
Technology in Healthcare: Collaborative Business Opportunities for Developing Cognitive Training Solutions for Older Adults in Cambodia

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Introduction

Cambodia is on the brink of becoming an aged society, with its elderly population rapidly. According to the National Institute of Statistics in Cambodia, the percentage of older adults has risen significantly, from 6.34% in 2008 to 8.86% in 2019, accounting for 1,378,688 individuals. By 2050, this figure is projected to increase further to 23.17%, transitioning Cambodia into what is known as a “super-aged” society. This demographic shift reflects a broader trend seen globally and within the Association of Southeast Asian Nation (ASEAN) Member States (AMS). Globally, the aging population has become a pressing concern. The World Health Organization (WHO) reported that in 2019, there were 1 billion older adults worldwide, a number projected to rise dramatically to 2.1 billion by 2050. Notably, 80% of these individuals will be living in low- and middle-income countries. Within the ASEAN region, a report from Thailand’s Department of Older Persons highlighted that in 2022, seven out of ten AMS had entered the “aged society” phase. A society can be considered as aged when older adults account for more than 10% of the total population. While Cambodia, along with Lao PDR and the Philippines, have yet to reach this threshold, the rapid increase in Cambodia’s elderly population poses potential challenges for various sectors, including government, healthcare sectors, and families who may need to provide care.

The use of healthcare technology has surged since the COVID-19 pandemic in 2019, as quarantine measures and

limited access to public spaces necessitated the adoption of digital solutions. In Cambodia, this was exemplified by the “Stop Covid” QR code, a tracing app developed by the Ministry of Post and Telecommunications to prevent the spread of COVID-19. This app was widely adopted by businesses and the general public, who used it to scan in and out of locations to ensure safety. This experience not only exposed older adults to digital technology but may have also reduced their hesitation to engage with other health related technologies in the future. Later, the app evolved into the “Stop QR Code Vaccine” app, further increasing familiarity with health technology. Previously, older adults in Cambodia primarily relied on radios for entertainment and information. However, the rapid increase in mobile phone adoption, with 20.8 million mobile phone users in 2020, has significantly shifted how people, including older adults, access information. According to Tob Vannara, as reported in “CamNess”, even older adults in rural areas now prefer mobile phones due to their portability and multifunctionality, offering features such as sound, video, and programs, similar to the radio. This growing familiarity and comfort with mobile technology, particularly during the pandemic, has opened the door for older adults to engage more with digital tools, potentially paving the way for broader use of health-related technologies in the future.

Healthcare technology is now being leveraged for a variety of purposes beyond COVID-19 prevention, including patient safety, monitoring physical health, nutrition, sleep patterns, and promoting behavior change, as well as for cognitive training. These technologies not only enhance accessibility but also address the shortage of healthcare workers. If the connection between healthcare and technology can be easily seen, a focus should be placed

on understanding how the private sector can seize collaborative opportunities with healthcare professionals to create innovative healthcare solutions. This growing intersection between healthcare and technology presents a prime opportunity for the private sector in Cambodia to collaborate with healthcare professionals, creating innovative solutions that meet the needs of an aging population.

Case Discussion: Computer-Based Cognitive Training for Older Adults

There are many avenues where businesses can collaborate with healthcare providers to create innovative solutions, and this review focuses on one specific area: computer-based cognitive training for older adults. As Cambodia's elderly population continues to grow rapidly, addressing their cognitive health is not just a business opportunity but a public health necessity.

Why Addressing Cognitive Training Among Older Adults is Important?

If healthcare providers were asked this question, their answers would likely be unanimous. Cognitive decline is a common concern as people age. While some individuals maintain cognitive function throughout their lives, others experience cognitive decline, which can severely impact their health. For instance, older adults with mild cognitive impairment are at risk of progressing to dementia or Alzheimer's disease, affecting their overall well-being and quality of life. This decline not only impacts the individuals themselves but also places emotional and financial strains on their families, who often bear the burden of caregiving.

Sadly, cognitive impairment is often more prevalent among individuals with lower income and education levels, which aligns with the socioeconomic conditions of many AMS. According to Griffiths et al. (2020), low income and low education are significant risk factors to cognitive impairment, particularly among rural older adults. This can be explained by the fact that people with less education may have limited access to information about the importance of maintaining cognitive function or be unaware of available cognitive training programs.

Types of Computer-Based Cognitive Training

Traditionally, cognitive training has been conducted using low-tech methods, such as paper-and-pencil

tasks. However, with advancements in information and communication technology (ICT), computer-based cognitive training has gained popularity due to its many advantages over traditional methods. These benefits include the ability to provide immediate feedback (e.g., scores, sound cues), cost-effectiveness, personalization, and an increased level of enjoyment and engagement during training.

Computer-based cognitive training can generally be categorized into two types: game-like training and virtual reality (VR) training. Game-like training is more accessible and familiar to older adults, making it a practical solution, while VR-based training, though more immersive, remains less accessible and less known among this demographic.

While VR-based cognitive training offers immersive experiences, its accessibility remains limited, as it is primarily used in hospital or rehabilitation settings and requires specialized supervision. Additionally, older adults may find VR technology challenging, struggling with headsets, controllers, or sensors, which could lead to negative experiences and affect the training's overall effectiveness. However, with a careful design that takes into account age-related issues, such as mobility challenges and vision impairments, VR training could also be successfully implemented among the older adult population. The issue of less accessibility to VR tools yet remains, making solutions based on more common devices, like tablets or smartphones, more suitable for larger use.

Game-like training (not VR) is often more suitable for older adults, who may be less familiar with complex technology. Unlike VR-based training, game-like training is easier to interact with through smartphones or tablets, required less technical skill. Examples of such game-like cognitive training programs currently available in the market include Elevate, Lumosity, Fit Brains, Brain HQ from Posit Science, and Brain Workshop. However, some commercial cognitive training programs, such as CogMed, Jungle Memory, and Cognifit, have been criticized for lacking a solid theoretical foundation and evidence-based mechanisms. Additionally, these commercial programs are not yet available in Khmer language. This presents a unique opportunity for Cambodian entrepreneurs, in collaboration with healthcare professionals, to develop evidence-based cognitive training programs tailored to the specific needs, language, and context of Cambodian's older adults.

The Need for Collaboration Between Healthcare Providers and Businesses

Healthcare providers often do not have the expertise to develop software applications, just as the private sector operating in the software development industry may have. In turn, the latter, most likely lack the in-depth knowledge of cognitive processes required to design effective cognitive training programs based on games of virtual environments. Collaboration between these two sectors is, therefore, essential to creating effective computer-based cognitive training solutions for older adults.

Healthcare professionals, particularly those specializing in cognition, are crucial in developing the content for cognitive training programs. These experts understand the relationship between specific cognitive domains and their effects on overall function, particularly in older adults. Simultaneously, the private sector brings to the table expertise in software development and program design, allowing them to create user-friendly and engaging applications. Without collaboration, neither party could effectively develop a robust cognitive training tool.

During the creation, a variety of factors should be accounted for effective development. For instance, the target audience usually presents age-related issues, such as declines in vision and hearing. These factors must be carefully considered during the design process to ensure that the applications are user-friendly and accessible. Another challenge is older adults' relative unfamiliarity with technology compared to younger generations, who have grown up using digital tools. This generational gap may reduce the acceptance and adoption of computer-based cognitive training among older adults, making it crucial to design intuitive and simple-to-use interfaces. A close collaboration between the private sector and healthcare professionals can open the doors to new opportunities for businesses in Cambodia. In this manuscript, we discussed one, namely computer-based cognitive training for older adults. But the array of opportunities is numerous, from telemedicine to electronic health records management, wearable health devices, robotics surgery, mobile health apps, big data analytics, Internet of Medical Things (IoMT), chatbots and virtual assistants, and remote patient monitoring. Opportunities that can emerge from a closer relationship between ICT professionals and healthcare ones.

Conclusion

The increasing population of older adults presents both challenges and opportunities for the healthcare and business sectors. Computer-based cognitive training solutions, developed through collaboration between healthcare providers and businesses, offer a pathway to address cognitive decline in older adults while also tapping into a growing market for innovative health products. By combining the strengths of both sectors, businesses can create impactful solutions that enhance the quality of life for older adults, while healthcare professionals ensure these tools are grounded in science and tailored to meet users' needs.