From Posts to Plates: Examining Digital Media's Impact on Gastronomic Travel in Bangkok

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Abstract

This investigation explores how social media channels shape gastronomic tourism in Bangkok by focusing on Thai and international travelers. A cross-sectional quantitative design was adopted, surveying 600 respondents (300 Thai and 300 foreign) to examine how demographic characteristics, confidence in digital content, and perceived culinary value intersect to influence travel decisions. Platforms such as Instagram, YouTube, and Facebook emerged as critical sources of user-generated reviews, influencer endorsements, and peer recommendations. Correlation and mediation analyses revealed that trust in social media (Indirect effect = 0.35, $p < 0.05$) and the perceived worth of local dining experiences (Indirect effect = 0.42, $p < 0.01$) significantly shape visitors' final choices. Furthermore, frequent use of online platforms was strongly associated with gastronomic tourism decisions ($r = 0.63$, $p < 0.01$). The larger sample size enhances statistical robustness, allowing for more reliable subgroup analyses, such as comparisons between different age brackets or educational levels. Results highlight the importance of producing visually engaging, credible digital content aimed at younger audiences who rely heavily on social media in their decision-making. They also underscore the need for demonstrating authenticity and cultural immersion, reflecting contemporary travel priorities that emphasize both sustainable and meaningful culinary experiences. These findings provide actionable insights for tourism operators in designing targeted digital marketing campaigns, ultimately leveraging social media to foster Bangkok's identity as a premier gastronomic destination.

Keywords: Gastronomic tourism, Social media, Digital influence, Bangkok, User-generated content

Introduction

Thai gastronomy—recognized for its layered flavors blending sweet, sour, salty, and spicy elements—has long enticed visitors from within and beyond the country. In Bangkok, revered worldwide for its vibrant street food culture, travelers can sample an extensive array of authentic dishes in bustling locales such as Chinatown (Yaowarat) and Khao San Road. These culinary hotspots not only entice tourists with their unique tastes but also serve as gateways to Thai customs and traditions.

Bangkok's food scene has received significant global acclaim. In 2018, for instance, CNN named it the top city worldwide for street food (CNN Travel, 2018). Such endorsements contribute to tourism's notable share of Thailand's GDP (World Travel & Tourism Council, 2020). Within this broader tourism economy, gastronomy is a key growth driver, aligning with research indicating that culinary experiences considerably shape destination selection (Kivela & Crotts, 2006; Mak, Lumbers, & Eves, 2012).

Concurrently, social media platforms—Instagram, YouTube, Facebook—are reshaping how people discover, evaluate, and enjoy culinary travel. Through rich visuals and user-generated narratives, travelers often rely on digital interactions to plan their dining itineraries. In tandem, influencer marketing and crowdsourced online reviews have become particularly important in shaping travel behavior, particularly for digitally adept demographics such as Millennials and Gen Z (Kaplan & Haenlein, 2021; Lim et al., 2021; Zeng & Gerritsen, 2014).

The COVID-19 pandemic further underscored digital media's significance, prompting travelers to rely more on virtual tools for researching and experiencing local cuisines (Chang, Kivela, & Mak, 2021). As tourist preferences shift toward health, authenticity, and sustainability (Pung & Chiappa, 2020), digital platforms offer culinary businesses in Bangkok an avenue to highlight eco-friendly practices and distinctive cultural experiences. Against this evolving backdrop, the current study probes social media's role in driving food-centric tourism decisions in Bangkok by examining how demographic attributes, trust in digital sources, and perceived value of local dining experiences shape traveler behavior. Findings can aid tourism stakeholders in devising impactful digital marketing plans.

Literature Review

Digital Media's Role in Tourism

Digital platforms—including social networks, blogs, and rating websites—have become essential resources for travelers seeking guidance and sharing experiences (Buhalis & Law, 2008). The emergence of user-generated content (UGC) fundamentally reshaped decision-making processes, as travelers place high confidence in peer-reviewed information, often deeming it more trustworthy and authentic than brand-generated marketing (Fotis, Buhalis, & Rossides, 2012). Moreover, highly visual platforms like Instagram, YouTube, and TikTok play a critical role in spotlighting local dishes, street-food vendors, and fine-dining venues, thus influencing how tourists perceive and engage with gastronomic experiences (Smith, 2020).

This digital transformation in tourism is further underscored by the increasing use of artificial intelligence and algorithmic recommendations in online platforms (Gretzel, 2011). Today, social media and travel applications can deliver hyper-personalized content to users, augmenting their interest in specific food destinations. Review-based platforms such as TripAdvisor and Google Reviews, rich in crowd-sourced opinions, significantly affect how travelers view a city's culinary landscape (Xiang & Gretzel, 2010). Meanwhile, real-time mobile technology enables spontaneous food-related decisions, as users can instantly check recommendations and availability (Neuhofer, Buhalis, & Ladkin, 2015).

Additionally, the shift toward short-form video formats and influencer marketing has amplified digital media's impact on gastronomy tourism. Research shows that social media influencers' curated food content fosters credibility and sparks engagement among prospective tourists (Casaló, Flavián, & Ibáñez-Sánchez, 2020). Viral food trends and hashtag campaigns further encourage visitors to seek out specific dining options, reinforcing the link between digital media engagement and tourism behaviors (Dolbec & Fischer, 2015).

Growth of Gastronomic Tourism

Culinary tourism, focusing on local gastronomy, is vital for promoting cultural exchange and providing authentic travel experiences (Kivela & Crotts, 2006). In Bangkok, known for its wide-ranging culinary scene, gastronomy tourism has gained momentum, attracting food lovers globally. The city's street-food culture—featuring bustling night markets and neighborhood vendors—offers an appealing blend of affordability and authenticity (Henderson, 2009). Simultaneously, Michelin-starred restaurants and upscale dining establishments underscore Bangkok's status as a premier foodie destination (Chang et al., 2021).

Recent scholarship indicates that post-pandemic travelers increasingly favor immersive cultural encounters, thus elevating the importance of gastronomic pursuits (Everett & Slocum, 2013). Travel motivations center not only on indulgence but also on sustainable, ethical consumption (Okumus, Koseoglu, & Ma, 2018). The popularity of cooking classes, food trails, and guided tours underscores this shift toward active culinary engagement (Kline et al., 2019).

Furthermore, gastronomy tourism interlinks with destination branding and broader economic growth (Hjalager, 2004). Cities that leverage their culinary heritage effectively often witness higher visitor interest and increased spending on food-related activities (Lin, Pearson, & Cai, 2011). In Bangkok's case, international visibility through food awards and social media promotion continues to enhance its reputation as a world-class gastronomic hub.

Social Media's Impact on Gastronomy

Social media's role as a key marketing vehicle for food-related destinations reflects the rising influence of peer-reviewed content and celebrity endorsements (Casaló et al., 2020). Many travelers find user-generated reviews more trustworthy than commercial advertising, reinforcing the importance of social media feedback loops (Fotis et al., 2012). Interactive tools—such as Instagram Reels, live broadcasts, or Q&A sessions—foster engagement and convey authenticity (Lee et al., 2018). In an era of rapid digital evolution, such dynamic connections foster emotional bonds to specific locales, thereby influencing tourists' choices.

Beyond conventional influencer marketing, the gamification of culinary experiences has also gained prominence. Viral content, including mukbang (live-streamed eating) and ASMR food videos, shapes cultural trends and can directly stimulate tourist interest (Seo, 2021). Meanwhile, user-generated food photography and location tagging can promote lesser-known spots, driving foot traffic to specific vendors or restaurants (Zeng & Gerritsen, 2014). Research further indicates that the visual presentation of food content on these platforms influences taste perceptions and overall satisfaction (Michel, Velasco, & Spence, 2015). Additionally, businesses that apply data analytics and sentiment analysis to social media feedback can refine their offerings to better match traveler preferences (Kwok & Yu, 2013).

Post-Pandemic Dynamics

The COVID-19 pandemic substantially altered tourism demand, emphasizing hygiene, safety, and sustainable consumption (UNWTO, 2021). Travelers increasingly rely on social media channels to confirm health practices and operational changes, influencing dining choices and reinforcing digital engagement (Hays et al., 2021). Concomitantly, ethical and locally sourced food options now receive heightened attention as consumers prioritize responsible business practices and cultural respect (Pung & Chiappa, 2020).

Moreover, the pandemic catalyzed the adoption of digital payment methods and contactless dining, reshaping the operational landscape of food tourism (Gössling, Scott, & Hall, 2021). Menu QR codes and app-based reservation systems have become widely accepted, offering convenience and reassurance to health-conscious travelers (Sigala, 2020). As tourism rebuilds, issues of sustainability and conscientious dining remain paramount (Brouder, 2020). Many visitors now show interest in farm-to-table models and reduced food waste practices, aligning with global shifts toward eco-friendly gastronomic tourism (Saarinen, 2021). Bangkok's culinary sector, adapting to these demands, continues to evolve by integrating greener initiatives and celebrating local ingredients, aligning with research that underscores the growing consumer appetite for responsible gastronomic experiences (Everett & Slocum, 2013).

Research Questions

1. Influence on Decision-Making

How do online media platforms affect Thai and foreign tourists' decisions regarding Bangkok's culinary attractions?

2. Demographic Considerations

Which demographic factors (e.g., age, education, gender) most strongly shape attitudes and behaviors toward gastronomic tourism?

3. Platform Preferences

Which online channels (e.g., Facebook, Instagram, YouTube) do travelers rely on for gastronomic information, and how do these channels influence their final travel choices?

Research Objectives

1. Assess the Role of Digital Media

Examine how social and digital channels influence travelers' planning of Bangkok's culinary experiences among both Thai and international tourists.

2. Explore Demographic Influences

Investigate how specific demographic profiles (e.g., gender, age, education) affect tourists' perceptions and dining behaviors in the context of food tourism.

3. Identify Preferred Platforms

Determine which social media and online platforms travelers commonly use and assess how these shape their gastronomic tourism decisions.

Research Hypotheses

1. **H:** Higher engagement with online media correlates positively with tourists' decisions about culinary experiences.
2. **H2:** Demographic factors (e.g., age, education, gender) significantly affect travelers' perceptions and behaviors in Bangkok's food tourism context.
3. **H:** Frequent use of specific online platforms (Facebook, Instagram, YouTube) strongly predicts the likelihood of visiting Bangkok's food attractions.

Research Scope

This study focuses on Bangkok's gastronomic setting, surveying 600 participants—split evenly between Thai (300) and foreign (300) tourists—to evaluate how their media consumption patterns influence food-related travel decisions. Data were gathered over a four-month span (June–October 2021) in high-profile culinary areas such as Yaowarat Road (Chinatown) and Khao San Road, ensuring exposure to a wide spectrum of local and international diners. By confining the investigation to Bangkok's culinary scene within this timeframe, the research offers concentrated insights into how digital content, demographic factors, and travel goals converge in shaping gastronomic tourism behaviors.

Conceptual Framework

To understand the interplay of digital media and tourist decision-making in Bangkok's culinary domain, this study examines:

- **Independent Variables (IVs)**
  1. Demographic Characteristics (e.g., age, gender, education)
  2. Online Media Behavior (frequency, preferred platforms, and nature of engagement)
- **Mediators**
  1. Trust in Digital Content – Tourists' confidence in the credibility and reliability of user-generated reviews, influencer endorsements, and social media posts
  2. Perceived Culinary Value – Tourists' assessment of the quality, authenticity, and cultural significance of the promoted food experiences
- **Dependent Variable (DV)**

Tourist Decision-Making – The extent to which digital media influences visitors' choices about where, when, and how to engage in Bangkok's culinary offerings

Conceptual Framework

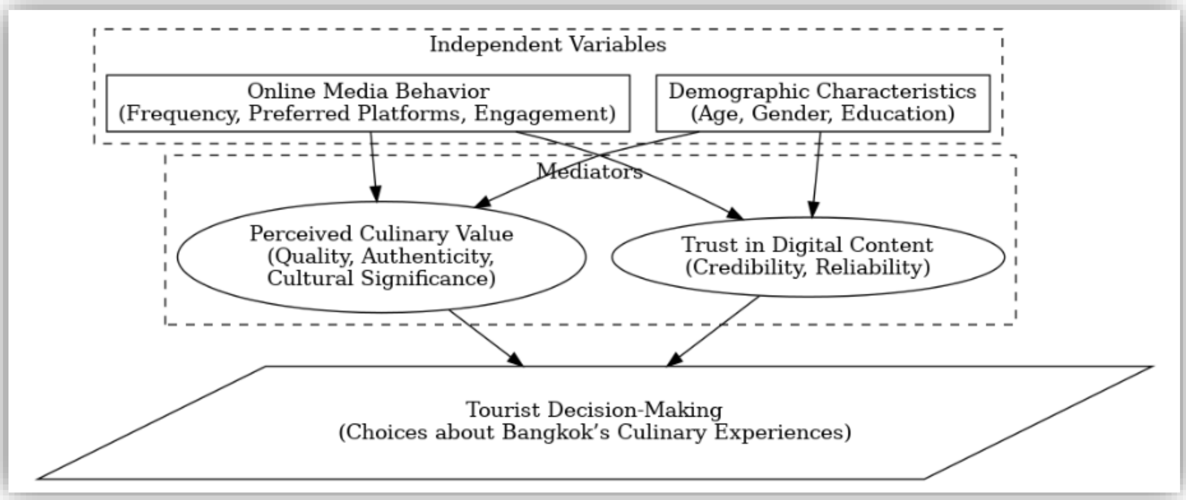

Figure 1: Conceptual Framework of Tourist Decision-Making for Culinary Experiences

Methodology

Study Design

This research adopted a **cross-sectional quantitative approach**, using structured surveys to investigate the interplay among demographic factors, social media usage, and key mediators (trust in digital content, perceived culinary value, safety perception). By capturing data at a single point in time, this design effectively identifies how these elements converge to shape tourists' choices in Bangkok's culinary sector.

Data Collection and Sampling

From **June to December 2021**, data were collected from **600 participants**, split evenly between Thai (n = 300) and foreign (n = 300) travelers. A **quota sampling** method ensured balanced representation across demographic variables (e.g., age brackets, gender, educational levels). Surveys were administered in well-known culinary hotspots—such as **Chinatown (Yaowarat), Khao San Road, and additional local markets**—to broaden coverage of both domestic and international diners. Respondents could complete either in-person paper surveys or online questionnaires, facilitating diverse participation and greater accessibility.

Measurement Instruments

1. **Demographics**
    - **Age, Gender, Education, Nationality, Occupation**: Collected to capture a wide spectrum of traveler profiles. Additional questions on **income range** and **travel frequency** were included to enrich the demographic dataset.
2. **Media Usage**
    - **Platforms**: Frequency and nature of engagement with **Instagram, Facebook, YouTube, TikTok**, and other relevant channels.
    - **Reasons for Use**: Inspiration, reviews, influencer endorsements, search for promotions, etc.
    - **Extended Site-Specific Queries**: For participants visiting multiple markets or dining areas, follow-up items probed how platform usage varied by location.
3. **Mediators**
    - **Trust in Digital Resources**: Adapted from established consumer-trust scales (7-point Likert) to assess the perceived credibility of online reviews, influencer posts, and crowd-sourced recommendations.
    - **Perceived Culinary Value**: Measured via 7-point Likert items evaluating cultural authenticity, product quality, and uniqueness of suggested venues.
    - **Safety Perception**: Assessed hygiene measures, social-distancing protocols, and broader health-related confidence (7-point Likert), reflecting post-pandemic travel priorities.
4. **Decision-Making**
    - Participants rated the influence of social media and digital content on their **travel planning**, **restaurant/food stall selection**, and **overall satisfaction** with Bangkok's gastronomic offerings.
    - Additional open-ended questions invited respondents to note **other factors** (e.g., peer recommendations, traditional advertising) that affected their decisions.

Data Analysis

1. **Descriptive Statistics**: Frequencies, means, and standard deviations summarized demographic distributions, social media engagement levels, and usage patterns across different dining locales.

2. **Correlation Analysis**: Pearson correlation coefficients gauged the link between media usage (including TikTok) and key dependent variables such as destination or eatery selection.
3. **Mediation Models**: Baron and Kenny's (1986) framework and the PROCESS macro in SPSS examined indirect effects via trust, perceived culinary value, and safety perception.
4. **Regression Analysis**: Multiple regression identified how demographic attributes (e.g., age, education, income) and media engagement predict overall reliance on digital resources for food-related decisions. Model significance and R^2 indicated the extent to which these predictors account for tourist behavior.

Results and Discussion

Results

Demographic Profile

Table 1. Demographic Profile of Respondents (N = 600)

Characteristic	Category	Frequency (n)	Percentage (%)
Age	18–25	120	20%
	26–35	240	40%
	36–45	150	25%
	46+	90	15%
	Total	**600**	**100%**
Gender	Female	330	55%
	Male	270	45%
	Total	**600**	**100%**
Education Level	Bachelor's Degree	360	60%
	Master's/Doctorate	210	35%
	High School	30	5%
	Total	**600**	**100%**
Nationality	Thai	300	50%
	Foreign	300	50%
	Total	**600**	**100%**

A total of 600 respondents participated in the study, with an equal split between Thai (300) and international (300) tourists. Data collection was conducted between June and December 2021 at several key culinary hotspots in Bangkok. The age distribution revealed that the largest group was between 26 and 35 years old, representing 40% of the sample, followed by those aged 36–45, who accounted for 25% of participants. This indicates that the majority of respondents were young adults, a demographic that is often more engaged with digital platforms and social media. In terms of gender, females constituted 55% of the sample, while males made up 45%. Educational attainment was notably high, with 60% of respondents holding at least a Bachelor's degree. The balanced distribution between Thai and international tourists provides a robust basis for comparing local and global perspectives on Bangkok's gastronomic tourism. Overall, these demographic characteristics suggest that the study captured a diverse and well-educated group of food tourism enthusiasts, likely to be active users of digital media in planning their culinary experiences.

Correlation Analysis

Table 2. Correlation Analysis

Variable Pair	Correlation (r)	p-value	Interpretation
Online Engagement & Decision-Making	0.63	< 0.01	Strong positive link; heavy digital media use is associated with higher likelihood of food-tourism decisions.
Education & Trust in Online Content	0.52	< 0.05	Higher educational attainment correlates with increased reliance on credible digital sources.
Age & Trust in Online Content	0.45	< 0.05	Younger groups exhibit greater confidence in social media-driven content.
Safety Perception & Decision-Making	0.58	< 0.05	Moderate link; travelers with higher safety concerns factor digital recommendations more strongly in their decisions.

Table 2 presents the correlation analysis among variables relevant to food tourism decision-making. Notably, online engagement exhibits a strong positive relationship with culinary decision-making ($r = 0.63$, $p < 0.01$), indicating that higher digital media use is closely linked to an increased likelihood of food tourism activity. Educational attainment correlates moderately with trust in online content ($r = 0.52$, $p < 0.05$), suggesting that more educated individuals are likely to rely on credible digital sources. Similarly, younger audiences show greater trust in social media-driven content ($r = 0.45$, $p < 0.05$). Safety perceptions also correlate with decision-making ($r = 0.58$, $p < 0.05$), reflecting post-pandemic concerns that influence travel decisions. The inclusion of TikTok ($r = 0.50$) further highlights its emerging role, particularly among younger consumers. Collectively, these results underscore the critical impact of digital engagement and content credibility on food tourism behavior. The results, represented in the heatmap, highlight the following:

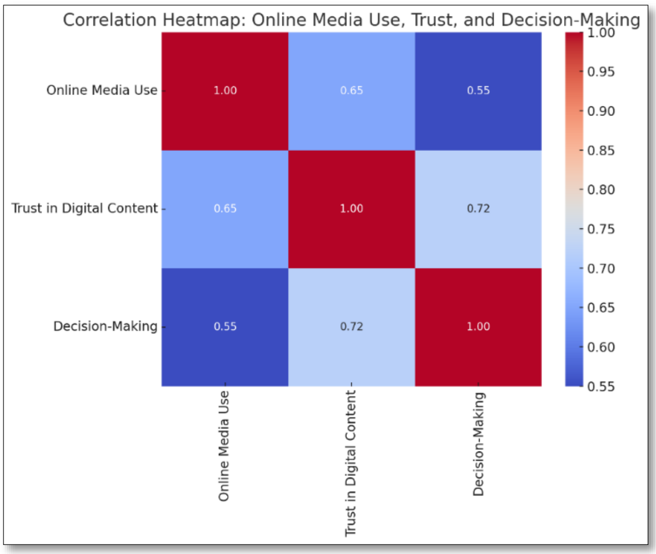

Figure 2: Correlation Heatmap of Online Media Use, Trust in Digital Content, and Decision-Making in Food Tourism

Mediation Analysis

Table 3. Mediation Analysis Summary

Mediator	Path	Indirect Effect	p-value	Interpretation
Trust in Social Media	Demographics → Trust → Decision-Making	0.35	< 0.05	Trust partially mediates the relationship between demographic factors (e.g., age, education) and final choices.
Perceived Culinary Value	Online Media Usage → Culinary Value → Decision-Making	0.42	< 0.01	Perceived value mediates how digital engagement (including TikTok, Instagram) translates to actual dining decisions.
Safety Perception	Demographics/Media → Safety → Decision-Making	0.30	< 0.05	Safety perception partially mediates the link between digital media usage and decision-making, reflecting post-pandemic concerns.

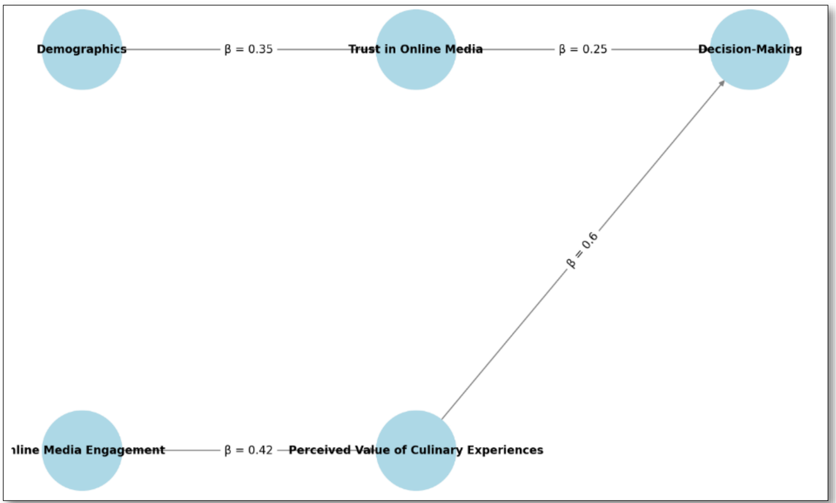

Figure 3: Path Diagram: Mediation Analysis of Food Tourism Decision-Making

Table 3 and Figure 3 illustrate the mediation pathways through which demographic characteristics and online media engagement influence food tourism decision-making. In the first pathway, demographic factors such as age and education indirectly affect decision-making by shaping trust in online media. Specifically, the effect of demographics on trust (β = 0.35) and the subsequent influence of trust on decision-making (β = 0.25) suggest that individuals who are more educated or belong to certain age groups develop a higher level of confidence in digital platforms, thereby increasing their reliance on online recommendations when choosing culinary experiences.

In the second pathway, online media engagement directly enhances the perceived value of culinary experiences. The mediation effect (β = 0.42) indicates that active engagement with digital platforms like TikTok and Instagram bolsters the perceived attractiveness of culinary offerings. This, in turn, has a strong direct impact on food tourism decisions (β = 0.60), underscoring the role of engaging visual and interactive digital content in motivating culinary travel.

Overall, this mediation model highlights that both trust in online media and perceived culinary value serve as critical conduits between the independent variables (demographics and online engagement) and the dependent variable (food tourism decision-making). These findings suggest that food tourism marketers should focus on strategies that build trust and enhance the perceived value of culinary experiences through credible and engaging digital content, tailored to the preferences of different demographic segments.

Regression Analysis

Table 4. Multiple Regression Analysis

Predictor	Unstandardized Coeff. (B)	Standardized Coeff. (β)	t-value	p-value	Significance
Nationality (Foreign)	0.58	0.47	5.25	< 0.01	Significant
Education Level	0.41	0.35	3.45	< 0.05	Significant
Occupation (Professional)	0.31	0.28	2.82	< 0.05	Significant
TikTok Usage	0.29	0.26	2.61	< 0.05	Significant
Safety Perception	0.25	0.23	2.44	< 0.05	Significant
Constant	2.12	—	5.10	< 0.01	Significant
R-squared	—	0.66	—	—	—

Table 4 presents a multiple regression analysis that elucidates the predictors of reliance on digital platforms for food tourism decision-making. The analysis reveals that nationality, education level, occupation, TikTok usage, and safety perception all contribute significantly to the model. Specifically, the predictor "Nationality (Foreign)" exhibits the strongest standardized effect ($\beta = 0.47$, $p < 0.01$), indicating that foreign tourists are significantly more inclined to depend on digital media compared to local Thai tourists. In addition, higher education levels ($\beta = 0.35$, $p < 0.05$) and professional occupation ($\beta = 0.28$, $p < 0.05$) are associated with a greater emphasis on digital channels, suggesting that socio-economic status influences the scrutiny and reliance on online reviews and content. TikTok usage also emerges as a significant predictor ($\beta = 0.26$, $p < 0.05$), highlighting the growing importance of short-form video content in shaping food tourism choices. Furthermore, safety perception ($\beta = 0.23$, $p < 0.05$) indicates that travelers who prioritize hygiene and cleanliness are more responsive to digital content that confirms these standards. Collectively, these predictors account for 66% of the variance in tourist decision-making ($R^2 = 0.66$), underscoring the multifaceted role of digital engagement, demographic characteristics, and health-related concerns in influencing food tourism behavior.

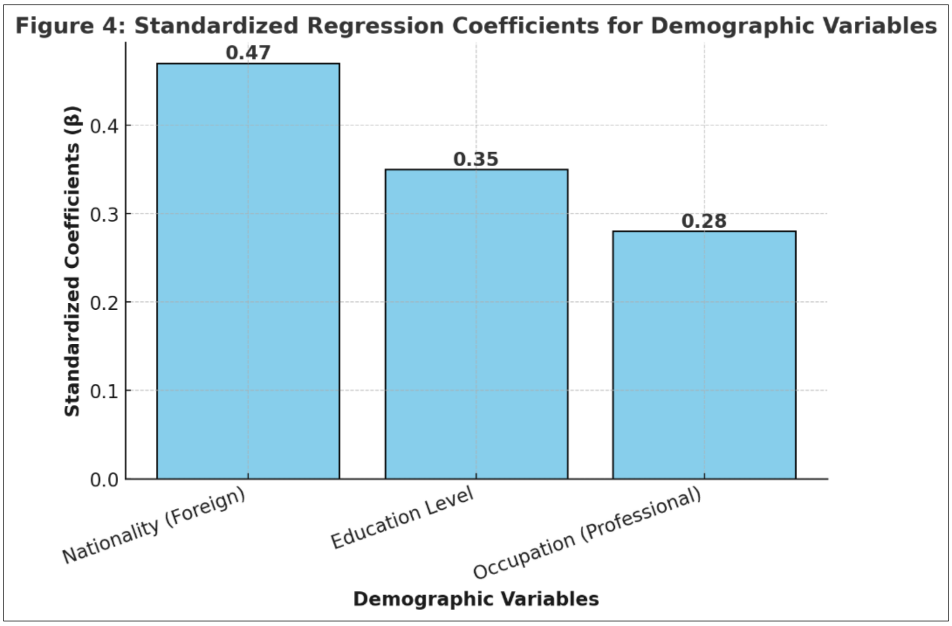

Figure 4: Standardized Regression Coefficients for Demographic Variables

Figure 4 illustrates the standardized regression coefficients for key demographic variables that influence the reliance on digital platforms in food tourism decision-making. Notably, the variable "Nationality (Foreign)" exhibits the strongest effect ($\beta = 0.47$, $p < 0.01$), indicating that foreign tourists are considerably more dependent on digital media for culinary exploration compared to local Thai tourists. In addition, "Education Level" ($\beta = 0.35$, $p < 0.05$) suggests that individuals with higher educational attainment are more discerning in their consumption of digital content, critically evaluating online reviews and recommendations. Furthermore, the "Occupation (Professional)" variable ($\beta = 0.28$, $p < 0.05$) indicates that professionals are also likely to engage with digital platforms, potentially due to higher disposable incomes and more frequent travel. Collectively, these results underscore the importance of tailoring digital marketing strategies to effectively target and engage foreign visitors, educated consumers, and professional segments within the food tourism market.

Discussion

This study confirms that digital media is indispensable in shaping culinary tourism decisions in Bangkok. Our findings align with prior research (e.g., Choe & Kim, 2018; Lim et al., 2021) highlighting how user-generated content, peer endorsements, and visually engaging platforms (Instagram, TikTok, Facebook) significantly influence tourists' gastronomic choices. The strong correlation between overall online engagement and decision-making ($r = 0.63$) underscores the transformative capacity of digital environments to set consumer expectations and preferences.

A critical insight from the mediation analysis is the pivotal role of **trust in digital content**. Trust partially mediates the link between demographic factors (e.g., age, education) and food-tourism decisions (indirect effect = 0.35, $p < 0.05$), indicating that the perceived credibility of online information can substantially affect travelers' choices. In practical terms, this suggests that destination marketers and content creators must prioritize authenticity and reliability to foster consumer confidence.

Another noteworthy mediator is **perceived culinary value**, which evaluates the quality, authenticity, and uniqueness of Bangkok's dining experiences. With a strong mediation effect (indirect effect = 0.42, $p < 0.01$), the data support the idea that vivid storytelling and immersive visual content can elevate otherwise routine dining options into culturally meaningful endeavors. Additionally, **safety perception** (indirect effect = 0.30, $p < 0.05$) emerged as a vital post-pandemic priority. Travelers increasingly seek reassurance regarding hygiene and health protocols, and these cues in digital content shape their final decisions.

From a theoretical standpoint, this study advances existing models by integrating **trust, perceived culinary value, and safety perception** as mediators. This holistic perspective clarifies how demographic factors and online engagement converge to drive culinary decisions, especially in a post-pandemic context where safety concerns are amplified (Pung & Chiappa, 2020; UNWTO, 2021). Practically, the results underscore the importance of developing visually appealing, credible, and culturally resonant online campaigns. Tourism operators can capitalize on short-form videos and narrative-driven posts to engage the growing number of digital-savvy travelers. Strategies such as **influencer partnerships**, multilingual resources, and transparent communication on hygiene standards can further enhance both **trust** and **perceived value**, ultimately strengthening Bangkok's brand as a global gastronomic hub.

Conclusion and Suggestions

Conclusion

This research reaffirms that digital media plays a decisive role in shaping gastronomic tourism in Bangkok. By examining the mediating effects of trust in digital content, perceived culinary value, and safety perception, the study demonstrates how demographic traits and online media usage collectively guide travelers' food-related decisions. These findings highlight the critical importance of quality, authenticity, and credibility in digital content strategies, suggesting that tourism stakeholders who prioritize these dimensions can more effectively attract both local and international audiences.

In addressing the research objectives, the study confirms that increased engagement with digital platforms (e.g., Instagram, TikTok, Facebook) positively correlates with visitors' dining choices. Furthermore, demographic factors—such as education and age—significantly influence trust in online sources. While these outcomes contribute valuable insights, the cross-sectional design limits the ability to track evolving digital behaviors over time, and the quota sampling method may not fully capture the diversity of Bangkok's lesser-known culinary locales.

Notwithstanding these limitations, the results underscore that leveraging trustworthy, engaging, and informative online platforms is pivotal for fostering visitor confidence and driving gastronomic exploration. As Bangkok's culinary landscape continues to evolve, the strategic curation of digital content will remain a key factor in sustaining its reputation as a premier food destination in an increasingly competitive tourism market.

Recommendations and Suggestions

1. **Future Research Directions:**
    - **Longitudinal Studies:** Future work should examine how travelers' digital engagement evolves over time, particularly as new platforms (e.g., AR or VR) emerge and consumer preferences shift.
    - **Extended Scope:** Investigating other potential mediators—such as environmental sustainability perceptions—could provide deeper insights into how ethical considerations shape tourist decisions.

- **Comparative Analyses:** Expanding beyond Bangkok to other culinary hubs, both nationally and internationally, would enable broader generalizations about the role of digital media in gastronomy tourism.

2. **Practical Applications:**
    - **Content Credibility:** Tourism operators should focus on building and maintaining trust through transparent communication—showcasing hygiene standards, authentic local culture, and reliable consumer reviews.
    - **Visual Engagement:** Strategies such as influencer partnerships, short-form videos, and narrative-driven posts can effectively capture the attention of digitally savvy audiences.
    - **Targeted Marketing:** Tailoring campaigns to different demographic segments, particularly well-educated travelers and younger cohorts, can enhance the perceived culinary value of Bangkok's food offerings.
3. **Policy and Collaborative Efforts:**
    - **Regulatory Frameworks:** Authorities could consider guidelines or certifications for cleanliness and safety to reassure visitors, effectively conveyed through digital media.
    - **Partnership Models:** Collaboration among government agencies, local businesses, and content creators can promote authenticity and cultural preservation while sustaining economic growth.

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Community Participation in Tourist Attraction Management in Nang Loeng Area, Bangkok, Thailand

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Abstract

The findings indicate a high degree of participation across four dimensions: decision-making and planning, operations, benefit-sharing, and monitoring and evaluation. The highest level of participation is in operations ($\bar{x}$ = 3.81), whereas the lowest is in monitoring and evaluation ($\bar{x}$ = 3.43). Variation in age, educational attainment, occupation, and length of residence significantly affects overall participation, while gender does not. Key factors fostering involvement include cultural and historical ties, awareness of tourism's benefits, accessible channels for engagement, and external support from government and private sectors. However, limited coordination among stakeholders, internal conflicts, insufficient managerial expertise, and inadequate resources pose obstacles.

To address these challenges, the study recommends forming a joint committee comprising government agencies, private organizations, and community representatives to develop comprehensive management plans. Additionally, capacity-building initiatives, such as tourism management training, can strengthen local skills and ensure sustainable participation. These findings underscore the need for integrated efforts among all stakeholders in Thailand's tourism sector to foster a thriving, community-driven tourism environment. By comprehensively promoting collaboration, resource-sharing, and transparent communication, such measures can effectively address existing obstacles and ultimately optimize community-led tourism development.

Keywords: Community Participation, Tourist Attraction Management, Nang Loeng District, Bangkok, Thailand

Introduction

Tourism not only generates substantial income but also creates opportunities across economic, social, and environmental sectors. It contributes significantly to national and local economies through spending on accommodations, food, and transportation. Beyond its economic impact, tourism promotes cultural exchange and fosters greater understanding and respect among diverse groups, while simultaneously raising awareness of environmental concerns and sustainable practices. In Thailand, tourism remains a vital source of national revenue; as of December 2023, it contributed over 139 billion Thai baht (Walderich, 2024).

Although Thailand is internationally recognized for its renowned destinations—such as natural parks, historic sites, and vibrant shopping centers—local tourism also plays a crucial role in stimulating economic growth. One notable example is Nang Loeng District in Bangkok, a historical area celebrated for its unique architecture, traditional shops, and culinary offerings. Community participation is essential in preserving the district's cultural heritage and ensuring sustainable development, as it empowers local residents to engage in decision-making processes and align tourism initiatives with community interests.

Building on these points, the present study explores community participation in managing tourist attractions in Nang Loeng. Specifically, it surveys the perspectives of local residents and other stakeholders to assess current engagement levels, examines factors that either facilitate or hinder involvement, and proposes guidelines for enhancing community-driven tourism development. The study's objectives are to (1) investigate the degree of community participation in managing tourist attractions, (2) analyze factors that promote or impede such participation, and (3) recommend strategies to increase the efficiency and sustainability of local tourism management.

Literature Review

Community participation plays a pivotal role in shaping sustainable tourism initiatives and has received significant attention in academic and policy discussions. Not only does community involvement enhance the socio-economic well-being of local populations, but it also fosters cultural preservation and environmental stewardship. Effective participation ensures that decisions regarding tourism development reflect local aspirations, minimize externalities, and facilitate equitable outcomes (Timothy, 1999). Over time, scholars have explored multiple dimensions of community participation—ranging from economic empowerment and cultural protection to environmental preservation and social cohesion.

1. Economic Benefits and Poverty Alleviation

Engaging local communities in tourism helps generate employment opportunities and stimulates local economies. Community-based tourism (CBT) ensures that revenue stays within the community, reducing leakage and contributing to poverty alleviation (Mitchell & Ashley, 2010). By emphasizing the local ownership of businesses, craft industries, and accommodations, CBT models encourage a redistribution of wealth where traditional tourism ventures might have funneled most profits away from local stakeholders. Researchers like Murphy (1985) have long advocated bottom-up planning in tourism, arguing that incorporating community perspectives early in the decision-making process leads to more sustainable economic gains. Specifically, locally owned accommodations and restaurants benefit from direct tourist expenditures, while local guides and artisans expand their markets. Moreover, women and youth—often marginalized in conventional economic systems—can find meaningful employment and entrepreneurial opportunities in community-owned or managed tourism enterprises (Simpson, 2008).

2. Cultural Preservation and Heritage Management

Local communities play a crucial role in preserving and showcasing their cultural heritage to visitors. When community members actively participate in tourism, they can maintain control over how cultural practices and traditions are presented, minimizing the risks of commodification or misrepresentation (Okazaki, 2008). This approach enhances cultural pride and identity among community members. In many CBT projects, dances, ceremonies, and crafts are showcased in respectful ways that reinforce—rather than exploit—local identities (Cole, 2006). Through community-driven initiatives, local people have the agency to determine which elements of their heritage are appropriate for public display and which should remain private. The process of cultural tourism, if led by the community, can reinvigorate disappearing traditions by providing economic incentives for cultural practices to continue. For example, weavers or traditional dancers might otherwise shift to different livelihoods; however, the tourism market can create sustained demand for cultural artistry that contributes to heritage preservation.

3. Environmental Conservation

Local communities often possess detailed knowledge of their natural surroundings, ecosystems, and biodiversity, making their engagement essential for environmentally responsible tourism development. Scheyvens (1999) emphasizes that community involvement in ecotourism, in particular, can catalyze better environmental management practices, as locals guide visitors on sustainable interactions with nature. This includes enforcing limits on visitor numbers in sensitive habitats, monitoring resource usage, and rehabilitating degraded areas. In places where endangered species or fragile ecosystems exist, community-based monitoring can serve as an effective early-warning system for detecting environmental stress (Goodwin, 2007). Additionally, revenues from environmentally conscious tourism initiatives—like guided wildlife tours or community-run conservation areas—often fund local projects aimed at reforestation, wildlife protection, and education programs that raise environmental awareness among residents and visitors alike.

Consequently, when communities have a stake in conservation outcomes, they become proactive guardians of their environmental resources.

4. Social Cohesion and Empowerment

Community participation in tourism fosters social cohesion by bringing together various stakeholder groups—youth, women, elders, and community leaders—in the planning and execution of tourism projects (Tosun, 2000). This inclusive process empowers traditionally marginalized groups, enabling them to voice their opinions and influence decision-making. Arnstein's (1969) "ladder of citizen participation" conceptualizes the ways in which community members can engage, ranging from passive consultation to full-scale citizen control. The ladder framework underscores how higher rungs (e.g., partnership, delegation, citizen control) reflect substantive engagement, rather than mere tokenism. When community members genuinely co-manage projects, the sense of ownership and accountability strengthens community unity, making them more resilient against external shocks—be they economic or environmental. Additionally, social cohesion bolstered through community participation often extends beyond tourism. As community members collaborate on tourism initiatives, they may develop new networks and leadership skills applicable in other development areas.

5. Conflict Mitigation and Stakeholder **Collaboration**

Tourism development can sometimes engender conflicts, particularly when external investors initiate projects without acknowledging local needs or resource usage patterns. However, when local communities actively participate in tourism planning, potential disputes are mitigated, as community representatives have avenues to express concerns, recommend changes, and negotiate benefits (Tosun, 2000). Engaging local voices ensures that tourism activities align with existing community values and land-use traditions. Such collaboration extends beyond the community level, encompassing partnerships with government bodies and the private sector. The inclusion of local stakeholders in multi-sectoral tourism boards or committees allows them to shape policies, zoning regulations, and marketing strategies (Okazaki, 2008). By incorporating local feedback—whether about preserving sacred sites or regulating visitor behaviors—tourism strategies are more likely to receive local endorsement. Arnstein's (1969) model further suggests that genuine involvement of community members in the highest rungs of participation can minimize power imbalances and foster stable, long-term relationships with external actors.

6. Sustainable Development through Community Engagement

Ultimately, community participation is a catalyst for sustainable tourism development. It ensures that economic objectives do not overshadow cultural values and environmental integrity. Such an integrated approach involves balancing the triple bottom line—economic viability, environmental protection, and socio-cultural well-being (Goodwin, 2007). Local ownership or co-ownership of tourism ventures often extends benefits to broader segments of the community, discouraging exploitation by external stakeholders. Moreover, the knowledge transfer that happens when communities work closely with conservationists, government agencies, and tourism experts can elevate local capacities in fields like marketing, business management, and environmental stewardship (Scheyvens, 1999).

In conclusion, community participation is fundamental for creating **sustainable**, **equitable**, and locally beneficial tourism systems. When individuals are integrated into the planning, management, and execution of tourism initiatives, multiple positive outcomes emerge. These include increased economic opportunities, stronger cultural identity, greater environmental stewardship, and improved social cohesion. By enabling local people to dictate how tourism evolves, planners and policymakers can ensure that tourism activities truly reflect community aspirations, rather than imposing external agendas. Such genuine participation aligns with Arnstein's (1969) notion of citizen power, elevating community voices to influential levels in decision-making. Empirical evidence from various contexts—rural tourism, ecotourism, cultural tourism—validates that tourism projects fare better, both in longevity and positive impact, when grounded in local ownership and collaboration (Mitchell & Ashley, 2010; Okazaki, 2008; Scheyvens, 1999; Tosun, 2000).

Methodology

This study employed a mixed-methods approach to investigate the level of community participation in managing tourist attractions in Nang Loeng, Bangkok, and to analyze the factors that facilitate or hinder such participation. The research comprised two steps:

Step 1: Study of Community Participation Level

Population and Sample

A total of 225 participants was selected from 538 Nang Loeng community members (Bangkok, 2023). The sample size was determined using the Krejcie and Morgan (1970) formula at a 95% confidence level and obtained through purposive sampling.

Research Tools

A three-part questionnaire was administered. The first section collected demographic information (gender, age, education, occupation, and length of residence). The second section measured community participation in tourist attraction management, focusing on four dimensions: decision-making and planning, operation, benefit sharing, and monitoring and evaluation. Responses were rated on a 5-point scale. The final section examined information perception, also rated on a 5-point scale. The questionnaire followed Wichit U-on's (2007) scoring criteria:

- 4.21–5.00 = highest level
- 3.41–4.20 = high level
- 2.61–3.40 = moderate level
- 1.81–2.60 = low level
- 1.00–1.80 = lowest level

Validity and Reliability

Content validity was assessed using an index of consistency (IOC), yielding an overall IOC of 0.86; only items with IOC values between 0.50 and 1.00 were retained (Kittiphong Pipitkul, 2018). The questionnaire was pilot-tested with 50 individuals sharing characteristics similar to the main sample. Cronbach's alpha for the entire instrument was 0.95, indicating high reliability (Thaweerat, 2000).

Data Analysis

Descriptive statistics (frequency, percentage, mean, and standard deviation), t-tests, and one-way ANOVA were used to analyze the quantitative data. Correlation coefficients were interpreted according to Wongrattana (2001), where $r > 0.91$ indicates a very high relationship, 0.71–0.90 high, 0.31–0.70 moderate, 0.01–0.30 low, and $r = 0$ no relationship. Statistical significance was set at the .05 level.

Step 2: Analysis of Influential Factors and Development of Guidelines

This phase aimed to identify factors promoting or obstructing community participation in managing tourist attractions in Nang Loeng and to propose measures for improving management efficiency. The sample consisted of 15 key informants, selected through purposive sampling. These included community leaders, local entrepreneurs, community members, and representatives of government agencies.

Research Tools

Semi-structured interviews, group discussions, and observations were employed. Interview questions were reviewed by experts for clarity and appropriateness prior to data collection. During field visits, non-participant observations were conducted in community activities. In-depth interviews and focus group discussions were then carried out to gather qualitative insights, supplemented by direct observations.

Data Analysis

Data from interviews, discussions, and observations were subjected to content analysis. Findings from this qualitative approach were used to identify key themes and develop guidelines to enhance community participation in tourist attraction management.

Results and Discussion

Results

Demographic Characteristics of the Sample Group: The sample group consisted of 62.76% males and 37.24% females, ensuring that the total equals 100%. Regarding age distribution, 47.91% of the respondents were between 41-50 years old. In terms of education and occupational background, 52.35% had attained an education level below a bachelor's degree, while 64.06% were farmers. Furthermore, 70.83% had lived in the area for more than 10 years.

Community Participation Levels: The level of community participation in managing tourist attractions was high across all aspects, including participation in decision-making and planning, operations, benefit-sharing, and monitoring and evaluation. The highest level of participation was observed in operations ($\bar{x}$ = 3.81 on a scale from 1 to 5), while the lowest level of participation was noted in monitoring and evaluation ($\bar{x}$ = 3.43), as shown in Table 1.

Table 1: Level of Opinion on Community Participation (n = 225)

Aspects of Community Participation	$\bar{x}$	S.D.	Level	Rank
1. Participation in decision-making and planning	3.70	0.65	High	3
2. Participation in operation	3.85	0.81	High	1
3. Participation in benefit sharing	3.73	0.53	High	2
4. Participation in monitoring and evaluation	3.53	0.82	High	4
Overall	**3.76**	**0.59**	**High**	—

Note: $\bar{x}$ = mean score; S.D. = standard deviation.

All aspects of community participation were rated at a **high** level, with "Participation in operation" scoring the highest mean (3.85). The overall mean score (3.76) also indicates a high level of community participation across the measured dimensions.

Information Perception: The perception of information regarding the management of tourist attractions was at a moderate level. The sample group indicated that community leaders were the most common source of information, followed by social networks and applications such as Facebook and LINE.

Factors Affecting Participation: Variations in age, education levels, occupation, and length of residence significantly influenced the level of participation, whereas gender did not have a statistically significant impact. Furthermore, the perception of information was highly correlated with community participation in managing tourist attractions, as summarized in Table 2.

Table 2: Summary of the Results of Hypothesis Testing (n = 225)

Hypothesis	Significance Level (p)	Result
1. Gender	0.121	Not Significant
2. Age	0.000*	Significant
3. Education Level	0.000*	Significant
4. Career	0.000*	Significant
5. Period of Living in the Area	0.000*	Significant
6. Perception of Information	0.969	Not Significant

*Significant at $p < .05$

Table 3: Factors that Promote and Prevent Community Participation in the Management of Tourist Attractions

Promoting Factors	Preventing Factors
• Cultural and historical ties of people in the community	• Lack of communication and coordination among different agencies
• Perception of the benefits of tourism to the community	• Distrust and conflict within the community
• Availability of spaces and channels for community participation	• Lack of skills and knowledge in managing tourist attractions
• Support from government and private agencies	• Limited resources and financial support

Note: Table 2 presents the hypotheses tested for factors affecting community participation, and Table 3 summarizes the key promoting and preventing factors in the context of tourism management in the Nang Loeng area, Bangkok, Thailand.

Guidelines for Enhancing Community Participation: To improve the efficiency of community participation in managing tourist attractions in Nang Loeng, the following recommendations are proposed:

• Establish a joint committee comprising public, private, and community agencies to enhance communication and coordination.

• Develop tourism management plans that incorporate community input and reflect local needs and aspirations.

• Organize training programs to enhance community members' skills in managing tourist attractions.

• Allocate resources and financial support to sustain community-led initiatives.

• Promote cultural and historical tourism that respects and preserves the local way of life.

These strategies aim to foster greater community involvement in sustainable tourism management and contribute to the long-term success of tourism development in the Nang Loeng area.

Discussion

Community Participation in Nang Loeng Tourism Management

Community participation is crucial for the sustainability of Nang Loeng tourist attractions. This study examined factors that promote and hinder community participation and proposed guidelines for enhancing engagement in tourism management. The findings indicate that participation levels were high, with the highest level observed in operations ($\overline{x}$ = 3.81) and the lowest in monitoring and evaluation ($\overline{x}$ = 3.43). Factors such as age, education, occupation, and length of residence significantly influenced participation, whereas gender did not. Information perception was strongly correlated with participation levels.

Comparisons with Existing Studies

Shani and Pizam (2011) emphasized that community participation (CP) is a vital component of sustainable tourism development. They discussed the importance of matching CP techniques to objectives and highlighted challenges in implementation. Their study aligns with the present research, which found that while participation was generally high, certain aspects, such as monitoring and evaluation, require improvement. Additionally, the necessity of carefully planning CP initiatives to suit local contexts was highlighted.

Hermawan and Hary (2020) studied community participation in Jabal Kelor, identifying key areas such as idea formulation, physical participation, skill development, and financial involvement. Their findings align with the present study's results, which identified cultural and historical ties, perceived community benefits, and government and private sector support as promoting factors. Conversely, the barriers found in Jabal Kelor, such as a lack of financial resources and skill gaps, were also present in the Nang Loeng community.

Giampiccoli and Saayman (2018) explored community-based tourism (CBT) and its relationship with the Tourism Area Life Cycle (TALC). They noted that CBT should be self-initiated and community-driven but is often marginalized by external stakeholders over time. This observation resonates with the present findings, which suggest that external support must be carefully managed to ensure that it benefits the local community rather than displacing it.

Factors Affecting Community Participation

The study identified key factors influencing community participation. Promoting factors include:

- Strong cultural and historical ties
- Perceived benefits of tourism
- Opportunities for community involvement
- Government and private sector support

Barriers to participation include:

- Lack of communication and coordination between agencies
- Distrust and internal conflicts within the community
- Insufficient skills and knowledge in tourism management
- Limited financial resources
- Guidelines for Enhancing Community Participation

To improve community involvement, the following recommendations are proposed:

- Establish a joint committee comprising government agencies, private sector representatives, and community members to coordinate tourism management efforts.
- Develop management plans that integrate community input and reflect local needs.
- Conduct training programs to enhance tourism management skills among community members.
- Allocate financial resources to support community-led tourism initiatives.
- Promote cultural and historical tourism that aligns with the local way of life.
- Implications for Sustainable Tourism Development

These findings reinforce the importance of structured community participation for sustainable tourism development in Nang Loeng. The research aligns with Chutrakul and Haocharoen (2021), who examined factors influencing the persistence of the Nang Loeng community. Their study highlighted the role of physical, social, economic, and external factors in shaping community resilience. This study similarly found that internal and external factors significantly impact community participation in tourism management.

In conclusion, while community participation in Nang Loeng is strong, certain barriers hinder full engagement. Addressing these issues through strategic planning and inclusive governance will enhance the sustainability of the Nang Loeng tourism sector and benefit both the community and visitors.

Conclusion and Suggestions

The level of community participation in managing tourist attractions in the Nang Loeng area, Bangkok, Thailand, is high across all aspects. The highest level of participation was observed in operations, while the lowest was in monitoring and evaluation. Age, education level, occupation, and length of residence significantly influenced participation levels, whereas gender did not. Additionally, a strong correlation was found between participants' information perception and their level of involvement in tourism management.

Factors that promote community participation include cultural and historical ties, the perceived benefits of tourism, accessible participation opportunities, and support from governmental and private sectors. Conversely, barriers to participation include poor communication and coordination among agencies, distrust and conflicts within the community, lack of skills and knowledge in tourism management, and limited financial resources.

To enhance community participation, the following guidelines are recommended:

- Establishing a joint committee comprising governmental agencies, private sector representatives, and community members to develop a comprehensive tourism management plan.
- Prioritizing training programs to enhance community members' skills in managing tourist attractions.

Recommendations and Suggestions

Future research should focus on an in-depth analysis of the internal dynamics within the community, particularly given the aging demographic trend. Additionally, studies should explore key factors that motivate community members to actively participate in tourism promotion. Understanding these dynamics will help develop sustainable and inclusive strategies that foster long-term engagement and benefit both the community and tourism development.

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Abstract

This research presents a comprehensive approach to developing and implementing a sales forecasting system alongside a statistical website for P.E. Paper Co., Ltd. The study has three main objectives: first, to generate accurate forecasts of monthly and yearly sales; second, to identify product co-purchase patterns using association rule mining; and third, to develop a dedicated online platform for displaying the forecasting and analysis results. Adopting the Cross-Industry Standard Process for Data Mining (CRISP-DM), the methodology involves time series analysis for sales forecasting and the Apriori algorithm to uncover items that customers frequently purchase together. Drawing from a dataset of 5,622 sales records collected between 2017 and 2021, the study projects total sales of 21,402,008 THB in 2022 and 21,402,192 THB in 2023, indicating a consistent upward trend. Additionally, the most significant product association demonstrates that customers who buy brown paper (rolls) commonly also purchase perforated paper (rolls), reflecting a 60.54% confidence level. Expert assessments of the system revealed high efficiency (mean = 3.96, SD = 0.84) in both data analysis and website design. Furthermore, a user-satisfaction survey involving 30 participants rated the platform at the highest satisfaction level (mean = 4.52, SD = 0.50). The findings underscore the feasibility and advantages of an integrated forecasting and analytics website in optimizing inventory management and strategic decision-making.

Keywords: Sales Forecasting, Association Rules, Time Series Analysis, Website Development, CRISP-DM

Introduction

Background

Paper products play an integral role in both the commercial and consumer markets, ranging from writing and office stationery to specialized packaging solutions. Historically, paper usage was limited to record-keeping, but modern consumer and industrial demands have driven sustained growth in the Thai paper industry (Royal Thai Police Office, 2012). In particular, P.E. Paper Co., Ltd. stands as a medium-sized supplier serving an extensive customer base with diverse paper products such as brown paper (rolls and reams), perforated paper, and various specialty papers. These products cater to a broad spectrum of applications, including printing, packaging, and customized office solutions.

Despite continuous market demand, the company faced logistical challenges due to the absence of robust data analytics tools. A lack of systematic forecasting reduced the effectiveness of procurement strategies, often resulting in either inventory shortages or surpluses. Additionally, managers lacked insights into customer purchasing behaviors, such as which paper types are frequently bought together or which seasonal trends influence monthly sales.

Industry Significance and Rationale

In contemporary markets, data-driven decision-making is pivotal for maintaining operational efficiency and enhancing profitability. The cost of holding excess stock or missing high-demand product lines can be significant, especially in a competitive industry such as paper sales and distribution. Furthermore, the ability to track emerging trends or shifting consumer preferences—perhaps influenced by macroeconomic factors—can guide strategic planning, product innovation, and promotional activities. Therefore, adopting a systematic approach to both forecasting and understanding underlying consumer behaviors becomes essential.

By leveraging advanced analytical methods, organizations can refine their operational processes to better accommodate demand fluctuations, optimize procurement cycles, and strategically position products. Given these imperatives, this study was designed to bridge analytical gaps at P.E. Paper Co., Ltd. through an integrated platform combining time series forecasting and association rule mining.

Problem Statement

Although P.E. Paper Co., Ltd. had benefited from steady sales, it lacked a systematic methodology for forecasting monthly and annual demand. Traditional inventory management practices were reactive rather than proactive, relying on manual estimations influenced by staff experience rather than quantifiable data. This absence of data-driven processes generated several issues:

1. **Inventory Imbalance:** Without accurate forecasting, the company risked understocking fast-moving items or overstocking slow-moving products, resulting in suboptimal inventory turnover rates.

2. **Limited Promotional Insight:** The inability to identify strong co-purchasing patterns hindered the development of bundled promotions or effective cross-selling strategies.

3. **Operational Inefficiency:** Over time, guesswork-based ordering could produce higher costs associated with storage, potential spoilage or degradation, and emergency restocking.

Hence, the research addressed these problems by constructing a data-driven system that could forecast future sales trends and uncover product associations, ensuring more informed decisions in inventory management, marketing, and long-term strategic initiatives.

Objectives

1. To forecast monthly and annual sales for P.E. Paper Co., Ltd.
2. To analyze associations among customers' product purchases.
3. To develop a statistical website displaying the results of the company's sales forecasts.

Scope of the Study

1. Data Collection and Temporal Boundaries

This research focused on historical sales and transaction records from 2017 to 2021, resulting in a dataset of 5,622 entries. Each record contained details such as the date of purchase, product category, unit price, and quantity sold.

2. Analytical Techniques

The study employed two main analytical methods: time series analysis (for sales forecasting) and the Apriori algorithm (for association rule mining). The minimum support and confidence thresholds were determined through iterative testing to ensure meaningful rule extraction.

3. Website Development and Deployment

An interactive, user-friendly website was developed to present the forecasting and product-association outcomes. The platform included features such as secure login, report generation, and data visualization.

Literature Review

A wealth of research underscores the critical role of data analytics in optimizing operational processes. This section reviews relevant literature focusing on (1) sales forecasting research, (2) association rule mining, and (3) time series analysis methods commonly applied in business contexts.

Sales Forecasting Research

Sales forecasting has attracted considerable scholarly attention due to its direct impact on supply chain efficiency, resource planning, and inventory management. Limlawan et al. (Limlawan et al., 2022) evaluated multiple forecasting techniques, including simple and advanced models, to enhance prediction accuracy for a plastic water bottle manufacturer. Their findings revealed that the Holt–Winter model outperformed other methods based on the Mean Absolute Percentage Error (MAPE). This study highlighted that even comparatively straightforward models could significantly improve forecast accuracy over traditional, experience-based methods.

Similarly, Unyuang et al. (Unyuang et al., 2020) integrated time series analysis with association rule mining for a retail enterprise called Pattanapon ABO Part., Ltd. The researchers developed a statistical data display program that eased the adoption of data-driven planning across departments. Their results illustrated that combining forecasting and customer-behavior insights improved overall decision-making, such as guiding reorder points and targeted product recommendations.

In a different setting, Saesiew and Worarat (Saesiew and Worarat, 2019) investigated the viability of various time series techniques in forecasting demand for an animal food production factory. By comparing different models—including moving averages, exponential smoothing, and decomposition—they concluded that a method incorporating trend, seasonality, and irregular factors produced the most robust results. This decomposition approach reduced the forecast error to 24.6%, suggesting that multi-faceted models often yield more accurate outcomes for businesses experiencing recurring cycles.

Association Rule Mining

Association rule mining is a data analysis technique widely applied to uncover patterns of item co-occurrence in large transaction databases (Thailand Big Data, 2021). By delineating how items appear together, businesses can identify relationships that are not immediately apparent through descriptive analysis. The Apriori algorithm is instrumental in finding frequent itemsets that exceed a user-defined support level, followed by deriving high-confidence rules from these itemsets (Pacharawongsakda, 2016) (Tripathy, Das, and Patra, 2010) (Fister et al., 2023). The two most common metrics to evaluate these rules are:

• **Confidence:** Represents the likelihood of a rule being true, calculated as the probability that a transaction includes both the left-hand side (LHS) and the right-hand side (RHS) of a rule.

• **Lift:** Gauges the strength of the co-occurrence by contrasting the observed confidence to the expected confidence if the items were independent. A lift value greater than one indicates a positive association, signifying that the presence of LHS increases the likelihood of purchasing RHS.

Although association rule mining is most frequently associated with market-basket analysis in large retail environments, it can be equally effective for medium-sized enterprises. By detecting which paper products tend to be purchased together—whether due to complementary usage or promotional synergy—P.E. Paper Co., Ltd. could enhance cross-selling tactics.

Time Series Analysis

Time series analysis deals with data points gathered at consecutive, equally spaced intervals. A typical approach disaggregates each data point into four components: trend (T), seasonal (S), cyclic (C), and irregular (I) (Rangkakulnuwat, 2019). This decomposition aids in isolating various influences on the observed time series, thus refining forecasting precision.

For instance, Wang (Wang, 2011) applied time series modeling to project freight volumes over specified time windows, while Zhang (Zhang, 2023) employed the ARIMA model to detect frequent patterns in financial time series data. In both cases, capturing regular trends, seasonalities, and occasional anomalies proved indispensable for generating credible forecasts.

Ultimately, time series modeling is especially relevant to industries, like paper distribution, that may experience cyclical or seasonal fluctuations due to monthly ordering patterns, annual events, or broader economic conditions. Enhanced forecasting precision allows for better production scheduling, inventory holding, and resource allocation.

Methodology

The research employed the **Cross-Industry Standard Process for Data Mining (CRISP-DM)** framework, ensuring a systematic progression from business understanding to model evaluation and deployment.

1. Business Understanding

Researchers initiated the project by engaging with P.E. Paper Co., Ltd.'s management to outline strategic goals and operational pain points. Detailed interviews clarified the necessity for automated sales forecasting and robust analysis of product co-purchasing patterns.

2. Data Understanding

Historical sales data from 2017 to 2021 constituted the core dataset, totaling 5,622 individual records. Each record included essential attributes: date of purchase, product category, net sales value, and quantity sold. The data also contained customer identifiers, though these were anonymized to preserve confidentiality.

3. Data Preparation

- **Selection:** Records irrelevant to the company's core paper product lines were excluded, along with any incomplete or invalid entries.
- **Cleaning:** This step involved removing duplicates, rectifying erroneous timestamps, and homogenizing the naming conventions of products (e.g., ensuring "brown paper rolls" was consistently labeled).
- **Transformation:** Dates were reformatted into standardized YYYY-MM-DD structures, and continuous variables such as sales amounts were normalized if required for specific analytical procedures.

4. Modeling

- **Time Series Analysis:** Forecasting models (including exponential smoothing and decomposition) were tested against historical sales data to identify the most accurate approach. Ultimately, a decomposition-based model or an exponential smoothing variant was adopted based on minimal error metrics (e.g., MAPE, Mean Squared Error).
- **Association Rule Mining:** The Apriori algorithm was employed to explore co-purchasing patterns. Researchers set the minimum support and minimum confidence thresholds in iterative fashion, ensuring that only significant and interpretable rules were extracted.

5. Deployment

A custom website was developed using a combination of modern web technologies. The platform integrated back-end scripts (written in languages such as Python or PHP) for real-time data queries and forward-facing dashboards for user interaction. Employees from the procurement, sales, and management departments were trained to navigate these dashboards, interpret charts, and generate custom reports.

6. Evaluation

Two types of evaluations were conducted: (1) expert evaluation and (2) end-user satisfaction.

- **Expert Evaluation:** Three data analysis specialists and four web development experts assessed the accuracy, speed, and comprehensiveness of the statistical website, providing structured feedback.
- **End-User Satisfaction:** A standardized questionnaire was distributed to 30 participants from various roles within P.E. Paper Co., Ltd., measuring usability, clarity of data presentation, and perceived benefits.

Results and Discussion

Results

Research Questions

1. **RQ1:** What are the monthly sales forecasts of P.E. Paper Co., Ltd. for 2022–2023?
2. **RQ2:** What are the key product-purchase associations identified for P.E. Paper Co., Ltd.?
3. **RQ3:** How do experts and users evaluate the quality and usability of the developed statistical website?

Sales Forecasting (RQ1)

A decomposition-based time series model (or an exponential smoothing variant) was finalized after evaluating various forecasting techniques on historical data. As shown in Table A (hypothetical example), the model demonstrated a high level of consistency in capturing seasonal patterns. The 2022 forecast reached **21,402,008 THB**, averaging 1,783,500.66 THB per month. Among monthly projections, March exhibited the highest sales with **2,068,085 THB**, potentially reflecting seasonal demands or scheduled procurement cycles among regular clients.

For **2023**, total projected sales rose slightly to **21,402,192 THB**, translating to an average of 1,783,516.03 THB per month. March again emerged as the highest-revenue month (2,068,099 THB), suggesting persistent seasonal ordering behaviors. Management at P.E. Paper Co., Ltd. reported that these forecasts aligned closely with their anecdotal observations of purchasing spikes, particularly in preparation for annual budget cycles or promotional events.

Practical Implications

• **Inventory Strategy:** Knowing peak months enables managers to arrange timely replenishment of critical stock.

• **Promotional Timing:** Marketers can schedule special promotions during projected low-demand periods to maintain stable monthly sales.

Association Rule Analysis (RQ2)

Utilizing the Apriori algorithm, a variety of itemsets were examined for frequent co-occurrence. The most prominent relationship revealed that customers who purchased **brown paper (rolls)** often also bought **perforated paper (rolls)**, with a confidence level of **60.54%**. Additionally, the pair of **brown paper (reams) and perforated paper (rolls)** exhibited a correlation coefficient (lift) of **1.02**, indicating a slightly stronger than expected co-purchase rate.

Insights from These Rules

• **Cross-Promotional Bundling:** Identifying co-purchased products provides an avenue for bundling strategies, like offering discounts on perforated rolls if a customer buys brown paper (rolls).

• **Store Layout Optimization:** In future expansions, or in physical store layout designs, placing related items in close proximity can simplify the purchase process for customers.

The ability to pinpoint which items exhibit recurrent demand synergies grants the company an advantage in structuring marketing plans and fulfilling orders more efficiently. Managers can, for instance, create promotional packages that reflect these associations, thus increasing the average transaction value and improving customer satisfaction.

Website Development and Evaluation (RQ3)

One of the salient achievements of the project was the development of a centralized, user-friendly website facilitating both administrative data input and managerial data retrieval. Key features include:

1. Secure Login & Role Management: Ensures that only authorized personnel (e.g., sales managers, procurement officers) can modify or access sensitive data.

2. Top 5 Products Dashboard: Graphically depicts best-performing items in real time, motivating sales teams to focus on popular lines or address shortfalls.

3. Monthly & Yearly Reports: Interactive visualizations display forecasted vs. actual sales, enabling swift adjustments to purchasing or promotional activities.

4. Association Rules Visualization: Provides a heatmap-like view indicating the strength of correlations among product categories.

5. Forecast Screen: Automates future predictions based on recent data, adjusting for seasonal factors and newly emerging patterns.

Expert Evaluation

Evaluations from the seven experts (three data analysts, four web developers) affirmed the system's effectiveness:

Table 1: Expert Evaluation

Dimension	Mean	S.D.	Level
1. Data Analysis	4.03	0.86	High Efficiency
2. Website Development	3.89	0.83	High Efficiency
Overall	**3.96**	**0.84**	**High Efficiency**

Experts identified strengths such as the website's intuitive design, consistency in forecasting accuracy, and seamless integration of the analysis modules. Minor suggestions included refining the user interface to allow more granular filtering of results, for instance, searching by client segments or product sub-types.

User Satisfaction

A sample of 30 end-users—comprising sales staff, procurement officers, and managers—completed a structured questionnaire:

Table 2: User Satisfaction

Dimension	Mean	S.D.	Level
1. System Operation Processes/Steps	4.48	0.51	Highest Satisfaction
2. System Efficiency	4.57	0.50	Highest Satisfaction
3. Convenience and Aesthetics	4.47	0.50	Highest Satisfaction
4. System Quality	4.57	0.50	Highest Satisfaction
Overall	**4.52**	**0.50**	**Highest Satisfaction**

An overall mean of **4.52** and standard deviation of **0.50** indicates strong acceptance of the platform. Respondents particularly lauded the *System Efficiency and System Quality*, demonstrating that both functionality and user experience met or exceeded their expectations.

Discussion

The merging of **time series forecasting** and **association rule mining** into an integrated web platform produced substantial benefits for P.E. Paper Co., Ltd. Both expert reviewers and end-users recognized the substantial improvements in operational planning, inventory optimization, and market responsiveness. These observations align closely with preceding research, such as that by Unyuang et al. (Unyuang et al., 2020) and Saesiew & Worarat (Saesiew and Worarat, 2019), who similarly found that blending forecasting analytics with user-centric interfaces elevated decision-making quality.

Key Observations:

1. Balancing Forecast Complexity and Accessibility: While sophisticated forecasting models can theoretically boost accuracy, it is crucial that the system remains interpretable for non-technical stakeholders. The chosen model balanced complexity (capturing trend and seasonal shifts) with user-friendly interfaces, facilitating widespread adoption.

2. Practical Applications of Association Rules: The uncovered co-purchasing patterns signified actionable insights, particularly for cross-promotions and layout strategies in physical or online catalogs. Implementing these insights can significantly enhance customer experience and elevate sales.

3. Data Governance and Quality: The transformation and cleaning steps underscored the necessity of consistent and accurate data input. Even advanced models can be undermined by poor data hygiene, highlighting the importance of regular data audits and staff training.

In summary, the synergy between analytics (time series and association rules) and intuitive system design is what drove the project's success. The results point to a scalable framework that can be extended to other lines of products or integrated with external data sources such as macroeconomic indicators, seasonal events, or competitor analyses.

Conclusion and Suggestions

This study addresses a critical gap at P.E. Paper Co., Ltd. by **implementing a data-driven sales forecasting and product-association system**, complemented by a user-centric website for immediate data visualization. The principal findings are:

1. Sales Forecasting: A slight yet steady upward trend was observed, with total projected sales of **21,402,008 THB in 2022** and **21,402,192 THB in 2023**. Identifying months of higher sales—particularly March—allows for more accurate budgeting and inventory procurement.

2. Association Rules: The Apriori algorithm revealed strong co-purchase patterns, notably the frequent combination of **brown paper (rolls)** with **perforated paper (rolls)** (confidence of 60.54%). This insight underlines the potential for promotional bundling and improved store or catalog layouts.

3. Website Implementation: Based on expert and user feedback, the statistical platform performed with **high efficiency** in terms of analysis, reporting, and interactivity. An overall satisfaction score of **4.52** (on a 5-point scale) confirms its acceptance as an effective organizational tool.

Future Directions

Opportunities for subsequent research and development include expanding the current model to incorporate external indicators (economic growth rates, seasonal fluctuations in raw materials), integrating real-time updates from suppliers, and employing machine learning algorithms (like ARIMA or LSTM networks) for enhanced predictive accuracy. Additionally, advanced data visualization techniques—such as interactive dashboards with drill-down filters—could further boost user engagement and strategic insights.

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The Development of an Employment Website

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Abstract

This research aimed to create and evaluate an employment website, focusing on both technical quality and end-user satisfaction. Employing the System Development Life Cycle (SDLC) model, the team defined eight core functionalities: (1) user login, (2) member management, (3) data verification for job postings, urgent applications, and internships, (4) job details, (5) data management for job applications, urgent applications, and internship applications, (6) a contact channel, (7) applicant notifications, and (8) application status tracking. A total of two web development experts and one graphic design expert assessed the system's quality, while 30 end-users—comprising students and recent graduates—provided feedback on user satisfaction.

Data collection involved a quality-assessment form for specialists, a user-satisfaction questionnaire, and direct observations of interactions with the prototype. Descriptive statistics, including mean and standard deviation, were used to quantify responses. The findings indicated that experts rated the overall website quality at a good level, citing strengths such as intuitive design and straightforward navigation. Parallel to these results, user satisfaction was also good, with particular appreciation for the system's clarity, responsiveness, and seamless user experience.

By offering practical features tailored to both job seekers and employers, the website addresses modern recruitment challenges. The study underscores the importance of well-structured functionalities and user-focused design principles. Moreover, it highlights how digital tools can effectively bridge the gap between candidates and potential employers, streamlining the hiring process in a manner that is both efficient and user-friendly.

Keywords: Employment Website, Job Search, System Development Life Cycle (SDLC)

Introduction

Background and Significance

In an age dominated by rapid scientific and technological innovation, online platforms profoundly influence how individuals communicate and seek information. Digital transformations have permeated virtually every sector of society, particularly in how organizations and job seekers connect. Traditional, paper-based recruitment has been steadily eclipsed by digital job boards, social media postings, and specialized employment websites. This shift can be partly attributed to the global rise of internet penetration, the proliferation of mobile devices, and widespread adoption of broadband connectivity (National Information Technology Committee Secretariat (NITC), 1996).

Recent global challenges such as the COVID-19 pandemic have further accelerated this transition by making conventional, in-person recruitment channels less accessible and prompting employers to explore online alternatives more aggressively (Phromsida, 2021). As social-distancing measures constrained face-to-face interactions, job seekers had to embrace digital platforms to find suitable opportunities, and employers had to adapt to a remote or partially remote hiring framework. While many online job portals exist, gaps persist in terms of user experience, localized opportunities, and specialized features (e.g., internships, urgent applications) that cater to students, recent graduates, or entry-level candidates.

Problem Statement

Rajamangala University of Technology Krungthep, like many higher-education institutions, annually produces a substantial cohort of graduates seeking employment. Despite exposure to mainstream job-search engines, these individuals often lack a dedicated, user-centric platform that simplifies the application process and provides crucial functionality—such as uploading resumes, verifying job postings, and receiving application-status notifications.

Simultaneously, employers require a system that efficiently manages job listings, internship postings, and urgent vacancies, all within an intuitive interface that verifies user data and assists in screening qualified candidates. Without a specialized and carefully designed platform, both employers and job seekers risk inefficient processes, missed networking opportunities, and duplicate communication efforts.

Objectives

To address these issues, this study set out three main objectives:

1. **Develop a Functional and User-Friendly Online Job-Search Website**

The website is intended to serve as a one-stop portal, offering secure registration, job-listing management, resume submission, and direct contact channels.

2. **Evaluate the System's Quality through Expert Assessments**

Web development experts and graphic design specialists were consulted to assess design coherence, technical performance, and the alignment of features with user needs.

3. **Examine User Satisfaction Based on the Website's Performance and Usability**

Feedback from a sample of end-users—primarily recent graduates and interns—was collected to gauge whether the platform effectively addresses their recruitment needs and meets usability standards.

Scope of the Study

1. Population: The broader user population includes student interns, new graduates, and organizations (businesses, public agencies, and nonprofits) seeking suitable applicants.

2. Sample Group: For this research, 30 interns and new graduates from Rajamangala University of Technology Krungthep were randomly selected to evaluate the website.

3. Expert Group: Two specialists in web development and one in graphic design rated the website's technical and aesthetic quality.

The developmental focus encompassed eight essential system functionalities: user login, member management, data verification for job postings, job-detail displays, data management for multiple job-application types, contact channels, applicant notifications, and application status tracking.

Literature Review

Online Job-Search Platforms

A robust body of research underscores the widespread adoption and impact of online job-search platforms. Banpakot (Banpakot, 2013) examined the development of a job-search website for elderly individuals and demonstrated that thoughtful design—emphasizing large fonts, simplified language, and uncluttered layouts—could enhance usability across varying age groups. One noteworthy finding was that even users with minimal internet literacy could benefit significantly from well-designed sites, highlighting the critical role of user-centric design principles.

Thianpermpool and Muhammad (Thianpermpool and Muhammad, 2017) analyzed how demographic factors (e.g., age, educational background, and income) and online behaviors (e.g., frequency of internet usage, favorite application channels) affect job seekers' satisfaction in Bangkok. Their study revealed that experience in internet usage strongly correlated with satisfaction levels and perceived outcomes in job searching. This aligns with the current study's focus on new graduates and interns, many of whom possess moderate to advanced digital skills yet still require a supportive, structured environment to navigate entry-level positions successfully.

Additionally, research by Chonrattanatham et al. (Chonrattanatham et al, 2016) on state-run employment centers illustrated that job-search limitations, awareness of available resources, and readiness to enter the workforce can vary considerably by gender and educational attainment. Although these factors were not found to be statistically significant in all instances, they underscore the importance of inclusive features. Employment websites must balance robust functionality—like resume-building tools and automated job matching—against simplicity and accessibility.

System Development Life Cycle (SDLC)

Developing a reliable software application often entails following the System Development Life Cycle (SDLC), a stepwise framework guiding projects from initial concept to final deployment (Raj, Singh, and Bansal, 2014) (Pei, Baohui, Chao, and Lan, 2009) (Khan and Beg, 2013). The phases typically include:

1. Problem Identification: Pinpointing project objectives and addressing core user needs.

2. System Analysis: In-depth understanding of required features, workflows, and constraints, often captured in diagrams or specifications.

3. System Design: Translating analysis into architectural blueprints, data models, and user-interface mockups.

4. System Development: Writing and integrating code, employing tools such as Visual Studio Code, PHP frameworks, and MySQL databases (Cui, Huang, Liang, and Li, 2009) (W3Schools, 2023).

5. System Testing: Detecting errors through functional, performance, and user-acceptance tests.

6. System Installation: Deploying the final product in a live environment, followed by ongoing support and maintenance.

Adhering to SDLC's structured approach ensures that key requirements are clearly defined and validated at each stage. Problems discovered late in development are typically more time-consuming and expensive to fix, underscoring the value of iterative feedback loops and consistent documentation.

Rating Scales for Website Assessment

Quantifying user feedback and expert opinions is crucial for continuous improvement. Rujchanaphan (Rujchanaphan, 2013) noted the effectiveness of five-point Likert scales in capturing nuanced assessments of usability, design, system reliability, and overall satisfaction. Such scales enable project teams to pinpoint areas of weakness and compare results over time or across user segments.

In the context of web-based systems, these rating instruments often explore dimensions like:

• **Interface Design:** Layout clarity, color schemes, font readability, and logical grouping of functions.

• **System Functionality:** Feature completeness, reliability, response speed, and integrative data flows.

• **Presentation:** Coherence of displayed data, consistency of visual themes, and appropriateness of graphic elements.

• **Overall Impression:** Users' holistic view, factoring in intangible elements like user trust, perceived value, and brand alignment.

By systematically analyzing mean scores and standard deviations, developers can weigh the significance of each aspect and correlate user satisfaction data with identified system improvements.

Methodology

Research Framework

Building on the SDLC conceptual model, this project employed a structured approach encompassing: (1) Problem Identification, (2) System Analysis, (3) System Design, (4) System Development, (5) System Testing, and (6) System Installation. An iterative process was crucial, with user feedback and expert evaluations shaping subsequent refinements.

Problem Identification

Preliminary interviews and focus group discussions were conducted with students and administrators at Rajamangala University of Technology Krungthep to ascertain common hurdles in traditional recruitment. During the COVID-19 pandemic, site visits and face-to-face interactions decreased, amplifying the need for digital solutions. Stakeholder feedback highlighted the desire for an accessible platform to post, locate, and apply for jobs and internships efficiently.

System Analysis

The project team performed an analysis of typical user requirements:

1. **Student/Job Seeker Needs:** Simple account creation, profile management, resume upload, quick job search filtering, and real-time application status updates.
2. **Employer Requirements:** Job-posting forms, data verification steps, candidate management dashboards, and integrated communication channels.
3. **Administrative Functions:** Oversight capabilities (e.g., user banning, job-post monitoring for fraudulent postings), secure database management, and statistical reporting (e.g., number of active postings, daily site traffic).

During this phase, Entity-Relationship (E-R) diagrams were produced to map out relationships among tables such as user accounts, job listings, applications, and notifications. Use-case diagrams additionally clarified how each stakeholder (administrator, employer, job seeker) interacts with the system.

System Design

The design phase translated functional requirements into more tangible deliverables:

• **Information Architecture:** A site map enumerating main pages (Home, Job Listings, User Dashboard, Employer Dashboard, Contact) and subpages (Job Details, Resume Upload, Payment Page for boosted listings, etc.).

• **User Interface (UI) Mockups:** Low-fidelity wireframes ensured key features were accessible. Emphasis was placed on intuitive layouts, clean icons, and minimal text clutter.

• **Color Palette and Typography:** A neutral color scheme was chosen to appeal to a broad demographic, while fonts were selected for readability across varied screen sizes.

System Development

Implementation leveraged:

1. **Visual Studio Code:** A versatile editor supporting rapid iterative development.
2. **PHP:** For server-side scripts managing dynamic content, form submissions, and database queries (Cui, Huang, Liang, and Li, 2009).
3. **MySQL:** For robust data storage and efficient retrieval of job listings, employer profiles, user resumes, and more (W3Schools, 2023).
4. **HTML/CSS/JavaScript:** For structuring content and enhancing interactive functionalities on the client side.

A modular approach allowed the team to develop core components—login, job posting, resume submission—independently before integrating them. During development, strict version control protocols and frequent internal reviews minimized bugs and ensured consistency.

System Testing

Before launch, testing was performed in iterative cycles:

- **Functional Testing:** Verified that each feature (e.g., job searches, notifications) worked as intended.
- **Usability Testing:** Invited sample end-users to navigate the site, complete tasks, and provide real-time feedback, which guided design tweaks.
- **Performance Testing:** Checked load times and concurrency handling, particularly for searching and listing thousands of job entries.
- **Security Testing:** Ensured the login process, password storage, and data verification processes complied with recommended security best practices.

Any identified technical issues were documented, prioritized, and resolved prior to final rollout. The feedback from each testing cycle informed minor design revisions and performance optimizations.

System Installation

The refined website was deployed on a managed hosting environment equipped with PHP and MySQL. The platform’s domain name was acquired and linked to the production server, enabling real-world accessibility. Post-launch, the research team continued to gather user feedback, addressing any emergent bugs and planning subsequent enhancements.

Evaluation Process

Two forms of evaluation were integral to gauging the project’s success:

1. **Expert Evaluation:**
   - o **Panel Composition:** Two web development experts and one graphic design expert.
   - o **Evaluation Criteria:** (a) Web Design (layout, color schemes, and typography), (b) System Functionality (feature completeness, reliability), (c) Presentation (organization of displayed content), and (d) Overall Perspective (general impression and alignment with stated objectives).
   - o **Rating Scale:** Five-point Likert scale (1 = lowest, 5 = highest).
2. **User Satisfaction Survey:**

- **Sample:** 30 individuals—students, recent graduates, or interns—who used the site under simulated or real recruitment scenarios.
- **Questionnaire Sections:** Measured (a) usability and navigation, (b) clarity of job postings, (c) functionality (resume upload, notifications, etc.), (d) site aesthetics, and (e) overall satisfaction.
- **Data Analysis:** Descriptive statistics (mean, standard deviation) were computed to provide aggregated insights into user perceptions.

Results and Discussion

Results

Website Development Outcome (RQ1)

Upon conclusion of the development cycle, the **final website** integrated eight major features, each carefully tested and refined:

1. **Login Page**
   - Secured by modern hashing algorithms for passwords.
   - Allowed for role-based user access (job seekers, employers, administrators).
2. **Member Registration Page**
   - Simplified sign-up flow, capturing essential details (name, email, desired role).
   - Included automated email verification to reduce spam accounts.
3. **Home Page**
   - Featured trending job openings, quick search functionality, and site updates.
   - Provided links for quick employer or job-seeker sign-in.
4. **Job Details Page**
   - Displayed comprehensive data: job title, responsibilities, qualifications, location, and compensation.
   - Offered direct application links or "save job" options for registered members.
5. **Resume Submission**
   - Allowed users to upload PDF or Word documents.
   - Integrated basic file-type and size checks for security.
6. **Job Registration Form**
   - Enabled employers to post vacancies, specifying job roles, required skills, deadlines, and potential benefits.
   - Incorporated an internal verification step for posted content.
7. **Payment Page**
   - Reserved for employers seeking premium listing features (e.g., job highlights, priority placements).
   - Supported multiple payment gateways and immediate job-post visibility upon confirmation.
8. **Employer and Applicant Management**
   - Employers could view applicant lists, filter by qualification, and update job statuses.
   - Automatic notifications informed candidates of any status changes (e.g., shortlisting, interview schedule).

In addition to these functionalities, responsiveness was built in, ensuring that core features rendered well on both mobile devices and desktop screens. Preliminary user feedback recognized the straightforward navigation, short load times, and overall consistency of the user interface.

Quality Assessment by Experts (RQ2)

Following system deployment, expert evaluators provided structured feedback (Table 1).

Table 1: Expert Quality Assessment

Dimension	Mean	S.D.	Level
1. Web Design Aspect	4.25	0.62	Good
2. System Functionality Aspect	3.92	0.29	Good
3. Presentation Aspect	4.25	0.75	Good
4. Overall Website Perspective	4.09	0.51	Good
Overall	**4.13**	**0.57**	**Good**

- **Web Design Aspect (Mean = 4.25):** Experts complimented the intuitive layout, color balance, and consistent navigation flows. They recommended further personalization options (like user avatars or adjustable site themes), but overall design synergy was considered strong.
- **System Functionality Aspect (Mean = 3.92):** While still rated as good, the lower mean compared to other categories suggests room for refinements, particularly around advanced features like job-search filters or chat-based assistance.
- **Presentation Aspect (Mean = 4.25):** Visual clarity and cohesive formatting of text, images, and icons received positive remarks.
- **Overall Website Perspective (Mean = 4.09):** The panel recognized the project's alignment with the stated objectives, commending the manageable learning curve and minimal technical hiccups.

User Satisfaction (RQ3)

A total of 30 end-users completed a standardized questionnaire, measuring various satisfaction dimensions (Table 2).

Table 2: User Satisfaction Assessment

Dimension	Mean	S.D.	Level
1. Web Design Aspect	4.38	0.71	Good
2. System Functionality Aspect	4.43	0.63	Good
3. Presentation Aspect	4.47	0.63	Good
4. Overall Website Perspective	4.41	0.68	Good
Overall	**4.42**	**0.66**	**Good**

- **Presentation Aspect (Mean = 4.47):** Stood out as the highest average dimension, indicating users appreciated the organized visual structure and clarity of job postings.
- **System Functionality Aspect (Mean = 4.43):** Emerged as an essential component driving satisfaction, affirming that the fundamental features—like applying for multiple jobs seamlessly—met user needs.
- **Overall Website Perspective (Mean = 4.41):** Echoed positive user experiences across the board, reinforcing that the website was user-friendly, reliable, and fulfilled its promise of simplifying job searches.

Users frequently mentioned that the website's straightforward design, quick job searches, and immediate notifications about application statuses greatly contributed to a favorable experience. Some suggested adding real-time chat or video-interview scheduling options, which might serve as areas for future enhancement.

Discussion

Interpreting the Expert and User Feedback

Both expert evaluators and end-users rated the website as good overall. The alignment between technical experts' feedback and lay-user experiences underscores the site's core strength: balancing robust functionality with accessible design. In line with Banpakot's (Banpakot, 2013) work, focusing on clarity and simplicity remains vital to user engagement. Even as job seekers become more digitally literate, they still value interfaces that do not demand excessive navigation or technical effort.

Reflecting on the SDLC Approach

By thoroughly following an SDLC-based methodology, the project team was able to mitigate common pitfalls such as late-stage design changes, unaddressed stakeholder requirements, and insufficient testing. System prototypes were refined in iterative cycles, incorporating inputs from prospective end-users to ensure that features aligned closely with real-world expectations. This resonates with established best practices, confirming that each SDLC phase is indispensable for building a stable, user-approved web platform (Raj, Singh, and Bansal, 2014) (Pei, Baohui, Chao, and Lan, 2009) (Khan and Beg, 2013).

Relevance to Existing Literature

Findings corroborate existing research discussing digital hiring interfaces in uncertain socioeconomic conditions. For instance, Thianpermpool and Muhammad (Thianpermpool and K. Muhammad, 2017) highlight how user satisfaction often hinges on demographic factors and internet usage patterns. Although the sample in this study largely comprised digitally adept university graduates, the repeated emphasis on intuitive design suggests that even tech-savvy cohorts value ease of use. Similarly, the system's alignment with recognized design heuristics (e.g., consistent layout, quick load times) resonates with broader studies that tie streamlined visuals to user retention.

Practical Implications

The success of this project has tangible implications for universities, employers, and job seekers:

- **Universities:** Can integrate such platforms into their career-support ecosystems, offering students direct channels for internships, part-time jobs, and full-time employment opportunities upon graduation.
- **Employers:** Gain access to qualified entry-level talent pools via a user-friendly interface that also verifies data accuracy and automates candidate notifications.
- **Job Seekers:** Benefit from an environment where postings are timely, legitimate, and filterable based on personal career goals. Advanced functionalities like urgent postings allow those with immediate needs to expedite the application process.

Limitations

1. **Sample Size:** Only 30 end-users were surveyed, all of whom were current or recent students. Expanding the participant range might yield more nuanced insights into website performance across different age groups or industries.
2. **Advanced Features:** The platform does not currently incorporate advanced analytics or recommendation engines (e.g., suggesting roles based on user profiles), which could enhance user satisfaction further.

3. Employer Engagement: This study focused heavily on the job seeker's journey; future iterations could explore how employers perceive the applicant-management dashboard and refine features that would streamline their recruitment cycles.

Conclusion and Suggestions

Summary of Findings

This research successfully **developed and evaluated an employment website** that addresses modern recruitment needs, particularly within academic institutions. Adopting the SDLC model, the team systematically tackled each project phase, from defining user requirements to deploying the final product. Assessments by both experts and end-users affirmed the site's strong performance in terms of design coherence, functional reliability, and overall user satisfaction. By offering features such as easy registration, file uploads, and real-time status updates, the site effectively bridges the gap between job seekers and prospective employers, making the hiring process more transparent and convenient.

Contributions to Practice

The website's modular and clear design stands as a blueprint for other educational institutions or small to medium-sized organizations seeking to develop similar platforms. It shows that focusing on the fundamentals—secure login mechanisms, coherent job postings, and straightforward communication channels—can foster positive user experiences. In an era where remote operations and digital transformations dominate, such a platform serves as a critical conduit for ensuring continued employability and organizational productivity.

Directions for Future Research

1. **Feature Expansion:** Integrating recommendation systems driven by machine learning could personalize job suggestions for candidates. Tools like chatbots could also provide real-time guidance for first-time users.
2. **Longitudinal Studies:** Observing usage patterns over a year or more would clarify how job seekers and employers adapt to the platform's features and whether recurring visitors remain satisfied or encounter repeated issues.
3. **Comparative Analyses:** Benchmarking this website against commercial job boards would illuminate competitive advantages or areas that require further refinement.

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Thai Undergraduate Students' Awareness of the Benefits of Massive Open Online Courses

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Abstract

This study discusses the benefits and limitations of Massive Open Online Courses. The study also examines Thai undergraduate students' awareness levels of the benefits of MOOCS and their providers. The participants of this study were 51 Thai 3rd year undergraduate English major students. The participants were chosen as they were nearing the end of their degree program and were taking elective business related courses. The study used a 5-point scale questionnaire to obtain data on student awareness levels of MOOCs benefits and their providers. Although the students were interested in learning skills outside of their chosen major, few were aware of the benefits of taking online courses. The results of this study found that students generally had low levels of awareness in regard to MOOCs.

Keywords: MOOCs, student awareness, Thai students

Introduction

MOOCs (Massive Open Online Courses) are free online open courses aimed at unlimited participation numbers. Many of the available MOOCs provide interactive user forums for supporting community interactions between the students and lecturers. Educational content is provided through media such as filmed lectures, readings and quizzes. MOOCs can offer various types of education. Some courses offer badges and "soft certification" (non-accredited certificates) for finishing courses or sections and are viewed as a form of non-formal education. Other courses though, may offer degree credits and recognised certificates. These courses are more formal in nature (Management Association, 2014, Oxford Brookes University, 2015). This paper discusses MOOCs and examines students' awareness of their existence and potential benefits.

In today's society, employers demand more specialized skills and knowledge from their workforce. Ever changing technology also requires staff to upskill and retrain on a regular basis. The 21st century is the era of the lifelong learner. MOOCs have been around for a number of years. Unfortunately, there is still a shortage of research on university students' awareness MOOCs and how participating in a MOOC can provide benefits.

The study aims to answer the following research questions: What are the levels of awareness of the benefits of MOOCs among undergraduate students studying at a Thai public university? What are the levels of awareness of MOOC providers among undergraduate students studying at a Thai public university?

The objectives of the study are as follows: To examine the levels of awareness of the benefits of MOOCs among undergraduate students studying at a Thai public university. To investigate the levels of awareness of MOOC providers among undergraduate students studying at a Thai public university.

This study provides data on undergraduate student awareness of MOOCs in a Thai context. This information may prove useful for providers of MOOCs within Thailand.

Literature Review

History has many examples of people who never went to university or lacked a formal education that went on to be highly successful. For example, Steve Jobs was worth $7 billion; Richard Branson is worth $4.2 billion, neither of these individuals needed a university degree to make a success of their lives (Steed, 2013). John Harrison a clockmaker and carpenter invented the marine chronometer without receiving a formal education (Wilford, n.d). In the field of sport, Sir Alex Ferguson won 49 major trophies and various personal accolades including 10 honorary degrees in his 39 years in football management. Sir Alex Ferguson acquired much of his footballing education through experience and informal channels. These examples though, seem to be the exception rather than the rule. Formal and recognised qualifications gained through accredited institutions are often a prerequisite for gaining employment in many fields (Elberse, 2013).

Formal and recognised qualifications are often required in order to gain well paid employment. For example, in the UK (United Kingdom) half of all employees aged 25-29 with no or low qualifications were found to be in low paid employment ("Impact of Qualifications", n.d; Labour Force Survey, 2010). These figures though only refer to those that are actually employed and do not take into account those not working. Furthermore, children from poorer backgrounds are half as likely to get five good GCSEs (General Certificates in Secondary Education) and are also less likely to go onto higher education (Perry & Francis, 2010; Sharples, Slavin, Chambers, & Sharp, 2011). A lack of a formal education or qualifications often results in social issues. In the UK, 52% of male offenders and 71% of female offenders have no qualifications (Natale, 2010).

Debates regarding informal and formal education have been confused due to the various different understandings of their meanings. During the early 1970's UNESCO (United Nations Educational, Scientific and Cultural Organization) attempted to promote the concept of lifelong learning (Smith, 2002). What came from this were three definitions by Coombs, Prosser and Ahmed (1973). The authors proposed that the term formal education relates to a structured, chronologically graded 'education system' from primary school through to university. This can include a variety of specialised programmes and institutions for full-time technical and professional training. Formal education results in accredited certification. Non-formal education is deemed to be any organised educational activity outside the established formal system. Non-formal education can offer some form of non-accredited certification. Both formal and non-formal-education have learning objectives. Informal education (self-education) covers what is left. This can comprise of interactions with friends, family, work colleagues and media such as books, newspapers and the World Wide Web. There is no structure to the learning and no certification is offered. MOOCs can be both formal and non-formal in their nature (Coombs, Prosser & Ahmed, 1973; Radaković, & Antonijević, 2013).

People today are living in an information age and it has never been easier to take an online course or program or become self-educated. In the past the only real practical options for learning were through attending a formal class at school, college or university or by being taught or trained by another person. In the modern world there are no longer guardians of knowledge. Libraries and the printed word began to open up another form of learning that did not require a teacher. Other forms of technology such as the television and computer have created further options for learning outside of the classroom. This has led to some people believing that qualifications are unimportant and skills and knowledge can be acquired from sources such as books and the World Wide Web. Whether this is true though is open to debate. For many years, Thailand has had issues with unqualified English teachers working in their schools. The ability to speak English was seen as being adequate to become a teacher in the language (Fairfield, 2014). Most people could search the World Wide Web for information on education and get a broad overview of the subject. This knowledge could be backed up by reading a few books and watching a few videos. In many cases though, those that are self-taught either have vastly inadequate skills or are lacking in certain areas of knowledge within their field. Those that are self-taught often lack a deeper understanding of a subject. For example, an online source of information may not provide the answers why the learning game that worked so successfully in the Thai classroom failed in the British classroom. Books, Websites and videos will often provide basic information that can be applied to generic situations. Without a deeper understanding the teacher is left with a one-size-fits-all approach that may or may not work. Informal learning and self-education do have an important role to play in education. Much knowledge can be and is acquired from informal sources and through interacting with other people. Unlike formally gained knowledge though, the learner may be exposed to factually incorrect information and out of date information.

Online learning and free and open content has transformed self-education. Nowadays, the unemployed, the elderly and retired can learn new skills for pleasure and for career enhancement. Those that are employed can keep their skills relevant and up-to-date. It has been noted that self-educators tend to be curious, are willing to try new things, view problems as challenges and have a desire to change. The self-educated are quite often persistent, self-disciplined, independent, self-confident and goal oriented and enjoy learning. In the 21st century there are an endless array of open educational resources (OER) and MOOCs available to assist the self-educator in obtaining a quality learning experience (Sheu, Bonk, & Kou, 2013).

In most occupations and fields, the sign of success is not whether a person can regurgitate factual knowledge but whether a person can analyse, criticise and use that knowledge to solve problems and create new knowledge. In addition, expert feedback is often needed in order to highlight a learner's areas of weakness. This type of education can be costly and classes may be difficult to attend if the person works full-time or is not close to a college or university. In this respect on-line MOOCs may provide the self-learner an opportunity to gain an education similar to a formally recognised one without having to attend a formal course. Many of these courses are provided by the world's best universities and are a cheaper alternative to full-time education. Often, course content can be accessed free but no feedback or certification is provided. Students can also learn from their peers in open forums in a rather less formal manner (Coursera, 2021). Education continues to change with the development of technology. MOOCs may provide a cost effective solution to those seeking a quality education with proof of learning such as a certificate or digital badge. They can also be a valuable resource for the lifelong learner or for those updating their skills and knowledge.

There have been some major changes in the world of higher education over the past twenty years. It is now possible for people in remote parts of the world to receive lectures from well-known professors at Princeton, Rice, Harvard, and MIT (Massachusetts Institute of Technology). Many of these lectures are usually provided free if no proof of learning is required. Millions of individuals across the world are now engaged in self-directed learning. This large group of learners also have the opportunity of collaborating with their global peers who have also signed up for the same courses. These experiences are now resulting in some people questioning whether a university degree still has the same value as in the past or whether it is still even necessary. The factory model of education is quickly being replaced or at least being challenged by various alternative learning networks (Sheu, Bonk, & Kou, 2013).

On April 4, 2001, Charles Vest, the then president of MIT set a goal of having the majority of the university's courses freely available on the Web within a decade. Since early 2009, MIT's entire curriculum of 1,800 courses, have been available online. MIT's curriculum of courses, are available for self-educators to explore, download, use, and share. Any learner with an internet connection can watch, listen to or read these resources. Initiatives such as MIT's open up concerns about the sustainability of the content, intellectual property rights, resource preservation, content quality and enhancement. Online education may not be suitable for all learners and measuring the impact of its effectiveness is becoming of great importance (Sheu, Bonk, & Kou, 2013).

An argument exists, that on-line, open and free courses could help solve many of the problems associated with a lack of education and qualifications. For instance, MOOCs may provide an opportunity for everyone to gain some form of education. Learners would be free to study when and where they like and so could potentially improve their skills and knowledge later in life. In regard to MOOCs, there is a risk of being caught up in the enthusiasm of online learning without considering some of the harsh realities. Powell and Yuan (2013) suggest that the current enthusiasm is being driven by a group of highly educated, IT (Information Technology) literate individuals that are comfortable navigating the intimidating nature of online learning (Powell, & Yuan, 2013). These suggestions are backed up with evidence from several universities that suggest that around 60-70 per cent of those who register for MOOCs already have degrees (Laurillard, 2014; Nelson, 2014). Therefore, a large majority of students registered on these courses are already capable learners that have made a long term commitment to education in the past. These are not the forgotten millions that lack a decent education and any form of formal qualification.

Sheu, Bonk, and Kou's (2013) study explored the learning experiences of self-directed online learners. Data was collected through a 43-item survey of 2 large online learning communities. The sample included 1,429 newsletter subscribers to the MIT, OCW (Open Course Ware) initiative, and 159 participants enrolled in a MOOC hosted by Blackboard using CourseSites. The preliminary findings found that people going online to learn are generally perpetual learners. These learners are amassing skills in various fields and are learning for various reasons. On-line learning resources and self-education gives these learners a sense of control over their lives. The learners were found to be looking for career progression and professional development. Some just wanted to learn something new. Obstacles to learning, included a lack of time and a lack of understanding of how to use the course technologies. In addition, two of the major issues related to MOOCs concerned participant retention and the motivation levels of students. Although, it has been found that tens or hundreds of thousands of people around the world often enrol in a single MOOC course, a study at Duke University indicated that the retention rate is often quite low (Sheu, Bonk, & Kou, 2013).

Aboshady et el. (2015). assessed the prevalence of awareness and use of (MOOCs) among 2106 undergraduate medical students in Egypt. The results of the study showed that 21.7% had knowledge of MOOCs. Furthermore, the results showed that 136 students had enrolled in at least one course. However, only 25 students completed their enrolled courses. The study found that Coursera was the most commonly used website among those enrolled (72.8%), followed by Edx (10.3%). Sahoo et al. (2019) study revealed a below average awareness of the MOOC (SWAYAM) programmes among regular university students. The study found higher awareness levels of the MOOC (SWAYAM) courses among Post Graduate and professional course students. The results showed significant differences between levels of awareness between undergraduate and post graduate level students towards the MOOC (SWAYAM) courses. The mean scores for the Post Graduate students was found to be 42.53%. Adebayo & Babalola (2020) study of 356 Nigerian undergraduate law students found a low level of awareness of MOOCs and the different providers of MOOCs.

There are a number of commentators that suggest that MOOCs are not the answer for those that lack a university degree or a formal education. It is suggested that to run a university course successfully the ratio should be around 1:25. The course format of MOOCs, cope with large numbers by relying on peer to peer support and assessment (Laurillard, 2014; Nelson, 2014). A good education usually requires good feedback from expert lecturers. Education is not a mass customer, factory produced industry. Higher education often needs to be personalised to meet the students' needs and requirements. To be successful the self-educators needs to spend much time evaluating their own weaknesses and strengths. They need to know where to improve and how to improve. Unqualified peer to peer feedback and assessment may not be the answer to these issues. Higher education is fundamentally about learning concepts and skills that are not acquire naturally or easily. To learn the skills and knowledge that is required to succeed at a higher level requires personalised, expert guidance (Laurillard, 2014; Nelson, 2014; Powell, & Yuan, 2013).

The ALISON MOOC model may provide a more realistic compromise. ALISON courses are free and can be completed at the leisure of the learner. The level of learning is below an undergraduate certificate so is ideal for the novice and for gaining vocational skills. There is no peer to peer assessments or feedback. The courses offer certificates and knowledge of a subject can be proven by re-taking the final assessment in the presence of a prospective employer (ALISON, 2023).

MOOCs provide a wide range of qualifications and certificates. These can be confusing for both the learner and future/present employer to understand. Micro-credentials are now becoming a serious source of income for MOOC providers. Qualifications that are accredited and approved are important for employers and other institutions that require proof of learning. The National Skills Development Handbook suggests that qualifications are genuine proof that learning has occurred and that the learner has not just regurgitated factual knowledge (Stuart, 2011). A certificate of completion is not the same as a certificate that has been granted after the completion of assessed assignments and formal written exams. The learner therefore must be aware of what qualifications or certificates are granted before taking a course. Recognition of qualifications may also vary between employers and other institutions.

Online courses are useful for lifelong learners and people who want to progress in their established careers. They appear to work better for professionals who are already in a career or for people that want to improve their existing skills and knowledge. The cost of running online courses or MOOCs does not appear to be its greatest issue. The significant initial investment required in the preparation of educational resources can be distributed over a very large student numbers. Advertising and students that take a formal degree can bear the brunt of the costs. Course content can also be re-used a number of times. The recognition of qualifications and certificates may prove an issue for the learner. A knowledge of the benefits and issues in relation to MOOCs may prove useful for the lifelong learner (Laurillard, 2014; Nelson, 2014; Powell, & Yuan, 2013).

Methodology

The study used a questionnaire survey to obtain data on student awareness levels of MOOCs and their benefits. The questionnaire had previously been checked for validity by experts. The questionnaire was translated from English to Thai and then back translated from

Thai to English by 2 Thai university lecturers proficient in both languages. The translation was deemed to be accurate and clear. The reliability was checked using a group of students not involved in the main study. The questionnaire was checked for reliability and all Alphas were found to be above .60 (.97) which is seen as reliable for data collection. Data were collected through a 5-point questionnaire that measured the levels of awareness as follows: Mean: 1.0-1.80 = Very Low Level of Awareness, Mean: 1.81-2.60 = Low Level of Awareness, Mean: 2.61-3.40 = Average Level of Awareness, Mean: 3.41-4.20 = High Level of Awareness, Mean: 4.21-5.0 = Very High Level of Awareness. The data were analysed through descriptive statistics namely the mean and standard deviation. The questionnaire was based on Adebayo & Babalola's (2020) model (Cronbach's alpha reliability coefficient of 0.92).

The study surveyed 51 mixed gender, English major students studying in 3rd year undergraduate programs at a Thai public university. The students were chosen to participate in this study as they possessed the required characteristics and were available. The students were studying business related courses in order to improve their employability.

Results and Discussion

The following section provides the results from the questionnaire survey (Table 1). MOOCs was written in full on the original questionnaire.

Table 1. The following table shows the mean value obtained from the 5-point Likert scale questionnaire and the standard deviation.

Statement	N	Mean	S D
1) Participating in MOOCs can increase your knowledge in your major subject	51	2.39	.98
2) Participating in MOOCs can improve your skills in your major subject	51	2.59	1.00
3) Participating in MOOCs can increase your knowledge in specialized subjects	51	2.47	1.12
4) Participating in MOOCs can increase your skills in specialized subjects	51	2.47	1.06
5) Participating in MOOCs is a cheap/free method for studying university level courses	51	2.59	1.15
6) Participating in MOOCs is a cheap/free method for studying vocational level courses	51	2.59	1.13
7) Participating in MOOCs can earn you a certificate	51	2.73	1.33
8) Participating in MOOCs can earn you university credits	51	2.45	1.24
9) Participating in MOOCs can enhance your resume/CV	51	3.02	1.17
10) Participating in MOOCs can boost your career growth	51	2.86	1.23
11) Rate your awareness of Coursera online MOOCs	51	2.22	1.08
12) Rate your awareness of edX online MOOCs	51	2.04	1.00
13) Rate your awareness of Open Edx online MOOCs	51	2.02	.93
14) Rate your awareness of Future Learn online MOOCs	51	2.27	1.22
15) Rate your awareness of Udemy online MOOCs	51	2.08	.98
16) Rate your awareness of Canvas Network online MOOCs	51	2.37	1.23
17) Rate your awareness of Udacity online MOOCs	51	2.04	.94
18) Rate your awareness of Iversity online MOOCs	51	2.02	.99

The study aimed to measure undergraduate students' levels of awareness of MOOCs (Massive Open Online Courses) based on a 5-point questionnaire. The results were categorized into five levels of awareness: Very Low, Low, Average, High, and Very High, based on the mean scores.

Overall, the awareness of MOOCs among students appears to be low. The majority of the questions regarding the general benefits of MOOCs—such as increasing knowledge and skills in both major and specialized subjects, being a cost-effective method of learning, and earning certificates—yielded mean scores between 2.39 and 2.73. According to the interpretation scale, these results fall within the Low to Average Level of Awareness range. None of the questions scored in the Very Low Level of Awareness range, indicating that students are somewhat familiar with MOOCs, but their awareness is not high. The results for items like improving knowledge and skills in the major subject (mean = 2.39) and the affordability of MOOCs for university-level courses (mean = 2.59) fall into the Low Level of Awareness category. These scores suggest that while students recognize the potential benefits of MOOCs, they may not be highly familiar with their specific advantages or may have limited exposure to them. On the other hand, the item on enhancing the resume or CV (mean = 3.02) indicates that students are more aware of how MOOCs might positively affect their professional prospects. However, this is still an Average Level of Awareness, suggesting that while some benefits of MOOCs are recognized, the students may not fully grasp the broader opportunities these courses offer.

The perceptions about how MOOCs can impact students' academic and professional lives reflect moderate awareness. For instance, students rated the potential for MOOCs to improve skills and knowledge in their major and specialized subjects with mean scores ranging from 2.47 to 2.59. These results suggest that students have some awareness of MOOCs' potential for enhancing their academic learning, but their awareness remains relatively low. Similarly, when asked whether MOOCs could enhance a resume or career, students gave these items slightly higher ratings, indicating some recognition of MOOCs as an affordable way to add credentials. However, these scores remain in the Average Level of Awareness category, showing that students acknowledge MOOCs' potential but may not fully understand the extent of their benefits.

The final set of questions focused on students' awareness of specific MOOC providers, and the results indicate low awareness across various platforms. For example, the awareness of Coursera (mean = 2.22), edX (mean = 2.04), Udemy (mean = 2.08), and FutureLearn (mean = 2.27) all fell within the Low Level of Awareness range. Awareness of other platforms, such as Open Edx, Canvas Network, Udacity, and Iversity, yielded even lower mean scores, indicating that students have limited knowledge of these online learning platforms. These results suggest that while students may have heard of some MOOC providers, their familiarity with the specific platforms remains quite weak. None of the platforms reached the Average or High levels of awareness, further supporting the conclusion that students' awareness of MOOCs is generally low.

The results highlight a generally low awareness of MOOCs among undergraduate students. Despite recognizing some advantages of MOOCs, such as their affordability and potential to enhance resumes or provide certificates, students demonstrate limited familiarity with these platforms. This suggests a need for greater exposure to and education about the opportunities MOOCs offer. The findings also emphasize a gap in students' knowledge about specific MOOC providers, which may be due to insufficient marketing or a lack of outreach about these platforms at the university level. Given the growing importance of online education, institutions could benefit from increasing awareness and promoting these platforms as viable resources for supplementary learning.

Several factors could explain the students' low awareness levels. One possibility is a lack of exposure, where students may not have been sufficiently introduced to MOOCs through formal channels such as university courses or orientation programs. Another reason could be the perceived relevance of MOOCs. Some students may perceive MOOCs as less relevant to their degree programs or career paths, especially when compared to traditional methods of education. Additionally, limited personal engagement may play a role, with students not actively seeking additional educational resources beyond their formal coursework.

Conclusion and Suggestions

Gaining micro-credentials through open online courses may be an affordable method to boost employability. In an ever more competitive job market for graduates, additional skills and certification may prove a deciding factor when aiming to gain employment. Therefore, it is important that students are fully aware of the benefits and options available for gaining further skills. While students show some awareness of MOOCs and their potential benefits, their general understanding remains at a relatively low level. Institutions and MOOC platforms may need to work together to improve outreach and engagement strategies, ultimately helping students make more informed decisions about leveraging MOOCs for both academic and professional growth.

Self-education and non-formal forms of education have an important role to play in learning. Societies though have also recognized the need for a more structured, public system of education. Formal education is central to the development of a nation and society as a whole. It is through the implementation of a formal system of education that a nation can develop and progress towards the achievement of societal goals. It appears that everyone can self-learn but it is only the most driven that excel. The majority of learners appear to need guidance and encouragement that can only be provided within the classroom. In today’s technology rich modern era a rethink is needed on how learning is attained, assessed and certified. Online MOOCs offered through universities have their place but may not necessarily be the answer to everyone’s learning needs. MOOCs appear to be better suited for upgrading skills and knowledge and the attainment of the basic facts of a subject. These courses may therefore be better suited to lower level learning, up skilling and specialized skills. In regard to this study, students could benefit from university level courses in areas such as business English and business related skills.

Further research could explore how universities and educators can better integrate MOOCs into curricula or create awareness campaigns to inform students about these valuable resources. Understanding the barriers to student participation in MOOCs, such as time constraints or a lack of technological access, would be useful for developing strategies to encourage broader engagement.

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Chinese Students' Perceived Difficulty Levels when Listening to Non-Native and Native English Speakers

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Abstract

This study examines the effects of non-native practitioners' accents on non-native participants' listening comprehension. The participants were 26 Chinese post-graduate students studying in international programs related to education and business. Students completed listening tests (30 items at 5 per accent) for both native (Australian and New Zealand) and non-native (Singaporean, Japanese, Bangladeshi, and Indian) accents. They were then required to grade them out of 5 for perceived difficulty (5=very easy; 1=very difficult). The results showed the highest test scores for the Australian accent (mean=4.65 out of 5) and the lowest test scores for the Indian accent (mean=3.08 out of 5). The Singaporean accent was perceived to be the easiest (mean=3.85) and the Bangladeshi and Indian accents were both perceived to be the most difficult (mean=1.88). There was no correlation between the perceived difficulty levels and test scores. The results of this study suggest a need for students to listen to and be aware of accents that they are likely to encounter on a regular basis.

Keywords: English language, accents, native, non-native, perceived difficulty

Introduction

English is now indispensable to many individuals as local people adopt it as a means of conducting business as a Lingua Franca for general daily communication. Therefore, low levels of English proficiency can have an impact on trade and business negotiations. This situation is exacerbated by the different accented forms of English spoken worldwide. It is estimated that approximately 1.5 billion people worldwide speak English. Around 1.1 billion of these speakers are second-language users. English is now a global language. However, the issue in regard to non-standard English accents has largely been ignored. As the number of people learning and speaking English around the world continues to rise, this situation will only become worse. Thus, it is essential that students have the necessary skills and knowledge to understand, or at the very least, be aware of other variations of English and different accents (Crystal, 2019).

The distinctive manner of pronouncing a language, known as an accent, can be associated with a particular region, area, or even social group. This is true whether the speaker is a native or non-native user of the language. A person's accent encompasses the phonetic and phonological aspects of a dialect and can be both formal and informal. Non-native speakers often have a different way of pronouncing words than native speakers. Unlike native speakers, a mother tongue can influence the pronunciation of the target language. English is the world's Lingua Franca and is used for communication. However, the biggest challenge for second language learners is listening comprehension. Non-native English speakers or those learning English as a second or foreign language can face this challenge. Language learning and accent are intricately connected, and the four skills of listening, speaking, reading, and writing are essential for mastering any language. It is known that, listening is the first and most important skill for language learners to develop (Irfan et al. 2021). English is spoken by millions of people around the world as a second language. It is estimated that up to 200 million people in India alone speak English (Betageri, 2017). Therefore, it is important that language learners are aware of the different accents that they may come into contact with. This will help avoid any breakdown in communication and avoid any misunderstandings.

In recent years, several test publishers, including TOEFL and IELTS, have included a diverse range of native accents into their assessments. This was done in order to more accurately represent authentic academic contexts. Since 2013, TOEFL iBT's Listening and Speaking sections have incorporated accents from North American English, Australian English, British English, and New Zealand English (Educational Testing Service, 2011). IELTS has also incorporated a comparable selection of various accents into their listening tests (British Council, 2015). Therefore, it would appear reasonable to create listening assessments and learning materials that align with authentic situations using non-native accents. These tests and learning materials could reflect the accents most likely to be encountered by the language learner (Bachman & Palmer, 2010).

This study aims to answer the following research question: Is there a correlation between test scores and perceived difficulty levels when listening to different accents in English?

The objective of this study is as follows: To investigate whether there is a correlation between test scores and perceived difficulty levels when listening to different accents in English.

The findings of this study could be used as a reference for those working in associated disciplines. The results could facilitate additional inquiry aimed at comprehending the challenges learners face in regard to English language listening comprehension.

Literature Review

Osada (2004), suggests the importance of listening as a skill is being undermined by both educators and learners. This has led to the neglect of this fundamental and important skill in language instruction and the learning process. Consequently, the development of listening comprehension among learners is being hindered. This is impeding their overall language learning progress.

A study at a university in North Lampung, Indonesia discovered that students had difficulties when it came to listening comprehension. The results of the study showed that a large number of students often found listening difficult when the accent was not familiar to them. Students were found to have difficulties understanding a dialogue when a word mentioned by the speaker could not be understood (Toni et al., 2021). This could therefore result in misunderstandings due to several words not being heard or understood correctly.

Matsuura et al. (2014), examined the listening comprehension skills of 75 Japanese university students. The researchers used Indian and Canadian accents in the study. The Japanese students were shown to have lower listening comprehension scores when listening to the unfamiliar Indian accent when compared to the more familiar Canadian accent.

Suppatkul (2009), studied students' comprehension levels of American, Thai, and Filipino accents. The study participants were 412 Thai high school students. The results of the listening comprehension test showed that the Thai listeners were disadvantaged when the speaker was Filipino, but not Thai or American. Due to their generally strong English skills, many Filipinos are employed as English instructors in Thailand. Therefore, exposure to Filipino accents could prove beneficial in this context.

In a study by Major et al. (2002), four groups of 100 participants, listened to short lectures presented in English by speakers with different native languages. The participants, whose native languages were Chinese, Japanese, Spanish, and standard American English, then answered questions based on what they had heard. The results showed that both the native and non-native participants scored significantly lower on the tests when listening to non-native speakers of English.

It has been shown that English is generally spoken with an accent related to the mother tongue. Many studies have found that a speaker's first language has an influence on the pronunciation of the target language. This is a significant factor in the speaker's accent when using the target language. Interference from the speaker's native language can produce errors in aspiration, stress, and intonation in the target language. Particular sounds that are not common in the native language can pose difficulties (Abu Taher, 2019). The following section provides a basic overview of some of the phonology characteristics of the non-native speakers of English studied within this research.

Chinese English language learners are known to have difficulties with “h” and “sh” sounds such as those found in “he” and “she”. Mandarin speakers have difficulty hearing and saying the “r” sound. The “r” sound is not generally found in the Chinese language. Native Mandarin speakers often do not pronounce the “r” in English when it appears near or at the end of a word (Recine, 2015a).

Most East Asian languages have few “closed” syllables. Closed syllables are those that end in a consonant. Words and syllables that end in a consonant are common in the English language. It is quite common for native Chinese speakers to leave out the consonants at the end of a word. Words such as “thought” and “bought” can quite often sound like “thaw” and “bore”. In some cases, Mandarin speakers will replace an English consonant with one that appears in the Chinese language. For example, a “g” sound found in English may be substituted for the “ng” sound that appears in Mandarin Chinese (Recine, 2015a).

Voiced consonants such as the “g” sound are difficult for Chinese learners to produce. The voiced consonant “th” is particularly difficult for Chinese speakers. Chinese speakers of English often substitute the “th” sound for other consonants such as “l,” “d,” “s,” and “z” (Recine, 2015a).

There are an estimated 200 million English users in India. Unfortunately, this regional form of English can often be difficult to understand for those not familiar with some of the characteristics. The main differences between the English spoken in Indian and the English spoken by a native speaker relate to the pacing and intonation. The characteristics of Indian English are also influenced by approximately 800 different native languages. These languages though often differ in similar ways from ‘standard’ English. Pronunciation of consonants often difficult for Indian natives when speaking English (Pandey, 2015; Recine, 2015b).

India speakers of English do not differentiate the sound of “v”, produced with the lower lips and top teeth; and the sound “w” where both lips are used. Also, the two “th” sounds in English (/θ/ and /ð/) are often replaced with d and t. The schwa sound in 'adjust' /ə/ and the 'u' sound in 'upper' /ʌ / often disregarded and replaced with the vowel (a) as in 'father'. In many of the Indian languages the consonants “r,” “t” and “d” are quite similar. In English, these sounds are more distinct. The “t” and “d” sounds in English are produced by tapping the tongue against the upper front teeth. “t” is voiceless, whereas “d” is voiced. The “r” for instance is made in the back of the throat (rhotic). In 'native' English the “r” is a “rhotic” sound, not a “rolled” sound. Indian speakers of English will often pronounce the “r” by “rolling” it. The replacement of two adjacent vowels by a single long vowel followed by the “r” sound is a characteristic of English spoken in India. For example, beer becomes “bir” and pear becomes “per” (Pandey, 2015; Recine, 2015b).

It is known that Bengali vowels are not conditioned by length. In English, range distinguishes the vowel sounds /iː i, ɔː ɔ, uː u/. However, Bengali speakers generally do not differentiate between long and short vowels. Another issue for a Bengali speaker of English is the use of the weak forms /ə/ and /ɪ/ in unstressed syllables. In general, these are not usually observed by Bengali speakers of English (Abu Taher, 2019).

When speaking English, the voiced palatal plosive /z/ and the voiced palato alveolar affricate /ʤ/ are generally pronounced as allophones of the same phoneme by Bengalis. The "z" is produced as /ʤ/ and the "j" as /z/. Consonant sounds such as /f/ and /v/; /z/. /ʤ/ and /ɜ/; /θ/ and / ð /; /t/ and /d/ are often mispronounced. The mispronunciation of some these sounds may be due to their absence the Bangla language's phonemic inventory. Bengali speakers of English often mispronounce the voiceless aspirated dental plosives /θ/ and / ð / as the voiced dental plosives /tʰ/ and /d̗/. Consonant clusters such as /sp/, /st/ and /sm/ are also an issue. The English fricatives /f, θ, ð, v, z, ʒ/ do not exist in the inventory of phonemes in the Bangla language. Therefore, /f/ is replaced with / ph/, /θ/ becomes /th/, /ð/ changes to /d/, /z/ becomes /dʒ/ and /z/ is pronounced as /ʒ/or /dʒ/. The /v/ as /bh/, a bilabial aspirated stop, is common (Abu Taher, 2019).

Singaporeans are known to speak English at a very high level. The accents of Singaporeans that speak English as a first language are similar in many respects to Received Pronunciation. Many Singaporeans speak more than one language. The common languages spoken by Singaporeans are Malay, Chinese, Tamil, or Singapore Colloquial English (Singlish). These languages have influenced Standard Singapore English. Singapore English and Singapore colloquial English are spoken with various accents. The strength of accent can be related to ethnic mother tongue and its dominance (Deterding & Hvitfeldt, 1994).

The Singaporean accent is generally non-rhotic. Many speakers leave out the "r" sound in words such as "far". Singapore English has a different intonational pattern. The rightmost syllable of a stressed word has the highest pitch. Words that are not stressed and unstressed initial syllables have a generally lower pitch. Singaporeans have difficulties pronouncing words that contain "th" sounds. The "th" is often pronounced as either /s/, /z/, or /d/. Singaporeans also have a tendency to shorten certain words ending with a "t" or "d" sound. Some of these issues are similar to those found in Chinese Mandarin speakers of English. Also, the "k" at the end of words and "t" sound in words such as "guest" and "artist" are often omitted (Deterding & Hvitfeldt, 1994).

Japanese speakers of English often confuse the alveolar approximant /r/ and the lateral alveolar approximant /l/. When producing /r/ the tongue does not touch anywhere and is produced at the back of the throat. For the /l/ sound, the tongue touches behind the top teeth. The schwa /ə/ does not exist in Japanese and there is no neutral vowel. In English the neutral schwa is used in many unstressed syllables. Fricatives such as /θ, ð/ are produced in the front of the mouth. These sounds are very difficult for Japanese speakers to produce. The two 'th' sounds: /θ/ and /ð/ are often replaced with either dental /t/ & /d/ or alveolar /s/ & /z/. A difficult English vowel sound for Japanese speakers is /əʊ/. This vowel starts neutrally rather than rounded.

Japanese speakers of English have a tendency to place equal stress on each syllable. This can make longer words unclear. When speaking English, Japanese natives often place a roughly equal stress on each syllable of a sentence. Strong/weak structures are used in English with only certain syllables stressed. Japanese speakers often separate words in a sentence rather than joining them with consonants or vowels. Japanese speakers sometimes add a small 'o' after consonants at the end of syllables. A small vowel is often added between two adjacent consonants. However, the consonants should be spoken quickly one after the other (Hudson, 2013; Shemesh, 2023).

Methodology

The accents used in this study were selected by considering their phonological characteristics. The listening comprehension tests involved a word identification gap-filling exercise that included 5 words per accent (30 words overall). The listening texts were then rated for difficulty on a scale of 1 (very difficult) to 5 (very easy). The listening texts were based on familiar subjects and rated at a lower intermediate level. Listening materials for the tests were sourced from elllo Lean English Naturally (elllo productions, 2023). The native and non native accents chosen for this study were Singaporean, Japanese, Bangladeshi, Indian, New Zealand and Australian. The study was constrained to a narrow demographic cohort. Further limitations were imposed by variations in students' English language proficiency levels. Although the tests were based on familiar topics, the subject matter may have impacted the test outcomes. The search for appropriate listening comprehension materials was hindered by a lack of availability, topic choices and language ability levels. The researcher attempted to make it difficult to guess the word based on context. The answer was not obvious based solely on the surrounding sentences and context. The study did not account for students' prior exposure to the accents used within this study. Furthermore, the research was restricted due to the students' primary fields of study being education and business, rather than English language.

The participants were 26 Chinese students studying on post-graduate international programs related to business and education taught in the English language. The students were of mixed genders and ages. The students were chosen for convenience and having the necessary attributes for this study.

Results and Discussion

The following section of this paper presents the results from the tests and self-perceived difficulty ratings (see Tables 1 and 2).

Table 1. Shows students’ test scores (out of 5).

Accent	Mean	Standard Deviation
Singaporean	4.42	.76
Japanese	4.50	.51
Bangladeshi	4.04	1.04
Indian	3.08	1.26
New Zealand	4.62	.57
Australian	4.65	.56

Table 2. Shows students’ self-declared perceived difficulty levels (1-5).

Accent	Mean	Standard Deviation
Singaporean	3.85	1.08
Japanese	3.38	.80
Bangladeshi	1.88	1.11
Indian	1.88	1.07
New Zealand	2.88	1.21
Australian	3.42	1.14

The results of the study revealed highest test scores for the Australian accent and lowest test scores for the Indian accent. The Singaporean accent was perceived to be the easiest and the Bangladeshi and Indian accents were both perceived to be the most difficult.

A Pearson correlation coefficient was computed to assess the linear relationship between the Singaporean accent test score and the perceived difficulty level of the Singaporean accent. There was no significant correlation found between the two variables, $r(24) = [.277]$, $p = [.170]$. A Pearson correlation coefficient was computed to assess the linear relationship between Japanese accent test score and the perceived difficulty level of the Japanese accent. There was no significant correlation found between the two variables, $r(24) = [.293]$, $p = [.147]$. A Pearson correlation coefficient was computed to assess the linear relationship between Bangladeshi accent test score and the perceived difficulty level of the Bangladeshi accent. There was no significant correlation found between the two variables, $r(24) = [.248]$, $p = [.223]$. A Pearson correlation coefficient was computed to assess the linear relationship between Indian accent test score and the perceived difficulty level of the Indian accent. There was no significant correlation found between the two variables, $r(24) = [.214]$, $p = [.294]$. A Pearson correlation coefficient was computed to assess the linear relationship between New Zealand accent test score and the perceived difficulty level of the New Zealand accent. There was no significant correlation found between the two variables, $r(24) = [.280]$, $p = [.165]$. A Pearson correlation coefficient was computed to assess the linear relationship between Australian accent test score and the perceived difficulty level of the Australian accent. There was no significant correlation found between the two variables, $r(24) = [.051]$, $p = [.806]$. The results showed no correlation between test scores and perceived difficulty levels in regard to the different English accents used in this study.

Various factors can aid English listening comprehension in regards to accent and pronunciation. Familiarity with the speaker’s accent may aid understanding for the listener. Japan is a major pop culture export country within its region. Soap operas such as Long Vacation and Tokyo Love Story are popular in China. One of China's biggest video platforms Bilibili, was originally established as a fan community for Hatsune Miku a virtual Japanese character. Many videos on this site relate to Japanese animation, comics, and games (Wu, 2021). The Japanese accent would therefore be familiar to many Chinese people.

Like many multinational nations, Singapore has a complicated linguistic landscape. Despite the government of Singapore's decades-long efforts to encourage ethnically varied Singaporeans to speak Standard English. The language of everyday communication though remains Singlish. A language is more than just a collection of forms that live in a cultural vacuum. Language is inextricably related to the society in which it is used. Some of the main linguistic and cultural factors that have shaped Singlish are rooted in the languages and cultures of China (Wong, 2021).

The English proficiency levels of Singaporeans may also influence listening comprehension. In the largest ranking of non-native English proficiency skills, Singapore ranked second behind the Netherlands as having very high English proficiency out of the 113 countries tested. In addition, Japan were ranked 87 with low proficiency levels. India and Bangladesh were ranked moderate at a joint place at 60 (English Proficiency Index, 2023).

Conclusions and Suggestions

The results from this study revealed that the 26 Chinese participants rated the Bangladeshi and Indian accents as the most difficult. Although, students scored lower in the tests for both the Bangladeshi and Indian accents, no strong correlation was found for perceived difficulty. However, the results of the study showed that students scored lowest for the Indian accent and also perceived it to be the joint most difficult. Indian speakers of English are large in number and likely to be encountered in a business and a travel context. Therefore, language learners should be made aware of the various accents spoken by both native and non-native speakers. At a beginner level, some native and non-native accents may not always be appropriate for listening training. However, these accents could always occur in everyday conversations. Consequently, it is imperative to expose higher level language learning students to different accents. Furthermore, students should be encouraged to listen to various different accents outside of the classroom environment. Relevant listening materials should be used in the language learning classroom. This could help ensure student are exposed to accents that they are likely to encounter. In the future, a larger scale study that investigates the phonological differences between the participants first language and the accented language in greater detail may prove beneficial.

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