially when it comes to the design of performance measuring systems that prioritize competitiveness and compliance. Results indicated that NSHEIs react differently to outside pressures. Rather, they use a combination of symbolic behaviors, adaptability, and compliance to satisfy various stakeholders while retaining some degree of autonomy. Nevertheless, these reactions also result in hybrid governance structures where market, academic, and state logics contradictorily coexist. The study contributes to the current debates on higher education governance by illustrating how institutional pressures interact in a Global South context.It also emphasizes the requirement of well-balanced policy frameworks that acknowledge the significance of institutional flexibility as well as accountability requirements.

Keywords: *Institutional pressures, Non-state higher education, Institutional logics, organizational responses, Sri Lanka*

Introduction to the study

Higher education in Sri Lanka is undergoing a significant transformation, shaped by rapid expansion in enrolments, limited state capacity, and rising aspirations

for globally recognised qualifications. Traditionally dominated by the state, the system has increasingly incorporated Non-State Higher Education Institutes (NSHEIs), which now play a vital role in providing access and diversity of programmes. These institutions include private universities, franchised branch campuses of foreign affiliated universities and degree-awarding institutes recognised by the University Grants Commission (UGC). While NSHEIs have expanded opportunities for students, they operate in a highly pressured and insistence institutional environment. They must simultaneously navigate coercive regulations from state authorities, normative expectations from professional and societal actors, and mimetic pressures to imitate successful higher education models globally. This confluence of pressures positions NSHEIs as organizations in search of legitimacy, compelled to design strategies, governance mechanisms, and performance systems that satisfy diverse stakeholders.

Problem statement

Since the NSHEIs have to become more profit driven as private HEIs, academics in HEIs have gradually grown accustomed to performance measurement systems (Ter Bogt and Scapens, 2012). According to recent research (Grossi et al. 2020), HEIs and academics are further influenced by a variety of institutional pressures, including market pressures, state laws and regulations, and the requirement to follow academic standards. Consequently, the NSHEIs are impacted by market forces from their international collaboration partners as well as government laws and regulations.

Accordingly, it showed that the various institutional forces have affected NSHEIs. NSHEIs must be able to withstand institutional pressure and perform successfully on both an individual and organizational level. As a result, institutions are shifting their emphasis from traditional performance evaluation to performance indicators and quantitative performance measurements. It is observed that when implementing performance measurements, institutional constraints were not given enough thought. As a result, studying in the same field is important because it influences the academics. It also showed that the institutional pressures in higher education have not received much attention (Grossi et al., 2020). Hence against this background, it indicated NSHEIs as higher education providers face these internal or external pressures where this could effect on performance measurement. However it indicated that there is lack of previous research on this area. Hence this research intends to address this research gap. . Therefore research questions of the study are as follows.

Research questions

1. What are the key institutional pressures faced by NSHEIs in Sri Lanka?

2. How do these pressures influence governance, performance measurement, and strategic practices?
3. How do NSHEIs respond to and negotiate multiple, and at times conflicting, pressures?

This research contributes to larger discussions on higher education governance, hybridity, and performance measurement by examining the dynamics of institutional forces in the NSHEIs via the prism of institutional theory (DiMaggio and Powell, 1983; Scott, 2014).

Methods and Methodology

A qualitative multiple case study design is employed in this study, which involves two NSHEIs in Sri Lanka. A purposeful selection process was used to choose two institutions and with a strong market orientation and Transnational education partners,with academic foundations but nonetheless operating under private ownership.

Data gathered from Academic staff, administrators, and senior leaders participated in 20 semi-structured interviews. Organizational documents analysed namely performance evaluation formats, accreditation submissions, quality assurance reports, and strategic plans. Notes from workshops and institutional meetings served as additional sources of information.

Research findings and discussions

The data was interpreted and coded using an inductive thematic method. Prior to analysing the themes for organisational response patterns, they were first categorised under coercive, normative, and mimetic pressures. Validity was increased by triangulating data from observations, documents, and interviews. Pressures in the NSHEIs can be identified as follows:

Coercive Pressures

Coercive pressures in NSHEIS can be identified as state control and accreditation. Both institutions face rigorous coercive pressures from the UGC, Ministry of Education, Tertiary Vocational and Education Commission, and related regulatory authorities. Requirements such as minimum staff-student ratios, approved curricula, and infrastructure standards heavily shape organizational strategies. Leaders and academics described compliance as a must since the institutions have Ministry of Education accredited degree programmes , with one noting:

"Definitely the Ministry of Higher Education should come first because the institute itself is producing UGC approved or Ministry approved programs. So every five years they come to audit us"

Due to this coercive pressures, institutions prioritize regulatory acceptance over innovation and creativity, which results in risk neutral practices. Performance systems are also compliance driven, with a strong focus on proving that state mandated requirements are being followed.

Normative Pressures

Cultural Expectations and Professional Standards can be recognised as normative pressures. These normative pressures were equally strong, particularly from students, parents, and professional bodies. Parents, frequently financing their children's education, expect career driven programmes with strong English competency. Professional bodies namely Institute of Chartered Accountants, Chartered Institute of Logistic and Transportation, British Computer society, and Engineering Councils enforce discipline special standards, demand NSHEIs to align curricula consequently.

In response, NSHEIs introduce student support services, career development units, and discipline oriented course structures. Faculty performance measures also incorporate student satisfaction surveys, reflecting normative demands for service quality and individualized attention.

Mimetic Pressure

Symbolic arrangement and TNE partners as models are examples of mimetic pressures. The institutions that seem to be more successful may need to be imitated by these institutions. For instance, if the institutions conform to the requirements and principles of the Sri Lanka Association of Nonstate Higher Education Institutes (SLANSHEI), they may need to imitate other institutions that seem to be more successful. The case institutions need to adopt international curricula, pursuing international accreditation, adhere to transnational education (TNE) agreements and measurement and evaluation standards and forming further collaborations with overseas universities.

One academic explained:

"We need to go to the international standard, if we are going to perform up to internal standard, to produce better teachers, better students in their learning environment"

Nevertheless, imitation also created tensity. TNE partners practices were not always allied with needs of the case institutions, leading to resource burden and challenges in contextual adaptability.

Organizational Responses: Negotiation and Hybridity

NSHEIs did not respond passively to pressures. Instead, they engaged in selective compliance and adaptation. Symbolic adoption of certain measures, for example publishing graduate employability rates for marketing while understate internal issues. Further balancing governance structures, with adhering to MOE /UGC standards. Faculty boards and academic councils make quality decisions but boards of management prioritizing market practicability.

Hybrid performance measurement systems incorporating regulatory compliance indicators, market-driven metrics (student recruitment, branding), and academic quality measures (publications, teaching evaluations). As case institutions purposely manage restraint rather than completely complying, this selective approach can be identified as a reflection of a larger process of hybridization.

Discussion

The results emphasized how NSHEIs in Sri Lanka are shaped by institutional pressures while simultaneously demonstrating their autonomy in reacting to coercive, mimetic and normative pressures. Coercive pressures ascertain endurance and legitimacy through conformity, but risk confining innovation. Meantime normative pressures strengthen societal and professional requirements, pushing case institutions toward service quality and employability. Further mimetic pressures encourage global alignment but also raise questions about contextual fit. Together, these pressures produce institutional complexity, compelling NSHEIs to balance conflicting logics. The study supports prior literature on hybridity (Battilana and Lee, 2014) by showing that hybridity is not a static structure but a dynamic process of negotiation.

Performance measurement systems appeared as critical situation where pressures are enacted. Rather than being purely method, performance measurement systems in NSHEIs are reflecting compromises between state, market, and academic stakeholders (Modell, 2021). This underscores the symbolic role of measurement in sustaining legitimacy.

Conclusion and Implications

This study concluded that NSHEIs in Sri Lanka are shaped by a convergence of coercive, normative, and mimetic pressures. These pressures influence governance, strategy, and performance systems, compelling institutions to operate as hybrid organisations balancing multiple logics. As theoretical contribution study extends institutional theory to the Global South, demonstrating how local cultural and political contexts intersect with global higher education trends. Further study emphasised performance measurement as an area where institutional pressures are visibly negotiated. Practical implications are that regulators should recognise that

undue coercive pressures may suppress innovation and adaptability. NSHEIs should design incorporated performance systems that balance compliance, market responsiveness, and academic standards. Officials should consider encouraging frameworks that enhance legitimacy while enabling institutional diverseness.

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Management Controls in the Space of Industry 4.0: A Case of a Sri Lankan Non-State Higher Education Institution

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Abstract

The contemporary world witnesses an ideological shift in how societies and thereby organizations operate in the context of Industry 4.0 (I4.0). I4.0 appears as an exponential application of advanced technologies such as Artificial Intelligence, the Internet of Things (IoT), Cyber-Physical Systems, and Real-time Analytics. These technologies appear at varying degrees across organizations, and this adoption may influence internal organizational practices, particularly Management Controls (MC). This paper investigates two research questions. First, what are the I4.0 conditions that appear in an organisation? Second, how does this appearance of I4.0 influence MC practices? Drawing on the seven design principles of I4.0, this paper assesses the appearance of I4.0. Then the study employs Anthony & Govindarajan's (2007) elements of the MC model on how such I4.0 practices influence MC. As organizations become more advanced in I4.0, rigid top-down controls seem to be replaced by flexible, decentralized, and data-based practices of control. I4.0 principles seem to contribute uniquely to the reconfiguration of MCs, demanding organizations to rethink how strategy, operations, and accountability mechanisms are aligned. The paper offers a conceptual model for assessing I4.0 appearance in relation to control practices and presents implications for practitioners in redesigning MCs for I4.0 readiness.

Keywords: *Industry 4.0, Management Control, Non-State Higher Education Institution in Sri Lanka, Industry 4.0 Design Principles*

Introduction

Organizations today are undergoing transformative change driven by the disruptive innovation and advancement of digital technologies. This appears to redefine how work is coordinated and controlled. This phenomenon is identified as Industry 4.0 (I4.0) or the Fourth Industrial Revolution (Schwab, 2016). I4.0 seems to promote intelligent and autonomous decision-making by integrating advanced technologies such as Big Data Analytics, Cloud computing, Agentic AI, and Real-time technologies (Liao et al., 2017; Xu et al., 2018). Such novel practices seem to challenge traditional behaviors of centralized authority and periodic reporting. This

appears to replace those practices with real-time, system-wide data flows that demand new approaches to management control (MC).

Problem Statement

I4.0 is identified to enhance organizational agility and performance. Yet, its implications for MC practices seem to remain under-theorized. Classic MC frameworks, such as Anthony and Govindarajan's (2007) four-element model of detectors, assessors, effectors, and communicators, were developed for hierarchical, analog contexts. In digitally enabled environments, detectors gather continuous sensor data, assessors rely on predictive analytics, effectors operate through distributed decision rights, and communicators span interactive platforms. Yet, empirical research that links I4.0 to these control elements is scarce. This study addresses the gap by investigating how I4.0 shapes MC in a Sri Lankan non-state higher-education institution.

Literature Review

From Mechanization to Digital Intelligence

Unlike earlier industrial eras that emphasized mechanization or electrification, I4.0 integrates physical and digital realms to create intelligent, adaptive operations (Moeuf et al., 2018). Beyond automation, the distinguishing feature of I4.0 is its real-time connectivity and autonomy, enabling organizations to predict, simulate, and respond dynamically.

Industry 4.0 Design Principles

There are design principles that capture the logic of I4.0. Namely, interoperability, virtualisation, decentralisation, real-time capability, modularity, service orientation, and information transparency (Hermann et al., 2016; Hall et al., 2022). Each principle appears to disrupt control in unique ways. Interoperability dissolves data silos, creating networked control systems (Audenaert et al., 2019). Virtualisation introduces predictive digital twins, shifting control from retrospective to anticipatory (Kamble et al., 2020) practices. Decentralisation delegates decision rights to autonomous subsystems (Tortorella & Fettermann, 2018). Real-time capability demands simultaneous detection, assessment, and action (Liu & Zhong, 2017). Modularity enables flexible, reconfigurable processes (Lu, 2017). Service orientation integrates customer feedback into control loops (Raimo et al., 2021). Information transparency democratizes data access while raising surveillance concerns (Hall et al., 2022). These principles challenge the notion of control as a fixed hierarchy, instead positioning it as a dynamic socio-technical practice.

Limitations of Traditional Control Models

Anthony & Govindarajan's (2007) framework conceptualizes control through detectors, assessors, effectors, and communicators. While appearing to be foundational, it assumes periodic reporting and top-down authority conditions at odds with I4.0's continuous data streams and distributed decision-making (Bertello et al., 2022). Scholars argue for extending this model to capture digitally mediated control (Kraus et al., 2022), where trust, culture, and real-time analytics coexist with formal mechanisms.

Methods and Methodology

This interpretive single-case study explored a non-state higher education institution in Sri Lanka that is actively pursuing digital transformation. The case approach is well-suited to investigating context-rich, contemporary phenomena where boundaries between technology and management practice blur (Yin, 2023).

Data collection involved 21 semi-structured interviews with senior, elite, and functional managers (30–120 minutes each), complemented by observations and institutional documents. Interviews probed perceptions of digital tools and evolving control practices.

Data analysis followed Braun & Clarke's (2006) thematic analysis procedure. Codes were iteratively mapped to the seven I4.0 principles and the four MC elements (Anthony & Govindarajan, 2007), enabling systematic identification of how digital maturity reconfigures control functions. Credibility was enhanced through member-checking, reflexive journaling, and a detailed audit trail.

Results and Discussion

Operationalization of I4.0 Principles

All seven Industry 4.0 principles are actively embedded in daily operations. Interoperability connects EMIS, SAP, Bitrix, and OneDrive, enabling seamless cross-functional data flows; virtualisation supports digital classrooms and online examinations; decentralisation equips frontline staff with decision rights via real-time dashboards; real-time capability accelerates academic and administrative responses; modularity allows rapid program reconfiguration; service orientation ties offerings to continuous student feedback; and information transparency builds trust, though it can produce information overload.

These shifts reconfigure management control. Detectors move from periodic reports to continuous, automated sensing. Assessors add predictive and QA analytics, with integrity concerns persisting in virtual settings. Effectors become distributed as managers and faculty act autonomously on live data. Communicators enable constant dialogue (e.g., 3CX, Bitrix), yet strategic visioning lags operational messaging.

Critically, I4.0 is socio-technical. Managers often practice their principles implicitly; resistance arises when tools feel like surveillance. Transparency and decentralisation must be paired—transparency alone risks micromanagement; decentralisation alone risks fragmentation. New digital competencies, resilience, and trust (in data, peers, and algorithms) are essential. Clear values, transparent performance criteria, and deliberate communication mitigate ethical tensions and sustain engagement. Without parallel investment in culture and human interaction, digital controls underperform, eroding the promised efficiency gains.

Theoretical Implications

Findings demonstrate a shift from command-based control to digitally distributed control, supporting arguments that MC should be viewed as a dynamic capability (Quattrone, 2016). Virtualisation and modularity illustrate how predictive and flexible infrastructures create new loci of control, while human factors such as trust, cultural alignment, and communication, remain critical to effectiveness (Burns & Scapens, 2000).

Conclusion

This study shows that I4.0 adoption is not mere technological modernization but a fundamental reconfiguration of MC. The seven design principles reshape detectors, assessors, effectors, and communicators into an integrated, real-time, and participatory control architecture. Effective digital control depends as much on human-centered design and relational trust as on technical capability.

Building on analytic rather than statistical generalisation (Yin, 2023), this case refines propositions transferable to other contexts. Wherever digital connectivity and data granularity rise, the I4.0 detector-assessor-effector logic should replace hierarchical variance analysis. Although drawn from one Sri Lankan HEI, these insights invite replication in other universities to test robustness (Ridder, 2017). Therefore, they offer a roadmap for academic managers seeking responsible, data-centric control that balances efficiency with academic values.

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