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Perspectives of Filipino workers on the usage of a personal mental health dashboard: A qualitative analysis of user reviews

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Abstract: Depression has remained one of the top causes of disability in the Philippines. From 2000 to 2012, WHO reported over 2, 000 cases of suicide wherein majority who died were aged 15 to 29 years. There is also a possibility that these statistics are under-reported because depression and other mental illnesses are harder to detect. Even more so, individuals suffering from mental illnesses tend to deny or hide the illness due to culture and perceived stigma on mental illnesses. Multiple studies have suggested that education is an effective means to reduce such stigma. Therefore, a web application has been developed to verify if the use of such tools increases mental health literacy, awareness, and help-seeking tendencies. The application measured the Filipino worker's mental health (in terms of depression, motivation, empathy, and self-efficacy) and provided additional information to increase the user's literacy on depression, motivation, empathy, and self-efficacy. User review questionnaires were sent to the application users. As of current writing, majority of user reviews indicate content and usability satisfaction (59%, 22 user reviews). Positive user review data suggests that there is a potential uptake of mental health applications.

フィリピンにおけるディプレッションは大きな問題であり、2000年から2012年にかけて2000人が自殺した。多くは15歳から29歳である。これらの数字は過小評価の可能性もある。多くの研究では教育が効果的な手段であるとされている。そのためディプレッションを防ぐためにフィリピンの労働者のメンタルヘルス対応力や意識、援助を促すアプリを開発した。このアプリは、ユーザーのディプレッション、モチベーション、共感、自己肯定感について理解するための情報を提供する。これらを活用してもらったところ、59%が満足した。これら肯定的な反応はメンタルヘルスの潜在的な可能性を示唆している。

Keywords: Mental Health, Personal Informatics, Self-Monitoring, Web Application, Digital Health Intervention

キーワード = メンタルヘルス、個人情報学、セルフモニタリング、ウェブアプリケーション、デジタル健康

I - INTRODUCTION

It can be argued that many of the unresolved social challenges in the world can be attributed to mental health, because it encompasses all facets of human life: physical, spiritual, intellectual, professional, and recreational. Mental Health, as defined by the World Health Organization, is a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, and can work productively and fruitfully, and is able to make a contribution to his or her community [1]. Having poor mental health can

therefore be detrimental to national productivity, and more importantly, quality of life.

Mental health disorders come in various forms. Generally, these disorders are characterized by a combination of abnormal thoughts, perceptions, emotions, behaviors, and relationships with others [2]. Currently, the known mental disorders are depression, bipolar affective disorder, schizophrenia, dementia, and autism.

The World Health Organization posits that depression is one of the leading causes of disability and contributor to suicide, worldwide. An individual suffers from depression if he or she experiences sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, tiredness, and poor concentration for an extended period of time, such that it substantially impairs him or her to function at work, school, or daily life [3].

According to the Global Burden of Disease Study conducted in 2010, it was found out that depressive disorders were the second leading cause of Years Lives with Disabilities in 2010. In terms of YLDs caused by dysthymia (a mild form of depression), Afghanistan scored the highest, while Japan scored the lowest [4]. In Southeast Asia, Over 85 million people are tagged with depression, making up 27% of the worldwide population of people with depression [5]. In Philippines, depression was included in the top five leading causes of years lived with disability (along with low back pain, iron-deficiency anemia, chronic obstructive pulmonary disease, and tuberculosis). There is also a possibility that the statistics presented are under-reported because depression is relatively harder to detect, easier to hide or simplistically dismiss compared to other clinical diseases. WHO emphasizes that depression is notorious for the different ways it can be expressed and its changeable nature. In an interview with Doctor Angel Adams, a clinical psychologist, she states “People don’t quite understand that you can still function and have depression”. Due to the complex nature of depression, its diagnosis requires clinical skills and experience on the part of the clinician [6].

II - MENTAL HEALTH IN THE PHILIPPINES

A. *Perceived Stigma*

Current social structures and collective beliefs hinder effective treatment and alleviation of mental health in the Philippines. For instance, in a qualitative study conducted by Kobe University in the Philippines, it was found out that individuals with mental health problems experience discriminatory behavior and treatment from society.

The individuals in the study were either abused (physically or verbally), taken advantage of, or not supported at all by their family [7]. Because of these negative connotations and treatments towards mental health, individuals will have diminished self-worth, increased levels of shame, and will eventually be reluctant to seek professional help [8]. A study in the U.S. by Alvidrez et al. found that 32% of its participants did not initially recognize the need to seek help for their mental problems because of stigma [9].

B. *Limited research on mental health of Filipinos*

In addition to stigma, very little research exists on Filipinos’ conceptualization and expression of mental illness or psychological distress. According to a literature review performed by Dr. Antover P. Tuliao, psychological research output within Philippines is generally low [10]. Majority of the current research on Filipino mental health focuses on migrant workers (in United States and China for example).

Therefore, perceived stigma and limited mental health research in the Philippines contribute to the overall lack of understanding of mental health. This lack of understanding can also hinder the general public from empathizing with individuals suffering from mental disorders. I argue that information-driven solutions and products must be initiated within the Philippines to foster and promote mental health.

III - ICT AND MENTAL HEALTH

A. *Education, Research, Literacy Intervention*

Peter Byrne asserts that education, in the form of research, helps the public in understanding the complexities of stigma [11]. It instigates discussion among members from the scientific community, which in turn will increase the number of investigations and studies related to the subject. Knowledge created from research increases society’s awareness, understanding, and empathy for the population experiencing mental illnesses.

In a study conducted in Australia, web-based mental health literacy interventions resulted in positive health outcomes: data suggested that mental health literacy and community attitudes improved. However, the help seeking levels of individuals with mental illness did not see any significant improvements [12]. In another study (Hechanova et al), it was found out that ease of use and accessibility to resources such as internet were associated with higher intent to seek online counseling among migrant workers [13].

B. Internet-based mental health assessment and diagnosis

Online psychological assessments have also shown potential to assist in the diagnosis of mental health disorders. Such tools are flexible and convenient for the test-taker and the examiner [14]. Moreover, results can be calculated and delivered faster (and with more accuracy) compared to a handwritten/manual test.

A random population-based study has been conducted by Australian researchers that investigated the effects of online psychological assessment with feedback on an individual's professional help-seeking tendencies. It was found out that the online tool was not effective in encouraging individuals to seek professional help [15]. It is important to note, however, that this study did not cover the tool's content usability and satisfaction, which may have had a big impact on an individual's help-seeking tendencies.

This study would like to extend the previous study by focusing on the users' perspectives on the usage of an online psychological assessment and feedback. A web-based application was developed that measures an individual's level of depression, motivation, empathy, and self-efficacy.

IV - METHOD

A. Participants and Procedure

Random sampling method was implemented in the recruitment of participants. An online survey link from Google was sent to Filipino working professionals through email and social media messaging. The survey measured the individual's level of depression, motivation, empathy, and self-efficacy. Prior to answering the survey, individuals were asked for their

informed consent, in compliance with the Philippines' Data Privacy Act of 2012. A total of 192 individuals successfully completed the survey. At the end of the survey, individuals were asked to provide an email address (not compulsory) if they would like to know their mental health scores. Out of the 192 participants, 154 expressed their interest in knowing their mental health results.

B. Psychometric scales to measure mental health

To measure depression, the Center for Epidemiologic Studies Depression Scale (CES-D) was used. It is a 20-item scale that aims to measure depressive symptoms defined by the American Psychiatric Association. To measure motivation, the Behavioral Inhibition/Activation Scale (BIS/BAS Scale) was used. This scale measures an individual's motivational patterns in terms of inhibition and activation. To measure empathy, the Interpersonal Reactivity Index was used. This scale measures an individual's empathy in terms of perspective taking, fantasy, empathic concern, and personal distress. Lastly, the General Self-Efficacy Scale (GSE) was used to measure self-efficacy.

C. Web-based application to display personal results

In order to efficiently deliver personal results to 192 individuals, a web-based application was developed using HTML, CSS and Javascript. The application was deployed and hosted in Google Firebase. The application is a single page application that calculates and displays the individual's personal mental health scores through easy-to-understand graphs. The application also displayed additional information (i.e. cut-off scores, definition of terms, etc) to give explanation and meaning to the scores.

D. System Walkthrough

In order to view the results online, a link was sent to the individual through email. Upon accessing the link, the website will require the user to input his/her email address, as displayed in the image below.

If the email address is valid, the application will display four (4) easy to understand graphs to visualize the individual's mental health in terms of depression, motivation, empathy, and self-

efficacy. An example is displayed below which shows an individual's level of depression. Each emotional state (depression, motivation, etc) provides additional information such as the meaning of the individual's score. In the case of Depression, the user can click the "What does my score mean?" to know more about terms, concepts and healthy cut-off scores. The average depression score of the Japanese population was also presented, as supplementary information by clicking the "Quick Comparison: Japanese Employees" and "More info" buttons.

The content mainly focused on the basic terms and concepts regarding the emotional state (e.g. depression definition, symptoms). Cut-off scores for depression (to classify if the user's score is dangerously high or low) were presented. However, the cut-off scores for Motivation, Empathy, and Self-Efficacy were not available (and not recommended by researchers and doctors). In order to compensate for this, comparisons of scores with other populations were presented. The comparisons are extracted from credible research journals (PubMed, PLOS One, Researchgate, and Sciencedirect).

V – VERIFICATION

After providing the results to 192 individuals, a follow-up questionnaire for user reviews was sent out through email. Out of the 192 participants, 27 submitted user reviews. The user review questionnaire, which consists of 26 questions, was divided into three main categories: (1) Ease of Use, (2) Content, (3) Overall impressions, and (4) Manual Sentiment Analysis.

A. *Ease of Use*

The application's ease of use was measured using a 5-point Likert scale (from Strongly Disagree to Strongly Agree). 55% (15 out of 27 respondents) strongly agreed that they were satisfied with the amount of time it took to read and understand the individual's results.

B. *Content*

The application's content organization, usability and relevance were measured using a 5-point Likert scale (from Strongly Disagree to Strongly Agree). 55.6% of the respondents

strongly agree that the website's content is well organized. Users were also asked to rate the visual usefulness of the graphs for depression, motivation, empathy, and self-efficacy. On average, 85% agree that the graphs displayed in the website helped the user to have a clearer image of his/her mental state in terms of depression, motivation, empathy, and self-efficacy. Users were also asked to rate the helpfulness of the definitions and explanations in understanding each mental state (depression, motivation, empathy, and self-efficacy). On average, 85% of the users agree that the definitions and explanations were informative.

C. *Overall impressions of the information and service*

In terms of overall content, 96% of the respondents agree that the information was interesting and useful.

In terms of service satisfaction (online assessment and online results and feedback), 88% stated that they were satisfied with such service, and that 77% stated that they would recommend the service to colleagues and friends.

D. *Manual Sentiment Analysis of user reviews*

The follow-up questionnaire also asked users for their opinions regarding the web application. They were asked to write (in free form text) the aspects of the website that they liked and disliked/found problematic. In terms of the positive aspects of the website, 21 user reviews were found. The 21 positive user reviews seemingly expressed two sentiments: (1) "The content was informative" and (2) "The website made me more aware of my mental state/mental health in general". Therefore, each positive user review was categorized as "Informative" and "Increased Awareness". 33% of the positive user reviews (7 users) were categorized as "Increased Awareness". 67% of the positive user reviews (14 users) were categorized as "Informative".

In terms of the negative/problematic aspects of the website, 11 responses were recorded. Out of the 11 negative user reviews, 3 were discarded due to insufficient information. The 8 remaining negative user reviews seemingly expressed the following sentiments: (1) "What is the cut-off score for the other emotional states? (i.e. how can we know if our motivational level is too high or too low?)", (2)

Lack of user Experience (some content is not readable in mobile phone), and (3) Reliability of information.

E. Verification Summary

This study aims to understand the users' perspectives on mental health applications in terms of ease of use, content, and overall impression. Based on the user reviews and evaluation, 74% of the respondents agree that they are satisfied with the web application's ease of use, 96% considered the content as interesting/useful, and 88% expressed satisfaction in the service (online assessment and online results/feedback).

VI - LIMITATIONS AND FUTURE WORK

A. Limitations

The first limitation of this study is the reliability of the content. Content presented and displayed in the web application were objective and based extracted from credible academic journals. However, inputs and advice from mental health professionals (i.e. clinical psychologists) would make the content more reliable and useful to the users, hence providing more value.

The second limitation is the amount of user reviews collected. Out of 192 application users, only 27 user reviews were collected. It can be argued that the length of the user review questionnaire (26 questions) was a main factor in the low user review response rate.

B. Future Work

To address the limitations in content reliability, future work may extend this study by incorporating insights from mental health professionals (i.e. clinical psychologists, psychiatrists) and providing professional tips/advice. Moreover, the current content should also be verified with mental health professionals to ensure correctness of the information.

To address the limitation of user review volume, this study can be extended by gathering more user review respondents. In order to achieve this, a more efficient user review process could be implemented by decreasing the questions or by incorporating website analytics and heat maps for increased automation. By increasing

the volume of user reviews, sentiment analysis (via machine learning and AI) can also be performed, which could also enrich user review analysis.

There is also a growing number of studies in Japan (conducted by Kyoto University, Tokyo University, Tsukuba University, to name a few) that uses Brain MRI in order to create the Brain Healthcare Quotient. The Brain Healthcare Quotient is a numerical index that measures an individual's brain health, in order to allow an individual to objectively monitor his/her brain health [16]. In these studies, psychometric scale results are heavily used in order to verify if certain emotional states (e.g. depression) are correlated with the Brain Healthcare Quotient. Results from these studies suggest that the Brain Healthcare Quotient is correlated with certain physical and social factors: age, sex, depression, anger, fatigue, and confusion [17].

The application created in this study could be extended by incorporating Brain MRI, speech patterns and facial expressions. I intend to continue this research by synthesizing psychometric scale results, Brain MRI, speech patterns and facial expressions to create the first mental health index in the Philippines (by means of AI, and Deep Learning). I intend to form a research group or startup company in the Philippines that collects data for Brain MRI, speech patterns, and facial expressions.

VIII - CONCLUSION

This paper discussed the viability and usability of internet-based mental health screening methods on Filipino workers. A web-based application was developed to understand the users' perspectives on such applications. The users evaluated the application in terms of ease of use, content usability, and overall impressions. Results from the verification show that uptake of such applications in the Philippines is possible. Future studies that are able to incorporate professional advice/insights, website analytics and heat maps could give us a much deeper understanding of the real needs of users in a mental health application. Moreover, I intend to incorporate technologies such as brain MRI, speech patterns, and facial recognitions in order to create a technology that objectively measures the mental health of an individual.

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