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Design and Implementation of Mobile Application for Herbal Medicine Prescription for Obstetrics and Gynecology Problems

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Abstract— In recent times, traditional herbal medicine found its way to modern medicine. It is used in many countries and common to all cultures due to its affordability. Hence, there is a need for the development of herbal database systems that contain the taxonomy hierarchy, structured knowledge of herbs that could be prescribe in a rapid and convenient fashion. This need serves as the major motivation for this work. In this paper, we proposed a mobile application for herbal medicine prescription on obstetrics and gynecology problems which provide patients with an opportunity to participate in and become knowledgeable of the whole prescription for the illness. The application was designed using android developing tools such as eclipse editor and SQLite as database engine. It was tested for usability and acceptability and the results were promising. This

application can also be used as alternative therapy, to meet the needs of those who could not afford orthodox medicine or those who do not even believe in the use of orthodox medicine. The system is user-friendly enough for indigenous and those literate in English language only.

Keywords/Index Terms: Mobile Application, Herbal Medicine, Obstetrics, Gynecology, Prescription, Smart phone.

1. Introduction

Most of the western world regards Herbal medicine as a mystery (Micozzi, 2018). Unlike the western medicine which is based on scientifically proven evidences, herbal medical practices are based on mystical concept often not understandable to the scientific world. The local methods of medical treatments, if carefully studied objectively, scientifically advanced, and unified with western medical procedures may provide the best medical services (Oladosu, et al., 2012). Every human desires quality health care without any waste of time as well as having quality health care service at an affordable cost which could be got from the use of herbal medicine. Developing nations like Nigeria has widely accepted orthodox (clinical) medicine due to the fact that it is the root of all modern medicine (Oladosu, et al., 2012). However, the problem of orthodox medicine include the price, sometimes far to access and the ability of people to afford it. Thus, an alternative in this case to orthodox medicine is herbal medicine. It is practiced all over the world and in some countries has gotten to a higher degree of sophistication in response to level of development. For instance, In the United States, traditional Chinese medicine (TCM) is recognized by the National Institutes of Health as an effective complementary and alternative medicine modality, widely used by consumers and growing as a profession (Bielory, 2018, Ayeni et al., 2014).

Mobile technology has long being a great invention which have had great impact on advancing livelihood of various individuals in every part of the world. Mobile technologies include mobile phones; personal digital assistants (PDA) and PDA phones (e.g., BlackBerry, Palm Pilot); Smartphones (e.g., iPhone); enterprise digital assistants (EDA); portable media players (i.e., MP3-players and MP4-players, e.g., ipod); handheld video-game consoles (e.g., Playstation Portable (PSP), Nintendo DS); and handheld and ultra-portable computers such as tablet PCs (e.g., ipad and Smartbooks) (Free et al., 2013). The invention of smartphones has led to an exponential growth which had offered greater services to users like web navigation, life advancing applications, games and more (Alshattnawi, 2013). Developers had thereby built applications that were tailored to meet the specifications of mobile phones which could be used easily through hand-held devices (Alshattnawi, 2013). There is a significant potential for the use of mobile technology to improve health service outcomes and data management (Bolton, 2012). In the healthcare industry, mobile applications provide better personalized healthcare, disease management and services to patients and their relatives, as well as a better and flexible way of

communicating with physicians, patients and medical suppliers (Kalem et al., 2015, Ajayi et al., 2017). Opportunities include: serving as a less costly substitute for existing interventions; providing interactive functions that multiply the power of existing interventions; and serving entirely new functions. The use of mobile technology in health services has the potential to create more than 5 billion points of contact between consumers, healthcare workers, health system administrators and firms. This research is hinged on the development of a mobile application for herbal medicine prescription on obstetrics and gynecology problems which will help patients (female) to be able to find out their ailment with ease (Obstetrics and Gynecology). This will also make prescription of herbal medicine possible from the readily available product in that locality. Here, the south western region of Nigeria was considered.

The need for mobile healthcare services was necessitated by the increasing problems with regards to limited resources for effective disease prevention and cure management. In most of our western societies, the "acute care" paradigm has led to the design of "find-it, fix-it" health systems, but they are not meeting the changes in demand of care services prompted by the aging population (HealthService24, 2006, Soyemi et al., 2015). The economic and social burden is pressing heavily on governments, healthcare providers and citizens. Emerging proposals are stressing the imperative need to redesign the provision of services in more flexible ways. Technology, especially mobile applications seems to be the cornerstone that will make this transformation possible.

The remaining section of this paper is organized as follows; section II provides the review of literatures related to this research work, the research methodology is presented in section III, results and discussion in section IV, section V concludes the paper and presents future intentions on the research.

2. Literature Review

Traditional medicine (including herbal drugs) comprises of therapeutic practices that have been in existence for hundreds of years even before the development and spread of modern medicine. Herbal medicine is the synthesis of therapeutic experience of generations of practicing physicians of indigenous system of medicine. Traditional preparations comprise medicinal plants, minerals and organic matter etc. Herbal drugs constitute only those traditional medicines which primarily use medicinal plant preparations for therapy. The earliest recorded evidence of their use in Indian, Chinese, Egyptian, Greek, Roman and Syrian texts dates back to about 5000 years. The herbal medicines / traditional medicaments have therefore been derived from rich traditions of ancient civilizations and scientific heritage (Mukherjee, 2019).

2.1. Herbal Medicine and Conventional Medicine

Although, herbal medicine and conventional pharmacotherapy are superficially similar but have three important differences which are use of whole plants, combination of various herbs and diagnosis.

1) Use of Whole Plants

Herbalists generally use unpurified plant extracts containing several different constituents. It is claimed that these can work together synergistically so that the effect of the whole herb is greater than the summed effects of its components. It is also claimed that toxicity is reduced when whole herbs are used instead of isolated active ingredients ("buffering"). Although two samples of a particular herbal drug may contain constituent compounds in different proportions, practitioners claim that this does not generally cause clinical problems. There is some experimental evidence for synergy and buffering in certain whole plant preparations, but how far this is applicable to all herbal products is not known (Vickers and Zollman, 1999, Osebor et al., 2017).

2) Combination of herbs

Often several different herbs are used together. Practitioners say that the principles of synergy and buffering apply to combinations of plants and claim that combining herbs improves efficacy and reduces adverse effect. This contrasts with conventional practice, where polypharmacy is generally avoided whenever possible.

3) Diagnosis

Herbal practitioners use different diagnostic principles from conventional practitioners. For example, when treating arthritis, they might observe, "under functioning of a patient's symptoms of elimination" and decide that the arthritis results from "an accumulation of metabolic waste products". A diuretic, cholerectic or laxative combination of herbs might then be prescribed alongside herbs with anti-inflammatory properties (Khan and Ahmad, 2019). In Traditional Chinese Medicine diagnosis is based on overall observation of the patient's symptoms. The imbalance in patient's body is assessed by four examination methods: inspection, auscultation and olfaction, inquiring and palpation (Lukman, 2007). The pathological changes of internal organs are predicted by the inter-relationship between the external part of the body and the internal organs. Observations of patient's pulse, face, hair, tongue, urine and stool provide information (Jokiniemi, 2010)

The earliest evidence of human's use of plant for healing dates back to the Neanderthal period (Gunjan et al., 2018). Herbal medicinal is now being used by an increasing number of patients who typically do not report to their clinician's concomitant use (Lam et al., 2018). There are multiple reasons for patients turning to herbal therapies. Often cited is a "sense of control, a mental comfort from taking action," (Lam et al., 2018) which helps explain why many people taking herbs have diseases that are chronic or incurable viz. diabetes, cancer, arthritis or AIDS. In such situations, they often believe that conventional medicine has failed them. When patients use home remedies for acute, often self-limiting conditions, such as cold, sore throat, or bee sting, it is often because professional care is not immediately available, too inconvenient, costly or time-consuming (Gunjan et al., 2018).

Several health care projects are in full swing in different universities and institutions, with the objective of providing more and more assistance to the people. CAST (Center for Aging Services Technologies) (Shahriya

et.al.,2009) is organizing multiple projects that include a safe home that will help debilitated elderly by tracking their activities and a sensor-based bed to track the sleep and weight, which will later be used in detecting diseases. Also, another type of project named AHRI (Aware Home Research Initiative) (Bissoli,et al., 2019) is going on at GeorgiaTech University.

Similarly, the Terva (Hew and Reddel, 2019) monitoring system had been introduced to collect data related to health condition like blood pressure, temperature, sleep conditions, weight, etc., over quite a long time. Here data has been collected four times a day (morning, noon, evening and night) and saved in the form a TOD (time-of-day) matrix and analyzed later. The whole system has been housed in a suitcase that includes a laptop, blood pressure monitor and several other monitoring devices. As a result, this system loses its mobility and becomes feasible to be used in a static manner in the home.

Furthermore, Mobile Health project (Cheung, 2018) can monitor crucial health signals through tiny medical sensors and transmit them to health care professionals through highly powerful and cheaply available wireless system as Body Area Network (BAN) has been used in signal monitoring and GPRS and UMTS has been used for transmitting signal on the fly.

Rivera et al. (2019) developed a mobile expert system for providing information about the different kinds of kidney diseases. The mobile application developed has the capability of diagnosing the users based on the condition of their health. The information gotten from the application aid users to identify the early signs and symptoms of kidney diseases and improved the knowledge as regards these diseases. They employed a Decision Tree and Fuzzy logic algorithm for filtering several symptoms and providing accurate result of the diagnostic testing. The result from the evaluation of the results revealed that the mobile application was able to meet the objectives from the survey got from the experts and other evaluators.

Caliwag et al. (2018) presented a mobile expert system for providing information in relation to the most common venereal and sexually transmitted diseases in the Philippines. It has the capability of diagnosing users based on a number of physical symptoms and usual observations that is seen in their body. The system made it possible to detect signs and symptoms early enough as well as improve the knowledge of the infectious diseases. They employed a fuzzy logic algorithm for filtering different symptoms and provide correct result of the diagnostic testing.

Anthony Berauk et al. (2017) carried out an assessment on the contents and attributes of mHealth applications to care for older people. They conducted a review and compared different mHealth apps for caring of older people available in Google's Play Store (Android system) and Apple's App Store (iOS system) were performed. The criteria for assessing the applications are the requirement for Internet connection, information of disease, size of app, diagnostics and assessment tools, medical calculator, dosage recommendations and indications, clinical updates, drugs interaction

checker, and information on disease management.

Gurbeta et al. (2018) presented the development and testing at real-time of an automated expert diagnostic telehealth system for diagnosing asthma and Chronic Obstructive Pulmonary Disease (COPD). The system makes use of Android, Java, MATLAB, and PHP technologies consisting of a spirometer, mobile application, and expert diagnostic system. As a means of evaluating how effective the system is, the authors conducted a prospective study in 3 remote primary healthcare institutions, and one hospital in Bosnia and Herzegovina healthcare system. Within 6 months of the testing, the system did assessment and diagnosis with a 97.32% accuracy.

Hemanth et al. (2018) intends to deal with the heart sound analysis problems and the diagnosis of diseases through the use of mobile application that can perform the tasks. This also provides support from both virtual reality and augmented reality-oriented components. The work looked into the technical background and essentials of the mobile system.

3. Research Methodology

The architectural framework of the mobile application for herbal medicine prescription for obstetrics and gynecology disease problems is presented in Figure 1. The architectural framework defines the components of the developed system together with the interactions between each component. During the design stage, the architecture of the system was developed taking into account the constraints imposed by the user requirements and the available technology. The mobile terminals / devices enable users launch the application on their mobile phones. This client can also through this devices select observable symptoms and view diagnosed result. Interface layer enables interaction with the system. The system provides the result through the mobile interface. The user selects the symptoms (diagnosis request) through the user interface, which consequently calls the knowledge base, feeding the user input data, the knowledge base is being consulted then the inference engine comes to a final diagnosis, which is displayed by the user interface to the user. The functional description layer is responsible for problem description, projection and also consist of the data description layer. This layer supports the interface layer showing necessary conditions to be met before the system diagnosed result. For example, if the user selects less than three symptoms, the system issues a signal acknowledging the user to select more. The knowledge representation layer provides knowledge about problem description, associations among these concepts, and constraints on these concepts and associations. The knowledge base consists of some encoding of the domain of expertise for the system. This can be in the form of semantic nets, procedural representations, production rules, or frames. These rules occur in sequences when the rules are examined by the inference engine, actions are executed if the information supplied by the user satisfies the conditions in the rules. The inference engine is the dialogue conducted by the user interface between the user and the system. The user provides information about the problem

to be solved and the system then attempts to provide insights derived or inferred from the knowledge base. These insights are provided by the inference engine after examining the knowledge base. The database server is a fundamental part of the system. It is also called the working storage; it works hand in hand with both the knowledge base and the inference engine as a means of data storage. It stores all important and detailed information about Herbal medications.

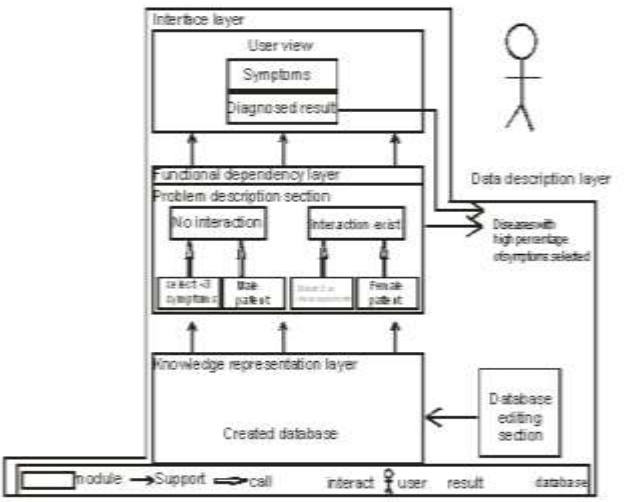

Figure 1: Architecture Of The Proposed Mobile Application For Herbal Medicine Prescription On Obstetric And Genecology Problem (Mahpog)

The data were collected through series of oral consultation and interview with some traditional herbal practitioners in Ogbomoso, Ibadan, Abeokuta in Nigeria and also consulting different herbal medicine company's website, to determine drugs name, its specification and location.

3.1. System Database

1) Summarized Symptoms

Due to the cumbersome symptoms gather during data collection, the symptoms used for the database is summarized for easy diagnosis. The representation of each symptom is shown below

S1 = Chest pain
S2 = Dizziness
S3 = Pulpitation
S4 = Breath shortness
S5 = High fever
S6 = Breast inflammation
S7 = Boils
S8 = Bowel bleeding
S9 = Anal itching
S10 = Anal swelling
S11= Feaces leakage
S12 = Headache
S13 = Blur vision
S14 = Rib pains
S15 = Vomiting
S16 = Abdominal pains
S17 = Irregular menstruation
S18 = Misconception
S19 = Frequent urination

S20 = Constipation
S21 = Prolonged menstrual cycle
S22 = Sexual pain
S23 = Menstrual cramps
S24 = Breast aching
S25 = Menstrual pain
S26 = Urinary difficult
S27 = Vaginal itching
S28 = Vaginal discharge
S29 = Extreme anger / anxiety
S30 = Depression
S31 = Backache
S32 = Pelvic pain
S33 = Insomnia

2) Summarized diagnosed table

The table below show how the diagnosed result is implemented. The associated column is diagnosed if the users select the appropriate pairing of the symptoms, if not, no result is diagnosed. Table 1 shows a summary of how the prescriptions were made based on the diseases diagnosed from the symptoms.

Table 1: Summarized Diagnoses Showing The Prescribed Drugs And Their Respective Production Company

Diseases	**Symptoms pairing**	**Drugs**	**Production company**
Cardiac	S_1, S_2, S_3, S_4	HBP capsule	YEMKEM
Staphylococcus	S_5, S_6, S_7	FORMULA YK 800	YEMKEM
Hemorrhoid	S_8, S_9, S_{10},S_{11}	FIJK (liquid & capsule)	OKO OLOYUN
Infertility	S_{16}, S_{17}, S_{18}	Formular YK 35	YEMKEM
Premenstrual disorder dysphoria	S_4, S_{14}, S_{29}, S_{30}	Multi vitamin energy plus	Tianshi
Leucorrhea	S_{16}, S_{26}, S_{27}	FORMULAR YK 15	YEMKEM
Endometriosis	S_{16}, S_{22}, S_{23}	Cag-Mag-100 tablets	Tianshi
Mastodynia	S_1, S_6, S_{24},	Quercetin plus	Tiashi
Cervicitis	S_{22}, S_{28}, S_{32}	Ruzu bitters	08087623067, 08096774069
Preclampsia	S_{12},S_{13},S_{14},S_{15}		
Premenstrual syndrome (PMS)	S_{12},S_{15},S_{16},S_{24},S_{31}	Sappiro Lemon Ginseng Liquor	Abllat Nig limited
Uterine fibroid	S_{17},S_{19},S_{20},S_{21},S_{32}		
Malposition of the Uterus	S_{22},S_{28},S_{32}	Chelated Zinc-100 tablets	GNLD
Chronic pile	S_{12},S_{16},S_{22},S_{31}		

3.2. Flow Chart of the Graphical User Interface

The GUI consists of symptom-options interface where users can easily select there observable symptoms which the application systematically return diagnosed result by querying the database. The overall system flowchart is shown in Fig. 2.

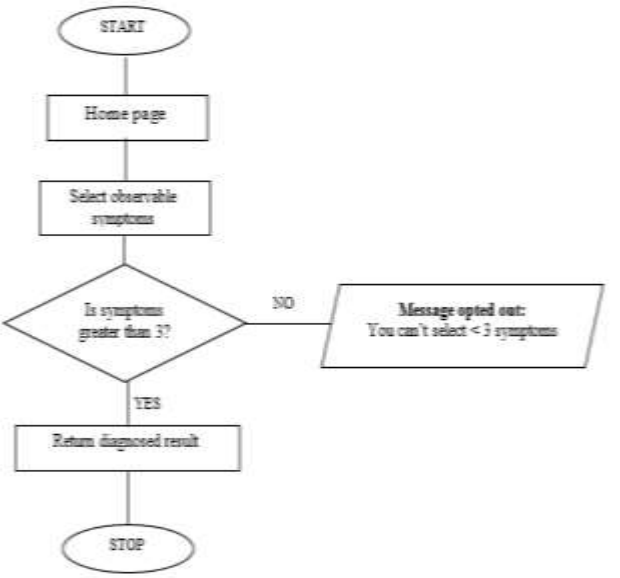

Figure 2: flow chart of the mahpog user interface.

The sequence diagram of the proposed system is fig 3 and fig 4 shows the sequence and activity diagram respectively which better describes the operation of the system.

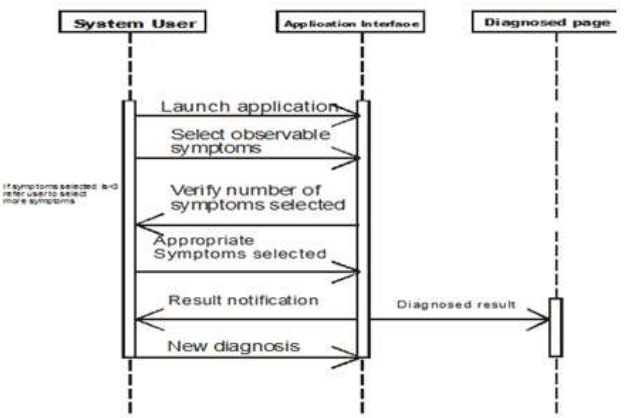

Figure 3: Sequence Diagram Of Mahpog

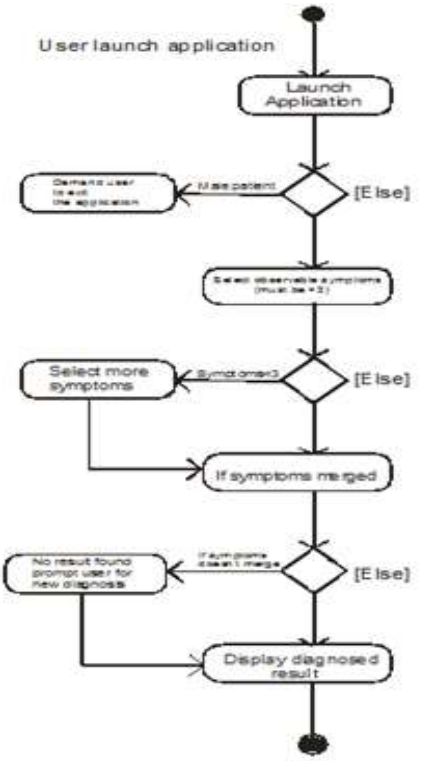

Figure 4: Activity Diagram Of The Mahpog

4. Implementation of MAHPOG

The mobile based application on herbal medicine prescription on obstetrics and gynecology is an application that runs on Android enabled mobile devices. The application was written using JAVA programming language and MYSQL as the database language. The languages were chosen for the purpose of good functionality in graphical outputs, ease in programming and its efficiency when it comes to mobile programming. The Graphical User Interface (GUI) platform of the mobile application enables users check their symptoms after which the system diagnosed the likely disease and prescribe the drug with the details (i.e. the drug to used, the company that produced it and where to obtain the product.). The platforms have some features such as the submit button for sending the symptoms selected by the user in other to diagnosed result. The new diagnosed which shows after first diagnosed. This buttons allow users to selects other observable symptoms among the list. The user can exit the application using the exit button.

5. MAPHOG Usability Evaluation

An evaluation was carried out on the mobile application using the Technology Acceptance Model (TAM) (Venkatesh and Bala 2008) which is recognized as one of the main Information Systems (IS) theories that contributes to understanding of users 'acceptance of information systems

(IS)/information technology (IT). In this paper, we made use of five factors from TAM: Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Perception of External Control (PEC), Job Relevance (REL) and Behavioral Intention (BI) as follows which was explicitly explained in Abdullah et al. (2016);

(1) PEOU is used to determine to what degree of ease is associated with the use of the MAPHOG;
(2) PU is used to determine the degree to which a person believes MAPHOG would enhance his or her performance in diagnosing obstetrics and gynecology problems.
(3) PEC is used to determine the degree to which an individual believes that organizational and technical resources exist to support the use of the MAPHOG;
(4) REL is used to determine the degree to which an individual believes that the target MAPHOG is applicable to his or her job.
(5) BI is used to determine the degree to which a person has formulated conscious plans to use MAHPOG.

After the development of mobile application, we conducted a a pilot study to validate the mobile application using twenty-one (21) participants with an aim to study the usability of MAHPOG. Given our aim to develop a health-relevant mobile application that will be acceptable in practice, we believe that the understanding of its quality was insufficient. This is because a high quality or performance does not determine its usefulness to the target users. Feedback gotten from the usability evaluation (conducted with obstetricians and gynecologists, as the summary is seen in table 2) is vital to determining the user's perception on MAHPOG, for providing insight into the future use of the mobile application.

Table 2 summarizes the overall usability feedback of MAHPOG. This feedback received from the participants showed that perception is evidenced by the 3.54 mean score for perceived ease of use, 3.92 mean score for perceived usefulness, 4.43 mean score for perception of external control, 3.60 mean score of job relevance and 4.04 mean score for behavioral intention. All construct were measured on a 5-point Likert scale through multiple questions in the usability.

Table 2: Usability Evaluation Results

Statements	**Mean**
Perceived Ease of Use (PEOU)	3.54
Perceived Usefulness (PU)	3.92
Perceived External Control (PEC)	4.43
Job Relevance (REL)	3.60
Behavioral Intention (BI)	4.04

In addition to exploring the mean rating for each participant per usability construct, we also explored the median score per usability construct, across all accumulated construct responses. In particular, we found that based on 210 responses for PEOU construct (which was measured with 10 questions, as outlined in table 3, each answered by 21 respondents) the median for overall

PEOU is 4. The score support the high agreement received on PEOU, as represented in the overall mean score of 3.54. This findings indicates that the participants agreed that MAHPOG is easy to use. Further exploration of the evaluation of PEOU of the ontology shows that PEOU1 received the highest mean score i.e. 4.57 (see table 3). These scores highlight the participants' agreement that "Background knowledge of mobile phone is essential to effectively use this application" followed by PEOU2 with mean score of 4.52 which shows that the participants agreed that "Users will understand this application with little effort". PEOU3 had a mean sore of 4.48 indicating that participants agree that they could easily maser the use of MAHPOG. The mean score of PEOU5 i.e. 4.38 showed the participants' agreement on the flexibility of the application in terms of usage. PEOU6 shows a mean score of 4.24 which showed the perception of participants in terms of ease of usage is highly positive. The 4.05 mean score of PEOU4 is an indication that the application could easily diagnose obstetrics and gynecology problem. PEOU8 mean score i.e. 3.95 revealed that it could be accepted that the participants agreed that the presentation of the mobile application allowed for easy diagnosis of obstetric ad gynecology problems. PEOU7, PEOU9 and PEOU10 were revere scale questions. The low scores for these questions indicate that the respondents do not consider that MAHPOG is difficult to use (PEOU7), nor unnecessarily complex (PEOU9), nor cumbersome to understand (PEOU10).

Table 3: Perceived Ease Of Use (Peou) Responses

Statements	**Mean**
PEOU1. Background knowledge of mobile phone is essential to effectively use this application	4.57
PEOU2. Users will understand this application with little effort	4.52
PEOU3. I can easily master the use of the mobile application	4.48
PEOU4. I find it easy to use the application to diagnose obstetrics and gynecology problem	4.05
PEOU5. I find the mobile application flexible to use	4.38
PEOU6. Learning to use the mobile application is easy for me	4.24
PEOU7. The application is difficult to use	2.05
PEOU8. The mobile application is presented in a way that allows me to easily diagnose obstetrics and gynecology problem	3.95
PEOU9.The mobile application is unnecessarily complex	1.57
PEOU10. The application is cumbersome to understand.	1.57

Three (3) statements were used to measure the Perceived Usefulness (PU) TAM construct, as shown in table 4. Further investigation of participants' feedback for PU suggests that MAHPOG is useful diagnosing obstetrics and gynecology problems. This finding is supported by the high mean score for PU1 and PU3 with 4.66 and 4.24 respectively. Considering all accumulated feedback, the PU construct received a median score of 5, which evidences the overall agreement on usefulness of MAHPOG as perceived by the health experts. The participants 'opinion on the usefulness of MAHPOG is also supported by their shared disagreement on PU2, which indicates the level of interaction required to use MAHPOG ("I need to ask several questions before I could start using the application"), which received a mean score of 2.86, which showed higher tendency towards accepting MAHPOG.

Table 4: Perceived Usefulness Responses

Statements	**Mean**
PU1.I find this mobile application useful for helping individuals/physicians diagnose obstetrics and gynecology problems	4.66
PU2. I need to ask several questions before I could start using this application	2.86
PU3. I find the application useful for my job	4.24

Perception of External Control was measured through two questions, PEC1 and PEC2 shown in table 5. Our findings indicate that participants agree on readily possessing all required resources and knowledge to use the application. In particular, the participants agree that they have the knowledge necessary to use the application. (PEC1 mean of 4.71) and, to a lesser but acceptable extent, the resource necessary to use the application (PEC2 mean of 4.14). PEC has a median score of 4.5 shows a high level of perception of necessary resources had.

Table 5: Perception Of External Control Responses

Statements	**Mean**
PEC1. I have the knowledge necessary to use the application	4.71
PEC2. I have the resources necessary to use the application	4.14

Job Relevance of the application to the context of the participant was measured through three statements, REl1, REL2, and REL3 as shown in table 6. For REL construct, high scores were received for REL1 and REL2. Participants agreed that the arrangement of operation (the progressive specialization of concepts) in the application is helpful (REL1), as indicated by the mean score of 4.43. Likewise, REL2 recorded a slightly higher mean score of 4.05. this score indicates that agreement achieved by the participants with respect to the application being able to address the entire symptoms necessary (i.e. "The application is able to address the entire symptoms necessary"). Similarly, the response to the reverse scale question REL3 (i.e. "The application is not in adherence to current practices"), indicates that the respondents agree that the mobile application is compatible

with current practice in the health domain.

Table 6: Job Relevance Responses

Statements	**Mean**
REL1.The arrangement of the operation of the application is helpful	4.43
REL2. The application is able to address the entire symptoms necessary	4.05
REL3. The application is not in adherence to current practices	2.33

Finally, Behavioral Intention is measured through five questions, BI1, BI2, BI3, BI4, and BI5 as depicted in table 7. The highest mean score of 4.00, received for BI1, indicates agreement on participants' belief that it will be a good idea to use MAHPOG for health application. BI2 received mean score of 4.14 and BI4, 3.95, indicating that the participants have an overall favourable attitude to the use of MAHPOG. The participants also agreed or strongly agreed that they intend to use the application for physician practice (BI3 of 3.71), however, they were highly sure in their willingness to refer to the application once in use (BI5 mean score of 4.8). overall, a median score of 4 was recorded from the Behavioral Intention assessment, evidencing a high level of agreement among participants with respect to the BI construct.

Table 7: Behavioral Intention Responses

Statements	Mean
BI1. I believe it would be a good idea to make this application for health organizations	4.00
BI2. I have generally favorable attitude toward using this application	4.14
BI3. I intend to use this mobile application for my physician practice	3.71
BI4. I like the idea of using this application	3.95
BI5. I will refer to this application often	4.43

6. Concluding Discussion

This research paper presented the implementation of a mobile application on herbal medicine prescription for obstetrics and gynecology (MAHPOG) developed to address an urgent and crucial need in the medical domain. MAHPOG is a result of a study that has gone through various phases of problem identification, feasibility study, information gathering, system design and implementation, expert feedback and the usability evaluation, has positioned MAHPOG as a mobile application that provides needful solution in the medical domain. The experts has indicated that they consider the application as highly useful and effective in diagnosing obstetrics and gynecology problems. This will be of great advantage for the usage of females whose environment are far from a medical center or those who can't afford visiting the medical center. The mobile

application will aid prescription of herbal medicine for obstetrics and gynecology problems which will help diagnose their ailment with ease. This will also help ensure first aid treatment to users. In addition, unsolicited feedback from the experts has also demonstrated the potential of this application. Finally, we also provided a detailed approach for MAHPOG usability evaluation based on Technology Acceptance Model.

As pervasive technologies become a more integral part of everyday life, attention is now being paid to how these ubiquitous computing systems can be used to monitor and contribute to herbal healthcare services. This paper diagnosed obstetrics and gynecology problem, prescribing herbal medicine with their production company, where it can be found and related diseases. We intend carrying out further research by enabling users input their symptoms so as to diagnose result, which will be more efficient and reliable. Also, the research work can be improved upon by the inclusion of machine learning techniques such as fuzzy, neuro-fuzzy, k-nearest neighbor for ascertaining definiteness in the diagnosis and prescription phases of the mobile application.

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