THE DEVELOPMENT OF APPLICATION TO PROMOTE THE KNOWLEDGE OF PHYSICAL THERAPY TO PREVENT FROZEN JOINTS SYNDROME IN ELDERLY AGE

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ABSTRACT

This research aims to develop an application to promote physical therapy knowledge to prevent frozen joints syndrome in elderly age and study the satisfaction level of users after using the application. People in the sample group are 377 elders in the Dusit district. The satisfaction feedback was inquired by users of the application. The population are 20,590 citizens in Dusit district, and the sample group contains 377 of them taken according to the table of Krejcie & Morgan. The tool used in this research are evaluation form of 5 levels. Statistics tools used in this study are Mean and Percentage. It was found that the majority of respondents were female and were highly satisfied with the application usage in terms of data presentation, font size, background color of the app, attractiveness of the display, pictures used in the app were rated satisfactory and overall utility of the application was excellent. Most of the elders expected to apply the gained knowledge and tips from the application to their daily life to help prevent them from being handicapped during the elderly age.

Keywords:

Application development, physical therapy, elders.

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Introduction

At present, Thai society is facing towards the old age citizen society. This increase in number of old age people poses effects in economical aspect in large scale such as savings, investment or number in workforce. In 2017, the number of effective work-force was approximately 38.42 million people while 4.06 million of them are elders, which was 35.8% of all elders in Thailand. (National Statistical Office, Ministry of Digital Economy and Society, 2018, Page 3).

In the future, this group of people must cease to work which will eventually cause the need in workforce even more. The major problems with elders are strength and healthy problems where their physical bodies naturally get fatigue with time. Some of them have been working since the young age and the diseases and fatigues started to accumulate gradually and revealed itself when they stop working after the retirement. Most of the diseases found in elders are as followed.

1. Muscle atrophy and muscle weakness occurs when they stop doing daily activities or limit the work to minimal movement. This shockingly results in gradual muscle strength reduction by 1-3% per day or 10-15% per week. The muscles that

got weakened in the initial stage are quadriceps, gastrocnemius-soleus and back extensors. The muscles shrink and get fatigue more easily than other muscles causing back pain in elders.

2. Frozen joints is the problem in the movement of joints caused by tissues wrapping around tendons and muscles. If there is no movement, the tissue will be accumulated and replaced by collagen tissue. This causes Fibers, tendons, muscles and other membranes to lose elasticity.

3. Loss in bone mass is caused by the balance between composition and de-composition of bones. Muscles movement tremendously affects the composition of bones. Patients who are unable to move away from bed or who fail to perform daily activities to exercise muscles have to face with the gradual loss in bone mass. In addition, osteoclast activity highly increases the risk of having Osteoporosis. Patients suffering from Osteoporosis will not experience lethal effects on physical body but the symptoms rather deteriorate gradually. Weight bearing exercise is advised and may be practiced enhancing physical strength.

4. The cartilage degeneration of joints may occurs causing it to suffer from insufficient blood circulation around the joints. If the joints do not experience appropriate movement or physical exercise, it may cause fatal effect on the cartilage.

When elders are sick or have some health problems, they choose to stay still by not doing any other daily activities. This might eventually lead them to end up in the vegetative state which will pose adverse effect to them both physically, mentally and emotionally as followed.

1. Reduce in mental perception to the surroundings like listening and memorizing.

2. Reduce in ability to solve simple problems and other instructions from the nurse or caretaker.

3. Change in self-concept where patients will feel themselves to have low self-esteem thinking that they are the burdens that have to rely on others.

4. Unstable emotional states. Getting angry or irritated very easily.

5. Unable to eat and sleep normally

6. Showing inappropriate behavior which could even lead to hurting oneself.

From the studies on effects on loss of movement skills in elders conclude that it affects elders both physically and mentally. Physical effect may cause elders to have weakened and fatigue muscles, frozen joints and Osteoporosis. If the patients are in bed for a long time without proper exercising therapy or any movement at all, they will undergo the psychological effects which will make the elderly feel unworthy and not aware of the things happening around them.

Nowadays, even elder people tend to use smartphone to get into the information using Internet. This allows them to get up-to-date with the latest news and trends as well as knowledge. The use of social media like Facebook and Instagram can be useful for elders to get in touch with their love ones.

This research focuses on the development of application to promote the knowledge of physical therapy to prevent frozen joints syndrome in elderly age. The development the application to promote the knowledge of physical therapy to prevent frozen joints syndrome in elderly age is highly expected to tremendously distribute the knowledge and tips about frozen joints syndrome in elderly age among elder people. After using the application, the researchers study the satisfaction level of users after using the application. This study is considered a developmental research in which the application is developed on Android platform. The satisfaction feedback was inquired by users of the application. The population are 20,590 citizens in Dusit district and the sample group contains 377 of them taken according to the table of Krejcie & Morgan (1970). The tool used in this research are evaluation form of 5 levels, computer with Windows 10 64-bit and Marvel App program.

Literature Reviews

Mobile Learning

Mobile application is an alternative tool that can be designed to serve as measures to counter with various kind of medical issues or even mental

health therapy (Kamerow, D, 2013: 347). With the apparent increase in interests among health experts towards mobile application development, the application served as another effective tools to assist the specialist and veterans to solve their problems as quickly and effectively as possible. There are many studies that even showed the use of applications used to reduce stress in clients (Dennis, T. A. & O'Toole, L. J., 2014). Another important aspect in using application is that the developer must determine which form of application, operating system and how-to-use the app is easily accessible by users (Khaddage, F. & Knezed, G., 2011). According the study of Hwang et al, mobile device is one of the most popular device used for communication to gain access to information (Hwang, G.J., Wu, P.H., Zhuang, Y. Y. &huang, Y.M., 2013). Android, one of the two well-known smartphone's operating system developed by Google, allows developers to the open source platform to create application through Google Java libraries. Software developers all over the world (Guiran Change, Chunguang Tan, Guanhua Li and Chuan Zhu., 2010). Android is the definition of customizable and yet simplified operating system and frameworks by Google which supports variety of audio as well as video formats. This is suitable for the creation of innovative application software for both newbie and professional developers (Shanmugapriya M & Tamilarasi, 2011).

Additionally, this research has also taken references and ideas from the other studies to help with the development of the application as followed. Miftahul Husna and Heru Kuswanto (2018), in their research, they have developed the physics mobile learning based on local wisdom to improve vector and diagram representation abilities in which a 4-D Model; Define Develop Design and Disseminate. The results show that the learning ability of students regarding vector and diagram representation can be improved using the app-based learning media. In this research of Chattavut Peechapon, Jaitip Na-Songlhla, Siridej Sujiva, Arthorn Luangsodsai (2018), they studied about the development of smartphone application based on the theory of planned behavior to enhance self-efficacy on online learning. The result showed online learners could enhance the learning efficiency significantly using the smartphone app based on Theory of Planned Behaviours. Athanasios S. Drigas and Marios A. Pappas, (2015) in this research, they applied the use of mobile learning application for mathematics and online application in mathematic teaching for all the classes.

In the study of Dwi Sulis woro, Ishafit, Kartika Fireausy, (2016) it was found that mobile application can be used to enhance student's learning interest and engagement using jigsaw technique.

Some study like that of Georgia K. Kokalia and Athanasios S. Drigas, (2016) has shown an impressive result on mobile learning for special pre-school education for children with autistic. The use of mobile learning application is apparent and effective for the sample group.

Hosam f. El-sofany, Samir A. El-Seoud, Hassan M. Alwadani, and Amer E. Alwada-ni, (2014) in this research they study about development of mobile educational services application to improve educational outcomes using Android technology. It was shown that students and instructors could easily contact each other via mobile of web-based interface application. Information can be transferred immediately and effectively while being monitored by the administrator.

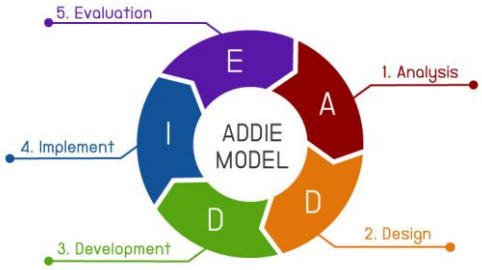
In the research of Thanakorn Uipanit (2019), the researcher focused on the use of mobile application as gamification to promote the learning OSI model concepts to learners. 'Packet Warrior' was found to be fun and interactive among students and served as effective tool for modern education.

Pornpisit Liangyoo (2019) in this research they study about the development of application to promote housework for elder people. It was found that in using the application's feedback was positive among elder people.

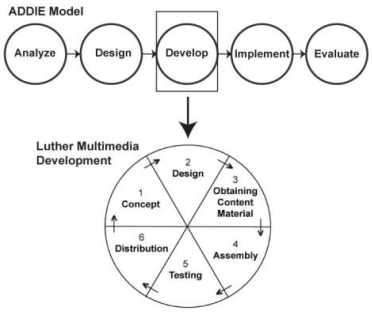
Research Methodology

1. The tools used in this research are the application promoting the knowledge of physical therapy to prevent frozen joint syndrome age elders and the questionnaire inquiring for satisfaction after using the application.

2. The idea of development of application is based on Addie Model (People Value Solution Provider., 2018) using the following picture;



ADDIE model: The idea of development of application is based



Research method combining ADDIE model and Multimedia Development Life Cycle according to Luther (Sutopo, H., Samosire, R. S. & Gatc, J., 2019)

The methodology of application development is based Addie Model which can be classified into 5 steps as followed.

1. Analysis: The data analysis is represented in the form of content in the application to promote the physical therapy to prevent frozen joints syndrome in elderly age. Other related research are studied to obtain similar ideas and concepts.
2. Design: Storyboard and content are created to state relationship between topics of the content that will be presented in the application. Display, position of content, fonts, background colors and button size are determined and design to be appropriate for elderly to use.
3. Development: The Android application is developed using packaged software and get checked by the specialist for quality and validity checking.

Fig 3. Display of the application to prevent the frozen joint syndrome in elderly.

Fig 4. Display of the application to prevent the frozen joint syndrome in elderly.

1. Implementation: When the application's development is completed, it is used to test with the try out group of 30 people first, before testing with the actual sample group to obtain the reliability of the application. After the app has been verified with good satisfaction level, it is then tested by 377 citizens in the sample group.
2. Evaluation: After the usage of the app, users are inquired to evaluate the application.

Results

The evaluation result of the application rated by the users is shown as followed.

Content representation aspect	$\overline{X}$	S.D.	Definition
1. Fonts size used is appropriate	3.77	0.76	Good
2. Background color and font family is appropriate	3.90	0.77	Good
3. Information representation is easily understandable	4.74	0.62	Excellent
4. Display of the app is interesting and colorful	3.94	0.75	Good
5. Images are related to the content	3.55	0.94	Good
Total	3.98	0.77	Good

In the overall aspect, the satisfaction evaluation by users is shown as followed.

Satisfaction level in each aspect	$\overline{X}$	S.D.	Definition
1. Content aspect	4.20	0.68	Good
2. Display aspect	3.98	0.77	Good
3. System aspect	3.93	0.79	Good
4. Utility aspect	4.22	0.72	Good
Total	4.08	0.74	Good

This research has found that most respondents are female which are found to be satisfied with the application. In the content aspect, users are mostly satisfied with the easily understanding presentation. In the display aspect, users are satisfied with font size, choice of background of the application, pictures used in the application, attractiveness of the presentation style. For overall satisfaction of the application, content, display, system and utility aspect of the application have been rated excellent. Most of the elders are expected to apply the gained knowledge and tips to their daily life to prevent themselves from obtaining frozen joint syndrome that would likely to occur during the old age.

Discussion

This research has the main objective to develop an application to promote the knowledge of physical therapy to prevent frozen joints syndrome in elderly age based on Addie Model. The processes commence from requirement analysis, design, development, application and end with evaluation. All this to help preventing elder people in becoming another patients. Other factors to keep elders healthy also have to be taken care to maximize the health care of elder people even more. For the development of application for the elderly in Thailand, there may be variety of the kind of app to be developed for elderly such as application promoting the tips for healthy meals, exercise, daily routine activities etc. which would promote the healthier life for elders. The development may pursue in the form of education development in other platform as well that would be more diverse and accessible to other older people in the future.

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