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Engaging Hmong Americans Long-term Use of Healthcare Technology Using Culturally Revised Social Cognitive Theory Model

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Engaging Hmong Americans Long-term use of Healthcare Technology Using Culturally Revised Social
Cognitive Theory Model

By
Peggy Xiong

A Thesis Submitted in
Partial Fulfillment of the
Requirements for the Degree of

Master of Health Informatics

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ABSTRACT

Engaging Hmong Americans Long-term use of Healthcare Technology Using Culturally Revised Social Cognitive Theory Model

By

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The University of Wisconsin-Milwaukee, 2019

Under the Supervision of Professor Min Wu

Purpose: Information technology benefits the world, and it's required for health care system, such as electronic medical records (EMR). User acceptance model is to systematically study how users come to accept and use a technology. For example, the cultural values of a society restrict use of technology in which an individual can be less incline to accept it. There is a significant amount of Hmong population in great Milwaukee area. Spirits are a central part of Hmong religious beliefs where the spirit is tied to health. Chronic disease is believed to be caused by bad actions done by the individual's past lives according to traditional beliefs and as a result may influence families' willingness to accept a prescribed treatment. The social cognitive theory (SCT) model assists in attaining information by measuring user acceptance through three criteria: behavior, personal, and environment. In this study, we will culturally revised SCT model to engage Hmong Americans long-term use of healthcare technology. Our

mainly research methodologies are literature review and modeling. The obtained results can be used for information technology applications in healthcare for Hmong Americans and assist in increasing user acceptance in the Hmong community.

Method: Create a user acceptance model(s) to gauge community's engagement level health related technology. Review through several user acceptance models that serve as potential model to involve key factors that are unique to the target group. Choose one model that can be revised to fit the Hmong community as well as possible. Gathering of related literature served as a foundation in understanding the community's culture and cultural factors were drawn from them to revise the SCT model.

Results: Incorporating Hmong cultural factors into a chosen user acceptance model gave an overview of various determinants that can help with understanding what things can influence a Hmong American's behavior and attitude towards health. There are no rules that would restrict them from using health technology and utilize either or both traditional and western method for health management. Hmong Americans rely on health providers for health information particularly for those who have trouble finding other sources of information, making successfully building a rapport between the two all the more important.

Discussion: It can be difficult to ascertain as to how well this group perceive health technology when there is little research done about their usage of any kind of health technology. Understanding how they view health can allow planning to devise ways to appeal to that view to increase usage. Future research directions can utilize a user acceptance model for other lesser known ethnic groups.

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1. Introduction

The question of how much further human health can be improved has been the driving force in seeking further advancement in health technology. Health technology enables interactions between patients and healthcare providers for better care. Patients can communicate to their provider their questions and concerns with ease, saving time on traveling only resorting to it when necessary. Health technology increases accessibility among patients allowing them to make more informed decisions about their health. Just some of the examples are how patients would be able to obtain their results electronically and health apps that provide information while helping in keeping track of health among other things.

Health technology in the U.S. presents benefits that can produce potentially useful information in understanding the needs of patients better, yet not all patients may utilize it for one reason or another. Certain groups may react differently from others regarding health technology. Understanding the stance of those groups can lead to addressing issues and creating solutions to remedy them. Ethnicity may factor in how certain groups perceive healthcare technology, with the ethnic group of focus here being that of the Hmong community. Language barrier, cultural values, and level of health literacy influences those perceptions. Before delving into the background of this community, a model is chosen to examine their likelihood of adopting health technology when implemented. Technology acceptance and adoption models explain factors that can affect user acceptance.

1.1 Models

The need to develop a project framework derives from the need to address issues emerging over the course of time. The process involves several phases when forming a framework to resolve a problem identified in the very first phase. This can be from a problem where goals were unmet and requires backtracking to uncover why initial expectations did not flow as intended. Understanding the issues that influence users' decisions makes it easier to determine which factors to consider in technology acceptance model development before finally entering the implementation phase (Taherdoost, 2018). Through user acceptance of health technology model to identify issues that would prevent users from accepting it. Users already being accepting of it presents an opportunity to increase number of users to utilize health technology. Another factor that can affect user acceptance are changes made to the technology to meet new requirements by the government or some other higher influences. There are several models and frameworks developed to explain or predict user adoption of new technologies (Taherdoost, 2018). Among those models the focus will be on one model that would be suitable to the Hmong demographic.

Theory of Reasoned Action (TRA)

The TRA model was originally developed for sociological and psychological researching purposes before becoming a tool to investigate users' behavior when it came to IT usage (Taherdoost, 2018). The model measures a user's technology acceptance level through several cognitive components in **Figure 1** (Taherdoost, 2018). There is a person's attitude towards IT, someone who is more accustomed to using IT to its fullest extent daily may have a more favorable view than someone else who rarely utilize it. Social norms contribute to how likely a

user will accept technology. If the cultural values of a society restrict use of technology that individual can be less inclined to accept it. Lastly, there involves intentions where an individual's decision to do or don't perform certain behaviors with varied reasons behind those intentions (Taherdoost, 2018). Methods such as generality, target, action, context, and time are established to improve correspondence between attitude and intention (Taherdoost, 2018). The TRA model possesses some flaws in that it fails to address the role of a user's habit, deliberation, misunderstandings of users reasoning in their perspective on technology, and moral factors (Taherdoost, 2018).

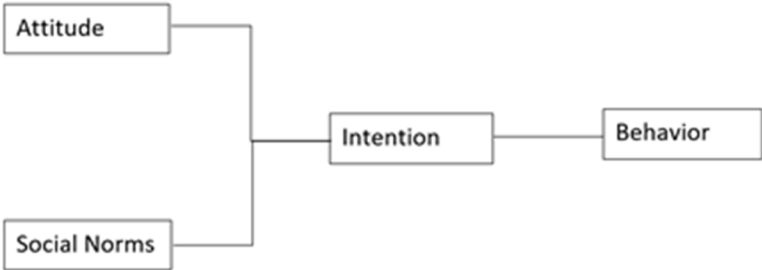


Figure 1. TRA Model

TRA uses attitudes and norms in predicting behavioral intent where one's personal opinions may clash with the general thinking of the mass. There they can choose to disregard either their own thoughts on the matter or on things that are considered the norm, with a third in seeking a compromise. When applying the TRA regarding the topic at hand a Hmong individual may prefer shamanistic treatments over seeing a doctor or use health apps, but U.S. norms encourages usage of healthcare system services for health needs. They may choose to ignore those norms and continue their preferred treatment or choose those norms to meet expectations. The former is chosen if their condition isn't too severe and an argument can be

made going against the norms due to lack of transportation and low health literacy resulting in poor understanding. The latter is more likely if they have means and have grown accustomed in adapting U.S. health norms into their own lives. The model would require some intensive reworking having few elements to work with in predicting behavioral intent. TRA doesn't necessarily have input including cultural factors and history that forms Hmong Americans' attitude towards the U.S. healthcare system and health technology. Social norm is a contributing factor in influencing attitude but having the model place heavy emphasis on cultural values is ideal when understanding their viewpoint on health technology.

Theory of Planned Behavior (TPB)

TPB model is a modified version of TRA where perceived behavioral control (PBC) is a new variable added to the model shown in **Figure 2** (Taherdoost, 2018). The user's ability in being able to use technology based on exposure and experience in handling it is taken into consideration by the model. PBC is influenced by several factors in determining user acceptability of technology through availability of resources, opportunities/skills, perceived significance of those resources, and ability to achieve outcomes (Taherdoost, 2018). Both TRA and TPB can make assumptions concerning a person's behavioral intentions, TPB has more emphasis on self-efficacy as an important determinant in user technology acceptance (Taherdoost, 2018). Other factors that affect behavioral intentions of users in the TPB model are subjective norm and behavioral attitude (Taherdoost, 1962). TPB has its own issue with how there being a lack of accessibility to technology and in turn affects an individual's formation of opinion on technology (Taherdoost, 2018).

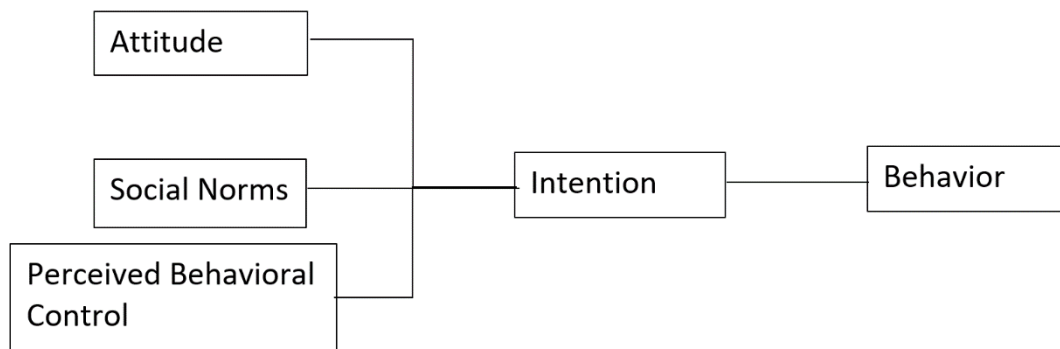


Figure 2. TPB Model

Although it's possible to remodel TPB to fit the cultural influence on Hmong perception on health technology, the limitations presented in the model should be considered when remodeling. The model does not take in account other variables such as fear, threat, or past-experience. Having poor experience with the healthcare system may deter future usage of its services for instance. TPB does not consider factors like environmental and socioeconomic ones outside of social norms when influencing a person's intent to perform a behavior. Hmong individuals from low income families have problems covering healthcare costs and health devices like glucose monitor for diabetes. An environmental influence example is availability of community-based groups geared towards Hmong Americans that provide aid and information on healthcare services. The model identifies contributing factors to behavior, but not how those factors in the decision- making process may change over time. The thought in mind in designing a model to understand the Hmong perspective on health technology and how it can change in to a more positive one.

Technology Acceptance Model (TAM)

The TAM model is derived from the TRA model that focuses on technology's perceived usefulness, its ease of use, and attitudes as determining factors in user's perception towards it as can be seen in **Figure 3** (Taherdoost, 2018). The first two factors have considerable impact on attitude aside from social factors that can influence attitude. A user's training in using technology, characteristics of technology, and how involved they are in the designing and implementation process could influence how accepting they can be (Taherdoost, 2018). Training in usage of technology can increase a user's confidence in using it and understanding its key features leading to knowing the overall feel of what it does. As a trade-off TAM model's heavy emphasis on usage ability places limitation on satisfying emotional needs. Social influence is not a major focus in the TAM model, making technology very self-contained in a working environment where its usage is born out of necessity rather than any other kinds of personal gain.

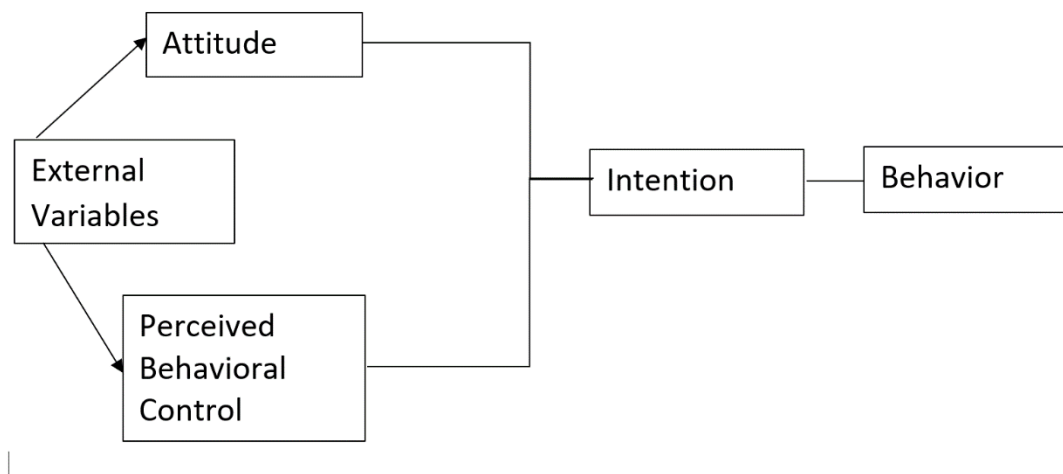


Figure 3. TAM Model

The TAM model can be difficult to work with in its lack of emphasis on social and cultural factors that shapes a specific group of people's attitude towards technology. Inclusions of those factors may change the core of the model entirely with the original method of determining attitude towards technology being based primarily on perceived usefulness to the individual. When put into practice scenario-wise its very centered on specifics in a situation. An example would be a patient centered EMR app that may require some training in using it, the individual may learn how to successfully use it but how satisfied they are with it to continue using it is not addressed.

Social Cognitive Theory Model (SCT)

The goal is to understand and increase health technology acceptance among the Hmong community. The design and purpose of the social cognitive theory (SCT) model assists in attaining information by measuring user acceptance through three factors: behavior (response to actions), personal (self-efficacy), and environment (surroundings influencing behavior) in **Figure 4** (Taherdoost, 2018). SCT's factors interactively work in tandem with one another when predicting both group and individual behavior (Taherdoost, 2018). Perceptions can change over time as more health industries and institutions switch over electronically or increase in technological innovations. Even if perceptions are slow to change or refuse to budge, SCT can identify methods that can change or modify behavior (Taherdoost, 2018). SCT is also based on several key principals shown in **Table 1** explaining user behavior with self-efficacy first and foremost. A user's level of self-efficacy is based on their beliefs on how well they can successfully achieve a given task (Dulloo, Mokashi, and Puri, 2015). Other key principals include the ability to self-regulate in being able to manage actions to reach desirable outcomes,

observational learning based on learned patterns and behaviors of others, and outcome expectancy (Dulloo, Mokashi, and Puri, 2015). Technology usage factors extends to principles such as behavioral capability in having knowledge/skills in carrying out goals and reinforcement where quality of outcomes determine probability of carrying out an action (Dulloo, Mokashi, and Puri, 2015). All these principles factor in the user's attitude towards technology based on perceived usefulness, ease of use, and facilitating self-efficacy when completing a task.

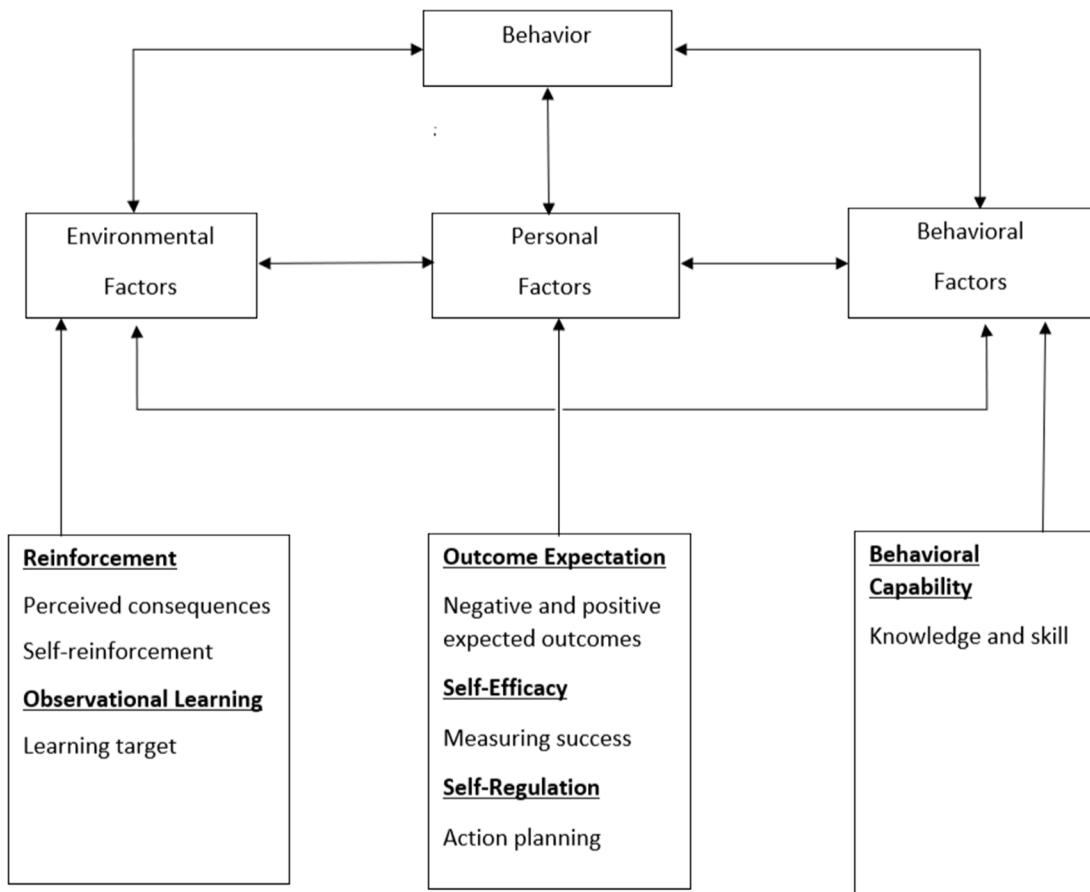


Figure 4. SCT Model

Social Cognitive Theory	
Key Principles	Description
Self-efficacy	Ability of an individual's ability to in succeeding in a task.
Self-regulation	Goal setting, planning, and monitoring are done before attempting to achieve an outcome.
Observational learning	Learning patterns of behavior and action from instructors, peers, friends, and experts.
Outcome expectations	Benefits are achieved and problems are prevented through behaving in certain ways.
Behavioral capability	Knowledge and skills are needed to carry out tasks.
Reinforcement	Responses are dependent on how positive or negative the outcomes are according to behavior.

Table 1. SCT Model

To determine how well Hmong-Americans accept usage of healthcare technology the SCT model will be used. The other models were too general and work better in certain situations. The TAM model emphasizes user involvement in technology development may be more suited in a working environment as mentioned. The model being sought is one that emphasizes

cultural values of users from a certain demographic and the SCT model provides an ease of modification. The key principals of each of the three criteria can be modified to explore those factors. Some factors that can influence thoughts regarding technology usage are language barrier, health literacy, and cultural values. Some individuals may have an easier time using it than others having been exposed more to technology and fluency in the English language, thus have an increased sense of self-efficacy. When adapting to living in another country or growing up in a bicultural environment would require adopting behaviors from the surrounding environment through observational learning. Incorporating healthcare technology into health regimen can assist in increasing technology acceptance level among Hmong-Americans.

1.2 Hmong

Hmong History

The United States is comprised of a diverse range of ethnic populations who moved there for various reasons whether it be for financial reasons or safety. The latter is true for the Hmong where most of the current generation exists today due to the first generation to reach U.S. soil first fled from the Vietnam war. During the Vietnam war, Hmong were recruited by the U.S. Central Intelligence Agency to help fight against communist forces (Xiong et al. 2015). Having lost the war, the Hmong faces retaliation from the Communist party for siding with the U.S. that resulted in some having to relocate to different countries (Xiong et al. 2015). Regions where they originated from are dispersed throughout Southeast Asia, but mostly from northern Laos (Xiong et al. 2015). Problems comes with the process of integrating in a different country. Struggling to adapt to the culture and language of that country can develop into a barrier to accessing healthcare (Xiong et al. 2015). Having healthcare personnel like nurses understanding

norms, cultural values, traditional and spiritual practices of the Hmong would help build a rapport between the two (Xiong et al. 2015).

Social and Family Structure

The Hmong live in a clan-like structure as a basic unit of social organization and lead in a patriarchal manner (Xiong et al. 2015). In that society, Hmong follow shamanism where a spiritual leader or shaman is utilized across clans when dealing with the overall wellbeing of an individual (Xiong et al. 2015). A shaman's role is to identify cause of illness and communicate with the spirit world to restore a person's soul to their body (Xiong et al. 2015). There are distinct roles among the men and women (providing and domestic duties respectively) in the family with women marrying between early teens and twenties to men in late teens up to their thirties (Xiong et al. 2015). Polygamy is also a common practice that has dwindled down over the years (Xiong et al. 2015). Newer generations have taken to adopting a more westernized form of marriage life/viewpoint where marriage is usually anticipated after completing higher education or even choosing not to marry at all (Xiong et al. 2015). Assimilation into western culture does not necessarily mean higher quality of living with economics being one of the factors in unequal pay employment (Xiong et al. 2015).

Cultural Beliefs

Spirits are a central part of Hmong religious beliefs where the spirit is tied to health. To prevent illness an individual is blessed with khi tes or string tying usually around the wrists as a defensive measure against malicious spirits (Xiong et al. 2015). Maintaining a balance between the body and the spirit ensures good health. In keeping that balance, shamans often act as a bridge between the living physical and spiritual plane (Xiong et al. 2015). Illness is dealt with

performing ceremonies to return the spirit of the ill person by a shaman (Xiong et al. 2015). Other treatments for curing illness are herbal medicines, spoon rubbing, and coining (Xiong et al. 2015). The skin scraping technique from the latter two treatments are believed to ease up muscle tension to promote healing. In terms of effectiveness there is little research that the benefits are a result of this technique or an outcome of a placebo effect. Reincarnation is a belief in shamanism where the body must remain as whole as possible to be properly reincarnated (Xiong et al. 2015). This belief can deter some families from accepting procedures that would disrupt bodily form in the way of surgical removal and implants such as dental fillings. Chronic disease is viewed as a result of bad actions done by individual's past lives according to traditional beliefs and may influence families' willingness to accept a prescribed treatment (Xiong et al. 2015).

Interaction between Hmong Families and U.S. Healthcare

In face to face interactions, body language conveys different meanings among people of varying cultures. Providers can mistake nodding as a sign of agreement with care plan and that it does not necessarily mean understanding what was spoken, but merely a gesture to indicate listening (Xiong et al. 2015). Distrust of the U.S. medical system stems from lack of familiarity with the healthcare system and troubled interactions leading to poor experiences. This kind of distrust can lead to delays in seeking out care and result in poorer health outcomes. Prescribed medication or care plans can be ignored for conditions with unseen symptoms (Xiong et al. 2015). Hmong families with children attending school make some exceptions for medical health routines that are required and come to an understanding of their importance such as immunizations (Xiong et al. 2015). Aside from religious beliefs and preference for herbal

remedies and low income interferes with gaining access to routine health care like dental and immunization.

Screening Among Hmong Americans

The importance of screening tests helps detect potential diseases and abnormalities that aren't readily apparent especially to those that are susceptible to certain health problems. A high incidence rate of liver cancer is five times higher among Hmong adults coupled with a low hepatitis B screening rate (Fang and Stewart, 2018). There are limited studies to assess how knowledgeable Hmong Americans are about HBV infections, along with how much their cultural beliefs influence their view on the disease (Fang and Stewart, 2018). As an explanation for not seeking screening is an attempt to protect family reputation implies social stigma towards diseases. Another reason is fear that medical test results may turn up poor prognosis. For older Hmong patients, seeking a doctor was secondary to traditional healing (Fang and Stewart, 2018). Other barriers to hepatitis B screening were health care costs, perceived discrimination, transportation issues, language barrier, and poor quality of care (Fang and Stewart, 2018). To improve screening healthcare providers, policy makers, and community-based organization would need to work together to create interventions addressing these issues (Fang and Stewart, 2018).

Improving Communication in Healthcare for Hmong Families

In improving healthcare to Hmong families it's important to establish a rapport to convey respect when teaching medical procedures, interventions, and diseases. At times interventions are declined or not followed through because the need and importance of them are not well understood. Nonverbal communication serves as cues for Hmong persons who have English as

a second language. Careless usage of nonverbal cues can either come off as offensive or lead to misunderstandings on the part of healthcare providers (Xiong et al. 2015). If disrespected, instead of confronting the provider(s) they choose to not return (Xiong et al. 2015). Another method in building trust is working with their shaman where shamans can act as consultants when discussing various diseases and treatments (Xiong et al. 2015). In bridging the gap between language barriers interpreters are used when the Hmong language is predominantly used by the patient. It is not usually recommended to have the patient's family member to interpret as it does not guarantee mitigation of misunderstandings (Xiong et al. 2015). A teach back method can be used to indicate understanding on the part of the patient (Xiong et al. 2015).

Recruiting Hmong Adults for Health Research

Trying to recruit ethnic minorities like Hmong Americans into health research can be challenging, only made easier if researchers has high enough affiliation with their target population. Conducting research on underrepresented ethnic minorities can provide a better understanding of their wants and needs when improving better care for those in the minority like the Hmong (Lor and Bowers, 2019). It could be useful to learn how Hmong participants view insiders or researchers well acquainted within the community versus outsider researchers (Lor and Bowers, 2019). There are considerable advantages and disadvantages posed by being an insider or an outsider researcher within a specified community. As an insider one has a better understanding of their study group's culture in part due to having an established relationship or successfully built one over time (Lor and Bowers, 2019). The down side is loss of objectivity and collected data are opinionated from personal knowledge rather than actual

results (Lor and Bowers, 2019). The disadvantage of an outsider is opposite to the advantage of an insider with the up side of remaining objective and reserving judgement.

A contributing factor that bars researchers is the historical context surrounding the relationship between the Hmong community and the healthcare system (Lor and Bowers, 2019). Members of the Hmong community whom have poor experiences with the healthcare system through barriers that includes poor understanding of researching purposes, fear of deportation for those under immigrant status, and any unintentional insensitivity towards cultural differences (Lor and Bowers, 2019). To address and mitigate those barriers involves community outreach strategies through working with professionals and members of the community (Lor and Bowers, 2019).

Health Related Decision Making Among Hmong Americans

Hmong whom immigrated over to the U.S. eventually settled down living as Americans and have more than one option of health management by deciding when to use traditional healing or western health services. A determining factor to which treatment is chosen depends on whether they consider the illness as a spiritual issue or not (Maichou et al., 2017). The criteria used for gauging the effectiveness of a treatment is physical evidence of improvement in health, influencing decisions to choose one treatment over the other (Maichou et al., 2017). Visible bodily problems like a bone fracture would elicit a decision to see a health provider, while symptoms associated with illness like fever induced pallor would opt for a traditional treatment (Maichou et al., 2017). Non-visible symptoms like heart or asthma attacks would lead to seeking services from the ER and symptoms associated with chronic illness like joint pain uses traditional treatment like herbal medicine. Health issues where the Hmong individual is

unable to make a connection according to traditional knowledge regarding the cause of a severe condition may turn to western treatment (Maichou et al., 2017). Both types of treatment are used interchangeably according to which would give better results in health improvement.

Hmong Americans and Health Related Technology

The Hmong being part of the ethnic minority meant living in a high electronic media environment, though not necessarily having a greater number of devices but device usage (Eisenberg et al. 2014). Socioeconomic differences may account for the number of devices in a household, in that families with limiting income may only purchase certain items that are necessary or will have frequent use (Eisenberg et al. 2014). There are attempts made by Hmong Americans to seek out information on different kinds of diseases despite low screenings. Health providers and the internet were some of the main sources of information for certain cancers like breast and cervical cancer accompanied by their screenings (Thorburn, Keon, and Kue, 2014). Other sources include family members, friends, and different forms of media (Thorburn, Keon, and Kue, 2014). For those who predominantly use their native language but may not necessarily read and write it, have English as their second language are more likely to encounter health literacy problems in cancer and its prevention as a barrier to screening (Thorburn, Keon, and Kue, 2014).

Health literacy can be less of an issue for recent generations who are more familiar with the English language and health terms. They can still face problems if they cannot read or write their native language even if they are fluent in it as it can cause some difficulty in translating health terms from one language to another (Thorburn, Keon, and Kue, 2014). The lack of

Hmong terminology for words like cancer, Pap test, mammogram, and more adds on to the literacy challenge faced by some Hmong Americans (Thorburn, Keon, and Kue, 2014). In reporting there is nothing stopping them from seeking information, the internet as one of the main sources in obtaining health information has an advantage of being convenient. The convenience forgoes having to venture out to seek out a professional if the individual has time constraints. Older Hmong patients who have little familiarity with other forms of information sources involving media outside the internet did not know where to get information and heavily depend on their health provider for it (Thorburn, Keon, and Kue, 2014). A willingness on the part Hmong Americans to self-educate and openness to different sources along with health providers can encourage acceptance of health technology.

1.3 Health Technology

SCT Application

There is the question of how SCT model and its key components can be applied in a real-life setting. In a study conducted by the Department of Nutritional Sciences to improve eHealth interventions by focusing on incorporating SCT in web strategies. The aim was to review a broad spectrum of digital health interventions that uses SCT in designing those interventions (Farfaglia, 2019). Gathered studies identified a pattern in which users gravitate more towards health interventions that have a web design promoting behavior change and adherence to changes (Farfaglia, 2019). The only difference is which types of web-based features are preferred when it came to certain age groups. There is more engagement in health self-efficacy among teens when they're able to create content and develop their identities through audiovisual materials (Farfaglia, 2019). Adults tends towards focus groups where they can share

their progress through uploaded pictures, recipes, and status updates (Farfaglia, 2019). When people encounter uncertainty, they may seek the opinions of others who have experienced or dealt with an issue before aside from obtaining information pertaining to their question. Communities springing up out of the desire to receive and give help offers an opportunity to form meaningful solutions to health problems through digital media as one of the most accessible source of information (Farfaglia, 2019). An example would be discussion forum based on pregnancy with one of its members seeking advice on postpartum bleeding with answers ranging from sharing experiences to giving instructions.

When finding related literature to review, keywords were chosen to locate papers containing characteristics of web-based health interventions in a randomized controlled trial (RCT) or social cognitive/learning theories (Farfaglia, 2019). The search strategy involved obtaining literature from the University of Connecticut Library databases, ProQuest, and PubMed using search terms related to the study (Farfaglia, 2019). Results obtained from the sorted literature required incentives or goal setting to encourage behavioral change. Behavioral change is a characteristic of a web design that determines the quality of a health intervention website that can elicit results. In one study bets are used in a weight loss challenge proffered by a social gaming site with its participants setting a percentage of body fat to lose (Farfaglia, 2019). Incentive formation fulfill several principles that defines SCT. Incentives serves as reinforcement with other participants joining and reporting their progress encouraging the user, along with self-regulation in managing actions in creating a set plan to achieve a goal.

SCT model can be applied in healthcare education for parents and families when addressing health and wellness changes through groups. Different instructional strategies and integrating technology in learning to meet the needs of families on an individual level (Portugal, 2018). Key principles of the model are utilized in the teaching. The self-regulatory concept refers to the individual's ability to control their behavior in challenging environments (Portugal, 2018).

Reproduction is a process where educators can place individuals in a safe learning environment to better retain knowledge, learned behaviors, and practiced changes (Portugal, 2018).

Observational learning through looking to peers and instructors when gaining knowledge and changing behaviors (Portugal, 2018). Group members teach and learn from each other through creating lesson plans, writing articles or books, interactive technology, and news (Portugal, 2018).

2.Methods

2.1 Literature Review

The findings in the study was mostly done through literature review to identify key factors unique to the Hmong people. In analyzing their cultural values and how those values affect their view on health provides contextual insight into how they view western medicine. How well they respond to western medicine and the healthcare system affect their view on health technology usage. Cultural values and perception on health become key factors that are incorporated into the SCT model when refitting it to be more specific to Hmong culture in **Table 2**. Certain key factors are placed or grouped together under corresponding key principles of the revised model, traditional medicine falling under outcome expectations in using traditional

method to manage health comes with the expectation of seeing visible improvement for instance.

2.2 Personal Observations

Some personal observations help lends some credence to the related literature reviewed showing correlation between what was studied about Hmong culture and what was observed. In terms of technology, internet was observed to be used as a health information source regarding diseases and health conditions alongside healthcare provider. When making decisions concerning a hospitalized family member who are nearing the end of their life or severely ill for life are usually handled by male heads in an extended family, tracing back to the patriarchal nature of the culture under social/family structure factor. It's not recommended to use relatives to translate particularly when it comes to medical terms and procedures in communication improvement factor. There are some exceptions if it's about the patient on a personal level, relatives would translate patient's question regarding their own comfort (feeling cold or feverish, pain level, items, etc.). Healthcare barriers were discussed with one of them being low quality of care. Some having poor experience due to the impression a healthcare provider giving off disinterest over their situation or concerns. A family member I spoke to was dissatisfied with their provider feeling their questions weren't adequately answered or brushed aside, not given their results, referrals to procedures involving surgery that they didn't want causes them to switch to a different provider.

Hmong Culture SCT Model	
Key Principles	Description

<p>Self-efficacy</p>	<p><i>Ability of an individual's ability in succeeding in a task.</i></p> <p><u>Screening among Hmong Americans</u></p> <p>Barriers preventing Hmong Americans from undertaking screening tests: language barrier, lack of transportation, health care costs, perceived discrimination, and poor quality of care.</p>
<p>Self-regulation</p>	<p><i>Goal setting, planning, and monitoring are done before attempting to achieve an outcome.</i></p> <p><u>Social and Family Structure</u></p> <p>To achieve wellness a shaman is consulted whose role is identify cause of illness and communicate with the spirit world to restore the individual's soul. Typically, roles are given when providing structure in a given society, shifts over time or change as a result of living in a different society.</p>
<p>Observational learning</p>	<p><i>Learning patterns of behavior and action from instructors, peers, friends, and experts.</i></p> <p><u>Hmong History</u></p> <p>Possesses beliefs and understanding of surroundings are passed down or learned from those around them. Having to incorporate American culture into their own to better integrate into society as an immigrant from another country.</p> <p><u>Interaction between Hmong Families and U.S. Healthcare System</u></p> <p>Health providers learning how to be appropriately culturally sensitive to Hmong patients in observing body language. Hmong families accepting or making exceptions to medical health routines after understanding their importance especially if it is a requirement related to work or school.</p>
<p>Outcome expectations</p>	<p><i>Benefits are achieved and problems are prevented through behaving in certain ways.</i></p> <p><u>Cultural Beliefs</u></p>

	<p>Spirits are central in Hmong religious beliefs where the spiritual state of a person is tied to their health. Illness is handled by shamans performing a ceremony in returning the spirit to its owner aside from using herbal remedies.</p> <p><u>Recruiting Hmong for Research</u></p> <p>To give better care to the Hmong population by collecting information. Results may vary among insider and outsider researchers where both have their own strengths and weaknesses.</p>
Behavioral capability	<p><i>Knowledge and skills are needed to carry out tasks.</i></p> <p><u>Health Related Decision-making among Hmong Americans</u></p> <p>When managing illness Hmong Americans have either options of traditional or western medicine. Criteria for effectiveness of treatment is physical evidence of health improvement.</p> <p><u>Hmong Americans and Health Related Technology</u></p> <p>Main sources of finding health information for Hmong Americans are through their health providers and the internet.</p>
Reinforcement	<p><i>Responses are dependent on how positive or negative the outcomes are according to behavior.</i></p> <p><u>Improving Communication in Healthcare</u></p> <p>To increase quality of care for Hmong Americans and encourage the use of healthcare services, healthcare providers build trust by working with shamans on discussing illnesses and treatments. Use of interpreters to bridge the language gap and learning nonverbal cues.</p>

Table 2. Hmong Culture SCT Model

3.Results

3.1 SCT Model Revised Including Hmong Culture Factors

Personal Factors

The Hmong cultural factors are now added into key principles to define the main factors that shapes behavior of this target group in the figure below. A belief system is constructed to explain every phenomena, most solutions traces back to a central belief of the wellbeing of the spiritual state is tied to the physical state. Being able to restore the spirit with an expected outcome of healing one's self is a form of self-efficacy in personal factors. Self-efficacy in being able to obtain useful information on Hmong Americans through two ways as an insider or an outsider researcher. The expected trade-off between the two having the possibility of losing objectivity in return of becoming more informed about the group's culture, their wants, and needs as an insider while the outsider maintains objectivity but may be locked out of the cultural ways of the group. Diminished self-efficacy in getting disease screening as a personal factor caused by language barrier, lack of transportation, being unable to cover medical costs, and experiences of poor quality of care. Improvement in self-efficacy in becoming well informed about importance of screenings through various sources from the internet, friends, family members, health care provider, and media (pamphlets, books, commercial ads, etc.).

Behavioral Capability factors

Behavioral factors are dependent on positive responses in repeating an action, for instance health related decisions are dependent in which method would give better physical evidence of

improvement. If illness is perceived as an issue with the spirit, traditional medicine is used otherwise western medicine is turned to as a response and western medicine is also used if the illness cannot be explained in any way via cultural beliefs. Hmong Americans and health technology as a behavioral factor where the perception of screening tests is influenced by the information they receive. How responsive the individual is to an unfamiliar disease depends on the quality of information they receive from the sources they seek from aside their healthcare provider.

Environmental Factors

Factors that influences an individual's behavior from their environmental setting is by observational learning and reinforcement. On the part of health care providers to increase quality of care and build trust with the Hmong community would require addressing issues with cultural sensitivity and language barrier as just some of the examples. In terms of observational learning, having to move to the United States to escape the Vietnam war as part of their history, would require some effort to integrate into American society.

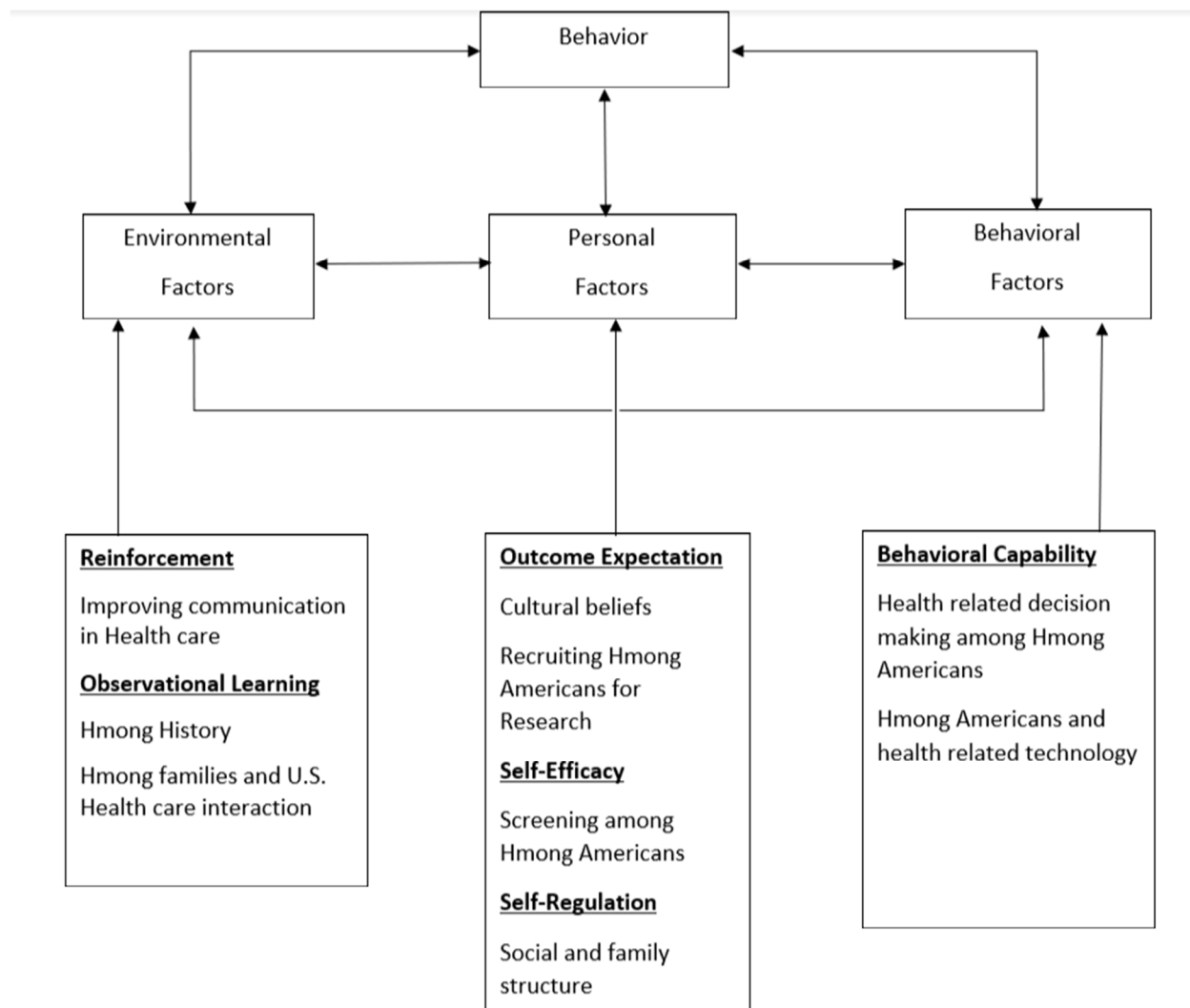


Figure 5. Revised SCT Model

3.2 Design Application and New Project Proposal

Some design applications for this model is to have user acceptance of health information technologies such as EMR, wearable technology, and monitoring devices targeting Hmong Americans. In garnering their attention, the model can be used to determine their preferred sources when seeking health information for inserting technologies related to those searches. Health providers being a main source of health information can educate on the uses of health information technologies to get Hmong patients more self-involved in care plans. Internet is

another main source of health information seeking. It can be used to find which sites are commonly used by this demographic to learn more about diseases, their symptoms, and treatments have the technologies listed under treatment options with how they are utilized. Telehealth allows long distance contact between health care providers and patients. A new project proposal is teaching benefits and usage of telehealth to Hmong Americans using the model.

4. Conclusions and discussions

In conducting research on determinants that can influence a group's perception of health technologies can help with understanding of how to increase its usage. It is possible for cultural factors to fit under more than one key principle. The recruit factor under outcome expectation can also fall under observational learning in that the culture of the target group is being observed as an example. A potential application of the model presented in this paper can be used to conduct other studies on lesser known ethnic groups. Gauging user acceptance among Hmong Americans can be challenging as not much research has been done on this target population's usage of health technology. A combination of working with members of this group like community centers and shamans, bridging the gap in language barrier, and increase cultural sensitivity could help in devising ways to improve user acceptance of health technologies.

5. References

- Dulloo, Rinku, et al. "Exploring Technology Acceptance Theories and Models - A Comparative Analysis." *1st International Conference Special*, 2015, pp. 308–317.,
khoj.mitsom.edu.in/index.php/KHOJ/article/view/107779
- Eisenberg, Marla E et al. "The home physical activity environment and adolescent BMI, physical activity and TV viewing: Disparities across a diverse sample." *Journal of racial and ethnic health disparities* vol. 1,4 (2014): 326-336. doi:10.1007/s40615-014-0040-4
- Fang, Dao M., and Susan L. Stewart. "Social-Cultural, Traditional Beliefs, and Health System Barriers of Hepatitis B Screening among Hmong Americans: A Case Study." *Cancer*, vol. 124, 2018, pp. 1576–1582., doi:10.1002/cncr.31096.
- Grace-Farfaglia, Patricia. "Social Cognitive Theories and Electronic Health Design: Scoping Review." *JMIR Human Factors*, vol. 6, no. 3, 2019, doi:10.2196/11544.
- Lor, Maichou, and Barbara J Bowers. "Hmong Older Adults' Perceptions of Insider and Outsider Researchers: Does It Matter for Research Participation?." *Nursing research* vol. 67,3 (2018): 222-230. doi:10.1097/NNR.0000000000000277
- Portugal, Lisa Marie. "Naturopathy Education, Social Cognitive Theory, PrecedeProceed Model, and Lesson Plan." *Journal of Natural & Ayurvedic Medicine*, vol. 2, no. 1, 2018, doi:10.23880/jonam-16000115.
- Taherdoost, Hamed. "A Review of Technology Acceptance and Adoption Models and Theories." *Procedia Manufacturing*, vol. 22, 2018, pp. 960–967., doi:10.1016/j.promfg.2018.03.137.

Thorburn, Sheryl et al. "Sources of breast and cervical cancer information for Hmong women and men." *Women & health* vol. 53,5 (2013): 468-78. doi:10.1080/03630242.2013.796305

Xiong, Shoua, et al. "Engaging in Culturally Informed Nursing Care With Hmong Children and Their Families." *Journal of Pediatric Nursing*, vol. 31, no. 1, 2016, pp. 102–106., doi:10.1016/j.pedn.2015.08.008.