Values of Infographics for Promoting Cultural Learning Resources and Tourist Attractions: A Case of Patum Village in Thailand

Nilobon Wimolsittichai* (iD)

Department of Information and Library Sciences, Chiang Mai Rajabhat University, Chiang Mai, Thailand
E-mail: nilobon_kun@cmru.ac.th

ABSTRACT

Infographics are influential and valuable communication tools for providing information, and can be used for promoting cultural learning resources and cultural tourism destinations. Therefore, this article presents values of using infographics for promoting Patum's culture and tourism in Phrao District, Chiang Mai, Thailand as cultural learning resources and tourist attractions. Employing a research and development approach, this study utilized three distinct instruments: (1) an interview form engaging 40 locals to uncover insights on promoting Patum village, (2) an assessment form evaluated by three arts and design experts, and (3) questionnaires distributed to 92 participants to gauge perceptions and satisfaction. The findings showcased the high quality and appropriateness of the eight infographics. Audiences derived six key values, including acquiring knowledge, fostering the promotion of Patum's culture, festivals, religions and beliefs, deriving aesthetic enjoyment, encouraging cultural tourism, contributing to the education sector, and enhancing comprehension of Patum's history. Participants expressed high satisfaction ($\bar{x}$=4.46) with the infographic use. The developed infographics are usable and valuable information to help audiences recognize Patum cultural learning resources and tourist destinations. They might be further tailored to the recognition of Patum village in the near future, affecting the area's development by increasing local people's incomes through cultural learning resources and tourism activities.

Keywords: infographics, infographics and learning, cultural learning resource, cultural tourist attraction, Patum village

1. INTRODUCTION

The advancement of technology and the growth of the Internet of Things influence information creation, usage, and dissemination. According to Statista (2022), the volume of data created and used information worldwide in 2020 was 64.2 zettabytes. The statistics are projected to increased up to 180 zettabytes by 2025. Due to the fact that people can process approximately 74 GB of information per day (Bohn & Short, 2012), an enormous volume of information generated each day leads to information overload, which affects human cognitive capacity.

In the digital era, the confluence of computer technologies and emerging gadgets has endowed people with potent tools for transmitting information across an array of formats, particularly within online realms. This paradigm shift has evoked a transformation in the manner that individuals engage with information, characterized by rapid toggling of attention and a discerning avoidance of information overload through selective attention (Heim & Keil, 2017). These dynamics, in turn, propel information creators into an intricate dance with the nuances of user experience and user interface, as they meticulously tailor their offerings to resonate harmoniously with their intended audiences. Therefore, information creators navigate a diverse spectrum of formats to unveil their content. Among these, information with image and data visualization emerges as a preeminent strategy, adept at capturing heightened attention and fostering deeper engagement compared to its counterparts.

This paradigm finds substantiation in the work of Khoja (2021), who noted that 74% of marketing content contains visual elements. In particular, a notable 41% of marketers have attested that infographics reign supreme as the most efficacious tools for dispensing information to serve their marketing objectives. This acclaim stems from their ability to harness rich and informative data in a visually appealing and engaging format, while also offering the ease of swift comprehension, retention, and recall. Meanwhile, Yıldırım et al. (2014) embarked on an educational exploration, revealing infographics as novel pedagogical resources that enhance teaching preparation and presentation. This revelation aligns harmoniously with insights gleaned from Ozdamlı et al. (2016), given that the studied students under scrutiny exhibited enhanced comprehension and heightened satisfaction when utilizing infographics as learning materials. It becomes evident that these visual aids possess a remarkable capacity to facilitate easy understanding and fortify the retention of the subject matter.

Clearly, infographics hold a substantial influence as valuable communication tools, proficient in conveying information. Their effectiveness stems from their ability to seamlessly integrate various components that enhance the conveyance and presentation of information. These components encompass texts, icons, graphics, photos, animated graphics, and data visualizations (Nediger, 2023). Additionally, infographics excel in encapsulating intricate narratives or conveying complex concepts within a concise timeframe. This amalgamation of attributes serves to instantly captivate the audience's attention and encourage engagement, ultimately resulting in impactful and visually appealing communication (StatSilk, 2021). Therefore, the proliferation of infographics is not confined to the realm of new media alone; their widespread popularity extends across diverse industries including health care, entertainment, education, and tourism industries.

In the realm of education, infographics find common application within instruction materials, appealing in various formats including printed materials and electronic media. Leveraging infographics for learning purposes extends beyond effective interpretation and understanding of visual knowledge. It also bolsters comprehension, retention, and recall of information (Bicen & Beheshti, 2017). Consequently, many educational resources adopt infographics as tools for information dissemination, strategically aiming to captivate learners and encourage their active involvement.

Infographics are seamlessly integrated into emerging learning paradigms, encompassing trends like blended, hybrid, and hyflex approaches. In particular, these dynamic modes extend learning beyond traditional classroom confines, finding resonance in environments such as libraries, museums, historical places, and online resources. This experiential shift cultivates a heightened eagerness and motivation for learning, bridging the gap between theoretical concepts and real-world contexts, thereby enriching students' knowledge and lived experience (Waite, 2011). Additionally, the contemporary educational landscape is marked by a predilection for digital resources and information dissemination. Learners gravitate towards digital platforms including websites, electronic books, and social media due to their innate accessibility, interactive functionality, and seamless sharing capabilities, collectively fostering a versatile and engaging avenue for active learning (Moundy et al., 2021).

Concurrently, the tourism sector has harnessed the potential of infographics as an instrument for promot-

ing tourist destinations and services for many decades. Within the context of a fiercely competitive business landscape within the tourism industry and the saturation of travel-related information, the utilization of infographics to distill essential facts, figures, and current trends offers an effective strategy to captivate the cognitive faculties of prospective tourists. Furthermore, the viral nature of infographics amplifies their impact, facilitated by swift dissemination across an array of media platforms including blogs, websites, and social media. This phenomenon assumes a pivotal role in shaping tourists' travel decisions, underscoring the power of infographics as a persuasive tool in guiding travel choices (Sezer, 2021).

Patum village, in Phroa district, Chiang Mai, Thailand is a historical place full of rich Tai and Lanna cultural heritage that has not been widely known as a cultural learning resource and tourist attraction. Patum village can be promoted as an important cultural learning resource and cultural tourism destination. Infographics are effective communication tools for both learning engagement and tourist attraction. Therefore, this study aims to (1) develop, implement, and evaluate information and designs for creating static infographics that are appropriate for promoting Patum village in Phroa district, Chiang Mai, Thailand as a cultural learning resource and tourist attraction, and (2) seeks to analyze the effectiveness and values of using those infographics.

This study holds significance in that the customized infographics contribute to the recognition of Patum village as a cultural learning resource and cultural tourism destination. This recognition, in turn, has the potential to spur the area's development by boosting local incomes through the tourism industry and activities associated with cultural learning resources. Additionally, the insights gained from this study can serve as a foundational platform for future research in the fields of information science and related areas.

2. LITERATURE REVIEW

2.1. The Concept of Infographics

An infographic is a combination of the terms "information" and "graphic" (Smith, 2019). Since infographics were introduced in the Victorian era with Florence Nightingale's depiction of the causes of mortality of the British Army, the combination of quantitative data and the artful design of colors and forms, imbued with aesthetic considerations, has highlighted the significance of infographics as an effective tool for data presentation (Kelidou

& Siountri, 2020). Throughout the twentieth century, infographics gained widespread utilization in journalism, serving as a means for conveying news and illustrating weather forecasts (Lester, 2003). An illustrative example comes from 2008 when news agencies across the United Stated employed infographics to convey information related to the presidential election (Beegel, 2014). In the advent of the digital age, infographics found even greater use and prevalence across diverse sectors such as commercial endeavors, health care, education, and tourism.

In this era, infographics have emerged as popular instruments for conveying information. This popularity can be attributed to the fact that infographics encompass a diverse array of elements, including texts, icons, graphics, photos, animated graphics, and data visualizations. These elements contribute to the effective communication of information. Furthermore, infographics seamlessly integrate data, information, and design principles. These inherent attributes not only capture audiences' attention at a glance, but also facilitate rapid comprehension and retention of information (Hassan, 2016; Kelidou & Siountri, 2020; Yıldırım, 2016). Moreover, the digital age has ushered in extensive communication avenues via the Internet and a variety of digital platforms, such as websites and social media. The visual nature of infographics serves not only to assist audiences to understand mass and complex information, but also encourages their active engagement by fostering the sharing of thoughts, feelings, and opinions (Davis & Quinn, 2013). In this context, it is noteworthy that McCready (2020) found that audiences exhibit a preference for liking and sharing infographics on social media platforms at three times higher compared to other content types.

In the commercial sector, infographics have gained widespread use for marketing purposes due to their ability to engage customers, encourage content consumption, and facilitate quick decision-making. The 2020 statistics regarding the utilization of infographics for marketing in four countries, the United States, Canada, United Kingdom, and Australia, revealed that infographics were frequently used and significantly made marketers reach their marketing goals, with 42.9% in Canada, 32.1% in the United States, 28.6% in Australia, and 20% in the United Kingdom, respectively. Notably, audiences have demonstrated a clear preference for infographics over articles, favoring them by a ratio of 30 to 1, and exhibiting a threefold likelihood of liking and sharing infographics on social media when compared to other content types. However, it is crucial to emphasize that achieving effective infograph-

ics necessitates a high standard of both content quality and visual design, as highlighted by McCready (2020) and Siricharoen and Siricharoen (2015).

The efficacy of infographics relies on quality of information and visualization. This effectiveness is rooted in the alignment of design methodologies with the intended objectives of the infographics (Yıldırım, 2016). According to Davis and Quinn (2013), efficacy stems from well-defined purposes, appropriate components, suitable typologies, and strategic approaches for information presentation. Additionally, numerous studies have affirmed beneficial effects of effective infographics on audiences, encompassing diverse dimensions such as heightened motivation, improved transmission and acquisition of information, and enhanced capacities for recall and retention (Egan et al., 2021; Ozdamlı et al., 2016). In addition to infographic impacts, Festi (2019) also confirms that the data and design employed in infographics significantly impact audiences' perceptions and cognitive processes.

In conclusion, infographics have evolved from their historical origins into a versatile means of communication across numerous sectors. Their impact is underscored by the need for purpose-driven design and quality content, ultimately enhancing audience engagement, knowledge acquisition, and information retention. Infographics are not only visually appealing; they are potent vehicles for effective communication in the digital age.

2.2. Infographics and Learning

Within the education sector, a consensus among scholars has emerged, underscoring the heightened adoption of infographics for educational objectives (Kelidou & Siountri, 2020; Lazard & Atkinson, 2015; Yıldırım, 2016). Infographics have evolved into robust instructional tools, lending extensive support to learning objectives and pedagogical aspirations, thereby exerting a positive impact on students' academic accomplishments. This phenomenon stems from students' active engagement with information, characterized by their adeptness in reading, analyzing, and interpreting visual content, which in turn fosters the cultivation of critical thinking skills during their engagement with infographics (Dunlap & Lowenthal, 2016). As highlighted by Ozdamlı et al. (2016), the influence of infographics on students' cognition extends further, facilitating the generation of meaning and conceptual ideas, thereby intricately enhancing the process of learning and understanding.

Davis and Quinn (2013) conducted a study that illuminated the substantial impact of infographics on students'

reading and writing abilities. Their research unveiled that students found it considerably easier to comprehend intricate information, particularly within the realms of sciences, history, and mathematics subjects. In the same vein, Batdı et al. (2019) harnessed infographics for science education and observed a manifold enhancement of students' skills, ranging from creativity and critical thinking to adeptness in presentation. The efficacy of educational infographics hinges not only on the caliber of their content and visual design, paralleling their utility in other contexts, but also on the precision of information they convey. Moreover, instructors or infographics creators must be attuned to strategic considerations and target audiences, driven by the realization that students' learning capacities diverge across levels. Scholars advocate for the integration of strategies such as mind maps, succinct summaries, or fundamental messages within educational infographics, facilitating students' effortless comprehension through swift scanning or skimming (Dunlap & Lowenthal, 2016).

Infographics have pervaded the education sector, not only as tools for conveying instructional content in specific subjects, but also as vehicles for disseminating diverse learning materials such as fiction, non-fiction books, and articles. These resources manifest in various formats, spanning printed, electronic materials, and online sources. A compelling illustration of this trend lies in the realm of infographic books, predominantly comprising non-fiction works that present captivating facts and statistical insights on specialized topics. Such publications prove advantageous for both classroom and extracurricular learning. In Thailand, *Wizes Infographic Book: Social Studies*, esteemed for its engrossing content and vibrant design, harmoniously augmented by the incorporation of augmented reality, clinched the prestigious design excellence award DEmark in 2017. This achievement underscores the book's resonance among high school students passionate about the social sciences (DEmark, 2017). In succession, the Thai publishing arena has borne witness to the emergence of an array of infographic books, spanning genres like biology, chemistry lectures, global exploration via infographics, and even Japanese language infographics (Naiin, 2022).

Infographics have been seamlessly integrated into a diverse array of education resources, serving as catalysts that empower and motivate learners to explore subjects aligned with their interests. Cultural and historical sites stand out as a noteworthy category. These sites bear significance for learners by offering glimpses into the world's reality, complete with its people, events, and landscapes, thereby

enriching learners' understanding and experiences (Waite, 2011). In addition to their informative value, cultural and historical resources fulfill a vital role in fostering cultural awareness and understanding the underpinnings of one's heritage, while simultaneously promoting the appreciation of cultural diversity (Limtasiri, 2017). Numerous infographics that spotlight cultural and historical locales have been published, frequently adopting digital formats to cater to contemporary consumption habits. Moreover, the convenience and accessibility of digital platforms such as websites, electronic books, and social media have further endeared them to learners, allowing for effortless engagement, interaction, sharing, and flexibility in learning pursuits (Moundy et al., 2021).

In conclusion, the integration of infographics into education has witnessed a surge in popularity, aligning with modern learners' preferences for engaging and visual-rich learning materials. The effectiveness of infographics spans various subjects and materials, ultimately enhancing comprehension, critical thinking, and retention. Their ubiquity in educational resources underscores their role in fostering cultural awareness and enhancing learning experiences. The rise of digital platforms has further facilitated their accessibility, rendering them an invaluable asset in modern education.

2.3. Infographics and Cultural Tourism

Infographics have become indispensable tools within the global tourism industry, functioning as conduits for dispensing crucial information, offering guidance, and spurring tourists to explore new destinations. Nowadays, tourists actively seek and prepare travel information in both printed and digital formats. Infographics play a pivotal role in meeting the information needs of tourists, owing to their versatile formats that cater to various devices like mobile phone or laptops (Sezer, 2021).

Cultural tourism is a distinct form of travel that centers around engaging in activities within cultural and historical locales. Tourists participating in cultural tourism are immersed in learning, exploration, and the unique experiences tied to a specific culture (World Tourism Organization [UNWTO], 2017). This form of tourism holds the distinction of being a high-value endeavor, generating not only economic benefits for local communities and nations, but also fostering a broader understanding and enriched experience for both residents and visitors alike (Tourism Authority of Thailand, 2021). The Tourism Authority of Thailand (2021) underscores the importance of harnessing digital technologies and innovative approaches

to enhance the portrayal and dissemination of content related to Thai cultural tourism, thereby widening its appeal to prospective tourists. Among these strategies, infographics emerge as a versatile tool capable of delivering information across a spectrum of digital platforms, including websites and social media.

In Malaysia, Sidyawati et al. (2019) have developed augmented reality infographics for providing information about Nusantara Mask Heritage in the Museum of Asian Art. The results showed the efficacy of infographics in this context, as the visually appealing nature of the content enticed tourists to engage with the interactive information provided. Meanwhile, Lee and Kim (2016) involved the development of ten infographics in a poster format. The outcomes of this endeavor demonstrated that these visually captivating infographics not only pleased tourists aesthetically, but also presented novel information in a manner that saved their time while perusing the material.

According to Ashman and Patterson (2015), infographics designed for marketing and information services should encompass key attributes such as novelty, informativeness, efficiency, and aesthetics. The elements of novelty can captivate audiences, igniting their interest to explore tourist destinations and engage with various products and services. Informativeness involves the presentation of information that is concise, reliable, verifiable, and complete.

Skinner Beitelspacher et al. (2011) noted that the efficiency of infographics becomes evident when the audience can swiftly comprehend and engage with the content upon an initial glance. This immediate grasp can influence viewers to further explore the featured products or services. In crafting an effective infographic, the aesthetics component, which encompasses the realms of artistry and design, is of paramount importance.

Scholars highlight the importance of tailoring infographic designs for tourism by identifying the intended audience. This allows for precise alignment of data, information, and visuals with tourists' preferences. A design characterized by clarity, simplicity, and ease of understanding, encompassing text, color, layout, forms, graphics, and data visualization, is pivotal. This meticulous design strategy captures tourists' attention instantly, prompting decisions, product consumption, and bolstering tourism marketing effectiveness (Sezer, 2021; Singhasin, 2017).

In summary, infographics have carved a prominent niche in the tourism sector by effectively delivering information, enhancing tourist experiences, and promoting

destinations. Their adaptability to different formats, platforms, and purposes positions them as potent instruments for communicating with diverse audiences, be it tourists seeking cultural immersion or travelers aiming to explore new places. The synergy between visual appeal, informative content, and strategic design makes infographics an indispensable tool in modern tourism marketing and information dissemination.

2.4. Infology Theory and Message Design Approach

A foundation of this study was based on infology theory and message design approach. Infology is one of the fields included under the umbrella of message design theory, which relates to four fields including combined disciplines, infography, infology, and infodidactics (Pettersson, 2015). Infology theory includes principles and approaches for achieving goals in presenting data, which involve verbal and nonverbal communication, and the message's interpretation. This theory centers on the intellectual and practical interplay between data and design. This study places particular emphasis on cognitive discipline, serving as the cornerstone for the creation of infographics aimed at promoting Patum village as a cultural learning resource and tourist attraction.

The cognitive principle includes four principles: facilitating attention, facilitating perception, facilitating mental processing, and facilitating memory (Pettersson, 2014). To facilitate attention, information creators must employ design elements that captivate and sustain the audience's focus, utilizing typography, text, visuals, layout, symbols, and color. In terms of facilitating perception, creators employ design techniques and effective information management strategies, enabling audiences to analyze, interpret, and realize the value from the information presented. Meanwhile, facilitating mental processing involves fostering an environment that encourage target audiences to understand the information. Lastly, creators are tasked with crafting information that is concise, meaningful, and coherent, harnessing the power of visual elements to enhance comprehension and retention.

Pettersson (2012) delineated a four-step message design approach. It commences with the commission process, in which creators ascertain the intended audience and articulate the explicit purposes of information design. Then in the design process, creators discern and employ the most suitable design principles and tools to fashion a preliminary draft and script. Finally, the creators meticulously craft the original version, followed by a thorough review, culminating in the presentation of the final product to the intended audiences.

In conclusion, this study highlights the symbiotic relationship between infology theory and the message design approach. Infology theory, nested within message design theory, provides principles applicable to diverse data presentation. Cognitive discipline becomes pivotal, enabling the creation of infographics that surpass visual appeal, encompassing cultural depth and tourist attraction. This emphasizes infology's role in shaping effective communication, resonating through meticulous message design. This confluence of theory and practice enhances the grasp of principles and cultivates strategies bridging creativity, understanding, and engagement realms.

3. RESEARCH METHODOLOGY

The research and development research step endeavors to create infographics rooted in infology and message design theory to effectively showcase Patum village as both a cultural learning resource and a tourist attraction. This will be achieved by disseminating the infographics through four distinct channels:

1) Book (A3)
2) Patum infographic ebook: https://online.fliphtml5.com/qesfb/orha
3) Glampatum website: www.glampatum.cmru.ac.th
4) Punya Patum Facebook fan page: https://www.facebook.com/glampatum

The research methodology employed for this study, including ethical considerations, is outlined as follows:

Ethical approval for this study was granted from the Chiang Mai Rajabhat University Ethics Committee (Approval number/IBRCMRU2020/022.24.06).

This research method employed three instruments, including:

1. A semi-structured interview form to seek the needs of topics and scopes from 40 of Patum's local people for promoting the Patum area as an important learning resource and cultural tourism destination in Chiang Mai, Thailand.
2. An assessment form for evaluating the quality and appropriateness of eight infographics from three experts.
3. Questionnaires containing both closed-ended and open-ended questions were employed to investigate the

values and levels of satisfaction associated with the utilization of infographics. The questionnaires were administered to a total of 92 participants, encompassing both local residents and the general public, who constituted the audience of the Glampatum website and the @glampatum Facebook fan page.

Purposive random sampling was used to select the participants in a semi-structured interview and assessment form, while simple random sampling was used to select the participants in the questionnaires. Quantitative data were subjected to descriptive analysis, encompassing measures such as frequency, percentage, mean, and standard deviation. Additionally, qualitative data underwent content analysis to categorize them into distinct themes.

Fig. 1 illustrates the conceptual framework of this study, wherein the researcher initiated the data collection process by delving into literature pertinent to Patum village. Additionally, interviews were conducted with 40 local residents of Patum to extract essential topics and themes that vividly portray the village's distinct attributes. The researcher then employed infology and message design theory as foundational pillars to craft infographics that would be well-suited for the purpose of promoting

Patum village as a cultural learning resource and tourist attraction. The message design approaches comprised commission, design process, design, and representation. Following this, the initial draft of the infographics underwent meticulous scrutiny in terms of format and quality, as assessed by three experts proficient in arts and design. The infographics were launched after making a revision based on the feedback of experts. Then, the researcher investigated the values and satisfaction of using those infographics from 92 audience members, including local residents, students, educators, and individuals following the @glampatum website and Facebook's fan page social media platform.

4. RESULTS

4.1. Needed Topics and Scopes Representing Patum Village's Characteristics

The findings of this study showed that there were eight topics for promoting Patum village as a cultural learning resource and tourist attraction, including:

Topic 1: Patum travel
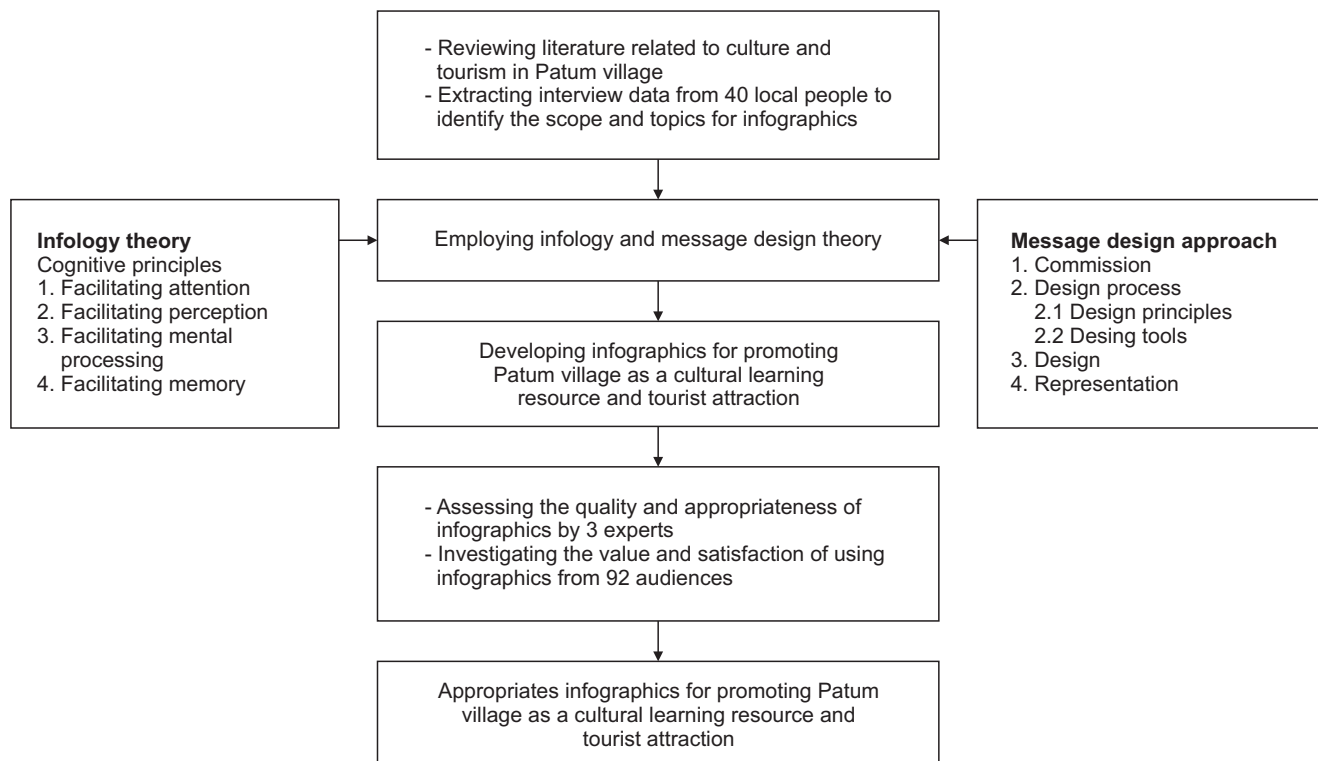Topic 2: Patumdon Temple: A solely Tai temple in Phrao

Fig. 1. Research conceptual framework.

District

Topic 3: 182-year-old *Ficus drupacea*: Tree of Patum's belief

Topic 4: King Ka La and Tho dance: The uniqueness of Tai culture

Topic 5: Twelve-month festivals of Patum's people

Topic 6: Tai food that should be tried together

Topic 7: Fermented soybean: Authentic Patum food

Topic 8: Brown sugarcane cube: Ancient Tai's natural food

Those eight topics were informed by the insights gathered during interviews with 40 local people of Patum, of which they were 13 (32.5%) male and 27 (67.5%) female. Most of them were aged above 50 years old (28, 70%), followed by those aged between 41-50 years old (7, 17.5%) and aged between 21-30 years old (3, 7.5%), respectively. The majority of the careers of local people were househusband and housewife (11, 27.5%), followed by self-employed (10, 25%), and farmer (9, 22.5%), respectively. The researcher analyzed both quantitative and qualitative data, gathering from seven main points, which included 1) Outstanding features of the village, 2) Important historical places in the village, 3) Outstanding products of the village, 4) Outstanding culture and festivals of the village, 5) Symbols of the village, 6) Cultural tourism destinations of the village, and 7) Information needed to promote Patum village as a learning resource and cultural tourist attraction for tourists.

As shown in Table 1, the results from the seven main points were extracted and categorized into four themes, including 1) Tourist destination, 2) Authentic food, 3) Culture and festival, and 4) Symbols. Then, the researcher ranged and chose the top three topics in each theme to be presented in the eight infographics.

Even though there were eleven topics aligned in four themes, the researcher placed all topics into the eight infographics. The first rankings of topics in each theme were selected as the four main topics, which included Patumdon Temple (*f*=98), fermented soybean (*f*=43), King Ka La dance (*f*=21), and *Ficus drupacea* tree (*f*=20). Patumdon Temple was presented in Topic 2: Patumdon Temple: A solely Tai temple in Phrao District. Fermented soybean was presented in Topic 7: Fermented soybean: Authentic Patum food. King Ka La dance was presented in Topic 4: King Ka La and Tho dance: The uniqueness of Tai culture. The *Ficus drupacea* tree was presented in Topic 3: 182-year-old *Ficus drupacea*: Tree of Patum's belief.

Then, the topics with high frequency in the second-ranking, brown sugarcane cubes (*f*=41) and beef skin salad (*f*=41), were also considered and selected as the main topic. Brown sugarcane cubes were presented in Topic 8: Brown sugarcane cube: Ancient Tai's natural food. Beef skin salad was presented in Topic 6: Tai food that should be tried together. Meanwhile, the rest of the topics were combined and presented with the other main topics. For example, 1) Tho dance (*f*=21) was presented with the King Ka La dance in Topic 4: King Ka La and Tho dance: The uniqueness of Tai culture, 2) Pan Pong Buddha (*f*=9) was presented with Patumdon Temple (*f*=98) in Topic 2: Patumdon Temple: A solely Tai temple in Phrao District, and 3) Monlann mountain (*f*=6) was presented with Jom Hin Buddha's relics (*f*=4) in Topic 1: Patum travel.

4.2. The Appropriateness and Quality of the Eight Infographics

Once the topics had been selected, the researcher embarked on the design and development of the eight infographics, guided by the principles of infology theory with a focus on cognitive principles. The process was then complemented by the utilization of message design theory, incorporating the following key phases:

1. Commission: Analyzing and synopsizing the target audience, which was local people, students, teachers, and people who had access to the eight infographics.

Table 1. Four main themes for promoting Patum village as a cultural learning resource and tourist attraction (n=40)

Theme	Ranking (*f*)		
	1	2	3
Tourist destination	Patumdon Temple (98)	Monlaan mountain (6)	Jom Hin Buddha's relics (4)
Authentic food	Fermented soybean (43)	Brown sugarcane cube (41)	Beef skin salad (41)
Culture and festival	King Ka La dance (21)	Tho dance (21)	Loy Kra Thong festival (20)
Symbol	*Ficus drupacea* tree (20)	Pan Pong Buddha (9)	-

Multiple answers.

2. Design process: The design phase was rooted in cognitive principles, encompassing four crucial aspects, including 1) facilitating attention, 2) facilitating perception, 3) facilitating mental processing, and 4) facilitating memory.

3. Design: Integrating text, layouts, pictures, symbols, and effects to design and develop the first draft of eight infographics and cartoon characters. Then, the drafts were assessed by three arts and design experts. The assessment criteria encompassed graphic quality, content, and overall usefulness. Feedback from the experts informed the subsequent refinement of the drafts, ultimately leading to the creation of the final versions.

4. Representation: The final step encompassed the publication and launch of the eight infographics across four distinct platforms: book, e-book, Glampatum website, and the @glampatum Facebook fan page.

After designing and developing the eight infographics, the researcher enlisted the expertise of the three experts in art and design to assess their appropriateness and quality using an evaluation form. The assessment covered three main themes: graphics, content, and usefulness (Fig. 2).

Table 2 provides the assessment of the appropriateness and quality of eight infographics by three experts in arts and design. The results show that the graphics of the seven topics were at a highly appropriate level. Conversely, Topic 7: Fermented soybean: Authentic Patum food, attained an

appropriate level ($\bar{x}$=4.33, standard deviation=0.58). The contents and usefulness assessments of all infographics were at a highly appropriate level.

Moreover, the experts also provided comments and feedback for the purpose of revising the infographics, as outlined below:

Topic 1: The graphics are stunning, especially the symbols, colors, and overall aesthetic. It is recommended for the researcher to adjust the colors to match the real colors of certain objects. The succulents should be removed, as they are not relevant to the village's geography.

Topic 2: The architectural details of the temple are well-presented and beautiful. The researcher should consider adjusting the background color by reducing the intensity of the orange hue.

Topic 3: This infographic is very engaging. The layout is well-structured and the content is perfectly executed.

Topic 4: The infographic is quite attractive with nice colors. The content is presented in a fun and visually appealing way.

Topic 5: It is suggested to add more data related to the September festival in this infographic.

Topic 6: To enhance the infographic, the researcher should add additional steps for making beef skin salad. Additionally, the color of the food should accurately reflect its real color.

Topic 7: This infographic provides interesting knowl-

Fig. 2. Draft of infographic before receiving feedback from three experts. Topic 2: Patumdon Temple: A solely Tai temple in Phrao District. Left: first draft; right: second draft.

Table 2. Appropriateness and quality of 8 infographics (n=3)

Assessment	Topic number	x̄	Standard deviation	Verbal interpretation
Graphic • Character • Color • Font and font size • Picture and picture size • Layout • Beauty • Attraction • Interested • Creativity	1.	4.67	0.45	Highly appropriate
	2.	4.78	0.26	Highly appropriate
	3.	4.96	0.64	Highly appropriate
	4.	4.93	0.13	Highly appropriate
	5.	4.78	0.26	Highly appropriate
	6.	4.63	0.45	Highly appropriate
	7.	4.33	0.58	Appropriate
	8.	4.67	0.39	Highly appropriate
Contents • Reliable • Completeness • Comprehension • Retention and recall • Storytelling	1.	4.53	0.47	Highly appropriate
	2.	5.00	0.00	Highly appropriate
	3.	5.00	0.00	Highly appropriate
	4.	4.87	0.23	Highly appropriate
	5.	4.93	0.12	Highly appropriate
	6.	4.87	0.23	Highly appropriate
	7.	4.80	0.35	Highly appropriate
	8.	5.00	0.00	Highly appropriate
Usefulness • Increasing and promoting audience awareness of Patum culture • Ability to promote Patum village as a learning resource and tourist destination	1.	4.84	0.29	Highly appropriate
	2.	5.00	0.00	Highly appropriate
	3.	5.00	0.00	Highly appropriate
	4.	5.00	0.00	Highly appropriate
	5.	5.00	0.00	Highly appropriate
	6.	5.00	0.00	Highly appropriate
	7.	5.00	0.00	Highly appropriate
	8.	5.00	0.00	Highly appropriate

edge about fermented soybeans. Consider adding one more step for the process of making fermented soybeans.

Topic 8: The graphics are engaging and easy to understand, promoting effective comprehension, retention, and recall. However, the overall theme feels a bit dark and could be lightened up for better visual appeal (Fig. 3).

4.3. Values of Using the Eight Infographics

The researcher collected quantitative and qualitative data from 92 respondents about the values of using all eight infographics by accessing:

1) Patum's mobile exhibition at a school and temple in Phrao district
2) Book
3) Ebook (https://online.fliphtml5.com/qesfb/orha)
4) Glampatum website (https://glampatum.cmru.ac.th)
5) Punya Patum Facebook fan page

4.3.1. Respondents' Demographic Characteristics

The study examined the demographic characteristics of respondents through the utilization of questionnaires comprising both closed-ended and open-ended questions. The questions specifically targeted gender, age, and occupation.

Table 3 presents the demographic characteristics of the 92 respondents under study. The predominant sex identification among them was female, constituting 54.35% of the total (f=50). In terms of age distribution, the majority of participants were under 20 years old (f=45, 48.91%), followed by 21-30 years old (f=28, 30.43%), and 31-40 years old (f=9, 9.78%), respectively. Regarding occupation,

Fig. 3. Revision after receiving feedback from three experts for Topic 1: Patum travel (left) before revision and (right) after revision.

Table 3. Demographic characteristics of the 92 respondents (n=92)

Demographic	f	%
Sex	92	100
Male	35	38.04
Female	50	54.35
Not specified	7	7.61
Age (yr)	92	100
≤20	45	48.91
21-30	28	30.43
31-40	9	9.78
41-50	5	5.43
51-60	1	1.09
≥61	4	4.35
Occupation	92	100
Student	64	69.57
Teacher	5	5.43
Government officer	8	8.70
Farmer	3	3.26
Freelance worker	9	9.78
Businessman	1	1.09
Freelance worker	2	2.17

the primary category among respondents was students, representing 69.57% (f=64), followed by freelance workers at 9.78% (f=9), and government officers at 8.70% (f=8).

4.3.2. Values of Using the Eight Infographics

The study revealed the existence of six distinct values, as follows: 1) acquiring knowledge (f=237), 2) fostering the promotion of Patum's culture, festivals, religions, and beliefs (f=97), 3) deriving aesthetic enjoyment (f=64), 4) encouraging cultural tourism (f=48), 5) contributing to the education sector (f=23), and 6) enhancing comprehension of Patum's history (f=21).

As depicted in Table 4, the majority of participating audience members reported experiencing various values from their interaction with the infographics. Notably, a significant proportion highlighted their engagement for the purpose of acquiring and augmenting new knowledge (f=227, 46.33%). This was followed by an expressed interest in contributing to the promotion of Patum's culture, festivals, religions, and beliefs (f=97, 19.80%). Additionally, a notable percentage indicated their pleasure in deriving aesthetic enjoyment from the infographics (f=64, 13.06%).

4.4. Satisfaction of Using the Eight Infographics

The research found that the overall satisfaction of participating audiences was at a high level. This satisfaction was evaluated based on three key aspects: format

Table 4. Values of using the eight infographics (n=92)

Value	f	%
Acquiring knowledge	237	48.37
Getting and increasing new knowledge	227	46.33
Disseminating knowledge	8	1.63
Creativity	1	0.20
Practical knowledge	1	0.20
Fostering the promotion of Patum's culture, festivals, religions, and beliefs	97	19.80
Understanding culture, festivals, religions, and beliefs	68	13.88
Raising awareness of Patum culture and local wisdom	10	2.01
Knowing values and importance of Patum culture, festivals, religions, and beliefs	8	1.63
Seeing the uniqueness and identity	6	1.22
Requiring to preserve and maintain culture, festivals, religions, and beliefs	5	1.02
Deriving aesthetic enjoyment	64	13.06
Appreciated the visual appeal of infographics	60	12.24
Experienced happiness while observing infographics	3	0.61
Derived enjoyment from viewing infographics	1	0.20
Encouraging cultural tourism	48	9.80
Knowing location, map, and important routes for travelling	32	6.53
Attracting tourists to visit the Patum village	8	1.63
Knowing new tourist destinations	5	1.02
Knowing Patum's products	2	0.41
Public relations for promoting Patum village as a cultural tourist attraction	1	0.20
Contributing to the education sector	23	4.69
Emerging learning resource	21	4.29
Useful for learning materials	2	0.41
Enhancing comprehension of Patum's history	21	4.29
Understanding useful hints of Patum's history	15	3.06
Knowing historical places and important antiques of Patum	5	1.02
Understand the roots of Patum people	1	0.20

Multiple answers.

and quality, content, and usefulness. Table 5 shows that the majority of audience members were satisfied with the format of Topic 7: Fermented soybean: Authentic Patum food ($\bar{x}$=4.51) at a very high level, while the satisfaction of the rest of the infographics was at a high level. For the content, most of the audience members were satisfied with the format of Topic 8: Brown sugarcane cube: Ancient Tai's natural food ($\bar{x}$=4.52) at a very high level, while the rest were at a high level. For the usefulness, there were five infographics that the audience members were satis-fied with at a very high level, including Topic 2: Patumdon Temple: A solely Tai temple in Phrao District ($\bar{x}$=4.57), Topic 4: King Ka La and Tho dance: The uniqueness of Tai culture ($\bar{x}$=4.58), Topic 6: Tai food that should be tried together ($\bar{x}$=4.55), Topic 7: Fermented soybean: Authentic Patum food ($\bar{x}$=4.54), and Topic 8: Brown sugarcane cube: Ancient Tai's natural food ($\bar{x}$=4.62). Meanwhile, for Topic 1: Patum travel ($\bar{x}$=4.46), ,Topic 3: 182-year-old Ficus dru-pacea: Tree of Patum's belief ($\bar{x}$=4.50), and Topic 5: Twelve-month festivals of Patum's people, the satisfaction was at a

Table 5. Appropriateness and quality of 8 infographics (n=92)

Satisfaction	Topic number	x̄	Standard deviation	Verbal interpretation
Format and quality • Reliable • Completeness • Comprehension • Recall • Attractiveness • Layout • Storytelling	1.	4.30	0.71	Satisfied
	2.	4.42	0.68	Satisfied
	3.	4.43	0.71	Satisfied
	4.	4.45	0.66	Satisfied
	5.	4.40	0.72	Satisfied
	6.	4.46	0.67	Satisfied
	7.	4.51	0.61	Highly satisfied
	8.	4.49	0.64	Satisfied
Contents • Beauty • Interested • Color • Font • Picture/graphic • Composition • Space • Creative	1.	4.42	0.66	Satisfied
	2.	4.47	0.65	Satisfied
	3.	4.46	0.65	Satisfied
	4.	4.48	0.64	Satisfied
	5.	4.40	0.71	Satisfied
	6.	4.45	0.67	Satisfied
	7.	4.46	0.65	Satisfied
	8.	4.52	0.63	Highly satisfied
Usefulness • Useful data • Increasing and promoting audience awareness of Patum culture • Ability to promote Patum village as a learning resource and tourist destination	1.	4.46	0.63	Satisfied
	2.	4.57	0.62	Highly satisfied
	3.	4.50	0.60	Satisfied
	4.	4.58	0.57	Highly satisfied
	5.	4.46	0.64	Satisfied
	6.	4.55	0.59	Highly satisfied
	7.	4.54	0.59	Highly satisfied
	8.	4.62	0.56	Highly satisfied

high level.

5. DISCUSSION

5.1. Infographics' Appropriateness and Quality

The eight infographics were created and designed based on infology theory by designing through cognitive principles. As such, Pettersson (2015) specified that the design process of infographics should begin with the analysis and synopsis process. Therefore, the researcher analyzed content gathering from 40 local people because they recognize the identity of their village and the needed information for promoting Patum village as a cultural learning resource and tourist destination. Additionally, information and evidence about the village from primary and secondary resources such as books, news, interviewees, and websites were analyzed for the production of scripts.

In terms of the cognitive principles, the experts provided that the eight infographics attracted and induced audiences to read and learn, achieving the facilitating attention element. Meanwhile, the audience members had a satisfying level in the content (beauty, interested, color, font, picture/graphic, composition, space, and creative) when looking at all the infographics. A study related to an interactive infographic for the Museum of Asian Art in Malaysia also confirmed that a successful infographic that can attract attention involves colors, fonts, picture/graphics, composition, and mixed techniques (Sidyawati et al., 2019).

In regard to facilitating perception, this research showed that audiences received six values after watching the eight infographics, including: getting knowledge, benefiting the education sector, understanding Patum' history, promoting Patum's culture, festivals, religions and beliefs, promoting cultural tourism, and enjoying aesthetics (Table 4). Those values can be facilitated for the perception of audiences in three sectors: education, culture, and tourism. In particular, the cultural and tourism initiatives are aligned with the Tourism Authority of Thailand (2021)'s strategy, which emphasizes the utilization of media, digital technology, and innovation for the development of cultural tourism content. These initiatives have the potential to transform the area's image and broaden the niche tourist market, thereby contributing to long-term growth. Moreover, cultural tourism is a high-value form of tourism making local people and tourists gain experiences, cultural learning, cultural awareness, and mutual understanding. Therefore, the eight infographics were powerful for promoting Patum's cultural tourism, benefiting local people and tourists.

Krum (2013) and Iliinsky (2010) indicated that a high-quality infographic needs to focus on information, language, and pictures suiting target audiences. Inthanai (2018) also mentioned that the appropriate character for cultural tourism promotion must be in a simple form and gesture, and with a neutral emotion because it can be used at every level of the audience. This study also chose a simple character in a man with local dress, basic information, and language that is easy to understand and recognize for facilitating mental processing.

In terms of facilitating memory, Pettersson (2015) stated that content that is easy to understand benefits comprehension and recall, which is called the pictorial superiority effect. The participating audiences provided that six infographics were easy to understand and they were satisfied at a satisfied level, excepting Topics 6 and 7 which were at a highly satisfied level.

5.2. Infographics' Values

Most audience members mentioned that they gained new knowledge related to Patum village. This means that those audiences possessed a visual literacy which can categorize, interpret, and be aware of the value emerging from the infographics. Moreover, they interpreted the values based on their careers and environments. For example, the students found value in learning, while teachers found value in teaching by using infographics as learning materials.

In regard to the value on promoting Patum's history and culture, the audiences provided that after they saw the infographics, they understood the root of Patum culture and had more awareness about Patum's culture involving festivals, religions, and beliefs. The graphics contained interesting information such as ancient historical places, local festivals, local foods, local wisdom, traditional knowledge holders, and the collaboration of communities. Moreover, the value of promoting Patum's history and culture was linked to the value of promoting cultural tourism. Furthermore, the infographics attracted audiences to visit the real places and reduce time for tourists for retrieving information. Alhadi (2019) suggested that novelty and outstanding information can make more attraction for tourists. As can be seen, the values of using the eight infographics had a positive impact on cultural tourism in terms of promoting the area as a learning resource and tourist destination. Meanwhile, the impacts on Patum's local communities were conservation, preservation, and dissemination of natural resources, culture, festivals, and local wisdom (Tourism Authority of Thailand, 2021).

Aesthetic value happened when the audiences enjoyed the graphics and contents of the eight infographics. There were 64 audience members who noted the happiness and fun that occurred when they looked at the eight infographics. Many scholars also note that arts and aesthetics are essential elements of designing infographics because they affect the pleasantness, joyfulness, and happiness of their audiences (Chukreu, 2018; Kai, 2015; Singhasin, 2017).

5.3. Satisfaction with Infographics Usage

The satisfaction was categorized into three points, including format, content, and usefulness. Most audience members had overall satisfaction using the eight infographics at a high level. For the format, seven out of eight infographics had a high satisfaction, except Topic 7: Fermented soybean: Authentic Patum food, which was at very high satisfaction. The reason was that it included how-to infographics and the content was easy to understand as a step-by-step process. This is similar to the study of Jantanarmsri and Chomngam (2018), where the famous infographics were designed in a how-to format because it was practical information and influenced the audience's behavior.

For the satisfaction related to the infographics' content, the audiences had overall satisfaction with using seven out of eight infographics (Topics 1-7) at a high level. Meanwhile, Topic 8: Brown sugarcane cube: Ancient Tai's natu-

ral food, had very high satisfaction because of beautiful graphics, appropriateness, attractiveness, and aesthetics. As such, Bateman et al. (2010) identified that graphics make more attractiveness for audiences, who can enjoy the information and aesthetics affecting comprehension, recall, and retention.

The usefulness of the eight infographics included: useful data, increasing and promoting audience awareness of Patum's culture, and the ability to promote Patum village as a learning resource and tourist destination. Audiences provided that using five out of eight infographics (Topics 2, 4, 6, 7, and 8) were extremely satisfying. Meanwhile, three out of eight infographics (Topic 1: Patum travel, Topic 3: 182-year-old *Ficus drupacea*: Tree of Patum's belief, and Topic 5: Twelve-month festivals of Patum's people), were highly satisfying. These were confirmed and in accordance with Ashman and Patterson (2015)'s claim that infographics are useful for business communication and information services, and in particular, can be adapted to tourism promotion. Significantly, an information designer and developer should rely on the reliability of information, completeness, flexibility, comprehension, conciseness, and verifiability.

6. CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS

6.1. Conclusions

Infographics are a powerful tool for providing information in many industries. They can attract people's attention and cognition in a short time. Nowadays, infographics can be disseminated in a variety of formats and channels which are easily accessed and engaged with by the target audiences. Based on the infology theory and message design process of Pettersson (2014), it is essential to emphasize the intellectual and practical work involved in handling data and design. Researchers in this study need to be aware of factors such as information reliability, completeness, flexibility, comprehensibility, conciseness, and verifiability. Furthermore, the cognitive principle focusing on facilitating attention, perception, mental processing, and memory was selected as a foundation, which gave directions to the researcher for developing eight infographics by integrating data, information, and visuals suiting the purposes and target audiences. Moreover, the four processes of message design approach informing the infographics were created systematically and thoroughly before launching to the target audiences.

The eight infographics of this study can be proof that they can be used effectively for promoting Patum village as a learning resource and cultural tourism destination. They might be tailored to the recognition of Patum village in the near future that can affect the area's development in particular other learning resources and tourist destinations benefiting Patum people's incomes. Furthermore, the knowledge from this study can provide a foundation for further research in information science and related fields.

6.2. Limitation

Simple random sampling was used to select the participants of the survey questionnaires for investigating values and satisfaction of using the infographics. The responses of all purposed were from the same respondents, which mostly were students and local people. The views and opinions of them absolutely fit the purpose of promotion of Patum village as a cultural learning resource. However, in terms of promoting the area as a cultural tourist attraction, this study does not specify tourists or cultural tourists as respondents. Therefore, it would be optimal for better insight if the researcher can collect more information from the views and opinions of tourists or cultural tourists specifically.

6.3. Recommendations
6.3.1. Recommendations from This Research

As the developed infographics can be used for two main purposes, promoting 1) cultural learning resources and 2) tourist attractions, the recommendations are provided as follows:

For the education sector, the developed infographics are published into two formats including printed and electronic, which were disseminated and launched in various channels. School stakeholders such as teachers and teacher-librarians, who are not only in Patum village but also other places in Thailand, can use these infographics as cultural learning materials for social science, Thai language, or related subject subjects. Furthermore, the infographic book can be integrated with other activities in school libraries such as reading promotions.

For the tourism sector, administrators of Patum subdistrict municipality, Phroa district, Chiang Mai, Thailand should consider using the developed infographics in the public relation policy and plans of the district in various channels, such as official websites, brochures, billboards, and social media in order to promote Patum village more widely. Additionally, the infographic books can be used

as a tour guidebook, with which local leaders and local people can provide tourist information of Patum village. They can further develop as tourist guides, cultural and historical curators, or lecturers of the village, which not only provides income and new careers for them, but also strengthens the village development and economy.

6.3.2. Recommendations for Further Research

The present researcher should translate infographics into other languages such as English, Chinese, and Japanese in order to further investigate the impacts of using the developed infographics on travel motivation to Patum village from both Thai and international tourists. Furthermore, the researcher can further pursue case studies of the impacts and value of using infographic books on developing the cultural competency of students in Patum village.

7. PATENTS

Supplementary Materials: The following supporting information can be downloaded at:

1) Patum infographic ebook: https://online.fliphtml5.com/qesfb/orha

2) Glampatum website: https://www.glampatum.cmru.ac.th

3) Punya Patum Facebook fan page: https://www.facebook.com/glampatum

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

Alhadi, H. (2019). *Infographic digital tourism of Bukittinggi* (master's thesis). Universitas Negeri Padang, Padang, Indonesia.

Ashman, R., & Patterson, A. (2015). Seeing the big picture in services marketing research: Infographics, SEM and data visualization. *Journal of Services Marketing, 29*(6/7), 613-621. https://doi.org/10.1108/JSM-01-2015-0024

Batdı, V., Talan, T., & Semerci, Ç. (2019). Meta-analytic and meta-thematic analysis of STEM education. *International Journal of Education in Mathematics, Science and Technology, 7*(4), 382-399. https://files.eric.ed.gov/fulltext/EJ1232747.pdf

Bateman, S., Mandryk, R. L., Gutwin, C., Genest, A., McDine, D., & Brooks, C. H. (2010, April 10-15). Useful junk?: The effects of visual embellishment on comprehension and memorability of charts. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 2573-2582). Association for Computing Machinery.

Beegel, J. (2014). *Infographics for dummies.* John Wiley & Sons.

Bicen, H., & Beheshti, M. (2017). The psychological impact of infographics in education. *Broad Research in Artificial Intelligence and Neuroscience, 8*(4), 99-108. https://lumenpublishing.com/journals/index.php/brain/article/view/2106

Bohn, R., & Short, J. (2012). Measuring consumer information. *International Journal of Communication, 6*, 980-1000. https://ijoc.org/index.php/ijoc/article/view/1566

Chukreu, S. (2018). *[Creating public relation media in gifographic].* Mahidol University. Thai.

Davis, M., & Quinn, D. (2013). Visualizing text: The new literacy of infographics. *Reading Today, 31*(3), 16-18. https://www.proquest.com/docview/1476493762?sourcetype=Trade%20Journals

DEmark. (2017). *DEmark Award 2017.* https://demarkaward.net/th/news

Dunlap, J. C., & Lowenthal, P. R. (2016). Getting graphic about infographics: Design lessons learned from popular infographics. *Journal of Visual Literacy, 35*(1), 42-59. https://doi.org/10.1080/1051144X.2016.1205832

Egan, M., Acharya, A., Sounderajah, V., Xu, Y., Mottershaw, A., Phillips, R., Ashrafian, H., & Darzi, A. (2021). Evaluating the effect of infographics on public recall, sentiment and willingness to use face masks during the COVID-19 pandemic: A randomised internet-based questionnaire study. *BMC Public Health, 21*(1), 367. https://doi.org/10.1186/s12889-021-10356-0

Festi, G. (2019). Infographics between figures and figurative

language: A semiotic investigation of data visualization. *Signata.* *https://doi.org/10.4000/signata.2342*

Hassan, H. G. (2016). *Designing Infographics to support teaching complex science subject: A comparison between static and animated Infographics* (master's thesis). Iowa State University, Ames, IA, USA.

Heim, S., & Keil, A. (2017). Too much information, too little time: How the brain separates important from unimportant things in our fast-paced media world. *Frontiers for Young Minds,* 5, 23. https://doi.org/10.3389/frym.2017.00023

Iliinsky, N. (2010). On beauty. In J. Steele, & N. Iliinsky (Eds.), *Beautiful visualization: Looking at data through the eyes of experts* (pp. 1-14). O'Reilly Media.

Inthanai, W. (2018, August 20-21). Character design Nai Raeng for infographics: The legend of Hua Nai Raeng. In Humanities and Social Science Committees (Ed.), *Proceedings of the 1st National Humanities and Social Science* (pp. 41-50). Song Kla Rajabhat University.

Jantanarmsri, T., & Chomngam, P. (2018). Content and format of communication via infographic on infographic Thailand Facebook fan pages. *Suthiparithat Journal*, 32(104), 143-154.

Kai, W. (2015). *Infographic design in media.* Images Publishing.

Kelidou, E., & Siountri, K. (2020). The use of infographics as an educational tool for the upcoming digital transition. *2nd International Conference on Cultural Informatics, Communication & Media Studies,* 1(1). https://eproceedings.epublishing.ekt.gr/index.php/cicms/article/view/2730

Khoja, N. (2021). *15 Visual content marketing statistics to know for 2021.* https://venngage.com/blog/visual-content-marketing-statistics-2022/#2021

Krum, R. (2013). *Cool infographics: Effective communication with data visualization and design.* Wiley.

Lazard, A., & Atkinson, L. (2015). Putting environmental infographics center stage: The role of visuals at the elaboration likelihood model's critical point of persuasion. *Science Communication,* 37(1), 6-33. https://doi.org/10.1177/1075547014555997

Lee, E. J., & Kim, Y. W. (2016). Effects of infographics on news elaboration, acquisition, and evaluation: Prior knowledge and issue involvement as moderators. *New Media & Society*, 18(8), 1579-1598. https://doi.org/10.1177/1461444814567982

Lester, P. M. (2003). *Visual communication: Images with messages* (3rd ed.). Thomson/Wadsworth.

Limtasiri, O. (2017). Enhancing learning skills of learners in 21st century through outdoor education. *Veridian E-Journal, Silpakorn University,* 10(3), 1643-1658. https://he02.tci-thaijo.org/index.php/Veridian-E-Journal/article/view/110163

McCready, R. (2020). *20+ New infographic statistics & facts for 2020.* https://venngage.com/blog/infographic-statistics/

Moundy, K., Chafiq, N., & Talbi, M. (2021). Comparative analysis of student engagement in digital textbook use during quarantine. *Education Sciences,* 11(7), 352. https://doi.org/10.3390/educsci11070352

Naiin. (2022). *Infographic books.* https://www.naiin.com/search-result?title=infographic

Nediger, M. (2023). *What is an infographic? Examples, templates & design tips.* https://venngage.com/blog/what-is-an-infographic/

Ozdamlı, F., Kocakoyun, S., Sahin, T., & Akdag, S. (2016). Statistical reasoning of impact of infographics on education. *Procedia Computer Science,* 102, 370-377. https://doi.org/10.1016/j.procs.2016.09.414

Pettersson, R. (2012). Introduction to message design. *Journal of Visual Literacy,* 31(2), 93-104. https://doi.org/10.1080/23796529.2012.11674702

Pettersson, R. (2014). Information design theories. *Journal of Visual Literacy,* 33(1), 1-96. https://doi.org/10.1080/23796529.2014.11674713

Pettersson, R. (2015). *Information design 1: Message design.* International Institute for Information Design.

Sezer, A. (2021). Infographics designed in the field of tourism. *Global Journal of Art Education,* 11(2), 141-147. https://doi.org/10.18844/gjae.v11i2.5880

Sidyawati, L., Sudarmanto, J. A., Prasetyo, A. R., & Hawari Bin Berahim, E. M. (2019). Application development of masks of Malaysian indigenous tribes at the museum of Asian art Malaysia based on augmented reality as media of tourism education. *Jurnal IPTA,* 7(2), 163-173. https://doi.org/10.24843/IPTA.2019.v07.i02.p07

Singhasin, P. (2017). *[Design and development of public relation media of sunrise in Siam festival]* (master's thesis). Ubon Ratchathani University, Ubon Ratchathani, Thailand. Thai.

Siricharoen, W. V., & Siricharoen, N. (2015, May 12-15). How infographic should be evaluated? *Proceedings of the 7th International Conference on Information Technology* (pp. 558-564). Al Zaytoonah University.

Skinner Beitelspacher, L., Glenn Richey, R., & Reynolds, K. E. (2011). Exploring a new perspective on service efficiency: Service culture in retail organizations. *Journal of Services Marketing*, 25(3), 215-228. https://doi.org/10.1108/08876041111129191

Smith, J. (2019). Unit 36: Graphic illustrations and the infographic. In J. Smith (Ed.), *Communication at work.* Pressbooks.

Statista. (2022). *Volume of data/information created, captured, copied, and consumed worldwide from 2010 to 2020, with forecasts from 2021 to 2025.* https://www.statista.com/statistics/871513/worldwide-data-created/

StatSilk. (2021). *The real difference between infographics and data visualizations.* https://www.statsilk.com/blog/real-difference-between-infographics-and-data-visualizations

Tourism Authority of Thailand. (2021). *[9 a new trend in the tourism future of tourism].* Tourism Authority of Thailand. Thai.

Waite, S. (2011). Teaching and learning outside the classroom: Personal values, alternative pedagogies and standards. *Education 3-13,* 39(1), 65-82. https://doi.org/10.1080/03004270903206141

World Tourism Organization (UNWTO). (2017). *Tourism and culture.* Paper presented at the 22nd session of the General Assembly of the UNWTO, Chengdu, China.

Yıldırım, S. (2016). Infographics for educational purposes: Their structure, properties and reader approaches. *Turkish Online Journal of Educational Technology,* 15(3), 98-110. https://eric.ed.gov/?id=EJ1106376

Yıldırım, S., Yıldırım, G., Çelik, E., & Aydın, M. (2014). Student opinions about infographics design process. *Journal of Research in Education and Teaching,* 3(4), 247-255. http://www.jret.org/FileUpload/ks281142/File/24.yildirim.pdf