Chapter #16

ATTITUDES TOWARD MHEALTH: A LOOK AT GENERAL ATTITUDINAL INDICES AMONG SELECTED FILIPINO UNDERGRADUATES

Roann Munoz Ramos[1], Paula Glenda Ferrer-Cheng[2], & Francine Rose de Castro[3]
[1]*RWTH Aachen University Hospital, Aachen, Germany*
[2]*University of Santo Tomas, Manila, Philippines*
[3]*La Consolacion College, Manila, Philippines*

ABSTRACT
Mobile phones are increasingly used for Internet access due to their relatively low cost, easy availability and high usage rates. The ubiquity of mobile technology, especially among young people, is being incorporated in healthcare delivery. Known as mobile health (mHealth), it is the practice of medicine and public health supported by mobile devices. In developing countries, such as the Philippines, mHealth is relatively in its early stage. The popularity of mobile devices and applications (apps) among Filipinos may offer advantages and opportunities for local health professionals. However, to maximize mHealth usage, it is important to ascertain the attitudes regarding mHealth. To this end, survey forms were distributed to 811 undergraduates. In addition, a series of focus group discussions (FGDs) was conducted with 76 participants, elaborating on survey responses and centering on themes such as mHealth familiarity and health app usage. Although the participants are technologically adept and active Internet users, majority who responded to the survey are unaware of mHealth (81%). During the FGDs, ambivalent attitudes toward mHealth and health apps are expressed. Despite acknowledging the benefits of mHealth and mHealth apps, crucial issues such as mobile health applications validity are raised.

Keywords: attitudes, behaviors, mHealth, mobile technology, mobile devices.

1. INTRODUCTION

Why is a study on attitudes relevant? For one, to an extent, our attitudes shape our social thoughts. They influence our evaluations of a stimulus by judging it in either a positive or negative light. Although attitudes do not consistently determine behavior, nor do all behaviors mirror attitudes, attitudes may still determine the intentions, which in turn, could predict behaviors. The importance of attitudes extends to the field of healthcare. By ascertaining which attitudes are dominant, for instance, has contributed to the promotion and modification of improved health behaviors.

An emerging trend in health management, mobile health (mHealth) is the use of mobile technology for health and its related services, such as medical information, doctor appointment reminders and vital signs tracking (e.g., pulse rate, sugar levels).

In this chapter, we present our work exploring mHealth attitudes among college undergraduates. Tagged as a technologically sophisticated generation, we wanted to know, among others, their familiarity with mHealth and their willingness to use their mobile devices in health-related functions. To this end, we conducted surveys and focus group discussions among college students to determine their thoughts and feelings on the utilization of mobile technology in health activities. We hypothesize, due to the strong

presence of mobile technology usage among adolescents and young adults, that they have formed attitudes toward mHealth and that current mHealth-related behaviors (e.g., downloading mHealth apps, use of fitness applications) reflect their mHealth attitudes.

1.1. Attitudes – A Brief Overview

Attitudes - whether they are affective-, behavioral- or cognitive-based, conscious or unconscious, observable or not - serve as our life compasses. They guide us at a personal level – how we think, feel and behave – and exert an impact involving a grander scheme of events – for instance, adopting best strategies and shaping decision-making in the field of healthcare.

Interest in exploring the nature of attitudes has a long and rich background. Even before Gordon Allport wrote his seminal chapter on attitudes in the 1935 *Handbook of Social Psychology* the term itself appeared as early as the 1660's, technically referring to a figure's posture in a statue or painting. Later on, it was used to describe the body's posture connoting a mental state.

1.1.1. Some definitions

Being among the earliest concerns in social psychology, scholarly works on attitudes have been occupying the field's research annals. As Allport (1935) famously mentioned, the study on attitude is "the most distinctive and indispensable concept in contemporary social psychology" and has been a "primary building stone". It remains, up to this day, an influential topic and point of discourse.

Since then, the term has been explained and discussed in a number of ways. Summing up various definitions, Allport proposed that an attitude is a "mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related." (Allport, 1935). As a "psychological tendency" in evaluating an object with "favor or disfavor" (Eagly & Chaiken, 1993), an attitude is "relatively enduring" and "organized" (Hogg & Vaughan, 2013). Based on evaluative knowledge, it is a reaction toward a target – someone or something – as manifested in one's beliefs, feelings or intended behavior (Myers, 2013; Olson & Zanna, 1993). Attitudes can also viewed as object-evaluation associations in memory (Fazio, Chen, McDonel & Sherman, 1982). The object of an attitude ("attitude-object") is "anything that can be discriminated by a perceiver" (Eagly, 1992) and can be evaluated in a dimension (e.g., like/dislike). Being strongly associated with an object, an attitude can be triggered by an object representation in memory (Sanbonmatsu, Prince, Vanous & Posavac, 2003; Fazio, Sanbonmatsu, Powell, & Kardes, 1986). In addition, the strength of an association and its accessibility from memory depend on how the attitude was developed. (Is it based on beliefs? Emotions? Behavioral information?)

However, one must exercise caution in drawing conclusions regarding an individual's response or responses to a self-report, questionnaire or any verbal or written query as automatically representing an attitude. Per se, such responses or "opinions" should not be taken at face value as "attitudes" but rather, as "verbal expressions of an attitude" which "symbolizes an attitude" (Thurstone, 1928). Although opinions can serve as a means of measuring attitudes, internal and external factors can influence an individual's responses, such as pressure to comply, self-presentation, item comprehension and perceived value. Opinions are best regarded as attitude indices.

1.1.2. Classifications of Attitudes

The domain of attitudes is scrutinized from different angles. For instance, as what is often mentioned, is that attitudinal components are broken down into affect or feelings (A), behavior tendency (B) and cognition or thoughts (C). From a functional perspective, attitudes serve to facilitate psychological needs by mediating between the inner needs (expression, defense) and the external environment (knowledge, adaptive) (Katz, 1960). The four functions are knowledge, ego-expressive, adaptive and ego-defensive. Having knowledge or meaning allows for behavioral prediction. In doing so, we are able to organize and control our environment and maintain consistency. Since attitudes constitute a part of one's identity, its verbal and non-verbal ego-expressions help in self-communication and asserting one's self. Attitudes also enable us to adapt socially by blending with groups and taking part in communal activities. Expressing socially accepted attitudes facilitates smooth interpersonal relationships. On the other hand, possessing attitudes contrary to one's group expectations leads to social-disengagement. Lastly, attitudes help protect one's self-esteem, as exemplified in attempts to "rationalize" and justify actions to cover up guilt and humiliation.

1.1.3. Attitude Formation

The expectancy-value theory (Fishbein, 1963) explains how attitudes are developed based on the appraisal of an attitude object. An attitude is the interplay between expectations and evaluation while a chosen behavior will depend on one's beliefs and values and the perceived gratification of a goal. With expectancy, it is one's belief or perception if an attitude object possesses a particular attribute, or if a behavior will produce a particular consequence. Evaluation involves one's affect toward an attribute or behavioral outcome. Since attitude strength may vary from one condition to another, its magnitude can be evaluated in progression. According to the attitude-nonattitude continuum (Fazio et al, 1986), associative strength progresses from attitude indifference or novelty due to the lack of previous evaluative association (nonattitude) to strong evaluative association (attitude). A strongly held attitude (and its likelihood to affect behavior) is determined by its significance to the person and the amount of knowledge one possesses regarding the attitude object. For an attitude to be personally relevant (significance), it should relate to one's interest, identification and value. Possessing more information and knowledge regarding an attitude object (e.g., topic of interest, direct experience) makes an attitude firmer.

1.1.4. Attitude-Behavior Connection

To what extent do one's attitudes guide behaviors?

Although expressed attitudes do not always predict behaviors, Myers (2013) lists three instances when behaviors match attitudes. One is having minimal external influences. When individuals are in the presence of others, they are swayed by the majority's attitudes, despite having expressed contrasting attitudes. By minimizing social pressure, people act according to their attitudes. Attitude-behavior congruence is also emphasized when the attitude we are looking into is specific to the behavior in question. Lastly, the more potent the attitude, the more likely it will influence behavior.

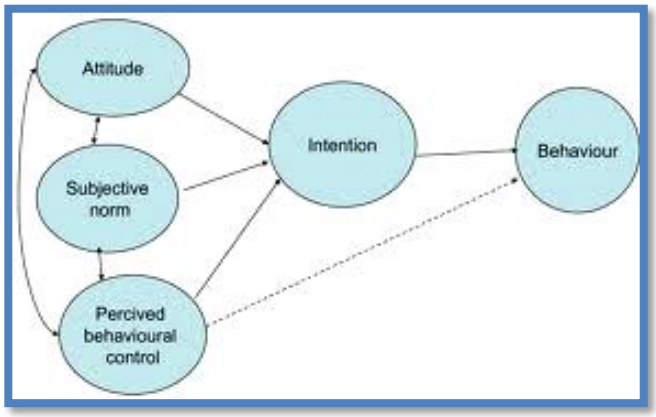
As compared to specific attitudes, general attitudes can have a stronger impact on behavior. Discussing possibilities that can moderate the strength of the attitude-behavior connection, Ajzen and Fishbein (2005) explain three factors which may have a bearing on this relationship: a) person doing the behavior (individual differences); b) situational conditions under which the behavior is performed (situational moderators); and c) characteristics of the attitude itself. Considered under individual differences, among

others, are self-monitoring, self-consciousness or self-awareness and need for cognition. The expressive behaviors of low monitors, for instance, are thought to be better indicators of their own attitudes. "Awareness" activities, such as being reminded of our attitudes and spending time to think through our actions, increase self-consciousness. Other influences that might lead people to behave in line with their general attitudes is possessing a special vested interest on the attitude object, having a heightened personal relevance or importance of the attitude and holding the attitude confidently. Some situation moderators include being under time pressure and having a mirror during the behavioral situation. It has been shown that the presence of a mirror increases one's self-awareness. As to the qualities of the attitude itself, attitude-behavior consistency depends on the harmony between the attitude's cognitive and affective components, source of information (direct vs. second-hand) and route of persuasion (central vs. peripheral). Attitudes based on direct experience, for example, are a better gauge of subsequent behavior.

However, it is not possible to obtain strong correlations between general attitudes and overt behavior. Attitudes may predict behavior, to a certain extent, as long as the measure of behavior broadly represents the attitude in question. According to the principle of aggregation, "the sum of the set of multiple measurements is a more stable and representative estimator than any single measurement" (Rushton, Brainerd & Pressley, 1983). The effects of an attitude become more obvious when we aggregate or average behaviors. By aggregation, the congruence between attitude and behavior is strengthened and reliability and construct validity of the behavior we wish to measure is increased.

In Ajzen's theory (1991) of planned behavior (formerly, theory of reasoned action) (Figure 1), performance of behaviors is explained in terms of the degree of self-control one is able to exert. Behaviors progress in a continuum from total control to complete lack of control, depending on the absence or presence of constraints (Godin & Kok, 1996). When there are no constraints, one has absolute control over his/her behaviors. On the other hand, the individual lacks control when there is the absence of opportunities and/or resources required to perform the behavior (e.g., skills, money). An important concept in the theory is behavioral intention or motivational factors as influenced by the *attitude* about the likelihood that the behavior will have the expected outcome and the *subjective evaluation* of the risks and benefits of that outcome. It is the expressed motivation to perform some behavior or achieve some goal (Warshaw & Davis, 1985). The stronger the intention or motivation, then the likelihood of behavioral performance is greater. Thus, one's perceived behavioral control can influence attitude, intention, and possibly, behavior.

Figure 1. The theory of Planned Behavior (Ajzen, 1991)



1.2. What is Mobile Health?

Worldwide ownership of mobile phones is fast growing, with more than 6 billion people having at least one unit (Gaggliogi & Riva, 2013). Its widespread-usage can be attributed to its relative low-cost and being unaffected by societal norms or cultural values (Brian & Ben-Zeev, 2014). Almost half of the over 78% of adolescents who have a cell phone possess a smartphone (Madden et al, 2013). They use mobile devices mainly for communication via instant messaging (IM) and text messaging (Alberts, Nakamaya & Martin, 2007).

Mobile information technology has fundamentally changed the way we interact with one another and with our environment. We have integrated the technology in our daily routine in more ways than one. For instance, when in the beginning, the function of mobile phones was limited to calling and, afterwards, text messaging, mobile devices nowadays are quickly emerging as tools in the practice of healthcare, thus paving the way for opportunities not previously available. Referred to as mobile health (mHealth), it makes use of mobile technology and its functionalities in the delivery of healthcare and health-related information (Varshney, 2014; World Health Organization [WHO], 2011). As a new field in electronic health (eHealth), mHealth is brought about by the "unprecedented spread of mobile technologies as well as innovative applications to address health priorities" (WHO, 2011). Mobile technology, through a system of monitors, alerts and provision of information, allow people to attend to their health more efficiently and to generate useful information that can be used by remote healthcare practitioners. The pervasiveness of mobile technology has allowed both patients and health providers to interact using various avenues and systems in order to exchange calls and SMS or text messages, to access websites for information, to provide clinical decision and support, to enhance assessment and diagnosis and to capture and transmit data and images (e.g., Shore et al., 2014; Jones et al., 2015; Iwaya et al., 2013; Luxton et al., 2011). Mobile or software applications ("apps"), designed to "extend the phone's capabilities by enabling users to perform particular tasks" (Purcell, Entner & Henderson, 2010), have been also specifically developed to promote and to assist in healthcare delivery. Some of the health app functions include providing disease information, counting calories, tracking fitness, losing weight, yoga and meditation exercises and monitoring menstrual cycle. In addition, mHealth has been tagged for its potentials as a partner strategy in achieving the United Nations' (UN) health-related Millennium Development Goals (MDGs), such as improving maternal and child health and combating poverty-associated diseases.

Apparently, there is a worldwide "excitement" surrounding the adoption of mHealth. According to the Second Global Survey on eHealth conducted by WHO in 2011, low income UN member states (77%; n=22) reported at least one mHealth initiative, in comparison to the 87% (n=29) of high-income member states. At least 75% of the participating member states from each region mentioned the presence of at least one mHealth initiative in the country, with the South East Asia (SEA) region reporting the most initiatives. Also, 48% of the participating member states are using mobile devices in emergency and disaster situations, with the SEA region showing greater than average adoption of these devices. In addition, the SEA region reports the highest emergency toll-free telephone services (88%). An example in the Philippines is the program by the National Management and Poison Control Center at the University of the Philippines for poison-related concerns. In terms of mHealth information initiatives, the SEA region (62%) posts the highest level of mobile information initiatives in terms of access to health information, such as publications and databases (WHO, 2011).

Although the use of mHealth is relatively widespread in some Asian countries such as in India and Bangladesh, its role as a complementary and supplementary approach to traditional healthcare practices has yet to be accepted in the Philippines. Despite this, the proliferation of the use of mobile devices in the Philippines among young people is promising for the introduction to mHealth. Among the healthcare IT trends foreseen to transform the country's healthcare delivery are the adoption of electronic medical/health records, mobile health applications health information exchange ("Healthcare IT trends", 2014).

The ubiquitous presence and usage of mobile technology can be harnessed to understand everyday health behaviors. The adoption of mHealth has a myriad of socio-economic impact. It broadens healthcare's reach to patients and increases the efficiency of its delivery. It is now increasingly possible to remotely diagnose, assess and monitor patients from rural areas or the elderly from their homes. It has the means to lessen medical costs and, at the same time, improve its quality. As a vehicle of empowering individuals, primary care becomes more patient-centric by allowing the patient greater freedom in managing private health records and personalizing healthcare. In addition, mHealth scales down the inequalities based on gender and income. Apps that deliver medical information become the venue for increased awareness regarding disorders. Particularly for individuals with mental illness, the use of mHealth provides privacy, thereby reducing the stigma they face.

1.3. Why Adolescent Health?

Although there have been numerous and diverse investigations on health, most have mainly focused on adult health. Unfortunately, the importance of adolescent health is overlooked. For this reason, it is perceived that, in comparison, youth health studies are in their infancy stage. Discussions are often in broad terms, when, in reality, the health concerns and needs of adolescents are varied and wide-ranging. In addition, they are considered to be a "vulnerable" group who depend mainly on parents for access to health information.

Many mental health issues emerge during the adolescent stage. Sadly, there is a social penchant to make light of their mental problems by merely attributing these problems to the adolescent phase of *Sturm und Drang*. Mental illnesses, particularly depression, have been identified as the largest cause of the burden of disease among young people (WHO, 2015). Aside from poor emotional regulation skills, Cairns, Yap, Pilkington & Jorm (2014) mention alcohol abuse, illicit drug use, insufficient sleep, negative coping strategies and weight issues as risk factors for depression and depressive symptoms. Mental disorders, when undiagnosed and unmonitored, will have profound negative implications for their over-all future development.

Benefits in investing in adolescent health are enormous. For one, healthy development during adolescence contributes to good mental health. Attitudes and practices shaped during this time are crucial not only for the adolescents' current wellbeing (short-term) but also set the stage for future health concerns when they reach adulthood (long-term). Proper health habits developed early in life reduce the risk for chronic diseases. Awareness regarding health-related topics reduces stigma and misconceptions and encourages them to seek professional help. It is during adolescence when individuals gradually take responsibility for their health (Crockett & Peterson, 1993). According to the 2001 WHO Global Consultation Report, by networking existing service-providers, adolescents are likely to obtain health services in school.

2. RESEARCH BACKGROUND AND OBJECTIVES

For our investigation, we decided to focus our attention on the attitudes of university undergraduates regarding mHealth for a number of reasons. Foremost, today's adolescents are described to be techno-centric. Being technology-savvy, they are likely to have more than one electronic device and get involved in technology-related activities. Madden et al (2013) report that 93% of US teens own a computer (desktop or laptop) or have direct access to one. Twenty-three percent have a tablet. Gadget of choice appears to be the mobile phone, with 78% owning one with almost half of them smartphones. Likewise in the Philippines, ownership of mobile phones is popular, mainly due to its functionality and affordability. According to Ipsos Media Atlas Philippines ("Ipsos study: The", 2012), almost a third of urban Filipinos acknowledge mobile phones as a life necessity. In 2002, AC Nielsen reported that out of the 1.5 million Filipino Internet users surveyed, 45% is in the 12-19 years age range (Asian Institute of Journalism & Communication, 2009).

Mobile access among teenagers is becoming widespread, incorporating mobile technology in their day-to-day happenings. Almost 3 in 4 (74%) between 12-17 years old use mobile devices to access the Internet with mobile phones becoming the preferred means to go online ("cell-mostly") (Madden et al, 2013). Twenty-three percent of teens access social networks via their mobile phones (Zickhur, 2010). In addition, adolescents are constantly engaged in various Internet-related activities. A 2010 survey conducted in 11 Asian countries show that Filipinos ages 8-24 are the top recreational users of the Internet. Based on the findings, Filipino youth are active in social networking, online gaming and watching Web videos ("Pinoy kids among", 2012)

As mentioned, mental health problems often start to manifest during adolescence. Since health issues of the youth are too often ignored, we deemed it vital to acknowledge health attitudes, particularly toward mHealth. As evidenced by the proliferation of mHealth, technology can be harnessed to improve access to health information. Hingle, Nichter, Madeiros & Grace (2013) found that among adolescents, text messaging or texting is a preferred medium in promoting healthy behaviors. As such, having lesser deterrents in obtaining health-related services may increase their help-seeking behaviors. By knowing undergraduates' attitudes toward health, particularly their use (or non-use) of technology in health practices, is beneficial in promoting and deciding best mHealth approaches targeted at this age group.

Our over-all objective for both the survey and Focus Group Discussions (FGD) is to determine the attitudes of Filipino undergraduates regarding the use of mobile technology for health purposes. Specifically, we also wanted to find out if their mHealth related behaviors are indicators of their attitudes. Survey items include what general software programs and specific mHealth applications they often downloaded. For the FGD, questions centered on the following aspects/themes:

- ✓ Familiarity with mHealth
- ✓ Attitudes toward mHealth
- ✓ Use of mHealth and mHealth apps
- ✓ Attitudes toward mHealth for mental health
- ✓ Intention to use mHealth

3. DESIGN

We utilized a cross-sectional survey research design for the profile of our undergraduate respondents. In addition, we conducted FGDs with randomly selected students to elucidate their opinions on mHealth.

4. METHODS

4.1. Participants

Eight hundred eleven undergraduates from varying course programs (15-25 years old; mean age: 17.90 years) (Female: 58%) (Freshmen: 34.64%) in Metro Manila and Central Luzon participated in our survey.

For the FGD, we randomly selected 76 participants from this pool of undergraduates who were later given academic incentives for joining.

4.2. Description of Instruments

We constructed a demographic form and survey to determine the profile of our respondents. It covers personal data (e.g., age, gender, year level) and use of mobile technology.

For the FGD, we formulated the following questions:

1. Have you heard about mHealth? What do you know about mHealth?
2. Can you think of possible mHealth benefits and applications?
3. Can you think of possible mHealth disadvantages?
4. Do you use your mobile phone to keep you physically- and mentally-healthy?
5. Do you think that mobile apps can help identify mental illness, such as depression? If mobile apps were to help identify mental illness, would you use it and/or recommend to others?

4.3. Data Gathering Procedure

Initially, we administered survey forms to 811 college students of varying undergraduate programs from three universities (two from Metro Manila, one from Central Luzon). In addition, we informed them about our study rationale and guaranteed their anonymity and personal data confidentiality.

From this group of survey respondents, we randomly selected and assigned 76 students (majority of whom have a certain degree of mHealth familiarity) who expressed willingness to join and were available during an FGD session (seven groups, 10 – 11 participants each). Informed consent was obtained prior to the conduct and recording of each session.

All seven FGD sessions (45-minutes each) were moderated by two of the authors (PGFC and FRdC). At the beginning of each session, they provided a quick briefing of the discussion procedures and a very short introduction on mHealth. They also shared some of the common responses from the survey to start off discussions among the participants.

5. RESULTS

5.1. Demographic Profile and Survey of mHealth Applications Usage

Table 1. Participant Data

Variables	Categories	N (811)	%
Gender	Female	470	58.00
	Male	323	40.00
	Not Specified	18	2.20
Age	15-17	336	44.20
	18-20	388	50.70
	21-23	39	5.10
	24-25	3	0.40
Year Level	First	281	35.00
	Second	200	25.00
	Third	202	25.00
	Fourth	77	9.50
	Fifth	16	2.00
	Not specified	35	4.30
Type of Device Used*	Smartphone	695	36.70
	Ordinary Phone	256	13.50
	Tablet	342	18.00
	Laptop/Netbook	602	31.80

** More than one device indicated*

Table 2. Software Applications Installed

Rank	App Function	No. of Responses*	%
1	Communication and Social	733	19.00
2	Entertainment	704	18.20
3	Browser and References	587	15.20
4	Utilities	376	9.70
5	Security	340	8.80
6	Organization	317	8.20
7	Reading and News	264	6.80
8	Health and Fitness	179	4.60
9	Shopping	108	2.80
10	Travel	104	2.70
11	Productivity	77	2.00
12	Cooking and Food	69	1.80
	Total	*3858*	

** Respondents were asked to select 3 commonly downloaded apps*

Table 3. mHealth App Downloads

Rank	App Category	No. of Responses*	%
1	Workout/Exercise/Running	112	54.90
2	Period Tracker	30	14.70
3	Food/Nutrition/Diet	26	12.70
4	Health Monitor	12	5.90
5	Health References	11	5.40
6	Weight Tracker/BMI	6	2.90
7	Sleep Apps	3	1.50
8	Psychological Health	2	1.00
9	Brain exercises	1	0.50
10	Skin care	1	0.50
	Total	*204*	

** Based only from those who installed Health and Fitness software applications (Table 2, item 8). More than one response was allowed.*

Majority of our survey respondents were females and in the mid- to late-adolescent stages. Similar to previous surveys, the college undergraduates in our study preferred the smartphone as the mobile device to connect to the Internet.

More than ¾ (n=653, 81%) are unaware and do not use mHealth apps. This finding is further supported by the rankings in Table 2, which show that apps related to health and fitness are not popular, with less than 5% of participants reported downloads of mHealth apps. When asked why they do not use such apps, majority report skepticism and perceived app inaccuracies. Others were simply not interested and had no use for them since they view themselves as healthy.

Of the 19% who are aware and use some form of mHealth app, the top three downloaded programs involve exercise (especially among the male respondents), monitoring menstrual cycle and nutrition. For this group, their main reason in availing the apps is for health awareness and taking more control of their health.

5.2. Focus Group Discussion Reactions

Generally, the responses we obtained during the sessions were elaborations of the survey data. We categorized the answers into five themes: 1) Familiarity, 2) Advantages and Disadvantages, 3) Actual mHealth usage, 4) Mental mHealth and 5) Intention to Use mHealth. Tables 4-7 provide summaries from the selected 76 participants:

Theme 1: Familiarity with MHealth

Table 4. Familiarity with mHealth

Question 1 Responses	%
a) Perceptions of inaccuracy and unreliability	35.00
b) Optimism about benefits and usefulness	29.00
c) Ambivalent	20.00
d) First time to encounter mHealth	6.00
e) Entertaining	8.00
f) Will consider to use apps if free	2.00

Majority of the FGD respondents have heard of mHealth, with mixed reactions. Most of the participants in the group, specifically those who have not downloaded any health-related application, expressed doubts and ambivalence regarding mHealth apps' accuracy and reliability. Those who regarded mHealth with optimism consider the apps as very informative yet entertaining and helpful in keeping them in shape. Like with any form of technology, they view that apps can be further improved.

Theme 2: Perceived Advantages and Disadvantages

Table 5. Advantages and Disadvantages of using Apps for health

Question 2 Responses	%
a) Self-awareness	48.00
b) Accessibility of information	43.00
c) More affordable healthcare	9.00
Question 3 Responses	
a) Lack of accuracy	48.00
b) App dependency	23.00
c) Discourages visiting medical professionals	7.00
d) Poor usability	12.00
e) Negative effect on self-awareness	10.00

To those who view the use of health apps as advantageous, their responses centered on increased self-awareness, access to information and lowered health costs. The majority (48%) of this group of respondents mentions that the major benefit is its ability to provide information and to facilitate self-awareness. They consider the apps as means to observe, improve, regulate, and monitor one's health without having to personally visit a doctor. Many (43%) indicate that apps make health information readily available. Data is instantly provided with little or no effort, anytime and anywhere. They also find installing apps as convenient since they almost always have their phones with them. Furthermore, free mHealth apps make information and health monitoring affordable.

On the one hand, mHealth is criticized for a number of reasons. Majority question the apps' accuracy and reliability. For instance, certain app reports do not reflect their personal observations. Some are unconvinced of the scientific-soundness of health software programs. Since health care must be considered on a case-to-case basis, a few find the results to medical inquiries too general and would prefer to see a physician. There is a perception that mobile phone users are able to manipulate their health concerns, thereby reducing the apps' validity. Another apprehension is that people will over-rely on mHealth apps for self-treatment, therefore depriving doctors of patients. Obtaining negative health results may lead to unfavorable self-perception, anxiety and exaggerated and unnecessary health worries. Lastly, participants expressed usability issues (e.g., poor/no Internet connection, loss of information when apps crash).

Theme 3: Actual Use of mHealth

Table 6. Mobile Phone for Physical & Mental Health

Question 4 Responses	%
a) Familiar and currently using mHealth apps	41.00
b) Downloaded but using inconsistently	18.00
c) Optimism about apps' usefulness/Have plans to download	9.00
d) Downloaded but uninstalled due to skepticism	14.00
e) Do not use mHealth apps	18.00

Majority of the FGD participants use their mobile phones for other purposes, aside from texting and calling. Many are familiar with mobile health apps for health awareness, monitoring (e.g., period trackers among females), maintenance and disease prevention (especially if the illness runs in the family), among others and use the software installations with varying degrees of consistency. A number of those using fitness programs are motivated by the desire to be physically attractive.

Theme 4: mHealth for mental health

Table 7. Use of mHealth apps for Mental Health Screening

Question 5 Responses	%
a) Provides information	21.00
b) Usefulness depends on assessment design (e.g. questionnaire, text analysis)	21.00
c) Better to seek help from mental health professionals	18.00
d) Inaccuracies as assessment tool	16.00
e) Negatively affect self-perception	11.00
f) Highly feasible	6.00

Around 21% perceive mental mHealth apps, for instance, depression, as useful, since apps can furnish information about mental illnesses and contribute to symptom detection. They can also serve as an instrument of self-awareness by sending out "warnings" and

reminders for individuals who had been diagnosed or is currently experiencing a mental disorder. Furthermore, since depression is quite prevalent among young people who are likely to conceal their suffering, it is better to have "some" intervention than nothing at all. They also cite the feasibility of using mobile technology since they have their phones with them most/all of the time. A number would use and/or recommend an app for mental illness if available.

However, this group of participants likewise mentions the difficulty of developing an app to properly evaluate mental health and to target specific mental illnesses. Since mental disorders can be complicated and manifest symptoms in varied ways, it could be challenging to design a test or questionnaire to clearly identify depression, for example, and minimize false-positives. They observe, among others, that certain online mental health tests do not always present options applicable to them and that questions can be too broad. Result presentation, such as proper wordings and discreteness, should consider how it impacts the user.

18% of the undergraduates prefer to seek the direct assistance from mental health providers. Face-to-face interactions allow for greater trust building, better expression and more accurate understanding between client and health professional. They are doubtful if an app will be able to adequately capture the nature and complexity of mental conditions.

Theme 5: Intention to use mHealth

This small group, although optimistic over the prospects of mHealth, have not tried, as of the FGD sessions, to install and use an mHealth app. A small number of participants (9% or 7 participants) expressed plans to download mHealth apps, especially if these are available for free. Being students, they rely heavily on their parents or other family members for financial support and have no source of personal income.

6. DISCUSSION

6.1. Demographic Profile and Survey of mHealth Applications Usage

One positive observation with our group of student respondents and participants is their technological adeptness, which supports previously conducted profiles of adolescents as techno-centric. Most own more than one mobile device. Not only do they use their mobile phones and related devices for sending texts and calling but also for downloading programs. They are also active Internet users and regularly go online for various purposes.

However, it appears that majority of the college undergraduates in our study do not use their phones for health reasons. As they are not very familiar with mHealth, mobile technology health applications are therefore not very popular, as they prefer to download programs that initiate and/or maintain social networks, entertain and assist in academic work.

Although our study did not cover undergraduates' general health attitudes, it is possible to encourage them to be more health-oriented by incorporating their mobile devices. Based on Fazio and colleagues (1986) attitude-nonattitude continuum, one determinant for the development of strongly held attitudes is the level of personal significance. To help increase the attitude-behavior connection is to make mHealth personally relevant to young people. For instance, in exploring a group of undergraduates' mHealth app usage, a survey by Haithcox-Dennis and colleagues (2012) showed that students who owned apps related to their location were more likely interested in a health app that incorporated campus resources. Providing more opportunities to easier access and use mHealth apps will make it more likely for them to engage in mHealth. In a WHO 2001

Report, networking existing health service-providers, for example, enables adolescents to more likely obtain school health services.

6.2. Focus Group Discussion Reactions

In this investigation, over-all attitudes are mixed (Theme 1). Those who view mHealth with skepticism perceive health applications as unreliable, inaccurate and not user-friendly based on personal experiences. As a result, they uninstalled the apps after some time. On the one hand, those with positive attitudes toward mHealth are using health-related application programs or have verbalized that they will consider its adoption. The likelihood that an attitude will lead to actual, subsequent behaviors is affected by the individual's source of information or experience. Attitudes stemming from direct information or firsthand experience are more accurate barometers of later behaviors. Among our skeptical participants, unless they can be convinced otherwise (e.g., strong external influences), it appears that they are unlikely to employ mHealth behaviors at least in the near future.

One concept of Ajzen's theory of planned behavior is the role of behavioral intention as influenced by the attitudes. The more potent and dominant the attitude, the more likely it will exert influence over our behaviors. Themes 2, 3 and 4 explored perceptions and actual use of mHealth. Students who hold favorable attitudes regarding mHealth are using mHealth apps (at least during the duration of the research). The principle of aggregation (Rushton, Brainerd & Pressley, 1983) explains that the effects of an attitude are obvious by averaging behaviors. For this group of undergraduates, series of behaviors – for example, downloading of health apps such as fitness (e.g., calorie counters, workout routine) and physical attractiveness (e.g., hair care tips), installing the programs in their phones and regular use of the health applications - reflect their favorable evaluations toward mHealth.

Preferred software applications are related to work out and diet, equating health with beauty or physical attractiveness. As elaborated by Fishbein's expectancy-value theory (1963), attitudes are developed based on our appraisal of an attitude object. In this case, they expect that the regular use of mHealth apps will enhance their physical attributes. Since they are invested on their looks, they mostly download programs that will benefit their appearances.

In addition, those who expressed positive feelings commend mHealth advantages, such as information accessibility, facilitation of self-awareness and easier detection of symptoms (particularly in depression). According to Fazio et al (1986), associative strength is also determined by one's amount of knowledge. The more knowledge one possesses about an attitude, the firmer the attitude becomes. Undergraduates who took part in our study appreciate the apps' ability to make health information handy and as convenient means to monitor health. Obtained health information from their mobile devices promotes greater self-awareness. Apps such as calorie counters and exercise remind them of their health attitudes.

Theme 5 looked into the intention to use mHealth. Albeit a small proportion of the FGD group, they verbalized their plans to make use of mHealth as soon as possible. In the theory of planned behavior (Ajzen, 1991), stronger intentions to perform a behavior may lead to its actual execution. Nonetheless, the strength of intention-behavior relationship may be affected by various personal and environmental control factors (Randall & Wolff, 1994). Whether or not this group of participants will eventually use mHealth apps will depend on the performance of a progression of steps (e.g., having reliable Internet connection, searching for an appropriate mHealth app, actual downloading of the app, use of the app).

6.3. Limitations

Among the limitations of our research is that we did not compute for correlations between attitude and behaviors. To compensate for this, we noted more reports of mHealth related behaviors among those whose expressed confident mHealth attitudes. It is also worth mentioning that we did not measure their mHealth attitudes prior to the development of mHealth behaviors.

Another limitation is that, although we had one FGD question on intention to use mHealth, measuring behavioral intention was not a major focus of this study. In this case, "using mHealth apps in the future" is a behavior tendency, not actual behavior.

Since there were no available standardized paper-and-pencil instruments at the time of our data gathering to objectively measure mHealth, we relied on the items (survey and FGD) we specifically developed for this investigation.

7. CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS

7.1. Conclusions

In this chapter, we presented college undergraduates' general attitudes toward mHealth as obtained from surveys and focus group discussions. We hypothesized that our participants have more or less established attitudes toward mHealth and their actual mHealth behaviors reflect mHealth attitudes. One main finding based on our survey is that, despite being techno-centric, a significant number of our college participants are unaware of mobile health or mHealth. They do not use their mobile devices for health purposes. Another major result from the discussions is that mHealth attitudes are mixed and that their use or non-use of mobile health apps is influenced by their attitude valence (positive versus negative). Undergraduates who use the health application programs hold a favorable attitude towards mobile health. On the other hand, participants who do not use or discontinued using health apps have misgivings about mobile health.

7.2 Future Research Directions

This research was initially conducted as a preliminary approach in the development and validation of a mobile mental health application for depression screening (Bitsch, Ramos, Ix, Ferrer-Cheng & Wehrle, 2015). Perceptions (which reflect attitudes) may aid mHealth app developers in terms of conceptualizing and designing applications. As suggested by theories, attitudes may not always direct behaviors and behavior tendencies. Nevertheless, perceptions may provide ideas how end users would respond to mobile health applications.

Generally, there is a need to boost focus on health attitudes among the young, particularly, adolescents. Despite increased research interest, youth health issues, specifically mental, are not fully explored. Knowing how they view health may allow us to determine their motivations for staying healthy. In this manner, we will be able to relate health with other life dimensions they consider important, such as self-awareness and physical attractiveness. Since it is during the adolescent stage when they start to make health-decisions, it would be beneficial to promote good health practices and/or modify health behaviors. It would also be advantageous to explore the variables in the health attitude-behavior connection. Doing so will provide insights regarding the process on how attitudes influence and shape behaviors in the health domain. For instance, our understanding of this interaction will allow for the development of programs or interventions (based on health attitudes) that adolescents will follow through (behavior).

Taking advantage of their online activity may also establish favorable health attitudes. Although being active Internet users, we observed with our undergraduates that there is a need for mHealth awareness. WHO (2011) reports that a major barrier in the acceptance and full utilization of mHealth is the lack of knowledge of possible applications and outcomes. To increase health-interest, we should consider incorporating health information in websites they frequently visit. Likewise, strengthening attitude-behavior relations can be accomplished by "investing" on a health issue. Encouraging adolescents to obtain direct experience with the attitude or providing opportunities for them to think carefully about the attitude may also bolster the attitude-behavior network. Creation of health discussion boards or fora, where they can openly deliberate health concerns, may facilitate the cognitive need to reflect on their attitudes.

A recurring attitude we encountered is their uncertainties over mHealth. There are doubts as to the scientific nature of the many mHealth apps available. We acknowledge that an often-overlooked feature of mHealth app development is proper evaluation. Admittedly, most of the commercial applications have not been carefully reviewed and scientifically validated. To appeal to individuals who value knowledge, apps should be supported with careful testing and research. Developers should not only focus on the apps' "appearance" and appeal. Involving professionals with health-related backgrounds in designing of mobile health applications can likewise be influential.

It is to the advantage of mHealth app developers to know their target group. By doing so, such information will guide in aligning mobile health application programs with the groups' perceptions surrounding health and mHealth.

To encourage the "future use" of mHealth, it might be useful to look into other variables (aside from perceptions) that might have better associations with one's potential use of their mobile devices for health-related activities, such as allowing potential users to access trial periods or test runs of a mobile health application.

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AUTHORS INFORMATION

Full name: Roann Munoz Ramos, PhD, CCLP, RP, RPm
Institutional affiliation: Department of Medical Informatics, RWTH University Hospital
Institutional address: Aachen, Germany
Short biographical sketch: Dr. Ramos is an academician, researcher and practitioner. She obtained her degrees (BS, MA Psychology and PhD Clinical Psychology) at the University of Santo Tomas (UST) with academic honors. She was a KAAD scholar and did part of her PhD degree at the University of Tübingen, Germany. She is an associate professor of psychology at UST. As a Senior Researcher in the mobile health division of RWTH University Hospital, she works with researchers from other disciplines in projects involving mHealth and the application of mobile technology in psychology. She is one of the co-developers of an mHealth app, *Psychologist in a Pocket (PiaP)*, which screens for depressive symptoms. In her practice as a clinical psychologist, Dr Ramos has worked with children with developmental disorders (such as ADHD and autism) and learning disabilities (primarily reading disorders).

Full name: Paula Glenda Ferrer-Cheng, MA
Institutional affiliation: The Graduate School, University of Santo Tomas
Institutional address: Manila, Philippines
Short biographical sketch: Ms Ferrer-Cheng has a Bachelor's degree in Psychology (Magna cum laude) and a Master's degree in Clinical Psychology at the University of Santo Tomas. Her main research interests are mental mHealth and depression among youth. Currently, Ms Ferrer-Cheng is involved in an international research project with computer scientists from RWTH Aachen University on the refinement and validation of the *PiaP*.

Full name: Francine Rose de Castro, PhD, RGC, RP, RPm
Institutional affiliation: La Consolacion College
Institutional address: Manila, Philippines
Short biographical sketch: Dr de Castro is a licensed counselor, psychometrician and psychologist and trainer. She completed Master's and Doctoral degrees (with honors) at the University of Santo Tomas. She teaches Psychology and Sociology to college students full-time. Aside from teaching, Ms de Castro serves as a consultant at a maritime company. Her research interests include ADHD, counseling of special population, family and adolescent life.