Factors Influencing the Animation Infographic and Augmented Reality Technique in Healthcare Promotion Communication for the Elderly in Thailand

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Abstract. When it comes to the digital age, computers and technological devices have grown more pervasive than in the past. As of now, technology has been considered to have a major role in every aspect of life. In this case, it is the health and cognitive senses of individuals. In terms of human perception, it is often associated with both long-term and short-term memory or active memory, which are recognized patterns by automated systems. When creating user interfaces, it is necessary to account for the cognitive strengths and limitations of humans. People can get an overview of large datasets if appropriately presented in a proper manner, which can help increase the efficacy and ability of information management. However, one of the most frequent data management issues is inadequate design and data collecting, particularly in the focus theme of elderly health and wellbeing. Infographics are a formal way to help people interpret complex health information more easily and avoid possible mistakes in data management. In the healthcare industry, the system of augmented reality (AR) has been shown to facilitate the procedures of healthcare using AR booklet and mobile applications for elderly-health-related content and healthcare management for older individuals.

Keywords: Infographic, Augmented Reality (AR), Aging society, Thailand, Mobile Application

1. Introduction

The elderly situation in Thailand: Thailand's aging population is comparable to that of many developed nations, ranking third in Asia, which is estimated at 26.9% of the total population in 2020. It is expected to access a full aging society by 2022 [1]. A higher number of elderly populations enables people to enjoy more rewarding lives as they have aged. An increasing reliance on mobile technology is not the only factor that has changed Thai people's lives as they age but can also create a positive impact for older people. Charoensuthipan and Katharangsiporna [2] stated that 72% of senior citizens in Thailand have been living in the same residence for over 40 years without intending to relocate or change habitats. Thailand's tendency indicates that it will become a "super-aged" society

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by 2031, with persons aged 60 and older accounting for up to 28% of the total population [3-4].

Thailand is on the verge of becoming a fully-aged society while being trapped in the middle income. Thailand's average age was predicted to be 40.1 years in 2020, making it the oldest among the region's growing economies [2]. This has the potential to produce issues in the structure of society, particularly in terms of domestic consumption and investment. An increasing fiscal obligation as a consequence of higher welfare spending will become a substantial obstacle for the government as the labor force and savings rate decline, impeding the country's economic growth [5]. Additionally, Thailand's reliance ratio on the elderly is anticipated to climb from 18% in 2020 to 30% in 2030 [4].

Individuals and communities often lack the resources necessary to care for elderly parents and other family members, as Thailand has been transitioning into an aging society since 2005. The number of people aged 60 years and over has continued to progress [6]. Thailand will become a completely aging society by 2021 when its population hits 13.1 million, or 20% of the total, the National Economic and Social Development Board (NESDB) estimates. Individuals aged 70-79 and over 80 made up 37.2 and 19.1 per cent of the population correspondingly, which represented 56.3 per cent of the overall population. The result has raised concern for families, communities, and the country as the elderly need more welfare and support in everyday life [7]. According to the health report number of seniors who need assistance with daily chores such as going around the home, eating, and bathing was assisted by 20.7% of adults in 2014, up from 15.5 per cent in 2009, while 1.3 per cent were declared incompetent.

The family is the first assistance for the elders. In general, children value and express gratitude towards their parents. However, the reduced family size has created pressures in this network. Families with young children accounted for 18.3% in 2015. In 2014, 8.7 per cent of the elderly lived alone, up from 3.6% in 1994, while 8.7 per cent resided with a spouse. In 2017, the National Statistical Office stated that the government may have to provide should also explore providing funds funding to families via the issuance of "Social Impact Bonds" to Support Long-Term Health Services for the Elderly [3].

2. Health Data gathering for Elderly Health Promotion

Physical decline is common among the elderly. The intellect and ability are as compared to younger generations as they are to older generations, with serious sickness diagnoses, but they are more beneficial with great experience as the offspring's shadow. Therefore, it is essential to be prepared prior to enter the senior age, as it is critical to examine the positive and useful aspects of life that may be experienced throughout this stage of life [5]. To be self-reliant, the elderly must not see themselves as a burden to others and accept the advantages of family, society, and country care in order to maintain proper psychological and physical health. In order for elders to maintain a high standard of living, they must consider the following: 1. Suitable nutrients for elders, 2. Exercise, 3. Excretion, 4. Sleep, 5. Emotional and stress, 6. Social aspects, 7. Environment and fall prevention.

When entering old age, various agility sensory and stimulus reactions diminish. Balance, hearing, and eyesight are all impacted, and accidents become more prevalent during this time period. Because recovery times may be longer for older generations than for younger generations, it is critical to avoid accidents via risk management. For instance, falling is the most prevalent cause of injury, particularly in damp and slippery

situations, where the elderly may have fallen over cables on the floor, stumbled over obstructions, or stepped on pets, especially in the dark. In certain houses, huge dogs may jump over the elderly, causing them to fall. Additionally, uneven terrain with obstacles along the way. The elderly often have visual and hearing difficulties, which impair their ability to recognize impediments. Despite the difficulty of mobility, prevention may seem impossible for the majority.

However, Augmented Reality (AR) is a relatively innovation that is gaining traction in a range of areas, including gaming, medical, automotive, and retail. Since the 1960s, augmented reality technology has been introduced and developed based on the most recent market estimates. The gadget technology enables users to observe the actual world while simultaneously displaying digital information in their current context. By the end of 2018, the market for augmented reality gadgets is estimated to reach $659.98 million [1]. In many aspects, augmented reality (AR) is a hybrid of virtual reality (VR) stimulation and assistive gadgets that adapt to the lifestyles of individuals who need assistance. These virtual assets are often represented by digital pictures or sound, and are frequently included in 3D models or augmented reality films through sensors such as cameras and video recorders [8].

3. Why does the infographic matter?

The doctor-patient relationship has evolved substantially over the years, in part due to emerging technological trends [9]. This trend is facilitated in large part by the growing usage of internet communication platforms. According to the CDW 2015 infographic, 53% of patients believe that telemedicine or video conferencing - whether "extremely" or "essential" - promotes their engagement in self-treatment decisions, even if video conferencing does not highlight how patients communicate with healthcare professionals. However, the infographic indicates that 64% of Americans are eager to provide physicians with video consultations. Additionally, patients converse with one another through technology. According to the data collected for the CDW Infographic, over half of US individuals seek health information through social media and training, which may have an impact on healthcare. 60% of physicians feel social media enhances the quality of patient care, according to medical infographics [9].

The Internet has resulted in the creation of new communication technologies. Utilizing these technologies effectively is critical for successful health communication in the digital era. Infographics are an innovative and eye-catching approach to communicating health facts to your audience. They amass vital information and numbers, behaving as if they were 'sound biting' [10].

Seventy-four per cent of individuals in the United States (74%) use the internet, and many participate in online health discussions. For instance: 80% of internet users do health-related searches on 15 particular themes, such as specific diseases or treatments. This is equivalent to 59% of all adults. 34% of internet users read other people's thoughts or experiences on health or medical issues in online newsgroups, websites, or blogs. 14% of internet users have opted in to receive email updates or alerts on health or medical issues. 4% of internet users have posted comments, questions, or information on a blog [11].

Infographics are an excellent method to drive visitors to your content. Rather than that, format each post as a list of facts. You can see the same data with free applications. Numerous free resources are available to aid you with data conversion. They provide

templates, graphs, and clip art for creating an infographic on an effective website. There are several tips and methods for designing excellent infographics, but one of the most effective is to select and quantify a few important statistics that can assist you in telling your narrative. Visual stimulation engages readers via the use of graphics, charts, and pictures. Additionally, you may seek guidance from others. Infographics are a simple and effective method of increasing health communication [10].

Without an infographic, it will be difficult to comprehend and transmit complicated information and data. The infographic is a very effective communication tool that may be used in not just the information technology industry, but also in unexpected sectors such as the medical sector [12]. It can automatically convert difficult data into visually appealing visualizations for patients. While conventional medical information is sometimes difficult to comprehend, physicians may readily analyze this complicated information using infographics.

The following reasons demonstrate how well infographics operate in the medical sector.

1. The focus on the Bigger picture

For most people find it quite impossible to envision their body system, namely their circulatory system. How do patients understand the function of coronary arteries and blood vessels? The answer is the employment of virtual images, which help in understanding the functions described in the infographics.

On the other hand, these data are communicated using infographics, which engage patients in the learning process and reduce their fear of not grasping medical content.

2. Visual Clarity of the Information

Getting people's attention may be difficult, especially when attempting to convey complex issues that need a lengthy explanation, or when employing foreign language and jargon. In contrast, infographics express information concisely. A few terms are used to clarify whether an abbreviation is "telling a narrative "about the skeletal or digestive systems. There is, however, an environment in which the patient's attention may be captured.

It is important to always engage in the audience's attention during a medical presentation is quite tough. This requires extensive lectures filled with medical terminology and jargon. Frequently, this causes audience members to get bored. Infographics differentiate viewers, who are always on the search for novel content. The language and concepts are easily accessible via the use of well-designed infographics. Currently, presentations predominate above all other activities. Infographics blend older and newer bottles of wine [13].

3. Increasing Exposure to Knowledge Appreciation

It has shown that conventional advertising will complement institutional promotion when it comes to a new hospital equipped with the most advanced critical care technologies or a nursing home with a particularly advanced design. Nonetheless, infographics may be incredibly powerful. Compared to normal brochures or handwritten notes, this is the optimal combination of vibrant colours and superior printing. The human eye is sometimes obliged to select unusual background features in order to create an impression on our subconscious [14-15].

4. Visual Guidance Offerings

Complex issues needing several steps may be difficult to comprehend. Additionally, it is essential to read the instructions carefully. Infographics may be used to engage via the use of instructions and pictures. For example, you may include photographs that

correlate to each step, such as a person injecting themselves with insulin to demonstrate the injection site. This is especially useful for persons with limited text-based memory.

5. Adaptable and Feasible

The contents provided on infographics allow users to express their originality and signature via the delivery of messages and data. Due to the fact that the infographics are editable and adaptable, they help to improve the identification of data within the business and brand. This strategy not only produces more attractive information but may also improve target audiences' comprehension of the material.

6. Excellent Information Providing

Most healthcare institutions and hospitals have social media pages. Infographics are the most popular kind of online material and get the most attention. When Infographics have the power to spread, they are contaminated within hours. And every company desires a strong online presence and exposure.

7. Health and Wellness Knowledge Provision

Health professionals should be aware of cutting-edge and innovative methods that may be used not just to treat patients, but also to produce energy.

Doctors and other healthcare workers must be knowledgeable about contemporary techniques and advancements. The developed doctor was happy and appreciative of the patient. Additionally, the usage of infographics in medicine enables health practitioners to increase their patients' health literacy.

We all suffer from excessive content. Infographics are excellent for storytelling. This is why they are popular in a variety of areas. Finally, we live in a world of 140-character tweets. A growing number of physicians make use of infographics to communicate with patients. And it's easy to foresee that the usage of infographics in the healthcare industry will skyrocket [12]. Computer components or display devices boost technology and dramatically improve medical results [1]. However, augmented reality technology has evolved to facilitate medical procedures and information sharing in the field. AR gear must be able to fit inside a person's skull. Work in an ergonomic and safe manner AR must be projected clearly, and the most accurate doctors must begin to believe that employing AR to help surgery during training, medical student, or even during a doctor's visit may significantly enhance practice. In the present day, AR has been more integrated into the medical profession than ever before, owing to the availability of technological and medical combinations. However, technological advancements will accelerate in the coming years.

4. Using Infographic in Healthcare Booklet with AR Application

The infographic with augmented reality has a major impact on learning. Several factors contribute to this method's superiority over other methods used in other groups, including data visualization, infographic illustration with 3D AR representation [16], the use of organizer images, and, simultaneously, reducing the complexity of AR through the use of infographic visualization [14]. Healthcare organizations may effectively communicate complicated information to the public using short animated movies that effectively cut through the social media clutter [17].

In the case study of the health infographic booklet, pertinent information about health was reduced to charts, images, and symbols indicating formal details because it provides a concise overview of the subject, which means that the audience does not need to read paragraphs to find pertinent information [18]. Numerous people have encountered

an abundance of stuff, resulting in information overload and bewilderment. However, producing an infographic that focuses on the important information will make it simpler to digest via the use of attention-grabbing graphics [19]. Eleven topic suggestions for a healthcare infographic are included. When it comes to developing a healthcare infographic, there are several aspects to include, which can be seen in the bullet points below [13]. There are: Technological revolution, Recent studies, Medical issues, Human anatomy, First aid advice, Information about medications, Statistics, Health care system reformation, Surgical techniques, Nutrition.

The research case study is used to demonstrate one method of using Augmented Reality (AR) to develop and construct an older practice handbook for mental and physical wellness. This pamphlet summarizes the material included in the handbook. The guidebook has AR markers. The augmented reality application dubbed "AR4Elder" is compatible with the Android operating system and must be loaded in order to read the augmented reality markers manually. The geriatric practice handbook is divided into seven chapters, each of which is critical for tracking mental and physical health levels: 1. Optimal Diet 2. Physical activity 3. Expulsion 4. Slumber 5. Emotional and Psychological Stress 6. Social and psychological well-being and 7. The environment and the prevention of falls. These seven chapters include animated seniors accompanied by voice discussion. The study findings indicate that overall contentment among the elderly is deemed to be rather high.

On the basis of the elderly report interviews, the data gathering procedure and application development may be carried out, with the following components: 1. Raw interview results 2. Practice handbooks for health and well-being that are based on the AR software application Third, the booklet is evaluated based on the results of the reports of health and well-being reports that may be published and shared using the augmented reality feature of the Android operating system.

5. Conclusion

Using the augmented reality supplemental application on the Android operating system, presenting information in digital media through publications. The combination of an infographic and a movie or animation provided through the augmented reality application may pique curiosity and generate enthusiasm. Additionally, novel user experiences The material associated with infographics may be floated away from print media and exhibited on a smartphone screen in the form of graphics, video, or animation [20]. Users may access data at any time and from any location. Additionally, they may rapidly and easily disseminate information online through social media platforms such as Facebook, Twitter, and Instagram, enabling them to connect with and satisfy the requirements of customers in the digital era. What matters is that users may engage with enhanced reality, media, narrative, and tools for everyone who needs improved healthcare communications [18], which may provide a better understanding for individuals to start living with a better outcome in their health and associations in activities that may help them to improve their wellness condition as well as being able to apply to other activities in daily life as well as being able to educate others into following the same pattern from the use of the Augmented Reality device.

The pictures below depict the user interface that users would get after downloading the programme, with an emphasis on the most important elements from the home page through the accessible content that are shown below:

Figure 1, 2, 3 The user interface of the application (4 start, 5 loading, 6 content page) Figure 4, 5 show a detailed screen of Guideline 1, Appropriate Food with an audio commentary with AR application.

The Elderly's Guide to Mental and Physical Health, complete with an Augmented Reality (AR) screen in Figure 1, 2, 3 shows a picture of the application's home page and encourages the user to aim the camera at the handbook (Figure 4, 5). Elderly Behavior for Mental and Physical Health using AR application is divided into seven chapters, each with a chapter marker. For instance, people and food may serve as a bridge between the apps that employ augmented reality to present manual data.

An infographic, when combined with animation from an augmented reality application, is described as a visual representation of facts or concepts that aims to transmit complicated information to audiences in a way that is simply consumable and understandable [15], particularly for the elderly. Additionally, the program addresses three critical aspects of making animated infographics: [17] 1. Script Development: the duration of the animation should not exceed two minutes or 150 words. To complete the appropriate tale-telling methods, consideration should be given at the onset of the narration choosing process. 2. Select the Appropriate Production Company: once the screenplay is finalized, you may bid it out to a motion graphics-capable production firm. 3. Approval of Storyboards: The initial stage will be to deliver music and storyboards for your approval. Infographic Animations will surprise you with their refreshing nature. They eliminate the requirement for physician and patient sound bites and on-location shooting in healthcare settings such as physician offices and hospitals. Indeed, they provide a novel and new approach to raising awareness of elderly healthcare

6. Suggestions for Future Research

According to the studies, there are still additional factors to consider in order to improve the studies, including the location, which should involve other related organizations within Bangkok and other cities by following the guidelines of the AR application that tracks the elderly's health and well-being through published programmed integration using virtual reality on Android to apply and promote elders' health and well-being by providing free tests without an appointment. The application should be built and developed in a variety of ways, including educating the target population about prevalent

ailments and devising and showing a basic physical therapy approach that can be practiced at home. Individuals would also be followed and consulted after the release of the findings. Additionally, the application should be examined, planned, and developed in order to be implemented in reality and on operating systems other than Android in order to broaden the channels and attract more users.

REFERENCES

[1] Sanchez J. 2020. Plug and Play: Augmented reality in healthcare. c2020 [cite 2022 15 May]. Available from: https://www.plugandplaytechcenter.com/resources/augmented-reality-healthcare/.

[2] Charoensuthipan P, Katharangsiporna K [Internet]. Bangkok: Society of seniors requires special treatment. c2019 [cite 2022 May 16]. Available from: https://www.bangkokpost.com/business/1722603/a-society-of-seniors-requires-special-treatment.

[3] Chitrong W. Bangkok: Risks grow for ageing population Econ. c2017 [cite 2022 May 12]. Available from: https://www.nationthailand.com/business/30333636.

[4] Bangkok Post [Internet]. Bangkok: Uncertainty for the elderly. c2021 [cite 2022 May 20] Available from: https://www.bangkokpost.com/business/2087527/uncertainty-for-the-elderly.

[5] Larpsombatsiri K [Internet]. Singapore: Policies on health of older adults in Thailand. Regional Workshop on Integrating Policy and Research on Aging in ASEAN: Conversations Across the Policy and Research Divide. c2019 [cite 2022 11 May].

[6] Wongboonsin P, Aungsuroch Y, Hatsukano N. The ageing society and human resources to care for the elderly in Thailand. The Aging Society and Human Resources to Care for Older People in Thailand. 2020 Nov:104-135.

[7] Frampton SB, Guastello S, Hoy L, Naylor M, Sheridan S, Johnston-Fleece M. Harnessing evidence and experience to change culture: A guiding framework for patient and family engaged care. Discussion Paper., 2017 Jun:1-28.

[8] Rafter N, Hickey A, Condell S, Conroy R, O'Connor P, Vaughan D, Williams D. Adverse events in healthcare: learning from mistakes. An International Journal of Medicine. 2015 Apr;108 (4):273-277.

[9] Conlan M. [Internet]. Illinois: How communications and healthcare technologies empower patients. c2017 [cite 2022 May 13]. Available from: https://healthtechmagazine.net/article/2017/01/how-communications-and-healthcare-technologies-empower-patients-infographic.

[10] Rhllwy [Internet]. California: Innovations in Health Communications. c2015 [cite 2022 4 May]. Available from: https://ihealthcomms.wordpress.com/2015/07/11/using-infographics-as-tools-for-communication/.

[11] Kanjanawatana S [Internet]. NHSO: Long-term care program: Thailand's preparation for entering an aged society. c2020 [cite 2022 15 May]. Available from: https://eng.nhso.go.th/view/1/DescriptionNews/Long-Term-Care-program-Thailands-preparation-for-entering-an-aged-society/212/EN-US.

[12] InfoGraphic Design Team [Internet]. Why Infographics are being adopted in healthcare sectors. c2017 [cite 2022 May 5]. Available from: https://www.infographicdesignteam.com/blog/why-infographics-are-being-adopted-in-healthcare-sectors/.

[13] Editor [Internet]. How to create a healthcare infographic. c2019 [cite 2022 19 2022]. Available from: https://hcsmmonitor.com/2019/08/10/how-to-create-a-healthcare-infographic/.

[14] Dehghani M, Mohammadhasani N, Ghelevandi MD, Azimi E. Applying AR-based infographics to enhance learning of the heart and cardiac cycle in biology class, interactive learning environments. Interactive Learning Environment. 2020 Apr: 1-7.

[15] Smiciklas M. The power of infographics. Bangkok. Que Publishing; 2012. 199-224p.

[16] Cicibas H, Yildirim SÖ. Adoption of internet of things in healthcare organizations. Current and Emerging mHealth Technologies. 2018 Apr; 283-302.

[17] Gold S [Internet]. Illinois: Infographic animations: a new tool for online engagement. c2013 [cite 2022 May 13]. Available from: https://www.pm360online.com/motion-promotioninfographic-animations-a-new-tool-for-online-engagement/.

[18] Siricharoen WV, Siricharoen N. Infographic utility in accelerating better health Communication. Mobile Networks and Applications., 2018 Aug; 23(1): 1-11.

[19] Siricharoen WV, Siricharoen N. Infographic utility in accelerating better health communication. MONET. 2018 Feb; 23(1):57-67.

[20] Davis J, Foley A, Crigger N, Brannigan. Healthcare and listening: a relationship for caring. International Journal of Listening. 2008 Jun; 22(2):168-175.