COMPILATION OF RESEARCHES

#WeCAN International Research Colloquium 2024

Let's Get Digital: Embracing Technology and Digitalization in Realizing the SDGs Through Social Entrepreneurship

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About De La Salle University

De La Salle University (DLSU) is a catholic co-educational institution founded in 1911 by the Brothers of Christian Schools. The University is a hub for higher education training renowned for its academic excellence, prolific and relevant research, and involved community service. Nestled in the heart of Manila, DLSU is home to local and international students seeking quality education for a brighter future. It is situated in a vibrant city where culture and diversity are well manifested. It is worth noting that DLSU is the first university in the Philippines to localize the United Nations Sustainable Development Goals (UNSDG) through its social engagement programs.

About Lasallian Social Enterprise for Economic Development Center

The Lasallian Social Enterprise for Economic Development (LSEED) Center is the flagship unit of DLSU in areas of social entrepreneurship and social innovation. It localizes the UNSDGs by working with students and marginalized communities in creating social enterprises.

At present, the LSEED Center implements various programs in areas of student formation and social enterprise development, curricular and co-curricular integration, research, internship and volunteerism, advocacy, internationalization, and incubation and acceleration.

In 2019, DLSU, through the LSEED Center, was named first runner-up for “Academic Leadership in Social Innovation” in Asia-Pacific by ASSIST, ADB, and AsianNGO. In 2023 and 2024, the ACEEU named the Center first runner-up for “SDG Initiative of the Year” in Asia Pacific. It was also declared “People’s Choice” by ACEEU in 2023 and received a “Merit Award - Community Outreach” in Asia during the eLearning Forum Asia 2024.

About Social Development Research Center

The Social Development Research Center (SDRC) is a leading center for social science research in the Philippines. It aspires to become the leading social development research center in Southeast Asia for the attainment of humane, inclusive, just, and sustainable communities through the production of transformative knowledge and social policy advocacy. The Center is committed to the highest standards of research and training in furtherance of the DLSU’s mission to advance learning and knowledge use.

About #WeCAN International Research Colloquium

The Sustainable Development Goals (SDG)—adopted by the United Nations as a development platform—emphasizes inclusive and sustainable development. It encourages stakeholders and social development institutions to initiate and develop programs that will address poverty and the lack of opportunities for the poor. The call is to recognize and maximize existing capacities, innovate, and develop strategies in the context of partnerships and collaboration. In the long run, this will help generate concrete plans of action on priority areas of development. The need to establish and promote relevant and proven approaches and strategies is made more urgent with recent statistics and narratives on poverty, especially those induced by climate change, often impacting the sector that is least able to cope with the consequences.

The #WeCAN International Research Colloquium 2024—with the theme "Let's Get Digital: Embracing Technology and Digitalization in Realizing the SDGs Through Social Entrepreneurship"—brought together students, faculty, and development professionals and practitioners to a one-day online research colloquium to popularize and learn from various practices in integrating technology and going digital to achieve inclusive growth, environmental sustainability, and inclusive education. These were further linked with the realization of the SDGs. The colloquium took place online—via Zoom—on September 20, 2024 with over 300 participants joining from all over the Philippines. Nine (9) impact-driven research papers[1] were featured. Most of which focused on the integration and use of technology in effecting meaningful teaching-learning experiences. Others highlighted the use of technology and going digital to measure, achieve, or promote economic growth and environmentally sustainable lifestyle.

In 2023, the same online colloquium was held by the LSEED Center. It showcased various impact-driven research on inclusive growth, inclusive education, and environmental sustainability. In 2019, DLSU, through COSCA-LSEED, successfully implemented the #WeCAN International Boot Camp, which brought together various universities from ASEAN member countries as well as those from Japan, China, and South Korea to a 10-day Boot Camp on social entrepreneurship. One component of the boot camp is a research colloquium, which showcased research on SDGs of students, faculty, and development professionals and practitioners.

[1] Only six (6) research papers presented during the #WeCAN International Research Colloquium 2024 were included in this compilation following the intent/request of some authors to not publish.

Compilation of Research based on SDG Themes

Environmental Sustainability

Demographic and guest profile vis-a-vis hotel green practices awareness and visit intention by Dale Anthony Nonato, Cristine Joy Lejarde, Fritz John David, Redick Patawaran, Cjay Sicat, and Denzel Yumang

Relationship between consumers' demographic profile, diner profile, perceived value, and practices on food waste management in buffet restaurants by Leonelle Llaneta, Paula De Guzman, Brix Aslee Barquin, John Emmanuelle Louise Bengco, Edison Bernardo, Nicale Shoko, and Aldriyan Sotto

Inclusive Education

Boosting Grade 7 engagement: Transforming computer lessons with augmented reality by Nathaniel Dave Gatchalian, Johnson Modesto Blanco, and Regie Boy Fabro

KaraOKAY: A research-based reading innovation in English by Ryan Tura

Financial capability and financial happiness among Bachelor of Science in Business Administration Major in Financial Management students by Ralph Glennard Joves, Natsuko Jayne Kousaka, Nica Ella Labria, Jennie Vieb Lafuente, Jossua Paul Josse Libanon, and Josie Fuentes

The state of digital transformation and Industry 5.0 readiness in Mindanao State University - Marawi Campus by Madelle Conales

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Research Papers on Environmental Sustainability

We, humans, are witness to how development is taking so much toll on the environment. In fact, we are among the reasons behind its continued degradation. Our unsustainable activities - whether big or small - significantly affect its regenerative capacity. This results in limited enjoyment of services derived from the environment. Yet, it is not too late for a change of lifestyle.

In this compilation, two (2) research papers explored students' preferences for environmentally friendly services like booking hotels and dining at buffet restaurants. Both research papers showed how cognizant students are of the principle of sustainability.

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Demographic and guest profile vis-a-vis hotel green practices awareness and visit intention

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ABSTRACT

This descriptive-correlational study was conducted to explore the respondents' hotel green practices awareness and visit intention with their demographic and guest profile. The study involved 385 respondents comprising 232 females and 153 males ranging from 21 to 27 years old, mostly single, with a monthly family income of P9,520.00 and below, college students, residing in Angeles City, mostly travel for leisure with companions, prefer online travel agencies, spent overnight in hotels, and travel once a year. This research study used purposive sampling and snowball sampling techniques. The researchers used descriptive and inferential statistics to interpret the data collected. The researchers used frequency and percentage distributions in the treatment and presentation of the demographic and guest profiles of the respondents. The frequency, percentage distribution, and mean were used in describing the respondents' hotel green practices and visit intention. For inferential statistics, the Pearson Chi-square test of association was utilized to measure the strength between the variables. On the other hand, the Spearman rho correlation was utilized to examine the significant relationship between respondents' level of awareness, perceived level of hotels' green practices, and visit intention. Results from the study reveal that the respondents are very aware of hotels' green practices. The respondents highly practiced energy management, waste management, and water conservation and are very likely to stay in green hotels. Results further reveal that there is a correlation between respondents' hotel green practices awareness and visit intention with their demographic and guest profile. The study's findings have implications for promoting and implementing sustainable practices in hotels.

Keywords: green practices, sustainability, sustainable development, sustainable development goals, and visit intention

INTRODUCTION

Sustainability is essential in all areas of life, including daily human needs and activities, where eco-friendly practices are vital for hotel services and facilities to promote a more sustainable environment (Adegbola & Arowosafe, 2022). It is a key objective across many sectors, especially in hospitality, where it plays a significant role in industry growth. The global climate crisis has led to increasing challenges, prompting hotels to adopt more sustainable operations due to rising demand from media, government, and consumers (Shen, Qian, & Chen, 2020). Furthermore, hotel operations

contribute significantly to carbon emissions, which remain impactful in the post-COVID-19 era as tourism and accommodation demands rebound (Filimonau, Matute, Mika, Kubal-Czerwinska, Krzesiwo, & Pawłowska-Legwand, 2022). The hospitality sector faces stiff competition, with customers increasingly seeking services that go beyond basic offerings. While limited research has specifically examined how sustainable features influence guest satisfaction, extensive studies have analyzed the relationship between service quality and customer contentment (Moise, Gil-Saura, & Molina, 2021). The United Nations World Commission on Environment and Development defines sustainability as development that meets current needs without compromising the ability of future generations to fulfill their own (UCLA Sustainability, 2024). This concept requires balancing economic, environmental, and social factors while considering both short-term and long-term impacts (Muñoz-Torres, Fernandez-Izquierdo, Rivera-Lirio, Ferrero-Ferrero, Escrig-Olmedo, Gisbert-Navarro, & Marullo, 2018). Tourism is a rapidly growing industry that significantly contributes to foreign exchange and employment while being closely tied to the social, economic, and environmental well-being of many nations, particularly in developing countries. The United Nations World Tourism Organization (UNWTO) describes sustainable tourism as tourism that considers its present and future economic, social, and environmental impacts, addressing the needs of all stakeholders, including tourists, businesses, the environment, and local communities (United Nations, n.d.). The tourism and hospitality industry is deeply dependent on ecosystems, which are

highly sensitive and require careful management (Kassim, 2023).

The UN Sustainable Development Goals (SDGs) include 17 objectives designed to foster a more prosperous, sustainable, and equitable world by 2030. Tourism plays a vital role in achieving these goals due to its extensive impact across various sectors. Few industries can simultaneously influence supply chains, preserve cultural heritage, create jobs, and promote sustainable community development (Prievo, 2022). In the Philippines, managing plastic waste has been a long-standing issue. A World Bank report estimates that the country produces about 2.7 million tons of plastic annually, with roughly 20% ending up in the ocean. Research by Madanaguli, Dhir, Joseph, Albishri, and Srivasta (2023) shows that the tourism industry accounts for 14% of global waste. At the current consumption rate, energy use is projected to rise by 154%, greenhouse gas emissions by 131%, and water use by 152% by 2050. A recent Social Weather Stations (SWS) survey found that most Filipinos believe climate change poses risks to their physical and mental health and feel equipped to address these challenges (De Vera-Ruiz, 2024). As consumers become more environmentally conscious, they expect businesses to adopt eco-friendly practices. The hospitality sector, particularly hotels, uses significant resources, including water and energy, and generates substantial waste. Modern travelers often choose accommodations based on the range of experiences and amenities offered, rather than just basic services. Hotels, as one of the highest resource-consuming sectors in tourism, face pressure to adopt sustainable practices (Pereira, Silva, & Dias, 2021). Pan, Teng, Wu, and Wen

(2022) highlight that global environmental issues, including ozone depletion and rising pollution, have prompted organizations to prioritize sustainability. Today's guests are increasingly aware of these concerns and demand "green" practices from hotel operators.

One aspect of sustainability is reflected in the food industry. Lin, Roig, and Molina (2021) note that diverse and innovative cuisines are entering local markets, potentially displacing traditional dishes. If this trend continues, the essence and sustainability of local culinary culture may be at risk. As part of the broader tourism sector, hotels have a significant environmental impact. The concept of green hotels involves various sustainable practices such as efficient use of energy, water, and natural resources; natural lighting and ventilation; recyclable-based furnishings; and educating guests on environmental issues (Fauzi, Hanafiah, & Kunjuraman, 2022). The hospitality industry is increasingly embracing these eco-friendly initiatives to remain competitive, enhance service quality, and address environmental concerns. Lower-tier hotel chains are also adapting by following the lead of industry giants and integrating green practices into their operations. In a related study, Ashok, Behera, Tewari, and Jana (2022) highlight the significant environmental impact of the hotel industry, emphasizing its connection to international tourism, which generated USD 856 billion in 2007. They note that eco-friendly environments promote relaxation and foster a harmonious relationship between humans and nature, contributing to both well-being and environmental conservation. As societal and regulatory pressures increase, hotels worldwide are implementing green initiatives and

familiarizing themselves with sustainable practices (Eid et al., 2020). The push for sustainability in hospitality is gaining momentum, driven by innovation and the sector's rapid growth. Various studies have explored the challenges and benefits of adopting sustainable practices. For example, Kapera (2018) examined the implementation of sustainable development standards in Polish hotels, while Han, Lee, Trang, and Kim (2018) investigated how guests' perceptions of water conservation and waste reduction influence their engagement with green practices and loyalty intentions. Investments in addressing environmental concerns have become a priority for hotels, as meeting societal demands can improve brand image and marketing outcomes (Mirando & Dassanayake, 2020). Research also shows that guests experience greater satisfaction in green hotels, particularly when eco-friendly initiatives prioritize public benefit over profit motives (Zareh, Nassar, Barakat, & Ramzy, 2023). The tourism industry's significant contributions to national economies underscore the need for sustainable practices to mitigate environmental impacts and ensure long-term success (Ferreira, 2019). Clean production and accessible innovation in the manufacturing sector pave the way for sustainable manufacturing (Javaid, Haleem, Singh, Suman, & Rab, 2021). In the hospitality industry, a growing interest in sustainable development principles, driven by media, government, and consumer pressures, has led many hotels to adopt eco-friendly practices (Kapera, 2018). These green initiatives are seen not only as ethical but also as strategic, helping to reduce costs, enhance brand image, and promote Corporate Social Responsibility (CSR). Hotels recognize that eco-management

contributes to investment returns, customer retention, and a positive reputation. However, developing sustainability strategies remains complex due to limited research on CSR implementation. Sustainable practices allow businesses to innovate, rethink their models, and establish new habits (Pereira et al., 2021).

Consequently, hotels have begun implementing progressive strategies to reduce environmental impact and address customer concerns (Abdou, Hassan, & El Dief, 2020). Studies show that green hotel practices minimize costs, boost earnings, and improve guest satisfaction and loyalty, while promoting environmental conservation. Despite this, research on how green hotel practices contribute to sustainable development goals, especially in developing countries, is still limited (Buunk & van der Werf, 2019). Green practices include recycling, using renewable energy sources, creating plastic-free zones, and implementing water-saving measures like low-flow fixtures and greywater reuse (Mehta & Karia, 2020; Han et al., 2018). These eco-friendly actions enhance operational efficiency and promote rational resource use, ultimately motivating hoteliers to adopt sustainability programs (Moise et al., 2021).

In the post-COVID-19 era, responsible tourism is more important than ever, aiming to reduce the negative impacts of travel on resources and communities. Although responsible tourism has gained attention, inconsistencies between tourists' attitudes and behaviors remain (Hu & Sung, 2022). Hotels and resorts now play a vital role in reducing the ecological footprint, with eco-conscious travelers seeking sustainable destinations. This shift reflects a consumer desire to minimize environmental pollution for future

generations (Işık et al., 2019). However, green hotels face challenges such as higher costs and competition with traditional hotels, which can deter budget-conscious travelers despite the demand for sustainable lodging (Han, Chua, & Hyun, 2020).

The general objective of this study is to examine respondents' awareness of green practices and their intention to visit green hotels, considering demographic and guest profiles. The findings aim to support the hospitality and tourism industry in developing green practices that address environmental concerns and align with sustainability goals.

This study aimed to explore respondents' green practices awareness and visit intention in relation to their demographic and guest profiles.

Specifically, the study aimed to answer the following questions:

1. How may the profile of the respondents be described in terms of (a) demographic profiles (e.g., age, sex, civil/marital status, family monthly income, highest educational attainment, profession, and residence) and (2) guest profiles (e.g., type of traveler, purpose of stay, booking preferences, frequency of visit, and length of stay)?
2. How may the respondents' level of awareness of hotels' green practices be described in terms of (a) energy management, (b) waste management, and (c) water conservation?
3. How may the respondents' perceived level of hotels' green practices be described in terms of (a) energy management, (b) waste management, and (c) water conservation?

4. How may the visit intention of the respondents on hotels be described?
5. Is there a significant relationship between respondents' profiles and level of awareness of hotels' green practices?
6. Is there a significant relationship between respondents' profiles and the perceived level of hotels' green practices?
7. Is there a significant relationship between respondents' profiles and visit intention?
8. Is there a significant relationship between respondents' level of awareness and practices of green hotels?
9. Is there a significant relationship between respondents' level of awareness of hotels' green practices and visit intention?
10. Is there a significant relationship between respondents' perceived level of hotels' green practices and visit intention?
11. What are the implications of findings in the tourism and hospitality industry?

METHODOLOGY

This study is quantitative and utilized a descriptive-correlational research design to determine the relationship between demographic profile, guest profile, green practices awareness, and visit intention. The Raosoft sample size calculator was used in the study to assess the extent to which a sample represents the population and ensure that the study produces sound information. In this study, purposive and snowball sampling techniques were utilized. Respondents who are 18 years old and above, residing in Pampanga, and have prior experience staying in any type of hotel are considered qualified respondents.

The researchers used a survey questionnaire to gather pertinent data from the respondents using Google Forms. The researchers conducted a pilot test on thirty (30) respondents to test the accuracy of the questionnaire before the actual data collection. Pilot study respondents were excluded from the final survey to prevent biases. The instrument used to measure the respondents' hotel green practices awareness yielded a Cronbach's alpha of 0.936. The other instrument used to measure respondents' hotel green practices yielded a Cronbach's alpha of 0.936. Further, the instrument used to measure respondents' visit intention in green hotels yielded a Cronbach's alpha of 0.883. The instrument used by the researchers yielded higher than the acceptable value of .70 which indicates that the instrument was highly reliable.

The survey questionnaire is divided into four parts: demographic profile, guest profile, green practices awareness, and visit intention. The last part of the questionnaire is designed to describe respondents' visit intention in green hotels and it is adapted from the study by Fauzi et al. (2022).

A research ethics review was undertaken to ensure the ethical and responsible conduct of this study.

Statistical tools such as frequency (f), and percentage (%) distributions were used in the treatment and presentation of the demographic and travel profile of the respondents. The frequency (f), percentage (%) distributions, and mean (x) were used in describing the respondents' level of awareness of hotels' green practices, perceived level of hotels' green practices in terms of energy management, waste management, and water conservation, and visit intention.

For inferential statistics, the Pearson Chi-square test of association

was utilized to determine a significant relationship between respondents' profiles and level of awareness of the hotels' green practices; respondents' profiles and perceived level of hotels' green practices; and respondents' profiles and visit intention.

To test the significant relationship between respondents' level of awareness, perceived level of hotels' green practices, and visit intention, the Spearman rho correlation was utilized.

RESULTS AND DISCUSSION

The data, as indicated in Table 1, reveals that the majority of respondents (88.3%) are aged 21-27 years, with a sex profile of 60.3 percent females and 39.7 percent males. The majority of respondents are single (92.7%) and have a family monthly income of Php9,520 and below (24.2%). Most respondents have completed their education until college (61.8%) or senior high school (31.2%). The majority of respondents are students (64.4%), with a majority of them working in the private sector. Most respondents reside in Angeles City (57.9%), with a majority traveling with a companion (82.1%). The purpose of their stay was msotly for leisure (87.3%) or business purposes (12.7%). The majority of respondents use online travel agencies, with a frequency of staying at least once a year (48.1%) and a length of stay of 4 nights or more (9.6%).

Table 1. Respondents' demographic and guest profiles

Age		Frequency	Percentage
18-27 years old		340	88.3
28-44 years old		37	9.6
45-59 years old		5	1.3
60-78 years old		3	0.8
	Total	385	100
Sex		Frequency	Percentage
Male		153	39.7
Female		232	60.3
	Total	385	100
Civil/Marital status		Frequency	Percentage
Single		357	92.7
Married		28	7.3
	Total	385	100
Family Monthly Income		Frequency	Percentage
P9,520.00 and below		93	24.2
P9,521 – P19,040.00		79	20.5
P19,041 – P38,080.00		82	21.3
P38,081.00 – P66,640.00		68	17.7
P66,641.00 to P114,240		38	9.9
P114,241.00 to P190,000.00		16	4.2
P190,001.00 and above		9	2.3
	Total	385	100
Highest Educational Attainment		Frequency	Percentage
Junior High School		1	0.3
Senior High School		120	31.2
College Degree		238	61.8
Masteral Degree		10	2.6
Doctoral		2	0.5
Others		14	3.6
	Total	385	100
Profession		Frequency	Percentage
Private		80	20.8
Public		21	5.5
Self-Employed		22	5.7
Student		248	64.4
Unemployed		14	3.6
	Total	385	100
Residence		Frequency	Percentage
Within Angeles City		223	57.9
Outside Angeles City		162	42.1
	Total	385	100

Table 1. Respondents' demographic and guest profiles (continuation)

Type of Traveler		Frequency	Percentage
Alone		69	17.9
With Companion		316	82.1
	Total	385	100
Purpose of Stay		Frequency	Percentage
Business		49	12.7
Leisure		336	87.3
	Total	385	100
Booking Preferences		Frequency	Percentage
Travel Agency (Physical)		123	31.9
Online Travel Agency		262	68.1
	Total	385	100
Frequency of Stay		Frequency	Percentage
Once a year		185	48.1
Twice a year		120	31.2
Thrice a year		38	9.9
More than 4 times		42	10.9
	Total	385	100
Length of Stay		Frequency	Percentage
Overnight		187	48.6
2 Nights		109	28.3
3 Nights		52	13.5
4 Nights or More		37	9.6
	Total	385	100

Table 2 shows respondents' awareness of hotels' green practices. They are aware of turning off lights, unplugging mobile devices, using less hot water, and taking stairs instead of elevators. They are also aware of waste management practices like waste segregation, using designated bins, and using refillable bottles. They are also aware of water conservation practices like turning off water while brushing teeth, soaping or shampooing, reusing towels and linen, and taking short showers to reduce water consumption.

Table 2. Respondents' level of awareness of hotels' green practices

Statements	1 (Not At All-Aware)	2 (Slightly Aware)	3 (Moderately Aware)	4 (Very Aware)	5 (Extremely Aware)	Mean	Description
1. Turning off the lights when leaving the room	5 (1.3)	24 (6.2)	50 (13.0)	104 (27.0)	202 (52.5)	4.23	Very Aware
2. Unplugging mobile devices (e.g. smartphones, tablets, laptop computers) once fully charged	4 (1.0)	21 (5.5)	42 (10.9)	101 (26.2)	217 (56.4)	4.31	Very Aware
3. Unplugging appliances when not in use	7 (1.8)	21 (5.5)	48 (12.5)	110 (28.6)	199 (51.7)	4.23	Very Aware
4. Using less hot water when not necessary	7 (1.8)	27 (7.0)	64 (16.6)	108 (28.1)	179 (46.5)	4.10	Very Aware
5. Choosing to take the stairs instead of the elevator when assigned to the lower floor of the hotel	25 (6.5)	52 (13.5)	109 (28.3)	92 (23.9)	107 (27.8)	3.53	Very Aware
Overall mean for Energy Management						4.12	Very Aware
1. Practicing waste segregation	4 (1.0)		72 (18.7)	129 (33.5)	151 (39.2)	4.02	Very Aware
2. Carrying my waste to the allocated bin provided by the hotel	7 (1.8)		50 (13.0)	130 (33.8)	182 (47.3)	4.21	Very Aware
3. Bringing refillable bottles instead of disposable	9 (2.3)	41 (10.6)	69 (17.9)	108 (28.1)	158 (41.0)	3.95	Very Aware
4. Ordering enough food to avoid leftover	4 (1.0)	26 (6.8)	53 (13.8)	123 (31.9)	179 (46.5)	4.16	Very Aware
5. Wrapping up leftover food	10 (2.6)	19 (4.9)	63 (16.4)	111 (28.8)	182 (47.3)	4.13	Very Aware
Overall mean for Waste Management						4.09	Very Aware
1. Turning off the water while brushing teeth	12 (3.1)	19 (4.9)	61 (15.8)	91 (23.6)	202 (52.5)	4.17	Very Aware
2. Turning off the water while soaping or shampooing	6 (1.6)	29 (7.5)	68 (17.7)	99 (25.7)	183 (47.5)	4.10	Very Aware
3. Reusing towels and linen	11 (2.9)	37 (9.6)	76 (19.7)	114 (29.6)	147 (38.2)	3.91	Very Aware
4. Taking short showers to reduce water consumption	27 (7.0)	53 (13.8)	97 (25.2)	87 (22.6)	121 (31.4)	3.58	Very Aware
Overall mean for Water Conservation						3.94	Very Aware

The respondents, whose responses are indicated in Table 3, highly practiced green practices in hotels, including energy management, waste management, and water conservation. They turned off lights when leaving a room, unplugging mobile devices, used less hot water,

and chose stairs instead of elevators. They also used designated bins and refillable bottles and ordered enough food to avoid leftovers. They also turned off water while brushing their teeth, soaping, shampooing, reusing towels, and taking short showers to reduce water consumption.

Table 3. Respondents' perceived level of hotels' green practices

Statements	1 (Not At All Practice)	2 (Slightly Practice)	3 (Moderately Practice)	4 (Highly Practice)	5 (Extremely Practice)	Mean	Description
1. Turning off the lights when leaving the room	4 (1.0)	17 (4.4)	39 (10.1)	95 (24.7)	230 (59.7)	4.38	Highly Practiced
2. Unplugging mobile devices (e.g. smartphones, tablets, laptop computers) once fully charged	3 (0.8)	12 (3.1)	47 (12.2)	100 (26.0)	223 (57.9)	4.37	Highly Practiced
3. Unplugging appliances when not in use	4 (1.0)	19 (4.9)	47 (12.2)	107 (27.8)	208 (54.0)	4.29	Highly Practiced
4. Using less hot water when not necessary	8 (2.1)	27 (7.0)	62 (16.1)	133 (34.5)	155 (40.3)	4.04	Highly Practiced
5. Choosing to take the stairs instead of the elevator when assigned to the lower floor of the hotel	17 (4.4)	51 (13.2)	80 (20.8)	94 (24.4)	143 (37.1)	3.77	Highly Practiced
Overall mean for Energy management						4.19	Highly Practiced
1. Practicing waste segregation	2 (0.5)	31 (8.1)	86 (22.3)	112 (29.1)	154 (40.0)	4.00	Highly Practiced
2. Carrying my waste to the allocated bin provided by the hotel	3 (0.8)	25 (6.5)	58 (15.1)	120 (31.2)	179 (46.5)	4.16	Highly Practiced
3. Bringing refillable bottles instead of disposable	4 (1.0)	37 (9.6)	83 (21.6)	108 (28.1)	153 (39.7)	3.96	Highly Practiced

(Cont. p. 38)

Table 3. Respondents' perceived level of hotels' green practices (continuation)

4. Ordering enough food to avoid leftover	4 (1.0)	23 (6.0)	65 (16.9)	121 (31.4)	172 (44.7)	4.13	Highly Practiced
5. Wrapping up leftover food	8 (2.1)	25 (6.5)	62 (16.1)	112 (29.1)	178 (46.2)	4.11	Highly Practiced
Overall mean for Waste Management						4.11	Highly Practiced
1. Turning off the water while brushing teeth	3 (0.8)	27 (7.0)	60 (15.6)	98 (25.5)	197 (51.2)	4.19	Highly Practiced
2. Turning off the water while soaping or shampooing	3 (0.8)	24 (6.2)	68 (17.7)	108 (28.1)	182 (47.3)	4.15	Highly Practiced
3. Reusing towels and linen	9 (2.3)	36 (9.4)	76 (19.7)	109 (28.3)	155 (40.3)	3.95	Highly Practiced
4. Taking short showers to reduce water consumption	22 (5.7)	53 (13.8)	81 (21.0)	84 (21.8)	145 (37.7)	3.72	Highly Practiced
Overall mean for Water conservation						4.08	Highly Practiced

Table 4 shows the respondents' visit intention towards green hotels, with a high likelihood of staying at a hotel with green practices, planning to stay at a hotel with green practices, and making an effort to stay at a green hotel.

The study found a weak positive correlation between respondents' profiles and their awareness of hotels' green practices. The results, as indicated in Table 5, showed a weak positive correlation between respondents' sex, highest educational attainment, type of traveler, purpose of stay, and awareness of hotels' green practices concerning energy management. However, age,

civil/marital status, family monthly income, profession, residence, booking preferences, frequency of visit, and length of stay did not correlate with energy management. The results also showed no significant relationship between respondents' awareness of hotels' green practices concerning waste management and demographic and travel profiles.

Table 4. Respondents' visit intention

Statements	1 (VU)	2 (U)	3 (L)	4 (VL)	Mean	Description
1. I am willing to stay at a hotel with green practices when traveling	1 (0.3)	2 (2.1)	93 (24.2)	283 (73.5)	3.70	Very Likely
2. I am planning to stay at a hotel with green practices when traveling	0	9 (2.3)	119 (30.9)	257 (66.8)	3.64	Very Likely
3. I will make an effort to stay at a hotel with green practices when traveling	0	13 (3.4)	118 (30.6)	254 (66.0)	3.62	Very Likely
Overall mean for Visit Intention					3.67	Very Likely

Table 5. Relationship between respondents' profile and level of awareness of hotels' green practices

Demographic Profile		Level of Awareness on Hotels' Green Practices		
		Energy Management	Waste Management	Water conservation
Age	Contingency coefficient	0.185	0.185	0.197
	p-value	0.325	0.323	0.213
	Decision	No correlation	No correlation	No correlation

Table 5. Relationship between respondents' profile and level of awareness of hotels' green practices (continuation)

Sex	Contingency coefficient	0.220**	0.196**	0.163**
	p-value	0.001	0.004	0.033
	Decision	Weak positive correlation	Weak positive correlation	Weak positive correlation
Civil/Marital status	Contingency coefficient	0.105	0.093	0.103
	p-value	0.371	0.500	0.391
	Decision	No correlation	No correlation	No correlation
Family Monthly Income	Contingency coefficient	0.266	0.300**	0.320**
	p-value	0.207	0.034	0.008
	Decision	No correlation	Weak positive correlation	Weak positive correlation
Highest educational attainment	Contingency coefficient	0.283*	0.217	0.228
	p-value	0.030	0.525	0.392
	Decision	Weak positive correlation	No correlation	No correlation
Profession	Contingency coefficient	0.202	0.179	0.221
	p-value	0.430	0.688	0.233
	Decision	No correlation	No correlation	No correlation
Residence	Contingency coefficient	0.100	0.068	0.107
	p-value	0.416	0.775	0.343
	Decision	No correlation	No correlation	No correlation

Guest Profile		Energy Management	Waste Management	Water conservation
Type of Traveler	Contingency coefficient	0.180*	0.234**	0.186**
	p-value	0.012	<0.001	0.008
	Decision	Weak positive correlation	Weak positive correlation	Weak positive correlation
Purpose of Stay	Contingency coefficient	0.225**	0.289**	0.264**
	p-value	<0.001	<0.001	<0.001
	Decision	Weak positive correlation	Weak positive correlation	Weak positive correlation

Table 5. Relationship between respondents' profile and level of awareness of hotels' green practices (continuation)

Booking Preference	Contingency coefficient	0.072	0.164*	0.155
	p-value	0.733	0.031	0.051
	Decision	No correlation	Weak positive correlation	No correlation
Frequency of Visit	Contingency coefficient	0.198	0.198	0.232*
	p-value	0.208	0.207	0.038
	Decision	No correlation	No correlation	Weak positive correlation
Length of stay	Contingency coefficient	0.182	0.171	0.243*
	p-value	0.357	0.475	0.020
	Decision	No correlation	No correlation	Weak positive correlation

**Correlation is significant at a 0.05 level*
***Correlation is significant at 0.01*

The Pearson Chi-square test showed a weak positive correlation between respondents' profiles and hotels' green practices in energy management, waste management, and water conservation. The results, as indicated in Table 6, showed that factors such as education, travel type, purpose of stay, and booking preferences did not correlate with respondents' green practices in energy management. The same was true for waste management, where factors like age, sex, and residence did not show a significant correlation. Lastly, no correlation was found between respondents' green practices in water conservation.

Table 6. Relationship between respondents' profile and level of hotels' green practices

Demographic Profile		Level of Hotel Green's Practices		
		Energy Management	Waste Management	Water conservation
Age	Contingency coefficient	0.150	0.203	0.179
	p-value	0.710	0.167	0.391
	Decision	No correlation	No correlation	No correlation
Sex	Contingency coefficient	0.133	0.162*	0.146
	p-value	0.139	0.035	0.079
	Decision	No correlation	Weak positive correlation	No correlation
Civil/Marital status	Contingency coefficient	0.066	0.102	0.081
	p-value	0.797	0.403	0.640
	Decision	No correlation	No correlation	No correlation
Family Monthly Income	Contingency coefficient	0.254	0.267	0.251
	p-value	0.328	0.200	0.363
	Decision	No correlation	No correlation	No correlation
Highest educational attainment	Contingency coefficient	0.295*	0.197	0.300**
	p-value	0.012	0.749	0.009
	Decision	Weak positive correlation	No correlation	Weak positive correlation
Profession	Contingency coefficient	0.241	0.281**	0.205
	p-value	0.095	0.008	0.393
	Decision	No correlation	Weak positive correlation	No correlation
Residence	Contingency coefficient	0.102	0.073	0.119
	p-value	0.395	0.721	0.237
	Decision	No correlation	No correlation	No correlation

Table 6. Relationship between respondents' profile and level of hotels' green practices (continuation)

Guest Profile		Energy Management	Waste Management	Water conservation
Type of Traveler	Contingency coefficient	0.189**	0.191**	0.175*
	p-value	0.006	0.006	0.016
	Decision	Weak positive correlation	Weak positive correlation	Weak positive correlation
Purpose of Stay	Contingency coefficient	0.248**	0.258**	0.256**
	p-value	<0.001	<0.001	<0.001
	Decision	Weak positive correlation	Weak positive correlation	Weak positive correlation
Booking Preference	Contingency coefficient	0.169*	0.105	0.097
	p-value	0.023	0.370	0.449
	Decision	Weak positive correlation	No correlation	No correlation
Frequency of Visit	Contingency coefficient	0.200	0.216	0.225
	p-value	0.187	0.095	0.059
	Decision	No correlation	No correlation	No correlation
Length of stay	Contingency coefficient	0.221	0.176	0.267**
	p-value	0.073	0.423	0.003
	Decision	No correlation	No correlation	Weak positive correlation

**Correlation is significant at a 0.05 level*
***Correlation is significant at 0.01 level*

The Pearson Chi-square test, with results indicated in Table 7, showed a weak positive correlation between respondents' visit intention and their profile, based on age, sex, income, profession, traveler type, purpose of stay, booking preferences, and length of stay, but not civil status or educational attainment.

Table 7. Relationship between respondents' profile and visit intention

Demographic Profile		Visit Intention
Age	Contingency coefficient	0.301**
	p-value	<0.001
	Decision	Weak positive correlation
Sex	Contingency coefficient	0.144
	p-value	0.017
	Decision	Weak positive correlation
Civil/Marital status	Contingency coefficient	0.115
	p-value	0.076
	Decision	No correlation
Family Monthly Income	Contingency coefficient	0.261**
	p-value	0.005
	Decision	Weak positive correlation
Highest educational attainment	Contingency coefficient	0.191
	p-value	0.148
	Decision	No correlation
Profession	Contingency coefficient	0.295**
	p-value	<0.001
	Decision	Weak positive correlation
Residence	Contingency coefficient	0.050
	p-value	0.613
	Decision	No correlation
Guest Profile		Visit Intention
Type of Traveler	Contingency coefficient	0.283**
	p-value	<0.001
	Decision	Weak positive correlation
Purpose of Stay	Contingency coefficient	0.282**
	p-value	<0.001
	Decision	Weak positive correlation
Booking Preference	Contingency coefficient	0.133*
	p-value	0.030
	Decision	Weak positive correlation
Frequency of Visit	Contingency coefficient	0.145
	p-value	0.217
	Decision	No correlation
Length of stay	Contingency coefficient	0.258**
	p-value	<0.001
	Decision	Weak positive correlation

ion is significant at 0.05 level
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The Spearman rho correlation analysis, with results indicated in Table 8, showed a moderate positive correlation between respondents' awareness of hotels' green practices and their perceived level of green practices. This was particularly evident in energy management, waste management, and water conservation. A strong positive correlation was found

in waste management. A moderate positive correlation was found in energy management and water conservation. The overall correlation was strong in water conservation and energy management.

Table 8. Relationship between level of awareness of hotels' green practices and perceived level of hotel's green practice

Level of Awareness of Hotels' Green Practices		Perceived Level of Hotels' Green Practices		
		Energy Management	Waste Management	Water Conservation
Energy Management	Spearman Rho correlation coefficient	.684**	.420**	.453**
	p-value	<0.001	<.001	<.001
	Decision	Moderate positive correlation	Moderate positive correlation	Moderate positive correlation
Waste management	Spearman Rho correlation coefficient	.526**	.725**	.568**
	p-value	<0.001	<0.001	<0.001
	Decision	Moderate positive correlation	Strong positive correlation	Moderate positive correlation
Water conservation	Spearman Rho correlation coefficient	.568**	.572**	.753**
	p-value	<0.001	<0.001	<0.001
	Decision	Moderate positive correlation	Moderate positive correlation	Strong positive correlation

**Correlation is significant at 0.05 level*
***Correlation is significant at 0.01 level*

Table 9. Relationship between level of awareness of hotels' green practices and visit intention

Level of Awareness of Hotels' Green Practices		Visit intention
Energy Management	Spearman Rho correlation coefficient	.348**
	p-value	<0.001
	Decision	Weak positive correlation
Waste management	Spearman Rho correlation coefficient	.399**
	p-value	<0.001
	Decision	Weak positive correlation
Water conservation	Spearman Rho correlation coefficient	.353**
	p-value	<0.001
	Decision	Weak positive correlation

**Correlation is significant at 0.05 level*
***Correlation is significant at 0.01 level*

The Spearman rho correlation analysis, as shown in Table 9, further reveals a weak positive correlation between respondents' awareness of hotels' green practices and visit intention, particularly in energy

management, waste management, and water conservation.

Table 10. Relationship between respondents' perceived level of hotels' green practices and visit intention

Perceived Level of Hotels' Green Practices		Visit intention
Energy Management	Spearman Rho correlation coefficient	.395**
	p-value	<0.001
	Decision	Weak positive correlation
Waste management	Spearman Rho correlation coefficient	.418**
	p-value	<0.001
	Decision	Weak positive correlation
Water conservation	Spearman Rho correlation coefficient	.325**
	p-value	<0.001
	Decision	Weak positive correlation

**Correlation is significant at 0.05 level*
***Correlation is significant at 0.01 level*

Lastly, the reults of the Spearman rho correlation analysis, as shown in Table 10, reveals a weak positive correlation between respondents' awareness of hotels' green practices, specifically in energy management, waste management, and water conservation, and visit intention

The study involved 385 respondents comprising 232 females and 153 males ranging from 21 to 27 years, mostly single, with a monthly family income of P9,520.00 and below, college students, residing in Angeles City, mostly travel for leisure with companions, prefer online travel agencies, spent overnight in hotels, and travel once a year. Gen Z members often know exactly what their desire is and are willing to spend the money needed to fulfill it and most Gen Z travel to consume their free time leisurely. Many Generation Z love to travel and explore the opportunities this world can offer (Padfield, 2021). It was also shown in the result that most of the respondent's marital status belongs to the single group. One of the potential reasons for these findings among the respondents is that single

persons are not required to do tasks related to family life, including child supervision.

Results from the study revealed that the respondents are very aware of hotels' green practices. The respondents highly practiced energy management, waste management, and water conservation and are very likely to stay in green hotels. Previous research suggests that more educated and younger people are more likely to rely on logical reasoning when making choices, which might have become the reason for the irrelevant impact of subjective norms on the guests' willingness to conserve energy in hotels (Wang, Zhang, Wong, & Wang, 2023). Based on the Lin et al. (2022) study results, it was mentioned that guests' consciences and values in their abilities are important factors that affect their willingness to conserve energy in hotels.

Results revealed that there is a weak positive correlation between respondents' profiles in terms of sex, highest educational attainment, type of traveler, purpose of stay, and level of awareness of hotels' green practices concerning energy management. A study conducted by Rodríguez, Florido, and Jacob (2020) confirmed that women are more likely than men to stay in green hotels, with women showing more positive attitudes in this matter.

In terms of respondents' profiles and level of awareness of hotels' green practices in relation to water conservation, the results revealed that there is a weak positive correlation in terms of sex, family monthly income, type of traveler, purpose of stay, frequency of visit, and length of stay.

Regarding the relationship between the respondents' profiles and the level of hotels' green practices in terms of energy management, results revealed

that there is a weak positive correlation in terms of highest educational attainment, type of traveler, purpose of stay, and booking preferences. In terms of respondents' profiles in relation to waste management practices, results revealed that there is a weak positive correlation in terms of sex, profession, type of traveler, and purpose of stay.

Results further revealed that there is a weak positive correlation between the level of hotels' green practices on water conservation and respondents' profiles in terms of highest educational attainment, type of traveler, the purpose of stay, and length of stay.

The findings revealed that there is a weak positive correlation between the respondents' visit intention and profile in terms of age, sex, family monthly income, profession, type of traveler, purpose of stay, booking preferences, and length of stay.

The findings revealed that there is a significant relationship between respondents' level of awareness and the perceived level of hotels' green practices.

The findings revealed that there is a significant relationship between respondents' level of awareness of hotels' green practices and visit intention.

Results further revealed that there is a correlation between respondents' perceived level of hotels' green practices and visit intention.

CONCLUSION

The majority of the respondents were females ranging from 21 to 27 years old, mostly single, with a monthly family income of P9,520.00 and below, college students, and residing in Angeles City. In terms of travel profile, the respondents prefer traveling with companions for leisure, preferring online travel agencies in

making reservations, and staying overnight once a year in a hotel.

The respondents are very aware of hotels' energy management, waste management, and water conservation.

The respondents highly practiced energy management, waste management, and water conservation when staying in hotels.

The respondents are very likely to visit and stay in green hotels when traveling.

There is a weak positive correlation between respondents' profiles in terms of sex, highest educational attainment, type of traveler, purpose of stay, and level of awareness of hotels' green practices concerning energy management. In terms of respondents' profiles and level of awareness of hotels' green practices concerning waste management, there is a weak positive correlation in terms of sex, family monthly income, type of traveler, purpose of stay, and booking preferences. In terms of respondents' profiles and level of awareness of hotels' green practices concerning water conservation, there is a weak positive correlation in terms of sex, family monthly income, type of traveler, purpose of stay, frequency of visit, and length of stay.

Regarding the respondents' profile and the level of hotels' green practices in terms of energy management, there is a weak positive correlation in terms of highest educational attainment, type of traveler, purpose of stay, and booking preferences. Concerning the respondents' profiles of waste management practices, there is a weak positive correlation in terms of sex, profession, type of traveler, and purpose of stay. There is a weak positive correlation between respondents' profiles and the level of hotels' green practices in terms of water conservation. There is a weak positive correlation in terms of highest

educational attainment, type of traveler, purpose of stay, and length of stay.

As to the relationship between the respondents' profile and visit intention, there is a weak positive correlation between the respondents' visit intention and profile in terms of age, sex, family monthly income, profession, type of traveler, purpose of stay, booking preferences, and length of stay.

There is a significant relationship between respondents' level of awareness of hotels' green practices and the perceived level of hotels' green practices in terms of energy management, waste management, and water conservation.

There is a weak positive correlation between respondents' visit intention and level of awareness of hotels' green practices in terms of energy management, waste management, and water conservation.

There is a weak positive correlation between respondents' visit intention and the perceived level of hotels' green practices in terms of energy management, waste management, and water conservation.

This study determined the relationship between respondents' profile, level of awareness, perceived level of hotels' green practices, and visit intention. Thus, the following recommendations are hereby presented:

1. An environmental awareness program must be created by the national government through the Department of Tourism to encourage guests with diverse backgrounds to be aware of the sustainable practices used by the hotels which enables them to respond to sustainable development. This initiative will allow people to understand the impacts of their behaviors on

the planet and the importance of its protection.

2. Hotels and other tourism-related establishments must have green or sustainability initiatives. These establishments must invest in environmental conservation that promotes the protection, preservation, and restoration of ecosystems and natural resources that ensure long-term well-being for both humans and the planet.
3. Responsible production and consumption must be practiced by hotel establishments and guests to minimize negative social, economic, and environmental impacts. This initiative can contribute to achieving the 17 Sustainable Development Goals SDG 6 Clean Water and Sanitation, particularly SDG 7 Affordable and Clean Energy, SDG 12 Responsible Consumption and Production, SDG 11 Sustainable Cities and Communities, and SDG 13 Climate Action.
4. Hotels must create green loyalty programs and engagement strategies to encourage guests' patronage and loyalty. This initiative may then act as a point for improvement or even inspire new sustainable ideas.
5. Future researchers can explore the uncovered areas of the study such as reducing carbon footprint and management of natural resources which may affect positively or negatively the environment, economy, health, and social stability. By studying these, future researchers can identify unsustainable behaviors and develop strategies to promote

more sustainable practices that have not been covered by this research.

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Relationship between consumers' demographic profile, diner profile, perceived value, and practices on food waste management in buffet restaurants

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ABSTRACT

This descriptive-correlational research primarily focused on the relationship between consumers' demographic profile, diner profile, perceived value, and practices on food waste management in buffet restaurants in Angeles City. In this study, a purposive sampling technique was utilized. Results reveal that the majority of the respondents were females, belonging to the age group 18-25 years old, with a family monthly income of P9,521-P19,040, college students, and single. Descriptive statistics such as frequency, percentage, and mean were used to describe the respondents' demographic profile, diner profile, perceived value, and practices on food waste management. Chi-Square and Spearman's rho were used to determine the relationship among the variables. The majority of the respondents are dining out for family gatherings less than five times a month, prefer Filipino cuisine, and spend P251-P500 in buffet restaurants. The majority of the respondents agree on the perceived value of food waste management in buffet restaurants. Further, respondents also agree that they practice food waste management in buffet restaurants. Results reveal that there is a correlation between the respondents' sex and food sustainability practices. Further, there is a correlation between respondents' family monthly income, highest educational attainment, and occupation and waste reduction practices. Results reveal that there is a correlation between the respondents' food sustainability practices and diner profile in terms of price range. Lastly, there is a correlation between respondents' perceived value of food waste management. The findings of the study have implications for actionable strategies to help buffet restaurants mitigate food waste.

Keywords: food waste, food waste management, sustainability, sustainable development goals, buffet restaurants

INTRODUCTION

Food waste management is the logical method and strategy used to address and divert food and agricultural products for more efficient uses such as human consumption, animal feed, industrial applications, and other environmental welfare (Hyseni, 2023.). This is imputed to the well-developed global markets of out-of-home food utilization as well as the gradually increasing spendable earnings of residents, which often get spent on dining out (Filimonau & Todorova, 2020).

In the Philippines, around 1,717 tons of food are wasted day-to-day as stated by the Food and Nutrition Research Institute of the Department of Science and Technology (Dela

Peña, 2021). As an act for this prevailing occurrence in terms of food waste management, a research conducted by Forbes, Quested, and O'Connor (2021) for the United Nations Environment Programme (UNEP) found that reducing food waste may lead to more accessible food, thus fighting hunger and producing economic returns. Where every single grain is pivotal in the Philippines, the Food Waste Reduction Act was introduced. This law aimed to diminish food waste through donations and recycling food as fertilizer or compost (Barrion, Calayag, Ngyuen-Orca, & Melo-Rijik, 2023).

Manala-O and Aure (2019) stated that the food service sector is one of the wide ranging and most profitable sectors in the Philippine economic system. Literature discovers that one of the pressing and immediate concerns of food service outlets is food waste. Economically speaking, it affects the cost firms incur in eliminating food waste and has severe environmental and social implications. Food waste is generated at two levels: the food service outlet known as Kitchen Food Waste and the consumer known as Consumer Food Waste. When the two levels are compared, the consumption level produces more food waste due to neglectful consumer practices. According to the Department of Environment and Natural Resources (DENR), most of the metropolitan solid waste is environmental waste which is approximately 52 percent and higher than 80 percent of that would be food waste (Cos, 2022).

Dining out has become a typical approach among Filipinos, bringing about a shift in resource utilization from eating at home to eating at food establishments (Manala-O & Aure, 2019). Approximately 2,175 piles of uneaten food in Metro Manila alone are ejected in the garbage every day.

When the poorest of the poor are scrounging for recoverable excess food in garbage bins, this stage of waste is delinquent. An example of uneaten food being “recycled” and consumed — and, in some cases, bartered — is pagpag. Pagpag is the vocabulary used for residual food from restaurants hunted down by waste disposal sites and dumps. Pagpag means “to brush off,” and refers to the act of brushing off the debris from edible portions of restaurant leftovers. These are either eaten immediately after the residue are found in the trash, or prepared in different ways after they are re (Nograles, 2021).

Around the world, 14 percent of food valued at an estimated USD400 billion is wasted during the harvest, leaving out retail (Food and Agriculture Organization, n.d). This means that approximately around 931 million masses of food go to waste each year. It estimates that food loss and waste cost the global economy USD936 billion a year. Overall, food systems cost the globe at large USD12 trillion in health, economic, and environmental costs, which is 20 percent more than the market's worth of food systems (Marchant, 2021). According to Forbes et al. (2021), at the retail and consumer levels, waste has increased by 17 percent. This is in line with the investigation of the Food and Agriculture Organization (FAO) of the United Nations (UN), which found that every year, around one-third of the world's food is mass-produced annually. Approximately 1.3 billion piles of human consumption are lost or wasted (Boliko, 2019). The need for food is rising globally. It is anticipated that demand for meat and dairy products will rise in particular. According to estimates from 2011 to 2012, this will cause the demand for food production to rise from 60 percent to 110 percent by 2050, necessitating

an increase in global food production. Meanwhile, food is wasted globally, with developing nations continuing to experience undernutrition (Lemaire & Limbourg, 2019).

Food waste also occurs at many stages of the food allocation process, from planting and collecting to the dining table. It is likely to happen at the provider of food materials, during the conveyance and exchange processes, and at food formulation and consumption locations. Most people recognize the significance of the global food waste crisis. Food waste is interpreted as meals that are adequate for human consumption but has not been eaten for a variety of factors, including appearance standards, misapprehending use-by dates, and oversupply (Van Bemmel & Parizeau, 2019). It includes generate and raw resources that are adrift during the farming, cropping, allocation, and preservation stages as well as food that diners didn't eat at restaurants and cast off at home. Food waste can take place at any stage in the supply chain (Lai, 2021). However, humans will face critical food shortages in the future, owing to several major crises, including global wars and climate change. If food surplus and waste issues are not addressed, the world could face an unusual food crisis. Furthermore, global food waste is rapidly increasing and is anticipated to more than double by 2050 (Huang, Liu, & Hsu, 2020).

Moreover, hospitality's food and beverage demands are a notable proportion of global food purchases. The high pressure from customers' demands and the precondition for sustainable management of food and beverage value chains from the tourism and hospitality industry are significant to attend to, especially food waste management (Kattiyapornpong, Ditta-Apichai, & Chuntamara, 2023).

Restaurants and food services account for a crucial proportion of food waste, which has been identified as an important unsustainability hotspot, and discovered that about 20 percent of all food handled and formed in the industry is squandered. They also found that food waste is contradicted by consumer groups, restaurant categories, and meal purposes (Matzembacher, Brancoli, Maia, & Eriksson, 2020).

Safdie (2023) mentioned that more than 30 percent of food is wasted or squandered every year. Considering the vast number of starved people on the globe, this number is even more surprising. Intending to achieve a more sustainable future by 2030, the UN adopted the 17 Sustainable Development Goals (SDG) while maintaining the 2030 agenda for Sustainable development to transform our world. These goals include reducing poverty, improving the economy and society, conserving energy, promoting sustainable production and consumption (SDG 12), addressing climate change (SDG 13), and many more. Food waste (SDG 12) is becoming an economic strain on all nations and either directly or indirectly obstructs the achievement of SDG 13 (Kumar, Choudhuri, Shandilya, Singh, Tyagi, & Singh, 2022). Food waste is not only an issue for UN SDG 12 (Responsible Consumption and Production) in developed countries but also an affair for SDG 2 (Zero Hunger) in developing countries. Concerning SDG 12, there is an increasing expectation concerning the sustainability of the tourism and hospitality sector. 50 percent of land, 10 percent of energy, and 80 percent of freshwater used are all used in the production of food. In addition to wasting 40 percent of food, the United States wastes 32 percent of its freshwater, 4 percent of its energy

budget, and 25 percent of its land. Meanwhile, 25 percent more methane emissions are caused by that food waste. By providing food for those in need, reducing food loss and waste could help combat hunger and poverty. Additionally, by lowering the quantity of food waste dumped in landfills, it combats climate change. After using onshore wind turbines and optimizing refrigeration management, reducing food waste ranks third among recommended countermeasures to climate change. Every aspect of the food chain can address this problem with a straightforward measure (One Third, 2023). A worldwide issue, sustainable food waste management is essential to improving food security, protecting ecosystems, and maintaining natural resources. Global agricultural supply systems not only return excess nitrogen and phosphorus but also severely strain freshwater supplies, putting the condition of unstable ecosystems (Prokic, Stepanov, Curcic, Stojic, & Pucarevic, 2022). As mentioned by Campbell, Hansen, Rioux, Stirling, Twomlow, and Wollenberg (2018) extensive emissions reduction will be indispensable in food systems if the global warming target is not to be exceeded. Thus, achieving SDG 13 will seek many actions for recalibration and alleviation in food systems. An imperative hurdle is that food systems are linked to many SDGs and there are likely to be concessions amongst SDGs through food system actions with trade-offs notably intricate in developing countries where climate change precariousness will be pinnacle.

This industry encompasses numerous businesses such as destinations, attractions, accommodations, restaurants, catering, festivals, and events. Mettler (2023) stated that diminishing food

waste not only decreases the industry's environmental footprint and helps fight global hunger, but continuously alters hotels' bottom line, engages employees, and strengthens relationships with consumers. As for the economic effect of food waste management, the total amount of food that is wasted each year is around USD1 trillion while in developing countries it is roughly calculated at nearly USD310 billion. This situation has several difficult consequences, including strain on natural resources such as land and water as well as economic liability. Food waste also occurs during preparation, cooking, or serving. At approximately 222 million tons, the number of food waste in industrialized countries is almost equivalent to the net produced in Sub-Saharan African countries – 230 million tons (Ishangulyyev, Kim, & Lee, 2019).

Food is frequently regarded as the least expensive supply in the food service sector, with restaurants treating it primarily as a throwaway. It is in line with the recent studies of the European Community, conducted between 2014 and 2016, which have revealed that the leading source of food waste in restaurants is the leftovers of consumers: what makes the gap is what surplus on the plate, which is not eaten at the table or returned home with, and that restaurateurs are obligatory to get rid of (Kim, Che, & Jeong, 2023). Research has shown that a consequential portion of food waste is produced during the consumption phase, which covers out-of-home dining (Dhir, Talwar, Kaur, & Malibari, 2020). Wang, Xue, Li, Liu, Cheng, and Liu (2018) stated that end-user food waste can be affiliated both at home and in several segments of the out-of-home food service sector (i.e.,

also called the hospitality sector), for example, catering, canteens (e.g., education, enterprise, hospital, etc.), hotels, and restaurants. The tremendous food waste generated by restaurants is not only a crucial implication for the food service business but also a catalyst of anguish for the emerging nations in which dining at a restaurant is becoming progressively trendy. Consumers' food wastes account for a prominent section of restaurant food waste, indicating the need for a change in consumers' practices to minimize food waste (Mumtaz, Chu, Attiq, Shah, & Wong, 2022). Notably, leftovers occurs when people purposely throw away nutritious food after struggling to appropriately plan their meals and store food before it spoils or expires, whereas food loss occurs primarily during the treatment stage caused by climatic conditions, an absence of sufficient facilities, and damaging practices (Feijoó & Moreira, 2020). Sakaguchi, Pak, and Potts (2018) stated that the most regular contributors of food waste in the restaurant industry include inaccurate storage, prearrangement residues such as improper handling of food products and over-preparation, unrestrained portions and leftovers on plates, difficulty in speculating the number of clients, forgotten and spoiled food, lack of awareness due to poor food waste insights and its economic and environmental costs, and lastly, struggling in meeting dietetic preferences of clients. Plate waste is considered one of the significant drivers of food waste in many restaurant types, such as eat-all-you-can facilities (Matzembacher et al., 2020). Dining facilities like cafeterias of educational institutions, hospitality, and private enterprises that offer buffet-style meals, especially with an

eat-all-you-can system, are unexpectedly wasteful in terms of food (Sakaguchi et al., 2018). Diners leave 17 percent of their meals uneaten, with more than half being thrown away rather than taken home (Ratliff, 2023).

Kim and Hall (2020) mentioned that when a restaurant provides for consumer participation in sustainability practices, consumer attachment to the restaurant as well as waste lessening practices in the restaurant are increased, in addition, participation in waste lessening and loyalty to sustainable restaurants lengthen the awareness of the relationship between self-centered green observational value and consumer assurance in a green hospitality business. Wu and Teng (2022) stated that customer practices play an important role in decreasing food waste in buffet restaurants. Making customers conscious of the green choices available in a restaurant is an important factor to consider when greening.

It is not a surprise that food waste, a very significant problem in the world, is highly studied by hospitality and food service practitioners. However, research on consumer practices toward food waste is still quite narrow (Attiq, Chu, Azam, Wong, & Mumtaz, 2021) which requires increased exploration for the blank spots. Moreover, although the references for food waste management are profuse, as evident in the review of related literature, some findings are contradicting, which calls for further investigation of the blind spots. Therefore, the researchers are motivated to conduct the research undergoing. Research in this area has uncovered drastic primary causes of restaurant food waste at the consumption level, including over-ordering and leaving untouched food on the plate. Thus, research is

involved in the current discussion on food waste management. The study aimed to determine the relationship between consumers' demographic profile, diner profile, perceived value, and practices on food waste management in buffet restaurants.

This study aimed to determine the relationship between respondents' demographic profile, diner profile, perceived value, and practices on food waste management in buffet restaurants.

Specifically, this study aimed to answer the following questions:

1. How may the demographic profile of the respondents be described in terms of age, sex, family monthly income, highest educational attainment, marital status, and occupation?
2. How may the diner profile of the respondents be described in terms of purpose of dining out, frequency of eating out, type of cuisine, and price range of the buffet restaurant?
3. How may the level of perceived value of respondents on food waste management in buffet restaurants be described?
4. How may the practices of respondents on food waste management in buffet restaurants be described in terms of food sustainability practice, waste reduction practices, and participation in sustainable practices?
5. Is there a significant relationship between respondents' demographic profile and food waste management practices in buffet restaurants?
6. Is there a significant relationship between respondents' diner profile and practices on food waste management in buffet restaurants?

7. Is there a significant relationship between respondents' perceived value and practices of food waste management in buffet restaurants?
8. What are the implications of findings in the hospitality industry?

METHODOLOGY

This study is a quantitative study that utilized descriptive-correlational research designs to determine the relationship between respondents' demographic profile, diner profile, perceived value, and practices on food waste management in buffet restaurants. A total of 30 respondents for pilot testing and approximately 385 respondents were recommended as a sample using the Raosoft sample size calculator. A purposive sampling technique was used in this study. Researchers had established requirements that the respondents must meet to be eligible for the study: must be residing in Angeles City, 18 years old and above, and with a buffet restaurant dining experience.

The researchers used a survey questionnaire to gather data from respondents. The researchers utilized Google Forms for data gathering. The survey questionnaire was divided into four parts: The first part of the survey questionnaire aimed to gather descriptive data concerning the demographic profile of the respondents. The second part of the survey questionnaire focused on determining the diner profile of respondents. The third part of the survey questionnaire aimed to determine the respondents' perceived value in terms of hedonic value and utilitarian value on waste reduction in buffet restaurants. The fourth part of the survey questionnaire focused on the respondents' practices on food waste management in buffet

restaurants in terms of food sustainability practices, waste reduction practices, and participation in sustainability practices. The third and fourth parts of the survey questionnaire were adapted from Kim and Hall (2020). Cronbach's alpha is used to identify whether items in a survey are internally consistent or averagely correlated to assess the reliability of a survey instrument. The research instrument yielded a Cronbach Alpha value of 0.958 on the perceived value questionnaire and a Cronbach Alpha value of 0.930 on the practices on the food waste management questionnaire.

Ethical clearance was sought before the research work was undertaken. The collected data from the respondents was tabulated into MS Excel. The data would be given appropriate numerical code and then transposed into Licensed IBM SPSS Statistics version 25 for statistical treatment and analysis. Descriptive statistics such as frequency, percentage, and mean were used to describe the respondents' demographic profile, diner profile, perceived value, and practices on food waste management. Chi-Square and Spearman's rho were used to determine the relationship among the variables.

RESULTS AND DISCUSSIONS

Table 1 shows the demographic profile of the respondents as follows: 79 percent are aged 18-25. The majority of respondents are female, college students, with a family monthly income of Php9,521–Php19,040, and are single.

Table 1. Respondents' profile

Age		Frequency	Percentage
18-25		304	79.0
26-35		65	16.9
36-45		11	2.9
46-55		4	1.0
55 and above		1	0.3
	Total	385	100.0
Sex		Frequency	Percentage
Male		156	40.5
Female		229	59.5
	Total	385	100.0
Family Monthly Income		Frequency	Percentage
9,250 below		68	17.7
9,521-19,040		111	28.8
19,041-38,080		97	25.2
38,081-66,640		63	16.4
114,241-190,000		6	1.6
	Total	385	100.0
Highest Educational Attainment		Frequency	Percentage
Elementary		1	0.3
Junior High School		14	3.6
Senior High School		116	30.1
College		251	65.2
Masteral		3	0.8
	Total	385	100.0
Marital Status		Frequency	Percentage
Single		346	89.9
Married		39	10.1
		385	100.0
Occupation		Frequency	Percentage
Employed		162	42.1
Self-employed		33	8.6
Unemployed		14	3.6
Student		176	45.7
	Total	385	100.0

Table 2 shows the distribution of respondents about their diner profile. In terms of the purpose of dining out the respondents, it can be noted that 185 (48.1%) of the respondents are dining out for family gatherings, 296 (76.9%) dine out less than five times a month, 186 (48.3%) are most likely to dine out in a restaurant that serves Filipino cuisine, and 150 (39.0%) of the respondents spent from Php251 to Php500.

Table 2. Respondents' diner profile

Purpose of dining out	Frequency	Percentage
Date	57	14.8
Social Gathering	55	14.3
Family Gathering	185	48.1
Business Meeting	3	0.8
Celebration on specific occasion	76	19.7
Others	9	2.3
Total	385	100.0

Frequency of Dining Out	Frequency	Percentage
Less than five times	296	76.9
5-14 times	82	21.3
15 times and over	7	1.8
Total	385	100.0

Type of Cuisine	Frequency	Percentage
Filipino	186	48.3
Korean	146	37.9
Japanese	24	6.2
Chinese	11	2.9
Mediterranean	3	0.8
Others	15	3.9
Total	385	100.0

Price Range	Frequency	Percentage
250 and below	48	12.5
251-500	150	39.0
501-750	105	27.3
751-1,000	55	14.3
1,001 and above	27	7.0
Total	385	100.0

Table 3 shows the distribution of respondents in terms of their perceived value on food waste management in buffet restaurants. In terms of the hedonic value, it can be seen that most of the respondents agree that eating at a restaurant that reduces leftovers is a pleasant experience ($\bar{x}$=4.23), eating at a restaurant that reduces leftovers is an interesting experience ($\bar{x}$=4.23), restaurant that reduces leftovers is a happy experience ($\bar{x}$=4.21), dining at a restaurant that reduces leftovers is an enjoyable experience ($\bar{x}$=4.21). The overall mean for hedonic value on waste reduction is ($\bar{x}$=4.22). In terms of the respondents' utilitarian value, it can also be seen that most of the respondents agree that reducing waste at restaurants helps provide a better deal as compared to other conventional restaurants ($\bar{x}$=4.07), reducing waste at restaurants helps

offer the benefits that I need (x̄=4.07), reducing waste at restaurants helps provide affordable for the price (x̄=4.05). The overall mean for the utilitarian value of waste reduction is (x̄=4.06).

Table 3. Respondents' perceived value on food waste management

Statements	1 (SD)	2 (D)	3 (N)	4 (A)	5 (SA)	x̄	D
1. I think that dining at a restaurant that reduces waste is a happy experience.	14 (3.6)	5 (1.3)	48 (12.5)	137 (35.6)	181 (47.0)	4.21	Agree
2. I think that dining at a restaurant that reduces waste is a pleasant experience.	13 (3.4)	7 (1.8)	45 (11.7)	133 (34.5)	187 (48.6)	4.23	Agree
3. I think that dining at a restaurant that reduces waste is an interesting experience.	13 (3.4)	8 (2.1)	46 (11.9)	129 (33.5)	189 (49.1)	4.23	Agree
4. I think that dining at a restaurant that reduces waste is an enjoyable experience.	11 (2.9)	9 (2.3)	51 (13.2)	130 (33.8)	184 (47.8)	4.21	Agree
Overall mean for Hedonic Value on Waste Reduction						4.22	Agree
1. Reducing waste at restaurants helps offer good value for the price.	11 (2.9)	6 (1.6)	69 (17.9)	164 (42.6)	135 (35.1)	4.05	Agree

Table 3. Respondents' perceived value on food waste management (continuation)

2. Reducing waste at this restaurant helps provide a better deal as compared to other conventional restaurants	12 (3.1)	3 (0.8)	68 (17.7)	164 (42.6)	138 (35.8)	4.07	Agree
3. Reducing waste at restaurants helps offer the benefits that I need.	12 (3.1)	3 (0.8)	83 (21.6)	152 (39.5)	135 (35.1)	4.03	Agree
Overall mean for Utilitarian Value on Waste Reduction						4.06	Agree

Table 4 shows the distribution of respondents in terms of their practices on food waste management. In terms of food sustainability practices, it can be noted that most of the participants agree that the restaurant uses qualified sustainable seafood/fish (e.g., MSG) ($\bar{x}$=3.56), restaurant primarily uses local food ($\bar{x}$=3.52). The overall mean for the food sustainability practice is ($\bar{x}$=3.23).

In terms of waste reduction practices, it can be noted that most of the respondents agree that restaurant uses durable items rather than single-use items ($\bar{x}$=3.82), restaurant uses local produce in food preparation ($\bar{x}$=3.77), restaurant uses strategies for reducing food waste ($\bar{x}$=3.75), restaurant uses strategies for reducing water waste ($\bar{x}$=3.71). The overall mean for the waste reduction practices is ($\bar{x}$=3.63). In terms of the respondents' participation in sustainable practices, it can be noted that they highly agree that they are willing to participate in pro-environmental practices at restaurants ($\bar{x}$=4.00), participate in reducing waste practices at

restaurants ($\bar{x}$=3.93), participate in almost all pro-environmental practices at restaurants to reduce waste ($\bar{x}$=3.81). The overall mean score for participation in sustainable practices is ($\bar{x}$=3.91).

Table 4. Respondents' practices on food waste management

	Statements	1 (SD)	2 (D)	3 (N)	4 (A)	5 (SA)	$\bar{x}$	D
1.	This restaurant has a smaller size of serving of meals.	14 (3.6)	74 (19.2)	163 (42.3)	95 (24.7)	39 (10.1)	3.18	Neutral
2.	This restaurant does not have a self-service system.	26 (6.8)	110 (28.6)	132 (34.3)	78 (20.3)	39 (10.1)	2.98	Neutral
3.	This restaurant mainly serves vegetable dishes.	28 (7.3)	84 (21.8)	136 (35.3)	97 (25.2)	40 (10.4)	3.10	Neutral
4.	This restaurant has menu labeling (e.g., calorie and/or nutrition information) .	46 (11.9)	96 (24.9)	108 (28.1)	79 (20.5)	56 (14.5)	3.01	Neutral
5.	This restaurant has a menu that states the carbon footprint of each dish.	36 (9.4)	88 (22.9)	122 (31.7)	94 (24.4)	45 (11.7)	3.06	Neutral
6.	This restaurant primarily uses organic food.	17 (4.4)	46 (11.9)	175 (45.5)	92 (23.9)	55 (14.3)	3.32	Neutral

Table 4. Respondents' practices on food waste management (continuation)

7.	This restaurant primarily uses local food.	12 (3.1)	45 (11.7)	129 (33.5)	128 (33.2)	71 (18.4)	3.52	Agree
8.	This restaurant uses meat substitutes.	16 (4.2)	54 (14.0)	141 (36.6)	124 (32.2)	50 (13.0)	3.36	Neutral
9.	This restaurant uses certified sustainable seafood/fish (e.g., MSG).	11 (2.9)	33 (8.6)	136 (35.3)	141 (36.6)	64 (16.6)	3.56	Agree
	Overall mean for Food sustainability practice						3.23	Neutral
1.	This restaurant uses recycled materials (e.g., paper, plastic, wood).	17 (4.4)	53 (13.8)	126 (32.7)	123 (31.9)	66 (17.1)	3.44	Neutral
2.	This restaurant uses strategies for reducing food waste.	11 (2.9)	21 (5.5)	110 (28.6)	154 (40.0)	89 (23.1)	3.75	Agree
3.	This restaurant uses strategies for reducing water waste.	12 (3.1)	22 (5.7)	115 (29.9)	151 (39.2)	85 (22.1)	3.71	Agree
4.	This restaurant uses durable items rather than disposable products.	11 (2.9)	19 (4.9)	106 (27.5)	142 (36.9)	107 (27.8)	3.82	Agree

Table 4. Respondents' practices on food waste management (continuation)

5.	This restaurant uses local produce in food preparation.	10 (2.6)	22 (5.7)	108 (28.1)	153 (39.7)	92 (23.9)	3.77	Agree
6.	This restaurant donates leftover food to food banks.	18 (4.7)	67 (17.4)	151 (39.2)	82 (21.3)	67 (17.4)	3.29	Neutral
	Overall mean for Waste reduction practices						3.63	Agree
1.	I am willing to participate in pro-environmental practices at restaurants.	11 (2.9)	7 (1.8)	83 (21.6)	153 (39.7)	131 (34.0)	4.00	Agree
2.	I try to participate in almost all pro-environmental practices at restaurants to reduce waste.	13 (3.4)	16 (4.2)	99 (25.7)	160 (41.6)	97 (25.2)	3.81	Agree
3.	I participate in reducing waste practices at restaurants.	12 (3.1)	10 (2.6)	88 (22.9)	159 (41.3)	116 (30.1)	3.93	Agree
	Overall mean for Participation in Sustainable Practices						3.91	Agree

Table 5 shows the results of the Chi-square test of association between the respondents' demographic profile and food sustainability practices. In terms of food sustainability practices, the p-value reveals that there is a

weak positive correlation in terms of sex (p=<0.001, cc=0.234**). Regarding respondents' demographic profile and food waste management in terms of waste reduction practices, results reveal that there is a weak positive correlation between waste reduction practices and demographic profile in terms of family monthly income (*p*=0.044, *cc*=0.296*), highest educational attainment (*p*=0.032, *cc*=0.260*), and occupation (*p*=0.028, *cc*=0.237*). Concerning respondents' demographic profile and participation in sustainable practices, the p-value reveals that there is a weak positive correlation in terms of age (*p*=<0.001, *cc*=0.376**), and sex (*p*=0.003, *cc*=0.200**).

Table 5. Relationship between respondents' demographic profile and practices on food waste management

Demographic Profile		Food Sustainability Practices	Waste Reduction practices	Participation in Sustainable practices
Age	Contingency coefficient	0.163	0.187	0.376**
	p-value	0.838	0.603	<0.001
	Decision	No correlation	No correlation	Weak positive correlation
Sex	Contingency coefficient	0.234**	0.147	0.200**
	p-value	<0.001	0.074	0.003
	Decision	Weak positive correlation	No correlation	Weak positive correlation
Family Monthly Income	Contingency coefficient	0.266	0.296*	0.260
	p-value	0.208	0.044	0.267
	Decision	No correlation	Weak positive correlation	No correlation

Table 5. Relationship between respondents' demographic profile and practices on food waste management (continuation)

Highest educational attainment	Contingency coefficient	0.220	0.260*	0.227
	p-value	0.244	0.032	0.180
	Decision	No correlation	Weak positive correlation	No correlation
Marital status	Contingency coefficient	0.147	0.127	0.136
	p-value	0.074	0.179	0.124
	Decision	No correlation	No correlation	No correlation
Occupation	Contingency coefficient	0.195	0.237*	0.155
	p-value	0.230	0.028	0.657
	Decision	No correlation	Weak positive correlation	No correlation

**Correlation is significant at 0.05 level*
***Correlation is significant at 0.01 level*

Table 6 shows the results of the Chi-square test of association between the respondents' diner profile and practices on food waste management. Results reveal that there is a weak positive correlation between food sustainability practices and diner profile in terms of price range (p=0.044, cc=0.255*).

Table 6. Relationship between diner profile and practices on food waste management

Diner Profile		Food Sustainability Practices	Waste Reduction practices	Participation in Sustainable practices
Purpose of Dining out	Contingency coefficient	0.259	0.183	0.191
	p-value	0.120	0.861	0.800

Table 6. Relationship between diner profile and practices on food waste management (continuation)

Frequency of Eating out	Decision	No correlation	No correlation	No correlation
	Contingency coefficient	0.140	0.169	0.133
	p-value	0.466	0.187	0.541
Type of Cuisine	Decision	No correlation	No correlation	No correlation
	Contingency coefficient	0.202	0.229	0.216
	p-value	0.696	0.382	0.528
Price Range	Decision	No correlation	No correlation	No correlation
	Contingency coefficient	0.255*	0.187	0.191
	p-value	0.044	0.603	0.560
	Decision	Weak positive correlation	No correlation	No correlation

**Correlation is significant at 0.05 level*
***Correlation is significant at 0.01 level*

Table 7 shows the results of the Spearman rho correlation coefficient. Results reveal that there is a correlation between respondents' perceived value and practices on food waste management. The p-value reveal that there is a moderate positive correlation between respondents' perceived value and participation in sustainable practices in terms of hedonic value (p=<0.001, r = 0.447**), perceived value, and waste reduction practices (p=<0.001, r = 0.426**), same with the participation in sustainable practices in terms of utilitarian value (p=<0.001, r = 0.428**). The p-value reveal that there is a weak positive correlation between respondents' perceived value and food sustainability practices (p=<0.001, r = 0.150**) waste reduction practices in terms of hedonic value (p=0.003, r = 0.364**). Furthermore, a correlation between the respondents' perceived value and food sustainability practices in terms of utilitarian value, it can be noted that there is a weak positive correlation (p=<0.001, r = 0.213**).

Table 7. Relationship between respondents' perceived value on food waste management

Perceived Value on Food Waste Management		Practices on Food Waste Management		
		Food Sustainability Practices	Waste Reduction Practices	Participation in Sustainable practices
Hedonic Value	Spearman Rho correlation coefficient	.150**	.364**	.447**
	p-value	<0.001	0.003	<0.001
	Decision	Weak positive correlation	Weak positive correlation	Moderate positive correlation
Utilitarian Value	Spearman Rho correlation coefficient	.213**	.426**	.428**
	p-value	<0.001	<0.001	<0.001
	Decision	Weak positive correlation	Moderate positive correlation	Moderate positive correlation

**Correlation is significant at 0.05 level*
***Correlation is significant at 0.01 level*

Results reveal that respondents belonging to the age group 18-25 years old are most likely to dine out. Chiciuden, Harun, Mureșan, Arion, Chiciudean, Ilieș, and Dumitraş (2019) stated that individuals belonging to the age group 18-25 years old or young people are the majority interested in terms of dining out because of the demand to socialize. In terms of sex, the results reveal that females are the most likely to dine out since dining out has become a global trend, attracting a variety of consumer groups, and women want to take their place in metropolitan settings, even if they are all alone. Women were admitted to restaurants with limitations in the nineteenth century, particularly when they were alone or in groups of solely women. However, attitudes shifted over time, and more accommodations for women were established, such as dining rooms where ladies traveling alone or in groups could eat. Furthermore, food preferences have shifted, resulting in a growth in the frequency of eating out (Yamini, 2019). Results reveal that respondents have a family monthly

income of P9,521-19,040 and are most likely to dine out. Lagmay (2023) revealed that most Filipinos are classified as low-income, so they naturally focus on spending their ready money on food, because for Filipinos, food is one of the three essential needs, they are pleased to spend a significant portion of their income on it. In the matter of highest educational attainment**,** results reveal that the most likely to dine out are college students. McDaniel (2022) stated that dining out is a favored activity for college students, offering a chance for them to socialize and be pleased with their meals. Single-status respondents are most likely to dine out, which is in line with the study of Bae (2022) that solo diners have become a crucial segment in the hospitality sector, because of the growing number of individuals who dine out or travel alone, driven by the increase in single-person households and the trend towards single life. In terms of occupation, the result shows that students are most likely to dine out due to the food service businesses outside of the school that provide a variety of foods, and students choose to get a better experience with friends at their selected restaurants (Mohamad, Manshoor, Idris, & Rahman, 2023).

In terms of the purpose of dining out**,** the result shows that family gatherings are the reason why the respondents dine out in buffet restaurants. Eversham (2021) mentioned that the main motive for dining out in restaurants is “quality family time with each other”, ahead of a family celebration and socializing. Results also reveal that most of the respondents dined out less than 5 times and preferred the Filipino cuisine type of buffet restaurant. In a survey conducted in the Philippines in 2022, 28 percent of respondents stated that they are eating out several times per

week (Balita, 2023). In terms of the price range of preferred restaurants, most respondents were recorded to dine out with the price ranging from P251-500. According to Bilog (2017), price remains one of the key factors that is applied in consumer decision-making as well as its subsequent behaviors deepened the insight by asserting that customers utilize price as a gauge of the quality of the restaurant.

In terms of hedonic value, most of the respondents agree that dining at a restaurant that reduces waste is a happy, pleasant, interesting, and enjoyable experience. Another construct is the utilitarian value, as shown in the results most of the respondents agree that reducing waste at the restaurant helps offer a good value, and offer a optimal deal as compared to other regular restaurants, and reducing waste at the restaurants helps offer benefits that the respondents' necessities. Kim and Hall (2020) mentioned that customer perception of values is produced according to the assessment of feeling-based features (hedonic value) and operational benefits (utilitarian value) as the main value area of the dining experience, also, the hedonic and utilitarian value appear analytical factors in the attitude, satisfaction, practices scheme of the individuals.

In terms of food sustainability practices, it can be noted that most of the participants agree that the restaurants use certified sustainable seafood/fish (e.g., MSG), and local food plays an important role in the shift to more sustainable diets. Kattiyapornpong et al. (2023) mentioned that working with local farmers and suppliers and utilizing local ingredients allow the hotel to take in local culture through local cuisine with fresh local ingredients in its original place. To young individuals, an

eco-friendly restaurant's attributes are the use of restorable energies, attention to the use of ingredients, circumventing of frying procedures, and the use of sustainable ingredients (Vargas & Hanandeh, 2018). Furthermore, in terms of waste reduction practices, it can be noted that most of the respondents agree that the restaurant uses durable items rather than single-use items, local produce in food preparation, and strategies for reducing water waste. Wu and Teng (2022) stated that donating leftovers to charity organizations is one of the several strategies that can help reduce food waste in buffet restaurants. Further, Kim and Hall (2020) mentioned that when a restaurant allows for consumer participation in sustainability practices, consumer attachment to the restaurant together with waste reduction practices the restaurant is increased, in addition, participation in waste reduction and loyalty to sustainable restaurants build up the knowledge of the relationship between self-oriented green experiential value and consumer trust in a green hospitality business. Customers are often impacted to support natural and/or local agriculture because they believe they are more sustainable than conventional agriculture (McCarthy & Liu, 2017). In terms of the respondents' participation in sustainable practices, it can be noted that they highly agree that they are willing to participate in the restaurant's pro-environmental practices, reducing waste practices, and participating in almost all pro-environmental practices to reduce waste. Wu and Teng (2022) revealed that customer practices play an important role in reducing food waste in buffet restaurants. Making consumers informed of the green option accessible in a restaurant is a key factor to consider when greening.

For instance, it presented that consumers made greener options if they were made aware of the root and greenhouse emission substance of the foods on their menu. Green practices create a green image that has been linked to escalating adoption intention among consumers (Madanaguli, Dhir, Kaur, Srivastava, & Singh, 2022). The attainable information on sustainable practices in the food service sector is escalating moderately, and consumers have started unveiling positive signs of restaurants being more environmentally aware and functional. It is also indicated that consumers choose restaurants that follow green procedures and practices (Chaturvedi, Kulshreshtha, Tripathi, & Agnihotri, 2022).

The result shows that there is a weak positive correlation between the respondents' demographic profile and food sustainability practices. In terms of food sustainability practices, there is a weak positive correlation in terms of sex which is categorized as female. Zhao, Gong, Li, Zhang, and Sun (2021) stated that gender differences in green consumption are significant with women demonstrating a stronger green consumption intention and purchasing more eco-friendly products compared with men. Furthermore, it was also stated in the study that women also waste less food than men. Females are less likely than males to waste food, and more likely to purchase local and organically produced food due to a consideration for healthy and sustainable food products (McCarthy & Liu, 2017). Results reveal that there is a weak positive correlation between waste reduction practices and demographic profile in terms of family monthly income, highest educational attainment, and occupation. Kanchanapibul, Lacka, Wang, and Chan (2014) mentioned that revenues

and education have a notable persuasion on people's ecological and environmental attitudes. They used demographics as segmentation criteria and initiated mid-to-high income and urban women tended to be one domain of green consumers. Concerning respondents' demographic profile and participation in sustainable practices, results reveal that there is a weak positive correlation in terms of age and sex. Schubert (2008) found that the younger and better-educated members of the public seem to be more bothered about issues of environmental quality and more committed to environmental protection. Kuchinka, Balázs, Gavriletea, and Djokic (2018) stated that females are more likely to express their concern for environmental status through day-to-day decisions than males, it is also indicated that males are slightly more distressed about environmental issues than females. Women who prioritize sustainability are not merely customers; they are the diplomats of change, catalysts for innovation, and preservers of the environment (Sustain Your Style, 2023).

Concerning the relationship between diner profile and practices on food waste management, results reveal that there is a weak positive correlation between food sustainability practices and diner profile in terms of price range. Daus and Clement (2023) stated that the desire to pay for sustainability in restaurants is likely to grow as consumers become more knowledgeable about environmental change and as sustainable options become more generally available, however, the desire to pay for sustainability in restaurants changes among age groups and differing factors such as personal values, income, and the perceived relevance of sustainability. Price is the main hurdle to the purchase of organic food.

Hence, one would expect organic food consumers to waste less to avoid the monetary loss associated with wasting quality food (McCarthy & Liu, 2017).

With the relationship between respondents' perceived value and practices on food waste management, the findings indicate that there is a moderate positive correlation between respondents' perceived value and participation in sustainable practices in terms of hedonic value. Kim and Hall (2020) highlighted that environmental concern significantly mitigates the correlation between hedonic and utilitarian values and dining etiquette. These findings show that customers with higher levels of environmental awareness have enhanced satisfaction while dining at restaurants with sustainable practices with subsequent increases in loyalty to restaurants and participation in sustainable practices. In terms of the relationship between perceived value and waste reduction practices, the results show that there is a moderate positive correlation. The findings show that sustainable restaurant practices have a favorable outstanding effect on customer hedonic value on waste reduction (Kim & Hall, 2020). Results revealed that there is a moderate positive correlation between participation in sustainable practices and utilitarian value. Teng and Wu (2019) revealed that utilitarian value plays a pivotal role in attitude intention, which means the experience of eating at a sustainable restaurant is more relevant and characterized as a vigorous goal-oriented and instrumental event, relatively than as an essentially pleasurable activity. This will in turn strengthen the consumers' insight into the utilitarian value of sustainable restaurants, further fostering preferences for and supporting sustainable restaurants.

The result shows that there is a weak positive correlation between

respondents' perceived value and food sustainability practices in terms of hedonic value, and there is also a weak positive correlation between perceived value and food sustainability practices in terms of utilitarian value. Kim and Hall (2020) mentioned that once restaurant goers have received gratification and satisfaction from eating at sustainable restaurants, then diners are more likely to participate in food sustainability practices as well as being committed to the restaurant, resulting in high-level restaurant revisit intentions. There is a weak positive correlation between perceived value and waste reduction practices in terms of hedonic value. The authority of hedonic value on customers habits (i.e., participation in waste reduction routines and commitment to sustainable restaurants in this study substantially expanded understanding of the correspondence between sustainable restaurant consumers' viewed hedonic value and their green restaurant behavioral intent in terms of sustainability (Teng & Wu, 2019).

CONCLUSION

The result of this study showed that the majority of the respondents belong to the age group 18-25 years old, females, single, with a family monthly income of Php9,521–Php9,040, undertook education until college, and mostly are students.

In terms of diner profile, the majority of the respondents dine out for family gatherings less than five times a month, prefer Filipino cuisine, and spend Php251–Php500 in buffet restaurants.

In terms of hedonic value, most of the respondents agree that dining at a restaurant that reduces waste is a happy experience. For utilitarian value, most of the respondents agree that reducing waste at restaurants helps offer good value for the price.

In terms of food sustainability practices, most of the respondents agree that the restaurant primarily uses local food and restaurant uses certified sustainable seafood/fish (e.g., MSG). In terms of waste reduction practices, the majority of the respondents agree that restaurant uses strategies for reducing food waste. The participation of respondents in sustainable practices, they're willing to participate in pro-environmental practices at restaurants.

There is a significant relationship between respondents' demographic profile and practices on food waste management. Specifically, a weak positive correlation exists between respondents' sex and food sustainability practices. Also, weak positive correlation exists between respondents' family monthly income, and highest educational attainment, and waste reduction practices. Lastly, there is a weak positive relationship between respondents' age, sex, and participation in sustainable practices.

Regarding the relationship between respondents' diner profile and practices on food waste management, there is a significant relationship between price range and food sustainability practices.

Concerning the relationship between respondents' perceived value and practices on food waste management, there is a significant relationship between respondents' hedonic value and participation in sustainable practices, food sustainability practices, and waste reduction practices. In terms of utilitarian value, there is a significant relationship with participation in sustainable practices, waste reduction practices, and food sustainability practices.

It is suggested that local government units create an awareness

program about food waste management that will benefit buffet restaurants by conducting orientation and information seminars in Barangay.

It is advised to implement food waste management in all food establishments to spread more awareness by having a stricter no leftover policy which will be innate to the consumers each time they visit any food establishment for them to minimize food leftovers on their tables.

It is encouraged that restaurants should do proper disposal of food waste at food banks to maximize food use and minimize food waste from consumers.

It is beneficial to future researchers to have a well-represented and balanced number of respondents per category. Thus, a proper number of representations of a demographic profile would be more useful, significant, and reliable results of the study.

It is preferable that responsible consumption and production must be an integral part of restaurant operations.

It is a good idea that future researchers explore not only Filipino cuisine but also international cuisine in buffet restaurants, and they must explore other types of food establishments such as fast-food chains, and casual and fine-dining restaurants.

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Boosting Grade 7 engagement: Transforming computer lessons with augmented reality

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ABSTRACT

Traditional teaching methods in computer hardware education often fail to engage students effectively, leading to disinterest and poor concentration. This study aimed to strengthen Grade 7 students' engagement in connecting computer ports and peripheral devices using Augmented Reality (AR) technology. Employing a one-group pretest-posttest design within an action research framework, the study involved 64 students at Ilocos Norte College of Arts and Trades (INCAT). The Analysis, Design, Development, Implementation, and Evaluation (ADDIE) Model guided the AR intervention design, with data collected through surveys, validity rating scales, and interviews. Pre-intervention results showed low student engagement with a mean score of 1.55, interpreted as not engaged. Post-intervention, the mean score significantly increased to 3.73 interpreted as highly engaged, with paired t-test results confirming improvement ($t = -15.32$, $p < 0.001$). The AR application was rated highly valid for content, instructional, and technical quality. Assessment of the intervention based on student and teacher experiences revealed positive outcomes in Effectiveness, Accessibility, Satisfaction, Collaboration, and Implementation. These findings demonstrate AR's potential to address engagement challenges in computer hardware education, providing immersive and interactive learning experiences. The study contributes to evidence supporting AR's role in STEM education and suggests its incorporation can significantly improve learning outcomes and address limitations of traditional instructional methods.

Keywords: augmented reality, student engagement, computer education, action research

INTRODUCTION

In the rapidly evolving landscape of education, Information and Communications Technology (ICT) has emerged as a cornerstone of modern pedagogical practices. The pervasive influence of ICT across societal domains necessitates its integration into educational settings, particularly as schools strive to create inclusive environments that address diverse student needs and prepare learners for the dynamic technological landscape (Herpich, Nunes, Petri, & Tarouco, 2019; Wei, Kuah, Ng, & Lau, 2021). This paradigm shift has catalyzed a transformation in traditional classroom dynamics, ushering in novel learning environments that leverage the potential of digital technologies.

The educational sector has witnessed a proliferation of innovative

teaching strategies, including e-learning, blended learning, and mobile learning, which harness the capabilities of various technological resources. From computers and tablets to smartphones and immersive headsets, these tools have demonstrated their efficacy in enhancing the educational experience (Yang & Liao, 2014; Ibáñez & Delgado-Kloos, 2018). The continuous advancement of technology not only facilitates the development of new educational alternatives but also enriches the learning process, fostering engagement and improving outcomes (Fabro, Rivera, Rivera, Rabang, Asuncion, & Limon, 2023; Mhlongo, Mbatha, Ramatsetse, & Dlamini, 2023; Nincarean, Alia, Halim, & Rahman, 2013;).

In the Philippine context, ICT plays a pivotal role in the K to 12 education system. The Department of Education's (DepEd) Computerization Program (DCP) exemplifies the nation's commitment to equipping public schools with cutting-edge technologies, thereby enhancing the teaching and learning experience (DepEd, 2010). This initiative aligns with the 21st-century educational demands, emphasizing the integration of ICT to cultivate technological literacy among Filipino learners through interactive and meaningful learning experiences. Supporting this perspective, Kaylani (2024) highlights that technology not only accommodates diverse learning styles but also encourages self-directed learning and digital literacy—skills that are crucial for thriving in today's digital landscape. Ultimately, this approach equips learners with the competencies necessary for success in an increasingly interconnected world.

Ilocos Norte College of Arts and Trades (INCAT), a prominent public technical-vocational institution

implementing the mandates of the Strengthened Technical-Vocational Education Program - Competency Based Curriculum (STVEP-CBC) has embraced this technological mandate, aligning its educational approach with DepEd's vision. By incorporating the Internet and Computing Fundamentals (ICF) subject into its Junior High School (JHS) curriculum, as stipulated in DepEd Memorandum No. 353, s. 2008, INCAT aims to equip students with essential technological skills crucial for navigating the digital age. However, despite these progressive initiatives, challenges persist in the practical implementation of ICT-enhanced learning. Observations during off-campus Field Studies (FS) revealed significant learning gaps in Grade 7 ICF classes, particularly in topics related to computer hardware. Students exhibited disengagement and lack of interest, highlighting the limitations of traditional teaching methods in addressing complex, visual subjects.

To address these challenges, there is a pressing need for innovative pedagogical approaches. Augmented Reality (AR) emerges as a promising solution that provides an interactive experience, seamlessly blending real-world elements with computer-generated information. Recent studies highlight AR's potential to significantly enhance student engagement in educational settings (Cabaleiro-Cerviño & Vera, 2020). Additionally, Liono, Amanda, Pratiwi, and Gunawan (2021) assert that AR can greatly improve learning, particularly for abstract concepts, by visualizing them as 3D objects. This visualization transforms learning into a more concrete and engaging experience, ultimately boosting student motivation and retention of information. By leveraging AR, educators can create dynamic learning environments

that facilitate deeper understanding and encourage active participation. The integration of AR technology alongside conventional teaching methods facilitates interaction with three-dimensional models and simulations, fostering a dynamic and participatory learning environment that promotes information retention and critical thinking skills development (Abinaya & Vadivu, 2024; Fabro, Rivera, Sambrano, Dinoy, Alcozer, & Agustin, 2024).

This study focuses on leveraging AR technology to augment the engagement of Grade 7 students at INCAT, specifically targeting the topic of computer ports and peripheral device connection. By developing and implementing an AR-based instructional intervention, this research aims to address the observed learning gaps and enhance student engagement during the second quarter of the School Year (SY) 2023-2024. Moreover, this research aligns with the United Nations' Sustainable Development Goals (SDG), particularly SDG4 (Quality Education) and SDG10 (Reduced Inequalities). By harnessing AR technology, this study seeks to create an inclusive learning environment that caters to diverse learning styles, supporting SDG4's target of ensuring equitable access to quality technical education. Additionally, the innovative use of AR contributes to SDG10 by potentially bridging the digital divide and promoting educational inclusion. AR can provide interactive and engaging learning experiences, making technical education more accessible and appealing to learners with different learning preferences (Wu, Lee, Chang, & Liang, 2013). For instance, AR can enable students to visualize complex concepts in three dimensions, allowing them to interact with virtual objects and environments. This can be particularly

beneficial for students who learn best through hands-on experiences or visual aids. Furthermore, the adaptive nature of AR technology enables individualized instruction, making it particularly beneficial for students with diverse learning requirements and those needing extra academic support.. By offering a more engaging and accessible learning environment, AR has the potential to empower students from diverse backgrounds and promote educational equity (Quintero, Baldiris, Rubira, Cerón, & Velez, 2019).

This study not only addresses immediate learning challenges at INCAT but also contributes to the broader discourse on technology-enhanced learning in the 21st century. By exploring the potential of AR in education, this research aims to pave the way for more engaging, inclusive, and effective learning experiences that prepare students for the technological demands of the future.

METHODOLOGY

This study employed a one-group pretest-posttest design within an action research framework, utilizing a mixed-method approach that integrated embedded development and validation design. Research questions were meticulously formulated to examine student engagement comprehensively. The study followed a multi-phase data collection process, with all Grade 7 participants receiving the AR intervention. Data acquisition was facilitated through various instruments, including an engagement survey checklist, performance rubric, unstructured interviews, and a validity rating scale for intervention validation.

The research process as shown in Figure 1, guided by the Analysis, Design, Development, Implementation,

and Evaluation (ADDIE) Model, encompassed several key phases. In the Analysis phase, a pretest was conducted to evaluate baseline engagement levels and identify specific learning objectives related to computer hardware connections.

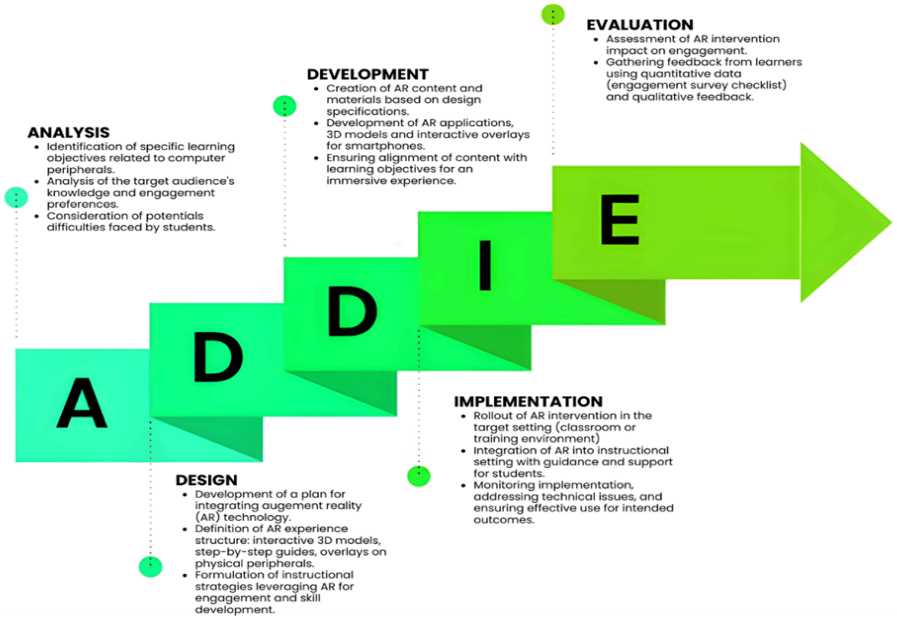

Figure 1. The research process

The *Design* phase involved developing a plan to integrate AR technology into the instructional intervention, incorporating various AR overlays such as gallery features, step-by-step video demonstrations, 3D models, and interactive elements (Jaber, Swidan, & Fried, 2023). During the *Development* phase, AR content and materials were created based on design specifications, ensuring alignment with learning objectives. The *Implementation* phase began with the introduction of a tailored AR intervention to bolster student engagement. Students used augmented sheets to access AR content, explore computer ports, and

practice connections in a guided, immersive environment. The intervention was tested across the initial, middle, and post-implementation stages to assess its consistency and effectiveness as seen in Figure 2. Following the intervention, a posttest was administered to evaluate engagement levels, corresponding to the Evaluation phase of the ADDIE model.

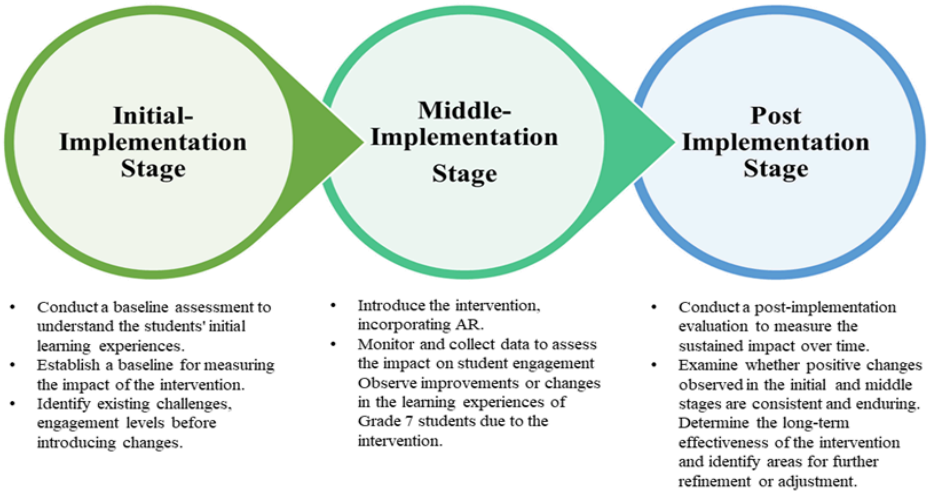

Figure 2. The implementation process.

Throughout the process, the intervention's validity was rigorously assessed by various experts, including ICT specialists and instructional material developers. A comparative analysis juxtaposed pre- and post-intervention engagement levels within the same cohort of students. The study concluded with a comprehensive evaluation of the intervention based on both quantitative measures i.e. engagement survey checklists and skill assessments and qualitative feedback from students and teachers.

This systematic approach, framed by the ADDIE model, allowed for a thorough investigation of the AR

intervention's impact on student engagement in computer hardware education, while also providing opportunities for iterative refinement of the instructional strategy. Data analysis employed a combination of qualitative and quantitative methods. Thematic analysis was utilized to identify patterns in qualitative data, while inferential statistics were employed to evaluate the intervention's effectiveness quantitatively.

These analyses culminated in evidence-based recommendations for enhancing student engagement.

It is imperative to acknowledge that the absence of a control group in this research design presents a limitation. This constraint makes it challenging to attribute observed changes in student engagement solely to the AR intervention. While the pretest-posttest comparison yields valuable insights, it is plausible that extraneous factors may have influenced the observed variations in student engagement. Despite this limitation, this research design provides a comprehensive framework for investigating the impact of AR intervention on student engagement in computer hardware education.

Locale of the Study

This investigation was conducted at the INCAT, situated in Barangay 5, P. Gomez Street in Laoag City, Ilocos Norte. INCAT is a secondary trade technical-vocational institution offering both JHS and Senior High School (SHS) programs, recognized as the preeminent technical-vocational (Tech-Voc) institution in the region. Its mission is to provide comprehensive academic and skills training to foster the development of responsible and productive citizens. The study specifically targeted Grade 7 students at INCAT, with the selection of this

institution predicated on two primary factors: the researchers' prior identification of learning gaps during their off-campus Field Study, and the enrollment of the target participants at this educational establishment. INCAT's distinctive identity as a technical-vocational school, renowned for its emphasis on practical, hands-on learning, provided an optimal environment for investigating the efficacy of AR in enhancing learning outcomes in specific technical subjects.

As a Tech-Voc institution, INCAT is distinguished by its curriculum alignment with evolving workforce needs, attracting a diverse student population with varying levels of technical proficiency. This context presented an ideal setting to assess the impact of AR interventions in enhancing technical education. However, it is imperative to acknowledge several limitations inherent in the chosen research setting. The confinement of the study to a single, specialized technical-vocational institution limited the generalizability of findings to other educational contexts. INCAT's unique characteristics, including its emphasis on practical skills, technical infrastructure, and student predisposition towards hands-on learning, have influenced the outcomes of the AR intervention in ways that might not be replicable in different educational settings. The exclusive focus on Grade 7 students further constrains the applicability of results to other grade levels or age groups.

Furthermore, this study primarily measured the immediate or short-term effects of the AR intervention. The data collection and assessment of learning outcomes were conducted in close temporal proximity to the implementation of the AR technology,

limiting understanding of the long-term impact of this educational approach. The distinctive educational culture at INCAT, shaped by its technical-vocational focus, may have created an environment particularly receptive to AR technology integration. While ideal for this study's purposes, this specialized setting may not be representative of the broader educational landscape, including general high schools or institutions with different curricular emphases. The study's constraints suggest the need for careful analysis of results, while pointing toward future research opportunities that could employ more extensive sampling methods and long-term investigations.

Population and Sampling

The primary data source comprised 64 Grade 7 students from two sections. Participant selection utilized total enumeration techniques, ensuring the inclusion of all students enrolled in these classes. The students actively engaged in various phases of the intervention and participated in random informal interviews conducted by the researchers. However, students who opted to discontinue their participation for personal reasons were excluded from the study.

A panel of experts, selected through purposive sampling, was tasked with assessing the validity of the intervention. The selection criteria for these experts included: (1) a minimum of two years' experience as Master Teacher, (2) with a Master's degree relevant to the field, and (3) willingness to participate in the study.

The research spanned a comprehensive six-month period for student participants, while validators engaged in a one-month duration to evaluate the developed instructional intervention. Their assessment focused on content quality,

instructional efficacy, and technical aspects.

Participant involvement was contingent upon parental consent, with the inclusion process adhering to informed consent protocols. This approach not only upheld ethical standards but also emphasized the voluntary nature of participation, underscoring the collaborative essence of this research endeavor among researchers, participants, and their parents.

The study's design, incorporating both student engagement and expert validation, ensured a robust evaluation of the instructional intervention's effectiveness. This multi-faceted approach allowed for a comprehensive assessment of the intervention's impact on student engagement while also validating its quality and efficacy through expert analysis.

Research Instruments

This study employed five research instruments to ensure comprehensive data collection and analysis: the Engagement Survey Checklist for Students, Skill Assessment Rubric, Validity Rating Scale, Interview Guide, and Needs Assessment Survey.

The Engagement Survey Checklist for Students, adapted from Singh and Srivastava (2014), comprised an eight-item scale utilizing a four-point rating system. This instrument assessed students' engagement levels before and after the intervention, with descriptive interpretations ranging from "Not Engaged" to "Highly Engaged." Both researchers and the resource teacher evaluated students' engagement using this tool.

The Skill Assessment Rubric, adapted from the school's curriculum guide, focused on evaluating students' proficiency in connecting computer ports and peripheral devices, as well

as their adherence to safety work habits. This rubric consisted of five criteria, each graded on a scale of one (1) to five (5), with interpretations ranging from "Needs Improvement" to "Excellent."

The Needs Assessment Survey, a two-part instrument, was crucial in gathering stakeholder input for developing the proposed instructional intervention. The first part presented potential interventions addressing identified engagement issues while the second part served as an interview guide exploring how these interventions could enhance student engagement and learning outcomes in the ICT course.

The Validity Rating Scale, based on DepEd's Guidelines and Learning Resources Management and Development System (LRMDS) Assessment and Evaluation (DepEd, 2009), was utilized to assess the validity of the developed intervention. This comprehensive tool evaluated content quality, instructional quality, and technical quality using a 19-item scale. Validators employed a four-point Likert scale ranging from "Not Valid" to "Highly Valid."

The Interview Guide, comprising five carefully selected questions based on related literature, was used to conduct unstructured interviews before and after the intervention. This qualitative tool aimed to gather in-depth insights into the perceptions and experiences of Grade 7 students and teachers regarding the intervention and the topic.

These instruments collectively ensured a multi-faceted approach to data collection, combining quantitative and qualitative methods to provide a comprehensive understanding of the AR intervention's impact on student engagement and learning outcomes in demonstrating computer port and peripheral connections.

Data Collection Procedures

The data collection procedure was designed and executed with a strong emphasis on ethical considerations and adherence to the ADDIE model. Initially, the researchers sought formal permission from the Schools Division Superintendent of Laoag City, providing detailed information about the study's objectives, methodology, and expected outcomes. Upon receiving authorization, the school principal was informed and tasked with disseminating information to relevant parties, including subject teachers, Grade 7 students, and their parents. Ethical standards were prioritized throughout the process, with a strong emphasis on voluntary participation and obtaining informed consent from all participants and their parents. This approach not only ensured compliance with ethical research practices but also fostered a collaborative environment among researchers, participants, and their families.

Aligning with the ADDIE model, the *Analysis* phase began with the administration of an engagement survey checklist to assess students' initial level of engagement with the topic. Performance tasks were then assigned to evaluate students' practical knowledge of connecting peripherals and cables to their intended ports. A needs assessment survey questionnaire was conducted with key stakeholders, including ICT teachers and a sample of Grade 7 students, to gather insights on potential interventions.

In the *Design* phase, the researchers developed a comprehensive AR-based instructional intervention based on the needs assessment results. The *Development* phase involved creating the intervention materials and subjecting them to thorough validation by

appointed experts to ensure effectiveness. During the *Implementation* phase, the AR-based instructional intervention was deployed in the classroom setting, with researchers providing necessary guidance and support. The *Evaluation* phase encompassed a follow-up student engagement survey, post-intervention performance tasks, and analysis of collected data to compare pre-intervention and post-intervention engagement levels and performance results.

The data collection extended to assessing the significant difference in Grade 7 students' engagement and task demonstration abilities before and after the AR instructional intervention. Furthermore, the researchers examined the experiences of students and teachers regarding the use of the intervention, aiming to capture nuances and perceptions of AR's effectiveness. This comprehensive approach, guided by the ADDIE model and grounded in ethical considerations, ensured a thorough and rigorous investigation of the intervention's impact on student learning and engagement in demonstrating computer port and peripheral connections.

Data Analysis

This study employed a comprehensive data analysis approach to address the research questions and assess the effectiveness of the AR intervention in strengthening the engagement of Grade 7 students in demonstrating proper connection of computer ports and peripheral devices. The analysis encompassed descriptive statistics, thematic analysis, and inferential statistics, ensuring a robust examination of both quantitative and qualitative data.

Descriptive Statistics. For research questions one, three, and four, descriptive statistics were utilized to provide a quantitative summary of student engagement and assessment of the intervention. This approach offered clear insights into central tendencies and variations within the observed variables, both before and after the implementation of the AR intervention. Measures such as frequency and mean were employed to present a concise overview of the data.

Needs Assessment Analysis. Research question two was addressed using a combination of basic descriptive statistical treatments on data from the needs assessment survey questionnaire. This included frequency distributions to summarize intervention preferences, percentages to represent stakeholder opinions, and ranking to order interventions based on stakeholder preferences. This comprehensive approach enabled the development team to prioritize and implement the most favored interventions for addressing challenges in the ICF class.

Validity and Acceptability Analysis. The overall validity and acceptability of the instructional material were determined by calculating mean scores across all dimensions and comparing them to predetermined thresholds, ensuring a rigorous evaluation of the developed intervention.

Inferential Statistics. To address research question five, which sought to determine the significant difference in student engagement before and after the AR intervention, inferential statistics were applied. Specifically, a Paired t-Test was utilized, with a significance level of 0.05. This test was deemed appropriate for analyzing dependent samples and aligns with

standard practices in educational research within the social sciences.

Thematic Analysis. To address research question six, which focused on understanding and interpreting the assessment of the intervention based on the experiences of students and teachers, thematic analysis was employed. Following Braun and Clarke's (2006) approach, interview statements were transcribed, coded, and categorized into themes, allowing for a rich interpretation of participants' experiences.

This multi-faceted analytical approach ensured a thorough examination of the AR intervention's impact on student engagement and learning outcomes, combining quantitative rigor with qualitative depth to provide comprehensive insights into the effectiveness of the developed instructional material.

Ethical Considerations

This study was conducted with a commitment to the highest ethical standards by ensuring that the rights and dignity of the participants are protected throughout the research process. A comprehensive ethical framework was implemented, encompassing all stages from data collection to reporting, to guarantee a legally compliant and ethically sound progression of the study.

Prior to data collection, the research process began with obtaining formal approval from students, parents/guardians, and school authorities. Each participant received clear explanations about the study's goals and procedures, with explicit emphasis on their freedom to withdraw from the research without negative impact. Privacy and confidentiality were prioritized through the implementation of robust data protection measures. All collected data

underwent a thorough anonymization process using sophisticated coding systems. Physical documents, including consent forms, assent forms, validation tools, and performance assessment rubrics, were securely stored in sealed envelopes to prevent unauthorized access or data leakage.

The AR application utilized in the intervention was designed as a standalone system, minimizing potential data breaches and unauthorized access to sensitive student information. Participants received comprehensive briefings on the proper use of AR technology and were closely supervised during its implementation to ensure their safety and prevent misuse. Validators were bound by stringent ethical guidelines, including the signing of confidentiality agreements to safeguard against unauthorized disclosure of sensitive information. While monetary compensation was not provided, participants benefited from exposure to an innovative instructional intervention utilizing cutting-edge AR technology. This non-monetary reward aligned with ethical principles of fair participant treatment while avoiding undue influence.

This multifaceted ethical approach not only ensured the integrity of the research process and protected participants' privacy but also upheld the study's fundamental commitment to the pursuit of knowledge and truth while meticulously avoiding errors or ethical breaches. By adhering to these rigorous ethical standards, the study maintained its scientific validity while respecting the rights and well-being of all involved parties.

RESULTS AND DISCUSSION

Engagement of Grade 7 students before the intervention

The results presented in Table 1 provide insights into the engagement levels of Grade 7 students in demonstrating how to connect computer ports and peripherals before any intervention was implemented. The overall mean engagement score of 1.55 falls within the "Not Engaged" (NE) category, indicating a significant lack of student engagement across all measured indicators.

Table 1. Results on the engagement of Grade 7 students in demonstrating how to connect computer ports and peripherals before the intervention.

Indicators	Mean	DI*
● The student engaged in class	1.41	NE
● The student engaged in the learning process	1.63	NE
● The student is very interested in learning	1.52	NE
● The student like what they are learning	1.53	NE
● The student think learning is not boring	1.64	NE
● The student work hard on the subject	1.49	NE
● The student strives to exceed the expectations of their teacher	1.61	NE
● The student contributes to class discussions	1.58	NE
Overall Mean	**1.55**	**NE**

*Descriptive Interpretation (DI): 3.25 - 4.00 - Highly Engaged (HE); 2.50- 3.24 - Moderately Engaged (ME); 1.75- 2.49 - Slightly Engaged (SE); 1.00- 1.74 - Not Engaged (NE).

This low level of engagement suggests that students were generally disinterested and uninvolved in the learning process related to computer hardware connections. Specifically, the data reveals that students were not actively participating in class discussions (mean = 1.58), showed little interest in the subject matter (mean = 1.52), and did not perceive

the learning experience as engaging or enjoyable (mean = 1.53). Moreover, the low scores in working hard on the subject (mean = 1.49) and striving to exceed teacher expectations (mean = 1.61) indicate the students' lack of motivation and effort.

The implications of these findings are significant for educational practice and research. Firstly, they highlight a critical need for innovative teaching strategies to enhance student engagement in technical subjects like computer hardware. The consistently low engagement scores across all indicators suggest that traditional teaching methods may be inadequate for capturing students' interest and facilitating active learning in this area, a concern echoed in recent literature (Bano, Zowghi, Kearney, Schuck, & Aubusson, 2018; Munna & Kalam, 2021).

These results corroborate existing research on the challenges of teaching technical subjects in secondary education. For instance, a study by Johnson, Jacovina, Russell, and Soto (2016) found similar disengagement patterns in STEM subjects, particularly in topics requiring hands-on experience. Furthermore, the findings align with research by Özeren and Top (2023), emphasizing the importance of interactive and immersive learning experiences in enhancing student engagement in technology-related subjects.

The low engagement levels observed in this study underscore the potential value of implementing novel educational technologies, such as AR, as suggested by recent studies (Abinaya & Vadivu, 2023; Swargiary, 2023). These technologies have shown promise in increasing student interest and participation in technical subjects by providing immersive and interactive learning experiences.

In conclusion, the pre-intervention engagement data presents a clear case for the need to explore and implement more effective teaching strategies in computer hardware education. It provides a strong rationale for investigating the potential of AR and other innovative technologies to address the engagement challenges identified in this study (AlGerafi, Zhou, Oubibi, & Wijaya, 2023; Herpich et al., 2019).

Proposed intervention in teaching proper connection of computer ports and peripheral devices

Based on Table 2, it is evident that both students and teachers strongly prefer AR demonstrations as an intervention for Grade 7 learners in ICT courses, with 39.1% of students and 44.4% of teachers ranking it as their top choice. This preference for AR aligns with current trends in educational technology that emphasize immersive and interactive learning experiences (Familoni & Onyebuchi, 2024).

The strong preference for AR demonstrations is further supported by the stakeholders' interviews. One student (personal communication, 2024) remarked, "AR demos make it easier to visualize complex computer parts. It's like they're right in front of me!" This sentiment was echoed by a teacher (personal communication, 2024) who noted, "AR demonstrations have revolutionized how I teach computer hardware concepts. Students are much more engaged."

The implications of these findings suggest that integrating AR into ICT curricula could significantly enhance student engagement and learning outcomes. This corroborates with recent research by Nikimaleki and Rahimi (2022), who found that AR implementations in middle school science classes led to improved

conceptual understanding and increased student motivation.

Another student (personal communication, 2024) highlighted the interactive nature of AR, stating, “I can actually see how different computer components connect and work together in 3D. It's so much clearer than just reading about it.” This hands-on, visual approach seems to resonate strongly with learners at this age. A teacher (personal communication, 2024) added, "AR allows us to bring complex hardware into the classroom without the need for physical equipment. It's cost-effective and provides a consistent learning experience for all students."

Table 2. Proposed intervention in teaching proper connection of computer ports and peripheral devices.

Proposed Interventions	**Students**			**Teachers**		
	f*	**%***	**Rank**	**f***	**%***	**Rank**
● Interactive digital modules	14	21.9	2	2	22.2	2
● Peer-led teaching sessions	10	15.6	3	1	11.1	4
● Gamified learning activities	6	9.4	5	1	11.1	4
● Augmented reality demonstrations	25	39.1	1	4	44.4	1
● Project-based activities	9	14.1	4	1	11.1	4

*f – frequency; % - percentage

Interactive digital simulations rank second in preference for both students (21.9%) and teachers (22.2%). This suggests a strong inclination towards technology-enhanced learning environments that offer hands-on experience without the need for physical hardware. The popularity of both AR and digital simulations indicates a shift towards more

immersive and interactive learning tools in ICT education (Rubio-Tamayo et al., 2017).

Peer-led teaching sessions emerge as the third most preferred intervention for students (15.6%) while ranking joint fourth for teachers (11.1%). This preference for peer learning aligns with social constructivist theories of education and highlights the value of collaborative learning in ICT education (Saleem, Kausar, & Deeba, 2021).

Project-based activities, ranking fourth for students (14.1%) and joint fourth for teachers (11.1%), demonstrate the importance of applied learning in ICT education. This approach allows students to engage with real-world problems and develop practical skills, which is crucial in the rapidly evolving field of technology (Boss & Krauss, 2022; Shin, 2018).

Gamified learning activities, while ranking last for students (9.4%), still garnered some support, tying for fourth place among teachers (11.1%). This suggests that while gamification has potential in ICT education, it may not be as highly valued as other interventions for this specific context and age group.

The implications of these findings suggest a need for a multi-faceted approach to ICT education for Grade 7 students, with a strong emphasis on immersive technologies like AR and interactive simulations. However, the value of traditional pedagogical approaches such as peer learning and project-based activities should not be overlooked. This corroborates with recent research by Nikimaleki and Rahimi (2022), who found that a blended approach incorporating both high-tech and traditional teaching methods yielded the best results in middle school STEM classes.

These insights provide valuable guidance for curriculum designers and educators in developing effective ICT

education programs for middle school students, emphasizing the importance of balancing cutting-edge technology with proven pedagogical strategies.

Validity of the AR

The results presented in Table 3 provide a comprehensive evaluation of the AR application developed for Grade 7 students, focusing on content quality, instructional quality, and technical quality. The overall mean score of 3.85 indicates that the AR application is highly valid (HV) across all three dimensions.

In terms of content quality, the AR application received high ratings (composite mean = 3.88), suggesting that it aligns well with the DepED Learning Competencies, is accurate, up-to-date, and relevant to real-life situations. This finding corroborates recent research highlighting the importance of content alignment and relevance in educational technology (Hwang, Wang, & Lai, 2020). The instructional quality of the AR application also received high marks (composite mean = 3.80), indicating that it effectively achieves its defined purpose, has clear learning objectives, and is engaging for students. This aligns with studies emphasizing the importance of well-designed instructional materials in AR-based learning environments (Akçayır & Akçayır, 2017).

The technical quality of the AR application was rated highly (composite mean = 3.89), suggesting that it is user-friendly, visually appealing, and technically sound. This finding supports research by Ibáñez and Delgado-Kloos (2018), who emphasized the importance of technical quality in AR applications for educational purposes. These results have significant implications for educational practice and research. Firstly, they suggest that well-designed

AR applications can effectively align with curriculum standards while providing engaging and relevant learning experiences. This supports the potential of AR as a valuable tool in enhancing traditional educational methods, as noted by Garzón, Pavón, and Baldiris (2019). Secondly, the high ratings across all dimensions indicate that AR can successfully integrate content, instructional, and technical qualities, addressing a common challenge in educational technology development (Bacca Baldiris, Fabregat, Graf, & Kinshuk, 2014). The findings also corroborate recent research on the effectiveness of AR in education. For instance, a meta-analysis by Yilmaz and Goktas (2017) found that AR applications can significantly improve learning outcomes when properly designed and implemented. Similarly, Tzima Styliaras, and Bassounas (2019) highlighted the potential of AR to enhance student engagement and motivation, which aligns with the high ratings for instructional quality in this study.

Table 3. Results on the validation of the AR for Grade 7 students.

Indicator	**Mean**	**DI**
Content Quality		
The content of the AR:		
● is consistent with topics/skills found in the DepED Learning Competencies for the subject and grade/year level it was intended	4.00	HV
● has developed to contribute to enrichment, reinforcement, or mastery of the identified learning objectives	4.00	HV
● is accurate	4.00	HV
● is up-to-date	4.00	HV
● is logically developed and organized	4.00	HV
● is free from cultural, gender, racial, or ethnic bias	3.75	HV
● has stimulated and promoted critical thinking	3.75	HV
● is relevant to real-life situations	4.00	HV
● has language appropriate to the target user level	3.75	HV

● has promoted positive values that support formative growth	3.50	V
Composite Mean	**3.88**	**HV**
Instructional Quality		
The AR:		
● has a purpose of the material is well defined	4.00	HV
● has material achieves its defined purpose	4.00	HV
● has learning objectives are clearly stated and measurable	4.00	HV
● has a level of difficulty is appropriate for the intended target user	3.75	HV
● has graphics / colors / sounds are used for appropriate instructional reasons	4.00	HV
● has material is enjoyable, stimulating, challenging, and engaging	4.00	HV
● has material effectively stimulates creativity of target user	3.35	V
● has feedback on target user's responses is effectively employed	3.50	V
● has target user can control the rate and sequence of presentation	3.50	V
● has instruction that are integrated with target user's previous experience	4.00	HV
Composite Mean	**3.80**	**HV**
Technical Quality		
The AR:		
● has video links that enhance understanding of the concept	4.00	HV
● has screen displays (text) that are uncluttered, easy to read, and aesthetically pleasing	4.00	HV
● has visual presentations (non-text) that are clear and easy to interpret	4.00	HV
● has visuals sustain interest and do not distract the user's attention	4.00	HV
● has visuals provide accurate representation of the concept discussed	4.00	HV
● has a design allows the target user to navigate freely through the material	4.00	HV
● has material can easily and independently be used	3.75	HV
● has material will run using minimum system requirements	3.75	HV
● has a program is free from technical problems	3.50	V
Composite Mean	**3.89**	**HV**
Overall Mean	**3.85**	**HV**

Note: DI - Descriptive Interpretation 3.51 - 4.00 Highly Valid (HV); 2.51 - 3.50 Valid (V); 1.51 - 2.50 Moderately Valid (MV); 1.00 - 1.50 Needs Improvement (NI)

In conclusion, the validation results of this AR application provide strong evidence for its potential effectiveness in supporting Grade 7 students' learning. The high validity scores across content, instructional, and technical qualities suggest that this AR application could serve as a model for future educational technology developments in similar contexts.

Engagement of Grade 7 students after the intervention

Table 4 presents the level of student engagement after the implementation of AR as an educational intervention. The mean score of 3.73 indicates a high level of engagement among students, categorized as Highly Engaged (HE). Notably, the aspect with the highest mean score, 3.80, pertains to engagement within the classroom environment, further reinforcing the notion of high engagement (HE). This underscores the efficacy of AR in strengthening student engagement, particularly in facilitating meaningful interactions within the classroom setting.

The utilization of AR has demonstrated effectiveness in fostering heightened student engagement during classroom activities. By leveraging AR technology, teacher can create immersive learning experiences that captivate students' attention and promote active participation. Through features such as text overlays, 3D models, step-by-step video demonstrations, audio, and link overlays, AR facilitates dynamic interaction between students and learning materials. This finding aligns with the research conducted by Familoni and Onyebuchi (2024), which emphasized the role of AR in enhancing student engagement by

providing multifaceted learning experiences.

Table 4. Results on the engagement of Grade 7 students in demonstrating how to connect computer ports and peripherals after the intervention.

Indicators	**Mean**	**DI***
● The students engaged in class	3.80	HE
● The students engaged in the learning process	3.73	HE
● The students are very interested in learning	3.72	HE
● The students like what they are learning	3.66	HE
● The students think learning is not boring	3.71	HE
● The students work hard on the subject	3.69	HE
● The students strive to exceed the expectations of their teacher	3.73	HE
● The students contribute to class discussions	3.77	HE
Overall Mean	**3.73**	**HE**

*Descriptive Interpretation (DI): 3.25-4.00 - Highly Engaged (HE); 2.50-3.24 - Moderately Engaged (ME); 1.75-2.49 - Slightly Engaged (SE); 1.00-1.74 - Not Engaged (NE).

Further corroborating the effectiveness of AR in enhancing student engagement are studies such as that conducted by Singh and Ahmad (2024) which emphasizes the role of AR in stimulating student engagement by offering immersive learning experiences. By integrating AR technology into educational contexts, students are afforded opportunities to interact with digital content within real-world settings, thereby fostering sustained focus and attentiveness. These findings collectively underscore AR as a potent tool for augmenting engagement within the learning process.

Results of the assessment of the significant difference on the engagement of Grade 7 students before and after implementing the intervention

The data presented in Table 5 provides compelling evidence for the effectiveness of AR intervention in enhancing student engagement in the TVE-ICF class. The significant increase in mean achievement scores from 1.71 to 3.72, with a mean difference of 2.006 and a t-value of 45.805 ($p < 0.001$), indicates a substantial improvement in student engagement. The calculated effect size (Cohen's d = 5.73), exceeding the benchmark for a large effect (0.8), further underscores the magnitude of this improvement.

This finding aligns with Bacca et al.'s (2014) study, which demonstrated that AR significantly improves students' engagement in immersive and interactive learning environments compared to traditional methods. This study highlights the potential of AR to create more engaging and effective learning experiences, leading to improved student outcomes.

Similarly, a study by Akçayır and Akçayır (2017) concluded that AR, as an online video platform, effectively strengthens students' engagement, leading to increased involvement in learning activities before and after its implementation. This finding further supports the idea that AR can be a powerful tool for enhancing student engagement and promoting active participation in learning. Furthermore, the findings of Gill, Irwin, Towey, Zhang, Long, Sun, Yu, & Zheng's (2024) study, which found that AR enhances students' hands-on activities and real-world simulations, further corroborates the potential of AR to promote active participation and deeper learning experiences. This study suggests that AR can provide

students with more engaging and meaningful learning experiences by allowing them to interact with the material in a more hands-on and immersive way.

Table 5. Paired sample t-test results comparing pre-intervention and post-Intervention scores.

Engagement	Mean	Mean Difference	t-test	p-value	Effect Size (Cohen's d)
Before	1.71				
After	3.72	2.006	45.805*	0.000	5.73

*The difference is significant at 1% level; effect size interpretation: 0.2 - small, 0.5 -medium, 0.8 - large

The substantial increase in mean scores and the exceptionally large effect size provide strong evidence that AR is a powerful educational tool, capable of significantly enhancing students' achievement and engagement in learning. The findings from these studies, coupled with the data presented in Table 5, suggest that AR has the potential to revolutionize education by creating more engaging, effective, and impactful learning experiences for students.

Results of the assessment of the developed intervention based on the experience of students and teachers

As can be gleaned from Table 6, the data reveals significant insights into the experiences and perceptions of both groups, providing a comprehensive evaluation of the intervention's effectiveness.

Table 6. Thematic analysis of student and teacher experiences with the AR intervention.

Theme	**Codes**	**Student Experiences**	**Teacher Experiences**
Effectiveness	Academic Impact	Improved understanding of computer ports and peripherals	Observed significant improvement in students' technical knowledge
	Student Engagement	Increased motivation for hands-on activities	Noted increased student engagement in practical tasks
	Skill Development	Enhanced troubleshooting skills	Reported better student performance in troubleshooting
Accessibility	Technology	Found video tutorials easy to use and helpful	Noted the intervention was accessible to students with varying technical expertise
	Resource Availability	Appreciated the variety of learning resources available	Appreciated the ease of integrating resources into lessons
	Inclusivity	Felt the content was suitable for different skill levels	Observed that diverse learning materials catered to different learning styles
Satisfaction	Enjoyment	Enjoyed the interactive nature of workshops and labs	Expressed satisfaction with the comprehensive curriculum
	Flexibility	Valued the flexibility in scheduling practice sessions	Appreciated the adaptability of the intervention to different teaching styles
	Relevance	Found the content relevant to real-world scenarios	Noted increased student interest and participation

Collaboration	Peer Interaction	Benefited from peer interactions during projects	Observed improved peer-to-peer learning
	Group Work	Learned different approaches through group work	Noted enhanced problem-solving skills in group settings
	Sense of Community	Felt a strong sense of community	Reported a more cohesive classroom environment
Implementation	Consistency	Appreciated consistent instructions across different sessions	Reported thorough training sessions for implementation
	Adaptability	Felt the pace was adaptable to individual learning speeds	Noted consistency in teaching methods across different modules
		Found the transition between theory and practice smooth	Appreciated the adaptability of the intervention to various classroom situations

Effectiveness. The intervention demonstrated notable improvements in students' understanding, engagement, and skill development related to computer ports and peripheral devices. Students reported enhanced comprehension and increased motivation for hands-on activities, while teachers observed significant improvements in students' technical knowledge and troubleshooting skills.

A teacher (personal communication, 2024) stated, “I noticed a marked improvement in students' ability to identify and connect various computer ports. Their confidence in handling peripherals increased significantly.” This observation aligns with Kong's (2021) research on experiential learning, which emphasizes that hands-on experiences significantly enhance

technical knowledge. This was also supported by another teacher (personal communication, 2024) who said, “The AR component really sparked students' interest. They were much more engaged in practical tasks than before.” This reflection supports Munna and Kalam (2021) findings that active learning strategies boost student engagement and learning outcomes.

Accessibility. Both students and teachers highlighted the ease of access to learning materials and resources. Students appreciated the user-friendly video tutorials and variety of learning resources, while teachers noted the intervention's suitability for students with varying levels of technical expertise.

One teacher (personal communication, 2024) commented that “the video tutorials were a game-changer. Students could revisit complex concepts at their own pace, which really helped with retention.” This observation is in line with Kumi-Yeboah, Kim, Sallar, and Kiramba's (2020) research, which found that online learning resources enhance independent study and flexibility. In addition, a teacher expressed her appreciation (personal communication, 2024), “I was impressed by how the AR content catered to different learning styles. Visual learners, in particular, seemed to benefit greatly.” This aligns with Çeken and Taşkın’s (2022) findings on multimedia learning, which signifies that varied resources cater to different learning styles and enhance comprehension and retention. Additionally, a teacher (personal communication, 2024) commented, “The intervention was accessible to students with different levels of technical expertise,” reflecting Johnson et al. (2016) that technology-based learning, which accommodates varying

levels of technical expertise among students, can be a cornerstone of more inclusive and innovative education that meets the needs of all students (Eden, Chisom, & Adeniyi, 2024).

Satisfaction. High satisfaction levels were reported by both students and teachers, attributed to the intervention's interactive nature, flexibility, and relevance. Students enjoyed the workshops and labs, while teachers appreciated the comprehensive curriculum and its adaptability to different teaching styles.

A teacher (personal communication, 2024) shared, "The students' enthusiasm was palpable. They often stayed after class to continue experimenting with the AR components." This observation is consistent with Ugalde, Santiago-Garabieta, Villarejo-Carballido, and Puigverts, (2021) research on the positive impact of engaging and interactive learning activities. Also, a teacher (personal communication, 2024) added, "The flexibility of the intervention allowed me to adapt it to my teaching style, which made the implementation much smoother." This aligns with Garrison and Kanuka's (2004) work on the benefits of flexible learning environments.

Collaboration. The intervention fostered beneficial peer interactions, group work, and community building. Students reported learning from peers and enjoying group work, while teachers observed improved peer-to-peer learning and a more cohesive classroom environment.

A teacher (personal communication, 2024) observed, "The group projects using AR really brought the class together. Students who rarely interacted before were now collaborating effectively." This reflection supports Shin, LeWinn,

Bush, Tylavsky, Davis, and Shaban-Nejad's (2019) theory on the importance of social interaction in cognitive development. This was also supported by another teacher (personal communication, 2024) noting, "I saw students teaching each other how to troubleshoot connection issues. It was peer learning at its best." This aligns with Johnson and Johnson's (2018) research on cooperative learning.

Implementation. Both students and teachers noted the intervention's consistent instructions, adaptability, and smooth transition between theory and practice. Teachers particularly appreciated the thorough training and consistency in teaching methods across different modules.

A teacher's (personal communication, 2024) statement, "The training we received about this intervention was comprehensive. It made me feel confident in implementing the AR components in my lessons," supports Ver Medalla's (2018) research on the importance of comprehensive training for successful implementation. Similarly, another teacher''s (personal communication, 2024) statement, "The consistency in how we taught connecting devices across different sessions really helped reinforce the concepts for students," aligns with Nincarean al.'s (2013) findings on AR's potential to standardize instructional methods. These observations highlight the significance of both comprehensive teacher training and consistent instructional methods in maximizing the effectiveness of AR in educational settings.

CONCLUSION

This study demonstrates the transformative impact of ICT on modern education, particularly in the context of the Philippine K to 12

education system. The research highlights the critical role of ICT integration in preparing students for technological advancements, as exemplified by initiatives such as the DepEd Computerization Program and INCAT's STVEP-CBC. However, despite these efforts, significant learning gaps were identified during field observations of Grade 7 ICF classes at INCAT, revealing student disengagement and difficulties with practical tasks due to limited interactive resources. To address these challenges, this study proposed and implemented an innovative AR intervention, following the ADDIE model. The intervention, which incorporated AR overlays with multimedia elements, aimed to enhance student engagement and skill development in computer hardware assembly. Statistical analysis and qualitative feedback confirmed the intervention's effectiveness, with student engagement significantly improving from "not engaged" to "highly engaged." Expert evaluations further validated the AR content's high quality across content, instructional, and technical dimensions. This research not only underscores the potential of AR as a powerful educational tool but also contributes to the broader goal of providing quality education by demonstrating the efficacy of integrating advanced technologies into educational practices. The findings suggest that AR can create more engaging, interactive, and effective learning environments, potentially revolutionizing the way students acquire and apply knowledge in technology-related subjects.

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

1. Encourage Grade 7 students to incorporate AR technology into

their learning processes, particularly for enhancing engagement and proficiency in computer hardware assembly tasks;

2. Facilitate the dissemination of AR resources among students, fostering a collaborative learning environment and enabling wider access to interactive learning materials;
3. Future researchers should prioritize the creation of AR applications that function offline, addressing the needs of students in areas with limited internet connectivity and ensuring equitable access to interactive learning tools;
4. Distribute the AR intervention materials to school administrators, department heads, and teachers to facilitate seamless integration into classroom instruction and curriculum planning;
5. Encourage future studies to investigate the impact of AR materials on various aspects of learning, including outcomes, performance, and cognitive processes. This research should target similar grade levels in ICT subjects, using the current study as a foundational reference;
6. Promote the tailoring of AR content to align with specific curriculum objectives and diverse student learning needs, ensuring relevance and effectiveness in achieving educational goals;
7. Extend the scope of research to include a wide range of educational institutions, such as general public high schools, private schools, and non-technical vocational

schools across different regions of the Philippines. This expansion will enhance the external validity of findings and provide a more comprehensive understanding of AR's effectiveness in various educational contexts;

8. Conduct extended research spanning multiple academic years to assess the long-term impacts of AR interventions. Focus on learning outcomes, skill retention, and practical application in technical-vocational education to provide insights into the sustained benefits of AR integration;
9. Implement comprehensive training programs for educators to enhance their proficiency in utilizing AR technology effectively in classroom settings. This will ensure optimal implementation and maximize the potential benefits of AR in education;
10. Explore the potential of AR technology across various subjects beyond ICT, investigating its effectiveness in enhancing learning experiences in fields such as science, mathematics, and humanities;
11. Ensure that AR interventions are designed with accessibility features to accommodate students with diverse learning needs and disabilities, promoting inclusive education practices; and
12. Foster partnerships between educational institutions and technology companies to facilitate the development and implementation of cutting-edge AR solutions tailored to educational needs.

These recommendations aim to build upon the current study's findings, addressing identified challenges and leveraging opportunities for enhancing educational experiences through AR technology. Implementation of these suggestions will contribute to the advancement of technology-enhanced learning in the Philippine education system and beyond.

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KaraOKAY: A research-based reading innovation in English

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ABSTRACT

In pursuit of improving the reading performance of the learners, the study was conducted to test if there is a significant difference on the reading performance of the learners between integrating music in reading and without music integration in reading English. The study used a quasi- experimental research design in which both control group and experimental group were tested using pre-test and post-test comparing their reading performance before and after the reading innovation. The study composed of one hundred fifty pupil respondents selected using purposive sampling method following criteria that a participant should either belong to instructional or struggling readers. To analyze and interpret the data, the study utilizes t-test paired two sample for means at 0.5 level of significance. The data revealed no significant difference between teaching reading with or without music integration as shown in the p-value of 1 greater than 0.5 level of significance. Furthermore, they have both the same weighted mean of 0.33 which pertains that the administration reading innovation before and after have no significant mean difference. The study concludes teaching reading does not vary on the strategy. It varies depending on how the teacher effectively applied the reading strategy in teaching how to read. The study recommends teachers to apply the integration of music in teaching reading in English, however, navigate effective strategies in teaching the learners through attending seminars and training related to effective teaching strategies in reading. Moreover, future researchers can use the same study but implement it over a longer period to test its significance.

Keywords: music in reading, reading intervention, reading innovation, Karaokay, English reading

INTRODUCTION

Reading is an important skill to be learned by a learner (Rubin & Travero, 2022). It is considered the basic skills that must be developed among learners in the basic education. When the learners can read and comprehend, this can develop other complex skills, help equip themselves with various skills, deepen and widen their horizon in different dimensions of life.

Learning does not take place only when the child cannot read. This principle motivated the Department of Education (DepEd) - Division of Cagayan de Oro City to launch various reading initiatives that aim to close the gap in reading among learners. For instance, the Project HOPE and

Project Read-A-Thon were designed to improve the reading levels of the learners especially those who are struggling in reading.

As most schools in Cagayan De Oro City are still recovering from the pandemic, it is understood that some of the learners, who are product of remote learning, have difficulties in reading and comprehension. This phenomenon, called “learning loss,” in the new normal is attirbuted to the absence of physical contact during the pandemic, when learners were using self-learning modules without proper guidance and supervision from their parents resulting to poor academic performance. This is consistent with the study of Engzell, Frey, and Verhagen (2021), which accounted these learning losses are up to 60 percent larger among students from less-educated homes, confirming worries about the uneven toll of the pandemic on children and families.

In response to the reading initiatives implemented in the city, Camp Evangelista Elementary School strictly track and monitored the reading progress of the learners in all grade levels through the use of the Annual Status of Education Report (ASER) Tool for primary levels (i.e., from Grade 1 to Grade 3) and Phiippine Informal Reading Inventory (Phil-IRI) for intermediate levels (i.e., from Grade 4 to Grade 6). Results show that reading levels dropped from the School Years (SY) 2020-2021 and 2021-2022. This signifies that intervention and innovation is highly advised to augment the reading progress of the learners. Some of the identified factors are the following: (a) on-line administration of the reading test; (b) less contact with reading materials, more on gadgets; (c) lack supervision at home in doing school homeworks; (d) no focus on their study due to environmental disturbance; and (e)

learners were not use done by the teachers. Moreover, it was found out that learners have more difficulty in reading English medium compared to Filipino among primary levels. However, the intermediate levels have found difficulty in reading the Filipino medium based on the result of pre-test and post-test.

The ASER post test result for the primary level of the same school year revealed that out of 484 learners, 102 (21%) are story readers and 232 (48%) are letter readers. The results indicated a minimal problem in the reading skills of the primary graders. Almost half of the primary graders are identified as letter readers of the alphabet. It can be deduced that primary graders were not exposed to reading materials at home such as posters and short story books because the family of these learners belong to below average income earners. Buying reading or educational materials is not the priority of the parents, hence the learners have not developed their attitude toward reading that can influence the development of their reading skills. This conclusion is directly opposite for the intermediate learners wherein reading level are considered developed as they have passed the primary level where teachers emphasized the love for reading and that learners understand information conveyed in simple, predictable, loosely connected text.

The abrupt change of learning modality for SYs 2020-2021 and 2021-2022, from face-to-face classes to distance learning modality due to the pandemic, made the reading skills of all learners dropped. This data serves as baseline in creating this reading innovation. The reading assessment result for SY 2021-2022, the second year of the distance learning modality scheme was found out to have almost the same result.

Most of the learners belong to frustration level in their reading ability. The result pointed out that during the locked down of the schools and distance learning modality was implemented, learners reading ability declined for the following reasons: (a) less contact with reading materials, more on gadgets; (b) lack supervision at home in doing school homeworks; (c) no focus on their study due to environmental disturbance; and (d) learners were not use to the on-line administration of the reading test done by the teachers.

Furthermore, Bautista (2023) states that the result of 2022 Programme for International Student Assessment (PISA) in which Philippines ranked sixth to the last with an average score of 347. It can be inferred that there is a reading poverty in our country that calls for immediate action. In fact, Chi (2024) states that least 90 percent of Filipino children aged ten (10) struggle to read or understand simple text, according to the World Bank's 2022 data on learning poverty. But even before the COVID-19 pandemic set back students' learning, the pre-pandemic figure pegged learning poverty in the Philippines at 70 percent.

Congruent to this, Camp Evangelista Elementary School scored low during the conduct of 2023 Division Achievement Test (DAT) with an MPS of 20.66 which call for a reading intervention to improve the school's performance. This reading innovation answers the challenges currently encountered by the teachers particularly in reading. One of the issues being addressed through this reading innovation is to decrease the number of struggling and instructional readers in English among primary levels and increase the number of independent readers at the end of the SY 2022-2023. One of the primary

reasons why there is a problem in reading and in comprehension in English among learners from Grade 1 to Grade 3 because of the Mother Tongue Based Multilingual Education (MTB-MLE) which is part of the K-12 Basic Education Curriculum. Since learners at this stage are using their first language (L1), which is the mother tongue, this serves as factor which bring difficulty in transitioning to the third language (L3), which is English. Thus, in order to attain mastery in speaking English and in acquiring vocabulary, this innovation has been perceived as an answer to the problem.

In fact, the study of Santiago and Dagdag (2021) cited that some parents and even teachers in the Philippines argue that children can hardly understand the language used in their books and other learning materials which are claimed as “mother tongue-based.” It cannot be denied that these uncertainties about the effectiveness of MTB-MLE in the academe originate from the choice of language to be considered as mother tongue (MT).

Additionally, problems like absenteeism and tardiness were also being addressed since this was continuously being a problem among teachers in the primary levels. It is observed that when learners are always present, there is a high prevalence of improving their academic performance because they never missed out the lessons every day. This reading innovation is aligned to their needs and interest since children love to sing and dance so when this is incorporated in reading, they will keep on coming back to school because they will never feel bored inside the classroom. On the same line, the study of Akkus and Cinkir (2022) supported that absenteeism negatively affects

students' academic and social development. It damages the relationships between the student and teacher and the relationship between the school and the parents. Teachers face difficulties in classroom management due to deficiencies in learning, and schools deviate from their goals. School administrators lose time dealing with absenteeism procedures instead of engaging in educational subjects, and thus, their resources become wasted. Furthermore, the lack of strategies of the teachers in teaching reading. It is observed that during reading time, teachers commonly used either books or information and communication technologies (ICT) like TV as aid for reading. Hence, the diversity of the learners is not being considered because of the uniformity of teaching strategies that is being utilized in reading.

These are underlying reasons behind crafting this reading innovation associated with music. This aims to improve the reading levels among struggling and instructional readers in Engli to become an independent reader at the end of the SY 2022-2023. This school's reading initiative centered its implementation on the primary learners since it is in this stage where competency like reading and writing should be mastered. Based on the existing data from the ASER, there are a total of 65 frustration readers and 85 instructional readers from Grades 1 to 3 with a total of 150 respondents.

This innovation is in conjunction to MATATAG program of the DepEd under quality which aims to attain all learning standards that equip them with the necessary skills and attributes to pursue their chosen paths. The innovator believed that this will not come into realization if the school will

not go down to the root cause problem which is the reading problems of the learners in school. When this highlighted and prioritized, this will pave a way into realizing the mantra of DepEd - Cagayan de Oro City which is “Nindot nga Tulunghaan sa Nindot nga Cagayan.” This will be attained if the learners inside the school can read, comprehend, and communicate effectively.

METHODOLOGY

The study used a quantitative research design which quasi-experimental method to come up with comparative assessment between the control group and experimental group which was evaluated using pre-test and post-test comparing their reading performance before and after the reading innovation using the ASER reding tool. The teachers utilized music with modified lyrics that will suit to the level of the learners according to their reading level. Part of the reading activities is to correct the spelling of the lyrics, find the meaning of the words in the lyrics and give the sound of each letter in the lyrics of the song. The study composed of 150 pupil respondents who were selected using purposive sampling method following criteria: a) that a participant is currently enrolled in Grade 1 to Grade 3 and b) they have a reading level of instructional and struggling based on the result of ASER pre-test. The pre-test will serve as baseline data to determine the reading level of the learners. Those who reached to the independent level are excluded in the study since they are already considered as readers. To analyze and interpret the data, the study utilizes t-test paired two sample for means at 0.5 level of significance comparing the means between pre-test and post-test.

A preliminary preparation prior to the conduct of the study was securing

permission from the school principal through a letter of consent and the Division Research Screening Committee through the Division Research Coordinator. After the approval, the author also sent a letter of consent to the parents of the respondents. The content of the letter includes the title of the research, name of the author, number of respondents, duration of the study and the objectives of the study. To ensure the full support and cooperation, an orientation was conducted with the learners, parents, and school head following the DepEd Order No. 026 s. 2021 or the Research Management Guidelines in the New Normal. After the orientation, the researcher started to administer the survey questionnaire to the respondents. Following the research ethics, the responses of the respondents were treated with utmost confidentiality in view of Data Privacy Act of 2012.

RESULTS AND DISCUSSION

The effectivity of this reading innovation was assessed on the month of July end of the school year to evaluate if there was a reading progress among the respondents. The teachers utilized the ASER reading assessment tool intended for primary level and evaluated individually through conducting an individualized reading assessment which will serve as a tool to track their reading progress.

Table 1 presents the reading levels of the learners before the implementation of the reading innovation. It can be gleaned from the table that majority of the respondents belong to frustration or struggling level of reading with a frequency of 80 (53%) of the total population. However, they are subgroup into two indicators in which 45 (30%) of them are learners who cannot recognize letters and words. They are considered struggling

because they were not able to perform this competency in which supposedly mastered this competency during their Kindergarten to Grades 2. Meanwhile, 35 (23%) of them are learners who can read words with initial and final blends of consonants and vowels or the CVC level. This competency was supposedly mastered during their Kindergarten because this was already introduced and continued in Grade 1. However, there are still learners who are from Grade 1 to Grade 3 who are still on this level of reading due to some factors.

Table 1. Reading levels of the participants before the reading innovation

Reading Indicators	**Reading Level**	**Frequency**	**Percentage**
Recognize letters and sounds	Frustration	45	30%
Read words with initial and final blends of consonants and vowels	Frustration	35	23%
Read words, phrases, and sentences	Instructional	70	47%
Comprehend the message of the song and understand the tone and mood of the song	Independent	0	0%
Effectively communicate the message of the song using English language	Independent	0	0%
Total		**150**	**100%**

Idulog, Gadiano, Toledo, Hermosada, Casaldon, Mariposa, Geron, Dequito, Grenada, Malipot, Pentang, and Bautista (2023) pointed out some factors to consider why does reading performance among learners continues to be a problem in the education system because prgrams are not effective enough to solve the reading comprehension problems or

are poorly implemented among all schools in the country. Further, there may be lapses in part of the educational system in the country. Not implementing the “no read, no pass” policy leads to passing those students who cannot even do the basic reading. Besides, parents also have lapsed for not some parents who depend on their child’s learning from the teachers, considering that learning the child should be started at home with their primary parents. Generally, teaching and learning from a child should be a shared responsibility of both teachers and parents. In relation to this finding, it can be inferred that the problem in reading revolves on the ability of the teachers to implement reading programs effectively and create reading extension programs where parents and other stakeholders will be involved. In such a way, we can build a bridge to close the gap in reading among learners.

Meanwhile, there are also learners at their young age who easily developed their skills in reading. It depends on the underlying factors that enable the child to be a reader. For instance, according to the study of Asikcan and Saban (2020) states that the use of various technological tools, software programs, and different reading strategies during the implementation process helped students focus more on the activities, raised their interest in them, and made their learning more pleasant. Moreover, the use of grouping strategies such as reading choir, reading theatre, and dart playing affected students positively for learning. In a mile state, it is very crucial that in teaching reading it should be done in different ways considering the diverse backgrounds of the learners. When you are merely relying on books or providing a uniformity of instructional materials in

teaching reading, the needs and interest of the learners were not put into consideration.

Relative to the findings of Lustyantie and Aprilia (2020) that reading interest and achievement motivation directly affect reading comprehension of English texts. This means that reading interest and achievement motivation significantly influence the level of reading comprehension. The higher the students' reading interest and achievement motivation, the better their understanding. In relation to this study, it is imperative to examine first the needs and interests of the learners so that we can provide reading strategies that are suited to them.

Table 2. Reading levels of the participants after the reading innovation

Reading Indicators	**Reading Level**	**Frequency**	**Percentage**
Recognize letters and sounds	Frustration	5	3%
Read words with initial and final blends of consonants and vowels	Frustration	15	10%
Read words, phrases, and sentences	Instructional	50	33%
Comprehend the message of the song and understand the tone and mood of the song	Independent	50	33%
Effectively communicate the message of the song using English language	Independent	30	20%
Total		**150**	**100%**

Table 2 depicts the reading progress of the learners after the implementation of the reading innovation. This implies that there is a decreased number of struggling readers from 80 (54%) to 20 (13%).

This means that learners who are under frustration level in reading had decreased to 60 (40%), which signifies that the reading innovation is effective because the reading progress is evident. Based on the table, out of 80 struggling readers who participated in the innovation, 60 (75%) of them advanced to instructional level of reading.

Supported by the findings from the study of Aksoy (2023) that it is more effective to use music for teaching reading skills through singing rather than as a treatment method, as a part of an integrated program or in the background. As another research problem on whether the effect of music differs according to reading sub-skills, it was concluded that it is mostly effective on phonemic awareness (pronunciation, first-last letter recognition, distinguishing pseudo words. While music has a large effect on phonemic awareness, it has a medium effect on grammatical accuracy and a small effect on reading aloud, which are other reading sub-learning areas. This signifies that through the use of the reading innovation, learners were able to gradually perform the basic reading literacy skill which eventually led them to become independent readers. In a mile state, when the teacher unleashes her creativity in teaching reading with the use of online platforms or any web-based app reading tools, this can ignite their interest to read and develop passion and love for reading. Connectedly, Chen and Yuan (2021) asserted that the “teacher’s imagination” will impact the “creative teaching” positively. The “vision practice” will affect “autonomous learning and challenge-presenting” positively as well. Moreover, the “vision feedback” plays a positive moderator role in how “creative imagination” contributes to

“interactive discussion and open-mindedness.”

Meanwhile, the instructional readers decreased from 70 (46%) to 50 (34%). This means that instructional readers dropped to 20 (12%) which signifies that there is reading progress among the respondents. This means that 20 of them are officially readers and officially graduates from the reading innovation. This implies further that the integration of singing in reading help the learners learn to read effectively which can lead them to become independent readers. Though, not all of them are into music, however, the nature of the innovation itself is very engaging and captivating since out from the songs, there are lot of reading activities that the teacher can maximize in order to enhance their vocabulary development and reading comprehension. This conforms to the findings of Su, He, and Li (2024) that the main effect of the music tempo was statistically significant, which indicated that participants read texts more quickly in the fast-tempo music condition than in the slow-tempo music condition. Furthermore, the main effect of the text difficulty was statistically significant. Additionally, the interaction between the text difficulty and music tempo was statistically significant. The music tempo had a greater effect on easy texts than on difficult texts. The results of this study reveal that it is beneficial for people who have a stronger preference for music listening to conduct English reading tasks with fast-tempo music.

On the same line, Bird (2024) cited that the seventh and eighth grade students showed improvements in their reading comprehension after being exposed to the instrumental music. The improvement in students’ reading comprehension was not limited to students of a certain reading level, showing playing instrumental

music can have an impact on students' reading comprehension despite their reading ability. Data analysis revealed that as students were exposed to instrumental music, their reading comprehension as a whole improved. The number of prompts students required to assist in their retellings of texts that they had read decreased over the course of the study, showing that the amount of information students was recalling after reading the text had increased.

Moreover, there are a total of 80 (53%) learners who advanced to dependent readers. These learners are from frustration level who advance to instructional level of reading and then from instructional, they progress to independent level and these learners were recognized as readers at the end of the school year. The data confirms the effectivity of the reading innovation because the number of learners who advance to the next level of reading is very evident. This postulates that the integration of music in reading can help develop reading literacy among struggling and instructional readers. Supported by the study of Moore, Simonyak, and Ruzicka (2022) states that there is a positive connection between music and reading instructional collaboration as well as the benefit of working on the same content between the two classrooms.

Additionally, the data indicate increased student engagement resulted from this intervention and our professional engagement increased as well. It is clear that student engagement and motivation were positively impacted by this collaboration, and we believe experimenting with inventive ways to integrate music and the fine arts into core instructional content would be beneficial to student learning. It can be inferred from the finding that music

and reading have a positive connection in which if we are going to combine both in the delivery of the lesson that can pave a way to honing more readers. The innovation itself can catch an interest among primary learners because most of this stage loves to sing. If teachers know how to integrate music in the instructional content, we can reduce the number of non-readers and it can help in promoting quality education where every pupil is a reader.

Table 3. Summary of reading progress before and after the implementation

Reading Levels	**Before**	**After**	**Diff.**	**p-value**	**t-critical**	**Interpretation**
Frustration	54%	13%				
Instructional	46%	34%	2	1	4.30	No significant difference
Independent	0%	53%				
Mean	0.33	0.33				

*0.05 level of significance

Table 3 shows the summary of reading progress before and after the implementation of the reading innovation. It can be gleaned from the table that the probability value (p-value) is 1 which is greater than 0.5 level of significance which signifies that there is no significant difference between teaching reading with or without music integration. Additionally, the table shows that they have both the same mean of 0.33 which pertains that the administration reading innovation before and after have no significant mean difference. The study concludes that teachers can teach reading even in the simplest way. The approach or the intervention utilized does not matter in reading, what matters is how the teacher effectively

uses that approach or intervention with her knowledge and skills in honing the children how to read.

This affirms the study of Adao, Relleve, Salazar, Macawile, and Chavez (2023) on language teachers being more capable in teaching reading; therefore, achieving target competencies better than teachers who have inadequate skills in teaching reading. Hence, teachers' capacity to teach reading effectively should be considered to improve the learner's reading performance because even if the teachers are using various innovation but lacks competence in teaching reading, still the problem will not be resolved. Integrating innovations is an additional factor to the reading competence of the teacher. If the teacher is good enough in teaching reading and created various innovations to support his teaching, then we can produce a lot of readers, and the problem of reading will be addressed.

Additionally, Laurito (2022) supported that to attain very satisfactory teachers must promote the development of reading skills by providing direct and explicit reading instruction that builds student mastery through scaffolded instruction and incorporates universal design for learning principles. More so, teachers should possess the very high extent of teaching reading competence to help improve the performance of the pupils in English on blended learning. In a mile state, it is crucial that teacher's competence in teaching reading should be considered first because how can she teach if she doesn't have. We need to assess and evaluate first the competency of the teacher in teaching reading in order that the reading performance of the children will be enhanced.

However, the study conducted during the second to the fourth quarter of the school year, due to the short duration of time, the study recommends to future researchers to conduct the same study with a longer period of implementation of the reading innovation to further examine as to the significance of the innovation towards reading and its impact on the academic performance of the learners across subject areas.

CONCLUSION

The study concludes teaching reading does not vary on the teaching strategy you employ for instance integrating music in reading or using the traditional method of teaching reading. It varies depending on how the teacher effectively applied the reading strategy in teaching reading. The competency and mastery of the teacher to teach reading is a primary consideration in order to the develop the skills in reading among learners and it will be enhanced further with the application of various reading strategies such as the integration of music. Based on the findings, both pre-test and post-test results yield the same weighted mean which implies that there is no difference in the integration or without integration of music in reading. This further means that the knowledge of the teacher as well as his background, expertise and experience in teaching reading matters the most. Since they have acquired the same mean means applying music to reading is still affective however, if the teacher lacks competence and expertise in teaching, still the reading performance of the learners will be affected. Hence, there must be a balance between the competency of the teacher to teach and the ability of the teacher to implement reading strategies such as the integration of music in order to improve the reading

performance of the learners. The study recommends teachers to apply the integration of music in teaching reading in English, however, navigate ways to improve also their competence and expertise in teaching reading by attending seminars and training. Furthermore, reading coordinators may include reading topics during Learning Action Cell (LAC) sessions and In-Service Trainings (INSET). Moreover, future researchers may opt to use the same reading strategy in teaching reading, however, adjust the period of implementation for a longer period to test its significance.

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Financial capability and financial happiness among Bachelor of Science in Business Administration Major in Financial Management students

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ABSTRACT

Many struggle to make the most of their available funds and cope with their financial situation because they have difficulty managing their financial capability. The study aimed to determine the relationship between financial capability and financial happiness among college business administration students. The focus was on understanding how financial knowledge and confidence impact students' well-being and satisfaction, particularly during significant financial transitions such as tuition payments and student loans—a quantitative, descriptive-correlational design collected data from 112 college students enrolled in the business administration program. A 4-point Likert scale questionnaire, adapted from open-source journals, assessed financial capability and happiness. The data were analyzed using statistical tools, including mean, standard deviation, and Pearson Product Moment Correlation Coefficient. The result showed a moderately positive relationship between financial capability and financial happiness, indicating that student financial knowledge and confidence improvements correspond with increased financial happiness. The study recommends that higher education institutions invest resources to create supportive environments that enhance financial knowledge and well-being, such as establishing campus financial wellness centers and facilitating collaboration with alumni and industry professionals for mentorship opportunities. This research contributes valuable insights into how financial capability affects the financial happiness of students, offering perspectives for policymakers, educators, and future researchers.

Keywords: financial capability, financial happiness, business students, descriptive-correlational design, Davao City

INTRODUCTION

The financial happiness of students is a multifaceted issue that varies across different regions and socio-economic contexts. A study conducted on stress and happiness among college students found that they are least happy on their financial condition, including in school and work (King, Vidourek, Merianous, & Singh, 2014). Financial happiness is critical to overall well-being, reflecting an individual's satisfaction and contentment with their financial situation. Hillman (2020) stated that a study conducted by a US bank revealed that a staggering 83% of teenagers admit to having limited knowledge about personal finance. Further, his study showed that this lack of financial literacy is particularly pronounced among late teenagers and

those in their early twenties who navigate the challenges of independent living while pursuing higher education. Like a Cornell (2015) study, people who struggle to meet their fundamental necessities frequently report feeling less happy about their financial situation because of the additional stress that comes with it. The core problem is that students often lack the necessary knowledge and resources to attain financial happiness, intensifying their financial stress. This study explores the determinants of financial happiness among students and proposes strategies to enhance their financial capability.

Barbić and Palić (2023) posited that wealthy individuals in Croatia experience lower financial happiness than their wealthy equivalents. The findings suggest that lacking financial happiness does, to some extent, entrap individuals with specific worries and a vital concern for their overall well-being. Moreover, in the study of Zottel and Khoury (2016), there is a noticeable contrast in behavior between rural and urban populations in Senegal, West Africa, particularly regarding their ability to experience financial happiness. Residents of rural areas, often lacking early exposure to effective financial habits, tend to display reduced financial happiness. Conversely, higher-income individuals in urban environments tend to prioritize savings, plan for future expenses, live within their means, and generally exhibit greater financial happiness.

Bernardo and Resurrection (2018) discussed that in the Philippines, many college students experience a lack of financial happiness due to the high cost of higher education. Their limited resources often lead to a lack of financial happiness, resulting in many students dropping out of school. This situation significantly affects their

overall well-being, impacting their academic pursuits, prospects, and quality of life.

Conversely, a recent study in Davao City delved into Senior High School students' challenges. Alegre, Damian, Duray, Indac, Peralta, Sotello, and Urdineta (2020) noted that the study identified a significant factor contributing to these difficulties: the students' lack of financial happiness due to financial struggles. These economic hardships can have lasting consequences beyond mere impacts on their credit ratings. The ability of senior high school students to handle their finances influences their level of financial happiness and the challenges they face in their economic lives.

Less research has been conducted on the financial happiness of tertiary students. A significant gap lies in understanding the specific components and dimensions of financial happiness relevant to Bachelor of Science in Business Administration students, such as their perceptions of economic security, satisfaction with financial decision-making, and overall well-being related to financial matters. Thus, this study was conducted.

For several reasons, studying the relationship between financial capability and financial happiness among college students is valuable. By researching this, the researchers could assess how well college students understand and apply economic concepts, such as budgeting, saving, investing, and managing debt. This helps identify gaps in financial education and areas where students might need additional support.

This study supports inclusive education and aligns with the United Nations Sustainable Development Goals, particularly in the following areas: SDG No. 8, which focuses on promoting sustained, inclusive, and

sustainable economic growth, full and productive employment, and decent work for all; SDG No. 11, which aims to make human settlements inclusive, safe, resilient, and sustainable; and SDG No. 12, which ensures sustainable consumption and production patterns.

Inclusive education emphasizes providing equitable access to resources and support for all students. Researching financial capability among college students can help identify disparities in financial knowledge and resources. By addressing these gaps, educational institutions can ensure that all students, regardless of their background or financial situation, receive the support they need to manage their finances effectively. Also, inclusive education values diverse perspectives and experiences. Understanding how financial capability affects financial happiness across various demographic groups, such as students from different socio-economic backgrounds, ethnicities, or educational levels, can help tailor financial education programs to meet the diverse needs of the student population.

Further, based on the study's insights, the research provides relevant information to higher education institutions that might implement mandatory financial literacy courses or provide personalized financial counseling services. Also, it can help institutions, economic organizations, and policymakers develop strategies to minimize financial stressors, thereby supporting better personal and professional outcomes and overall success. Lastly, it can serve as a reference for further research and investigations into the specific factors affecting financial well-being among different demographic groups or contexts.

METHODOLOGY

This study employed a descriptive-correlational research design. Descriptive research design is a method that investigates one or more variables without manipulating any of the variables, merely observing and measuring them (McCombes, 2019). Conversely, correlational research design investigates the relationships between variables, highlighting the strength and direction of their connections (Bhandari, 2021). A descriptive research design was used to describe the level of financial capability and financial happiness. At the same time, a correlational research design was used to measure the relationships between financial capability and financial happiness.

This research was conducted in a Davao City, Philippines higher education institution. This institution was established to provide high-quality education, engage in research, and contribute to the community. It also fosters local and international collaborations and partnerships, supports student mobility, and aims to produce responsible global citizen graduates. Being a sectarian school, it is part of its constituents' financial capacity and frugal education curriculum.

The respondents of this study were 112 business students at the Higher Education Institution (HEI). These respondents in the Business Administration program were enrolled in the School Year 2023-2024 in the Bachelor of Science in Business Administration major in Financial Management degree. Further, business students have been chosen as the study's respondents since their interests meet within the topic's scope. This quantitative study utilized a simple random sampling method based on the criteria set. Probability randomization is used with the

randomization distribution principle to derive a result from a sample and determine the sampling problem (Etikan & Bala, 2017). Data was chosen using a computer-generated list of random numbers, specifically the application research randomizer.

The research instruments were adapted from published open-source journals. It has three parts. The first part of the questionnaire contains statements depicting financial capability as the independent variable with the following indicators: financial knowledge and confidence. The second part of the questionnaire includes statements depicting financial happiness as the dependent variable, including economic well-being and financial satisfaction indicators. Also, the adapted survey questionnaire was subjected to contextualization based on the intended study and validity tests from the experts. The range of means was used based on the 4-point Likert scale design with descriptive levels and corresponding interpretations.

The researchers gathered information for the study by collecting data from respondents using proper approaches. After receiving permission to conduct the survey and a certificate of compliance from the institution's Research Ethics Committee (REC), the researchers started administering the online survey. Ethical considerations were observed during the study. The researchers conducted an online survey since most respondents were online learners in the institution's learning mode. The institution's Google accounts provided easy access to the respondents' email addresses and messenger accounts. Respondents were requested to participate by answering the Google Form, which took 5-10 minutes. In that case, data collection took place for three weeks and one month, considering that most respondents

were preoccupied with their respective tasks or experienced intermittent internet. The Google form used for the survey contained informed consent and assurance of the confidentiality of the data gathered in compliance with RA 10173 or the Data Privacy Act (DPA) of 2012. The statistical tools used in this study are mean, standard deviation, and Pearson product-moment correlation coefficient.

RESULTS AND DISCUSSION

The presentation and analysis of the gathered data from 112 business students, specifically from the higher education institution based in Davao City, are covered in this chapter. This section contains the following information: the level of financial capability in budgeting, borrowing, and investment; the status of financial capability in terms of economic knowledge and financial confidence; and financial happiness. Furthermore, it included the findings based on the correlation and analysis.

Level of Financial Capability

Presented in Table 1 shows the level of financial capability in terms of financial knowledge and confidence. The overall mean score for financial knowledge is 3.47, which means high financial capability is often evident. This suggests that respondents possess an excellent grasp of financial principles and practices. Similarly, the overall mean score obtained for financial confidence is 3.15 (high). This means that financial capability is often evident/observed. This indicates that respondents feel secure and assured in making financial decisions and handling financial challenges effectively. The overall mean score of the two indicators suggests that financial capability is often evident/observed among the respondents, indicating their

competence in managing financial matters. This finding underscores the respondents' ability to make informed financial decisions, handle financial challenges effectively, and maintain financial stability and confidence. This confirms the study of Sreeja and Sreeraj (2019), which concludes that financial knowledge is an important variable that helps appropriately manage personal finance. Their study also found that females have better financial knowledge than males. Moreover, this confirms the findings of the National Endowment for Financial Education (n.d.) that financial education programs significantly enhance financial capability and, consequently, financial happiness.

Table 1. Descriptive statistics for financial capability

Financial capability	**Mean**	**Standard deviation**	**Descriptive level**
Financial knowledge	3.475	.3354	High
Financial confidence	3.154	.4345	High

Financial Knowledge

Table 2 shows that the first three items (I create a budget from my allowance and monitor my expenses; I always compare prices when buying items; and I understand the concepts of saving, spending, budgeting, and investing) are all rated with a very high level with mean ratings of 3.57; 3.63; and 3.63, respectively which means that financial capability is always evident/observed. Meanwhile, items nos. 4 and 5 are rated high, with mean ratings of 3.40 and 3.14, respectively. This means that the financial capability is often evident/observed.

Table 2. Financial knowledge

Financial knowledge	Mean	Standard deviation	Descriptive level
I create a budget from my allowance and monitor my expenses	3.57	.565	Very high
I always compare prices when buying items	3.63	.585	Very high
I understand the concepts of saving, spending, budgeting, and investin	3.63	.522	Very high
I stay within my allowance when I spend	3.40	.592	High
I possess the knowledge necessary to establish a bank account	3.14	.696	High

The responses regarding financial knowledge provide valuable insights into the respondents' financial capability. The very high ratings for creating a budget, comparing prices, and understanding critical financial concepts indicate a high level of proficiency in fundamental financial skills. These skills support effective money management, budgeting, and investment decision-making. Additionally, the high ratings for staying within one's allowance and possessing the necessary knowledge to establish a bank account suggest satisfactory financial competence. While not as strongly endorsed as the other questions, these responses demonstrate a solid grasp of essential financial concepts and practices.

The result corresponds to a study by Xiao, Ahn, Serido, and Shim (2014), which emphasizes that financial capability encourages individuals to use relevant financial knowledge and engage in desirable consumer behaviors to enhance and improve their financial status. Furthermore, the study of Khan, Çera, and Alves (2022) stated that an increase in financial knowledge leads to a higher level of financial capability,

as individuals who possess a deeper understanding of financial concepts are more likely to make informed financial decisions, manage their finances effectively, and achieve more excellent financial stability and success.

In addition, the results from the study of Johan, Rowlingson, and Appleyard (2021) highlight that possessing sufficient financial knowledge and achieving adequate financial capability not only assists individuals in managing their finances effectively but also has significant implications for the broader economy. Individuals with a strong understanding of economic principles are better equipped to make sound.

Financial decisions lead to increased savings, responsible borrowing practices, and prudent investment strategies. This, in turn, can contribute to overall economic growth by fostering a more financially literate and resilient population. Moreover, improved financial well-being among individuals can lead to reduced financial stress, enhanced productivity, increased consumer spending, and, ultimately, a positive impact on the overall well-being and prosperity of the country.

Table 3. Financial confidence

Financial confidence	Mean	Standard deviation	Descriptive level
I can make my own financial decisions, especially regarding spending	3.46	.565	High
I have confidence in effectively planning my weekly allowance budget	3.26	.585	High
I feel confident when purchasing something for myself	3.27	.522	High
I prefer consulting my parents	2.70	.592	Low

to manage my finances			
I am confident in my ability to create my own bank savings account	3.09	.696	High

Table 3 presents the financial confidence of the respondents. Item no. 1 got the highest mean of 3.46 (high), meaning financial capability is often evident/observed. In contrast, preference to consult their parent in managing their finances is rated low, with a mean score of 2.70. This means that financial capability is rarely evident/observed. The mean ratings reveal insightful patterns regarding respondents' financial confidence, a critical component of overall financial capability. Questions on personal financial decision-making, budget planning, self-assurance in purchasing decisions, and confidence in establishing a savings account all received ratings indicative of a high level, reflecting a positive outlook and competence in these areas. Specifically, respondents expressed confidence in making independent financial decisions, effectively managing their weekly budget, feeling secure in personal purchases, and being capable of creating their own savings accounts. However, the lower rating for the question regarding a preference for consulting parents in financial matters indicates certainty in making financial decisions independently, as evidenced by the disagreement-level rating.

The results align with the study conducted by Khan et al. (2022), where it was found that individuals with financial capability exhibit a notable correlation with heightened financial confidence. This correlation stems from their ability to access formal education in finance, which enriches their understanding of financial concepts and enhances their

decision-making skills in financial matters. Furthermore, the study explored how factors such as socio-economic background, level of financial literacy, and personal experiences with money management also influence the relationship between financial capability and financial confidence.

In addition, the results of the study conducted by Setiyani and Solichatun (2019) found that possessing financial confidence can motivate students to strive for economic prosperity. This confidence instills in them a belief in their capacity to effectively manage finances, empowering them to shape their future regarding financial capability. Moreover, the study highlighted the role of financial education and practical experiences in building this confidence among students, emphasizing the importance of integrating financial literacy programs into educational curricula to foster a generation of financially capable individuals.

Financial Happiness

Table 4 presents the level of financial capability in terms of financial well-being and satisfaction. The overall mean score for financial well-being is 3.40, signifying a high descriptive level among respondents, indicating that they generally perceive their financial well-being as positive and satisfactory.

Table 4. Overall results for financial happiness

Overall standard deviation and mean of the financial happiness	**Mean**	**Standard deviation**	**Descriptive level**
Financial well-being	3.400	.4532	High
Financial satisfaction	3.255	.5002	High

Likewise, the overall mean score for financial satisfaction is 3.25, which indicates a high descriptive level. This suggests that respondents generally feel satisfied with their financial situation and outcomes. The combined mean score of these two indicators indicates that financial happiness is often evident/observed by the respondents, suggesting that they experience a considerable level of satisfaction and contentment with their financial circumstances.

Table 5. Financial Well-being

Financial Well-being	**Mean**	**Standard deviation**	**Descriptive level**
I find joy in witnessing my savings grow daily from my allowance	3.70	.534	Very High
How I manage my money allows me to enjoy and appreciate life fully	3.60	.561	Very High
I allocate my finances towards the things that bring me joy and fulfillment	3.39	.649	High
Despite my limited allowance, I can obtain the things I want	3.25	.777	High
My allowance can sustain me for an entire week	3.06	.893	High

Table 5 shows the financial well-being. Item nos. 1 and 2 are rated very high, with mean scores of 3.70 and 3.60, respectively. This means that the result is always evident/observed. While item nos. 3 to 5 were rated high, with mean scores of 3.39, 3.25, and 3.06, respectively. This means that the result is often evident/observed. The high-level statements regarding deriving joy from savings growth and managing money effectively to enhance life experiences indicate a positive correlation between financial practices and happiness. Respondents who experience satisfaction in witnessing their savings grow and who feel that their money

management skills contribute to a fulfilling life tend to have higher levels of financial happiness. Similarly, the high-level ratings for allocating finances towards fulfilling activities, achieving desired purchases despite budget limitations, and sustaining oneself financially for a week suggest a sense of contentment and stability in financial matters. When individuals can align their financial decisions with their values and priorities, they are more likely to experience financial happiness.

In the study of Dewi, Febrian,Effendi, and Anwar (2020), it was found that there is a positive significant influence between financial well-being and financial happiness. This correlation underscores the importance of achieving financial stability and experiencing emotional satisfaction and contentment related to one's financial situation. The research also delved into factors contributing to this relationship, such as financial behaviors, attitudes toward money, and individual perceptions of financial success. These findings offer valuable insights into the complex interplay between financial well-being and overall happiness, highlighting the multifaceted nature of financial happiness and its impact on individuals' lives.

Moreover, Owusu, Bekoe, Arthur, and Koomson (2021) found a strong correlation between financial happiness and financial well-being, indicating that individuals with prosperous lives typically experience higher levels of contentment and life satisfaction. This connection stems from the capacity of financial resources to afford access to essential needs like healthcare, education, and housing, as well as opportunities for leisure and personal development. Thus, economic stability can contribute to overall happiness by fostering a

sense of security and enabling individuals to pursue fulfilling experiences and goals.

In addition, Strömbäck, Lind, Skagerlund, Västfjäll, and Tinghög (2017) reveal that individuals with self-solid control save additional money and tend to make more prudent financial decisions. This behavior improves current and future financial situations, leading to higher happiness and well-being. Furthermore, these individuals often report feeling less anxious and more secure about their financial circumstances, which can positively affect overall mental health and life satisfaction. The ability to exercise self-control in financial matters promotes financial stability. It fosters a sense of empowerment and control over one's financial future, contributing significantly to overall financial happiness and well-being.

Table 6. Financial satisfaction

Financial satisfaction	**Mean**	**Standard deviation**	**Descriptive level**
I am satisfied with my weekly allowance	3.13	.796	High
It is gratifying that my parents can readily provide money whenever I ask	3.28	.750	High
I derive greater satisfaction from saving money for the long term	3.37	.600	High
I am content with my parents' additional funds for my personal needs	3.34	.789	High
I am at ease when it comes to handling school payments	3.17	.709	High

Table 6 shows that all items about financial satisfaction indicated that the mean results ranged from 3.13 to 3.37, which is a high level, meaning the respondents' satisfaction is often evident/observed. The detailed analysis of mean scores regarding financial satisfaction provides insights into factors contributing to financial happiness. Respondents who express

satisfaction with their weekly allowance, find it gratifying when their parents can readily provide money, derive greater satisfaction from long-term saving, are content with additional funds for personal needs, and feel at ease handling school payments tend to experience higher levels of financial happiness. These responses indicate that financial satisfaction is crucial to overall well-being and happiness. When individuals feel satisfied with their financial situations, such as being content with available resources, feeling secure in managing expenses, and experiencing gratification from financial support, it positively impacts their overall happiness and quality of life. Furthermore, the agreement-level ratings across these questions suggest a consensus among respondents regarding the importance of financial satisfaction in contributing to their sense of happiness and well-being.

The results align with the studies conducted by Ngamaba, Panagioti, and Armitage (2020) and Muresan, Fülöp, and Ciumaș (2021), both of which highlight the positive relationship between financial satisfaction and financial happiness. It was found that individuals with high levels of financial satisfaction were more likely to experience increased financial happiness, emphasizing the importance of achieving a balance between financial stability, meeting financial goals, and experiencing emotional contentment for overall well-being. Additionally, Muresan et al. (2021) identified a robust indirect effect between financial satisfaction and financial happiness, indicating the significant role of financial contentment in influencing an individual's overall sense of joy and well-being. Leonard's (2018) research found notable links between different dimensions of financial satisfaction and several

measures of happiness in college students.

Correlations Between Financial Capability and Financial Happiness

Table 7 shows the data on the correlations between financial capability and financial happiness. The correlation coefficient between "Financial Capability overall" and "Financial Happiness overall" is 0.523, which suggests a moderately positive relationship between these two variables. This means that as financial capability increases, there is a tendency for financial happiness also to increase, and vice versa. This suggests that as an individual's financial skills, knowledge, and resources improve, their overall satisfaction with their financial well-being also tends to increase.

However, it's important to note that the strength of this relationship is moderate. This suggests that while there is a relationship, it is not a perfect or robust association. Other factors may also influence financial happiness beyond financial capability. Other factors such as income, expenses, debt levels, and overall financial circumstances likely also play a role.

Furthermore, neither of the correlations' p-values is more significant than 0.001, suggesting that the association is not the result of chance and is highly statistically significant.

Table 7. Correlations between financial capability and financial happiness

		Financial capability overall	**Financial happiness overall**
Financial capability overall	Pearson Correlation	1	.523**
	Sig. (2-tailed)		<.001
	N	112	112

Financial Happiness overall	Pearson Correlation	.523**	1
	Sig. (2-tailed)	<.001	
	N	112	112

**Correlation is significant at the 0.01 level (2-tailed)

The analysis is based on a sample size of 112 participants for financial capability and financial happiness, revealing a significant relationship between them. This outcome leads to the rejection of the study's null hypothesis, indicating that there is indeed a correlation between financial capability and financial happiness.

These findings could suggest that enhancing financial capability through financial education, counseling, or access to financial resources may increase financial happiness among individuals and lead to great satisfaction in financial well-being. By improving financial skills and knowledge, individuals may feel more in control of their finances and satisfied with their financial situation, which could boost their overall financial well-being and life satisfaction. Thus, perceived financial well-being and financial health are believed to be significant antecedents of overall subjective well-being (Dolan, Peasgood, & White, 2008; Netemeyer, Warmath, Fernandes, & Lynch, 2018).

Limitations of the Study

Limitations of this study should be acknowledged. The sample of students who were surveyed was not representative. Additionally, a greater sample size would have prevented low cell counts, which were observed in some results not presented here.

First, the methods used are only through online surveys. This study utilized cross-sectional data, which is only suitable for exploring the associations between factors of

financial capability and financial happiness. One limitation is the inability to infer causality from the findings. However, the observed patterns could still provide valuable insights for creating financial education programs tailored to the diverse needs of consumers, particularly those who are vulnerable. Another limitation is that the data was collected from one country, the Philippines. Future research must include data from other regions within the country and can be used to confirm or disconfirm some findings of this study.

The fourth limitation was the lack of generalizability due to a single site and one program and significant., cross-sectional design that can affect the instrument's causality, reliability, and validity of the instrument, and confounding factors that can affect the dependent variable. Some of the results of this study can be supported or refuted by data from different courses in future investigations. Fourth, future studies can look at vulnerable consumers in other areas, like gender and education.

CONCLUSION

The following conclusions were drawn based on the presented data and findings of the study from the respondents' responses.

The overall level of financial capability among respondents, as measured by financial knowledge and financial confidence, showed favorable results. The respondents have the necessary skills and mindset to make informed financial decisions and manage their finances effectively. The analysis of financial happiness, as evaluated by financial well-being and financial satisfaction, reveals positive outcomes. The respondents perceived their financial situation positively, which may have an advantageous

effect on their overall well-being and quality of life.

The high ratings for budgeting, comparing prices, and understanding critical financial concepts indicate commendable proficiency in fundamental financial skills. This suggests that respondents have proficient knowledge of basic financial skills. The respondents showed high confidence in various aspects, including personal financial decision-making, budget planning, purchasing decisions, and the establishment of savings accounts. This shows a positive attitude and competence in managing their financial matters independently. The strongly agreed-upon statements regarding deriving joy from savings growth and effectively managing money to enhance life experiences highlight a positive correlation between financial practices and happiness. Respondents who find satisfaction in seeing their savings grow and believe that their money management skills contribute to a fulfilling life tend to report higher levels of financial happiness. Financial practices are critical to promoting both financial well-being and happiness. Those who express satisfaction with their weekly allowance, find fulfillment in parental financial support, derive greater satisfaction from long-term savings, are content with additional funds for personal needs, and feel at ease handling school payments tend to have higher financial happiness. These responses demonstrate financial satisfaction's significance in overall well-being and happiness.

The findings show a significant relationship between financial capability and financial happiness. This result rejects the study's null hypothesis, indicating a correlation between financial capability and happiness. Furthermore, the findings

suggest that as individual financial capabilities increase, their financial happiness also increases. A positive relationship between the two variables indicates that having more outstanding financial capabilities will likely contribute to higher financial happiness among the Bachelor of Science in Business Administration Major in Financial Management students. It becomes more apparent that an individual's financial capabilities are intrinsically connected to their level of financial contentment. Brüggen et al. (2017) discussed that those who have grown their current and future income or wealth are more financially happy. Such traits have more positive future outcomes and increase one's faith in wealth potential.

The results of this study confirm the Capability Theory of Sen (1993), in which the integration of financial Capability with Sen's capability approach highlights the need to consider not just individuals' financial resources but also their ability to utilize these resources effectively to enhance their well-being. This approach underscores financial security and literacy, which are essential to overall life satisfaction and happiness. Research has indicated that applying Sen's framework can provide a more nuanced understanding of financial capability, allowing for a more transparent and consistent definition that incorporates the complexities of individual circumstances and choices. This has implications for policy-making to enhance financial literacy and capability, ultimately contributing to improved financial happiness. Sen's Capability Theory aligns with the study of financial capability and happiness, as both frameworks emphasize the importance of real opportunities and the ability to make meaningful choices that enhance individual well-being.

Drawing from the results and conclusions, the researchers recommend the following actions:

The Commission on Higher Education may mandate that institutions include specialized courses on financial well-being. They may also conduct training workshops for faculty members to update them on the latest teaching methods. Collaborations with financial institutions and industry experts can provide students with practical experiences and enrich their understanding of financial management.

Higher Education Institution administrators are urged to invest resources in creating a supportive environment that promotes financial knowledge and well-being. This could involve setting up campus financial wellness centers offering counseling services and workshops to improve economic management skills. Collaboration with alums and industry professionals can provide valuable career guidance and mentorship opportunities.

Students enrolled in the business programs may actively participate in workshops and seminars to deepen their financial knowledge. Developing a personalized financial plan encompassing budgeting, saving, and investing is crucial for long-term stability and happiness. Seeking guidance from financial advisors or mentors is recommended for making informed decisions and prioritizing financial well-being. Also, students may consult their parents regarding their economic stability so that the former would know and be able to support and guide them on properly managing their finances.

Lastly, future researchers may broaden their study to include students from various courses better to understand the relationship between financial capability and financial

happiness. Designing interventions to enhance financial capability and happiness can improve financial education and well-being.

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The state of digital transformation and Industry 5.0 readiness in Mindanao State University - Marawi Campus

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ABSTRACT

This study investigates the state of digital transformation and Industry 5.0 readiness within the Philippine education system, focusing particularly on business education at Mindanao State University - Marawi Campus. The research identifies significant challenges faced by educational institutions such as inadequate digital skills among faculty and limited access to technological resources, which hinder effective curriculum delivery and alignment with industry demands. Furthermore, the study highlights the necessity for institutional cultural shifts and faculty upskilling to overcome these barriers and fully leverage the benefits of digital transformation. The findings underscore the critical need for enhanced collaboration between universities and industries, as well as the implementation of innovative teaching methodologies that incorporate real-world experiences, thereby ensuring that graduates are equipped with the skills necessary to thrive in a technology-driven environment. This research contributes to the ongoing discourse on educational reform in the Philippines, advocating for a strategic approach to integrate digital technologies and industry partnerships into the curriculum, ultimately fostering a more responsive and competent workforce.

Keywords: digital transformation, Industry 5.0, Technological Capability Maturity Model, business education, Philippines

INTRODUCTION

The rapid advancements in technology have transformed the business landscape, presenting both challenges and opportunities for educational institutions. In this light, universities in the Philippines are undergoing digital transformation aimed at equipping students with the necessary digital skills and competencies to thrive and excel in the digitally-driven business landscape. In the recently conducted CHEDx 2023, the Commission on Higher Education (CHED) Chairman Popoy De Vera highlighted the necessity for Philippine Higher Education Institutes to respond to and satisfy the demands of the ever-evolving workplace. He acknowledged that recent technological advancements like the integration of applications of analytics, artificial intelligence (AI), automation, cybersecurity, and the Internet of Things (IoT) challenge the academe sector to re-evaluate education,

workforce readiness, and societal progress. It is worth mentioning that De Vera calls upon the academe to be committed to responding to the call of the industry to produce prepared graduates (Hernando-Malipot, 2023).

The rise of Industry 4.0 and the imminent transition to Industry 5.0 have presented significant challenges for the Philippine education system, particularly in the realm of business education. One major issue is the mismatch between the curriculum and the competencies required by the industry. The curricula used in many Philippine business schools are often not aligned with the rapidly evolving needs of the business world, leading to a disconnect between the skills of graduates and the demands of employers. This gap between business education practices and industry expectations has limited the market availability of business graduates (Almazan, 2023).

As to the best knowledge of the researcher, there are very limited studies in the Philippines tackling digital transformation and awareness of Industry 5.0 among state universities in Mindanao. Hence, this study attempts to fill in the knowledge gap and provide an update in the literature by providing empirical evidence on the current state of digital transformation technology and stakeholder perceptions in digital transformation and Industry 5.0 in the context of Mindanao State University - Marawi Campus.

Hence, this research aims to delve deeper into the digital transformation trends and issues of the impending Industry 5.0 that is shaping the future of business education. In particular, this research sought to answer the following specific research questions:

1. What are the relevant trends that significantly impact

business education from the perspective of students?

2. What are the challenges of incorporating emerging trends and Industry 5.0 into business curricula?
3. What is the current level of technological capability of Mindanao State University - Marawi Campus?
4. What are the performance gaps in the technological resources utilization and what are the areas for IT improvement in the University?

Industry 5.0

In 2021, the European Commission officially called for the Fifth Industrial Revolution - Industry 5.0. It acknowledges the supremacy of the industry in achieving social goals that go beyond jobs and growth as well as respecting the sustainability of our planet and putting the emphasis on being worker-centric at the heart of the production process. It supplements the existing Industry 4.0 paradigm by transitioning to a sustainable, human-centric, and resilient industry (Breque, De Nul, & Petridis, 2021).

For short, Industry 5.0 shifts the focus from economic value towards a focus on societal value thereby prompting a shift from welfare focus to well-being (Kraaijenbrink, 2022).

Digital Transformation

Digital transformation refers to the strategic initiative incorporating digital technology in all aspects of an organization. Digital transformation assesses and revolutionizes an entity's processes, products, business operations, and technology to enable continuous, fast, and customer-compelled innovation (O'Brien, Downie, & Scapicchio, 2024).

The extant literature on the digital transformation of Philippine

universities divulges several key insights into its enforced inception, challenges, and progress (Times Higher Education, n.d.). Digital transformation in the Philippine higher education institutions was partially hastened during the COVID-19 pandemic when the modality of learning shifted from traditional face-to-face to online class mode delivery. As experienced, some of the main challenges encountered by Philippine universities are (1) the absence of reliable internet connectivity and (2) access to devices, especially in the country's remote areas (Bai, 2023). Moreover, researchers have recognized issues like resistance to change, lack of digital skills among faculty, and the need for institutional cultural and organizational shifts (Benavides, Arias, Serna, Bedoya, & Burgos, 2020). In addition, studies also revealed limited resources, resistance to change, and the need for faculty upskilling (Hashim, Tlemsani, & Matthews, 2021; OpenGov Asia, 2021; World Bank, 2020). Overcoming these hurdles is deemed crucial for Philippine universities to fully reap the benefits of digital transformation.

Despite these roadblocks, there are also signs of development in this digital transformation endeavor. Philippine education providers are gearing towards digitizing their processes in a step to enable digital transformation to improve the online teaching and learning experience. Such efforts include the utilization of digital tools for collaboration, communication, and content delivery. There are also ongoing efforts to modernize learning platforms like DepEd TV which provide students a more personalized and self-paced learning (OpenGov Asia, 2021).

In this light, studies also highlighted the broader in-progress national

initiatives geared to support digital transformation. As such, struggles are being made to resolve the digital divide, level up internet connectivity, and nurture a more conducive business environment for the digital economy (World Bank, 2020). Indeed, universities are integrating e-learning platforms, virtual classrooms, data analytics tools, and other digital solutions into their curricula. This journey is ultimately aimed at preparing graduates with the necessary digital skills and competencies to thrive and excel in the digitally-driven business landscape.

METHODOLOGY

This study is descriptive in nature. Descriptive research is a research method describing the characteristics of the population or phenomenon that is being studied (Sekaran & Bougie, 2016). It is also used to validate any existing conditions that may be prevalent in a population (Sekaran & Bougie, 2016). This design is used to ascertain and narrate the different trends and issues shaping the future of business education from the perspective of students. An interview and a focus group discussion (FGD) were employed to supplement and validate the survey results.

The locale of this research is Mindanao State University - Marawi Campus in Mindanao, Philippines. As constitutionalized in the Republic Act No. 1387 (as amended), the creation of the University follows the national goal of institutionalizing a Center of Peace Development, Center of Excellence, and Center of Development through a university system that would enrich global competitiveness with program implementation and policies directed towards relevant competence.

A structured interview with key IT personnel was undertaken to evaluate

the technological capability of the University. Meanwhile, an FGD was conducted with the newly elected JPIA officers to shed light on the emerging trends and issues at hand.

The 87 students are chosen from the total population through purposive sampling under the nonprobability sampling method. Purposive sampling is a non-probability sampling technique where researchers select participants based on specific criteria that align with the research objectives. One widely cited definition of purposive sampling is provided by Patton (2002), who described it as *a sampling method in which elements are selected for a purpose, usually because of the unique position they occupy in a particular population*. This method allowed the researcher to deliberately choose participants who possess characteristics or experiences relevant to the study, thereby enhancing the likelihood of obtaining rich and meaningful data. This research focuses on incoming third-year and graduating students of the department as they have already reached maturity in business education and will soon join the workforce.

The focus group discussion was guided by structured questions gauging the perceptions of officers as student leaders with regard to the emerging trends and issues of digital transformation and Industry 5.0.

Furthermore, the Technology Capability Maturity Model (TCMM) was utilized in the interview with key IT personnel. It is an established assessment tool for evaluating technology resource utilization and recommending courses of action. This model has been tested to help organizations assess their current technology capabilities, identify areas for improvement, and develop a roadmap for enhancing technology utilization to achieve strategic

objectives. The tool has four (4) parts divided into four assessments namely: (1) infrastructure, (2) applications, (3) data management, and (4) IT governance.

Theoretical Framework

This study utilized the TCMM as an assessment tool. It is a framework that assesses the maturity of an organization's processes in technology and software development. It is structured into five maturity levels, namely: initial, managed, defined, integrated, and optimized.

At the *Initial* level, processes are limited and still manual. As organizations move forward to the *Managed* level, they start to standardize and have basic components in place. At the *Defined* level, the organization is now at the maturity level and begins with automation. Moving on to the *Integrated* level, the emphasis is on integration and real-time processing. Finally, at the *Optimized* level, the organization concentrates on the optimization of processes and continued advancements (Beecham, Hall, & Rainer, 2005).

Another relevant framework is the Social Cognitive Theory (SCT) originated by Albert Bandura. It underscores the role of learning through observation, imitation, and modeling in behavior change. Moreover, SCT offers an extensive framework to comprehend the underlying forces of learning and behavior in social contexts (Leggette, Rutherford, Dunsford, & Costello, 2015).

Conceptual Framework

The following schematic diagram guides and monitors this research:

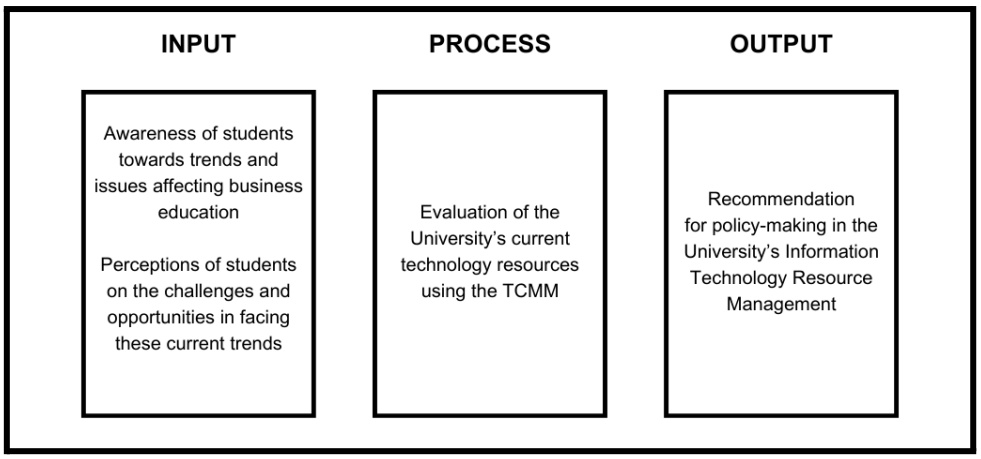

Figure 1. Schematic diagram of the study

For this research, the following were taken as inputs: (1) awareness of students towards trends and issues affecting business education and (2) perceptions of students on the challenges and opportunities in facing these current trends. An evaluation was made of the relevant technological resources of the University using the TCMM.

RESULTS AND DISCUSSION

This research intends to assess the students' perception and awareness of the trends and issues brought by digital transformation and Industry 5.0, particularly those that will significantly impact business education.

Students' perception of the relevant trends that will have the most significant impact on the future of business education

It was revealed that technology integration wherein students perceive the inevitable utilization of AI and machine learning (ML) in business education. This finding aligned with the results of Hossain et al (2020) highlighting that strong technical knowledge, including familiarity with AI and ML, are crucial factors for

employability as perceived by business graduates in Bangladesh. This finding is further echoed in the study of Rodrigues et al (2021) stating that particularly in a rapidly changing job market, technological skills development is crucial for students' academic and professional success.

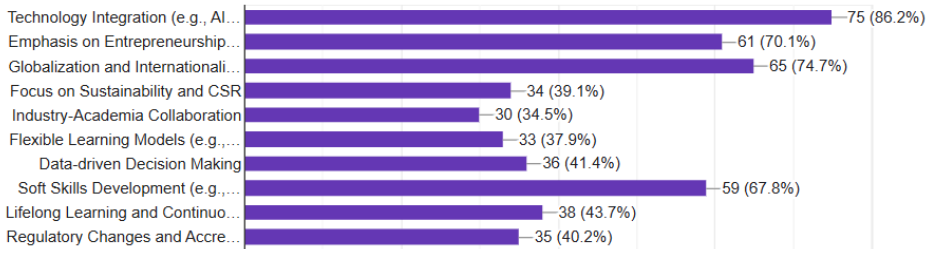

Figure 2. Relevant trends that significantly impact business education.

Second on the list is globalization and internationalization. Gumede et al (2020) further argued that exposure to international business concepts enhances students' understanding of global markets and, thereby, prepares them for careers in a multinational context. This is further validated by the focus group discussion wherein student officers recognized that the playing field nowadays is on a global scale and indeed there is a need for the University to commit to its internationalization efforts.

In addition, the results revealed that the third important trend is the emphasis on entrepreneurship and innovation. This result is consistent with that of Boldureanu et al (2020) in asserting that the course on entrepreneurship has a positive influence on students' business start-up intentions. This very perception is critical in regions where traditional employment opportunities

are scarce, wherein students are motivated to create their own business endeavors. Likewise, Maulana (2023) strongly advocates for the integration of entrepreneurship and innovation into business curricula. Students express a desire for practical experiences, such as internships and project-based learning, that allow them to apply entrepreneurial concepts in real-world settings. This hands-on approach not only enhances their understanding of business operations but also fosters a culture of innovation among aspiring entrepreneurs.

Another finding of this current study showed that the fourth trend is on soft skills development like leadership and communication. Based on the focus group discussion of student officers, leadership skill is a crucial skill to stand out. Communication skills are also very essential in business as one needs to collaborate with other stakeholders such as customers, suppliers, creditors, employees and the public in general. Moreover, in Kazakhstan, Amantay and Ermakov (2021) emphasize the need for educational reforms that prioritize soft skills development within the curriculum. Students in underdeveloped countries express a desire for training programs that enhance their interpersonal skills, as these competencies are essential for navigating diverse workplace environments. This is also resounded in another research which highlights the importance of soft skills in preparing students for the workforce, noting that effective communication and leadership are critical for career success (Messaoudi, 2023).

Surprisingly, the respondents rated the industry-academe collaboration as the least trend as compared to the above mentioned trends. This could imply that students and student officers alike does not see significant

and consistent real-life collaboration with the host university and the industry. Another implication is that the institution may have lagged behind in tapping the industry and focused only on the instruction and needs an upgrade of its curriculum. This observation seemed to be resounded particularly in the context of underdeveloped countries where business students perceive it as a significant yet underutilized trend. This gap is echoed in the findings of Li and Niyomsilp (2020) and Evans and Miklosik (2023), who argued that effective collaboration between industries and universities can significantly enhance the capabilities of graduates responding to the needs of the evolving and dynamic market. Moreover, this need is called for under the concept of the "triple helix" model, which involves collaboration among universities, industries, and government.

Students' perception of the challenges of integrating these emerging trends and Industry 5.0 concepts and skills into business education.

As we know, the integration of emerging trends and Industry 5.0 into business education curricula is increasingly recognized as essential for preparing students in underdeveloped countries to meet the demands of a rapidly evolving job market. In this light, respondents were asked about their perception of the main challenges of integrating these emerging trends and Industry 5.0 concepts and skills into business education. It was found that there are insufficient technological infrastructures and resources. This point was also stressed during the focus group discussion wherein student officers feel that the University needs to invest in technology to remain relevant and competitive. This

need was further stressed during the interview with key IT personnel. However, insufficient technological infrastructure remains a significant challenge that hampers this integration.

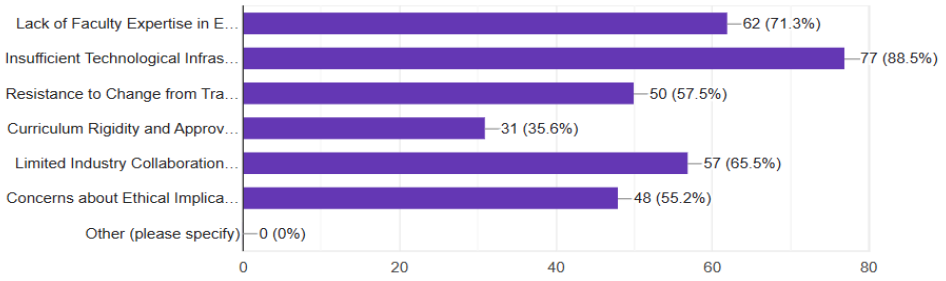

Figure 3. Challenges in integrating emerging trends and Industry 5.0 into the business education curricula.

This research finding echoed the primary concerns highlighted in the literature that is, the lack of adequate technological resources impedes the effective delivery of modern curricula. This is consistent with the study of Rahayu, Mayasari, Fitriyatinur, and Agustina (2023) in Indonesia which emphasizes that entrepreneurship education must incorporate technology to optimize business processes and enhance product quality; yet, many institutions in underdeveloped regions struggle with limited access to necessary technological tools. In addition, this finding supports the findings of Ahmed, Haroon, Tambi, & Kamal (2021), who identified infrastructural challenges such as overcrowded classrooms and insufficient teaching aids as critical barriers to effective business education. Indeed, these limitations hinder the ability of educational institutions to provide students with the technological skills required for

success in today's business environment.

It was also revealed that students perceive that the faculty force lacks the necessary expertise in emerging technologies. It can be implied that faculty have limited formal training on these technologies. This result aligned with the findings of Gough, Bown, Campbell, Poronnik, and Ross (2022) in highlighting that faculty members often lack the necessary expertise in specific technological areas, hindering effective teaching and learning. This observation is particularly relevant in the context of business education nowadays, where the rapid pace of technological advancement necessitates continuous faculty development to keep curricula relevant and engaging. Moreover, a study even emphasized that inadequate mentorship and training for faculty members can significantly impact their ability to guide students in research and practical applications of emerging technologies. Hence, the lack of experienced faculty can lead to a cycle of underpreparedness, wherein students graduate without the necessary skills to prosper in today's technology-driven environments (Macharia, Kamya, D., Waweru-Siika, & Kathomi, 2024).

In addition, respondents noted the limited industry collaboration and partnerships. This could imply that there is a need to revisit internship and on-the-job training guidelines to include relevant industry linkages. This result resounded with the research of Chen (2022) in Taiwan, which highlights that collaborative teaching and enterprise visits can enhance students' learning outcomes by providing real-world experiences that complement formal education. Indeed, the absence of such collaborations often results in a curriculum disconnected from industry needs,

leaving students ill-prepared for the job market. This disconnect is particularly pronounced in underdeveloped countries, where educational institutions may lack the resources or networks to engage effectively with industry partners. True enough, the lack of established frameworks for collaboration often results in missed opportunities for integrating industry insights into academic programs.

Current level of technological capability of Mindanao State University - Marawi Campus

A TCMM was utilized in the interview with key IT personnel. It has four (4) parts divided into four (4) assessments, namely: (1) infrastructure, (2) applications, (3) data management, and (4) IT governance.

The first part of the assessment focused on the IT infrastructure. The interview revealed that the University is on Level 2.5 - somewhere in between Level 2 in which standardized infrastructure components and basic automation tools are in place and Level 3 in which robust infrastructure management practices with automated monitoring and maintenance. Quoting the IT personnel (personal communication, 2024), “[W]e’re too lenient. So, we tend to break policies always. So, we cannot automate that anymore.” In terms of building, ICTC has a newly constructed building, which is part of the ICT modernization program by the Senate. Yet, it is still lacking in terms of networks, servers, and other IT infrastructure. There is also lack of holistic support from all administrative offices. There is not enough equipment and a lack of resources provided by the administration which could be a result of budget cuts in education. The desired target probably is level 3 as they will be starting to upgrade to the new Campus Management System

into a web-based system so it will be easier to implement and much accessible.

The second part of the assessment is on applications. The interview revealed that the University is on Level 2.5. - somewhere in between Level 2 in which standardized application platforms and basic integration capabilities are in place and Level 3 in which mature application lifecycle management practices with automated testing and deployment are in place. Quoting the IT personnel (personal communication, 2024), “[W]e are actually mature but we are not yet fully automated testing & deployment because we are short with developers”. The interview revealed that the University is short of skilled manpower, particularly software developers. It was also pointed out that ICTC has the highest rate employee turnover rate because compensation rates are not attractive and there is no job tenure. Programmers are leaving because skills are really in demand and yet no permanent items were provided with ICTC The key personnel highlighted that in the Software Development Life Cycle, manpower, policies on processes, and infrastructure are highly needed. Currently, the University is short on all these in relation to the desired target level within five (5) years, which is Level 3.

The third part of the assessment is on data management. The interview also revealed that the University is on Level 2.5 - somewhere in between Level 2 in which standardized data management processes and basic data governance framework are in place and Level 3 in which mature data management practices with automated data cleansing, classification, and archival are present. Data management is a vital part of the SDLC. It was further relayed that there

is no formal procedure for data gathering at the very beginning. There is no direct instruction from departments for ICTC so they cannot do anything. All are verbal and no clear processes to standardize. Another problem is that there is no capability from requesting departments. So what happens is that programmers from ICTC do everything. When they leave, no one will continue the task. It was reiterated that there is no established IT policy, there is a lack of equipment , and there is no SMART goal in implementing the desired change. Quoting the IT personnel (personal communication, 2024), “[I]deally, each department will be like their own business owners, they will just tap us for data consolidation in the database and some sort of assistance. But, even at the frontline services, there’s lack of data gathering.”

The last part of the TCMM evaluates IT governance. The interview revealed that the University is on Level 1.25 - just barely surpassing Level 1 in which an informal IT governance structure with limited oversight and accountability is present. It was further revealed that since there’s no clear policy. Should there be, they are easy to bend in terms of special requests for data modification. As such, equality and fairness are compromised.

Performance gaps in the technological resources utilization

In analyzing the performance gaps, a fishbone diagram was utilized to identify the causes of the constrained ICTC capability.

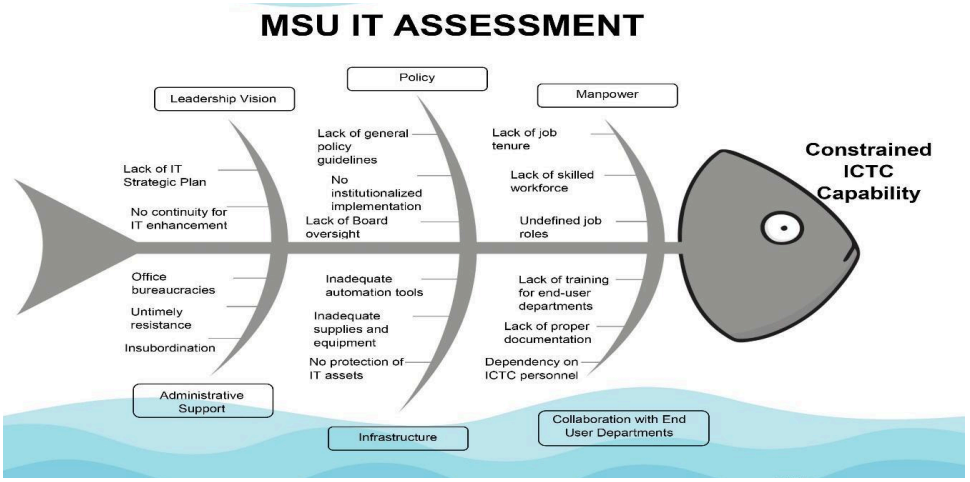

Figure 4. Fishbone diagram showing causes of constrained CTC capability of the University

As can be seen in Figure 4, the main causes are the lack of manpower, lack of collaboration with end-user departments, lack of IT policy, lack of IT infrastructure, lack of administrative support, and lack of leadership vision. The manpower problem was brought about by the lack of job tenure, lack of skilled workforce, and undefined job roles leading to employee burnout. The problem of collaboration with end-user departments is caused by the lack of training, lack of proper documentation, and dependency on ICTC personnel.

The issue of IT policy is brought by the lack of general IT policy guidelines. Thus, there is no institutionalized implementation and, therefore, no Board oversight. In terms of infrastructure, be it recalled that there is a mention of inadequate automation tools, inadequate supplies, and equipment. There is also no protection of IT assets, which leads to asset destruction and theft.

Lastly, there is a need to revisit the leadership vision. IT is a very crucial matter nowadays and there should be a strategic plan so there should be

continuity for IT enhancement for the University to be globally competitive.

CONCLUSION

The research conducted at Mindanao State University-Marawi Campus aimed to assess the state of digital transformation and the awareness of Industry 5.0 among students, specifically those taking up Bachelor of Science in Accountancy. The key findings are as follows:

1. There was a significant emphasis on the challenges and opportunities that digital transformation presents for business education, with a focus on equipping students with necessary digital skills;
2. While there was some progress in digitization efforts, like other universities in the Philippines, the University faced challenges such as the lack of reliable internet and digital skills among faculty;
3. This study emphasized the necessity for the University to adapt and align with industry needs, lean to more interdisciplinary and experiential learning, commit to internationalization efforts, and continue faculty upskilling; and
4. Provision for infrastructure, digital skills, and university readiness were identified as areas for further improvement.

Based on the results and findings of the research conducted at Mindanao State University - Marawi Campus, it is evident that the institution is slightly lagging behind in addressing the challenges opportunities presented by digital transformation. This study showcased the necessity of improving educational pedagogies to meet the accelerating demands of Industry 5.0, and

ultimately equipping students with the digital competencies.

While there are barriers such as infrastructure limitations and digital skills gap among faculty, the University is slowly making progress in digitizing processes and modernizing learning platforms. The research reveals the need for continued investment and policy support to further develop the technological resources and capabilities of the main campus. Moreover, a collaboration between the academe, government, and industry is very much needed to connect the classroom lessons with the realities of the evolving business landscape. This is particularly relevant in contexts where traditional educational models may not adequately prepare students for the demands of the labor market. By doing so, the University can produce high quality graduates who are not only equipped to join the workforce but are ready to lead.

The researcher believes that the results of this study provide a good basis of intervention to improve the competitiveness of students in light of these emerging trends in digital transformation and Industry 5.0.

To the University administrators, the following are recommended:

1. *Prioritize IT infrastructure enhancement*. Allocate resources to build and maintain a robust IT infrastructure that supports seamless digital experiences, including stable internet connectivity and access to digital tools;
2. *Integrate digital literacy into the curriculum*. Develop programs that incorporate digital literacy across all disciplines to better prepare students for the challenges and demands of Industry 5.0. This course can be taken alongside their minor subjects;

3. *Facilitate faculty training on digital tools*. Offer continuous professional development opportunities for faculty to become adept at using and teaching with new digital technologies especially to maintain academic integrity. Faculty subscription and training with TurnItIn or Grammarly is a necessity;
4. *Expand access to technology*. Strive to ensure that all students, regardless of their socio-economic status, have access to the technological devices and software needed for their studies. The University should maintain the free wifi access in the college premises and maybe expand such service to dormitories and canteen;
5. *Strengthen industry partnerships*. Engage in collaborative projects with industry partners to keep the university's courses aligned with real-world applications and requirements. MSU Marawi should be in a constant quest to ink MOAs and MOUs with industry partners; and
6. *Emphasize cybersecurity and data privacy*. As digital processes are adopted, ensure that policies and practices are in place to protect MSU Marawi's data privacy and security.

In responding to the gaps found in TCMM, the following action plans, milestones, and continuous performance measures are recommended for continuous and smooth digital transformation:

1. *Institutionalize policy guidelines for IT use and management*. Policies should be drafted and implemented with clear and just

schemes for penalties in cases of violation;

2. *Empower the IT personnel*. Provide tenured IT jobs, hire more skilled IT personnel with attractive compensation packages, and clearly define job roles and responsibilities;
3. *Collaboration and administration support*. Establish proper administrative support and foster collaboration between IT and different service units;
4. *Improve IT infrastructure*. Invest in upgrading servers, hardware, software, and network infrastructure to sustain reliability and performance;
5. *Optimize the Campus Management Systems*. Consolidate processes from different service/end-user departments, develop programs, and draft workflow for more automation;
6. *Align IT with the University's goals*. Establish IT governance frameworks and develop a roadmap for aligning IT initiatives with strategic university goals;
7. *Establish an IT Governance Board*. Include in regular APC matters concerning IT to track performance, monitor progress, and evaluate IT projects and deliverables;
8. *Craft an IT Manual*. Consolidate processes from different service/end-user departments, programs developed and implemented and institutionalize violations for policy breach; and
9. *Continuous learning*. Establish regular training programs to capacitate service departments

For future research on the same subject matter, the following are recommended:

1. *Expand research scope*. Diversify the population and sample size in future studies to include students from various departments and universities to validate and support the findings of this study;
2. *Longitudinal studies*. Conduct longitudinal research to track the progress of digital transformation initiatives and their long-term effects on educational outcomes and graduate competencies. Employability and tracer studies should be continued from time to time; and
3. *Incorporate comparative analysis*. Include comparative studies with other sister universities like Mindanao State University - Iligan Institute of Technology to gauge where Mindanao State University - Marawi Campus stands relative to similar universities in terms of digital transformation.

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