Developing and evaluating the effectiveness of mobile phone-based career intervention for career competencies of Malaysian public managers: Protocol for a mixed method study

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ABSTRACT

Background: This study presents a protocol for a mixed method study on the development and evaluation of the effectiveness of mobile phone-based intervention for enhancing career competencies of managers in the Malaysian public service. Career competencies, being central to the self-management and development of one's career, are necessary for proactive management of careers; they help to guide the individuals towards subjective career success which subsequently leads to organization success. However, there is a lack of career competencies intervention practices in the Malaysian public service. Therefore, this study aims to develop and evaluate the effectiveness of a user and expert centric mobile phone-based career intervention program of career competencies among Malaysian public managers. In this study, the Social Cognitive Career Theory (SCCT) is adopted as the framework to develop mobile phone-based intervention for career competencies.
Method: This is a sequential exploratory mixed method study which involves, in Phase 1, a qualitative approach: reviewing of literature and interviewing experts and public servants who are users of mobile phones so as to obtain their perspectives regarding the components in the career intervention module and mobile phone application features. A quantitative approach is implemented in Phase 2 that evaluates the mobile phone-based career intervention program. Validation will be conducted to meet the objectives of (i) the usability of the mobile communication career intervention application (survey), and (ii) evaluation of the effectiveness of the intervention program for career competencies delivered through mobile phone application (randomized controlled trial). The career intervention program consists of five modules through which development is based on reflective, communicative and behavioral dimensions.
Outcome: The primary outcome of this study is career competencies. The career competencies score will be compared between participants in the intervention and control group at the baseline, and follow-ups at week four and week 12 respectively, using mixed design ANOVA.
Discussion: The results from this study will indicate the effectiveness of the career intervention program for career competencies in the reformation of public services management. The intervention can serve as a new modality to enhance career competencies among public managers in Malaysia if its effectiveness is proven.

1. Introduction

There are empirical evidences that Malaysian public servants are generally ineffective and underperforming (Bakar et al., 2015; Nyamita et al., 2015; Salleh et al., 2016; World Bank Group, 2019), and that many public managers are unable to advance their careers successfully because of their inability to identify the competencies needed for a fit-for-purpose public service (OECD, 2017a). As such, the performance of the Malaysian public sector has stagnated, lagging behind the standards of the Organization for Economic Co-operation Development (World Bank Group, 2019). The complaint rate, rising to 17% from 2017 to 2019 (Public Complaints Bureau Malaysia, 2019), is an indication of the sad state of affairs in the public sector. Delays in public service delivery, low-quality services, and failure to meet expectations of the public are

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issues that need to be rectified (Abdul Ghani Azmi et al., 2009; Hafiz et al., 2015; Ho et al., 2019; Majid et al., 2019).

The Malaysian government has strived to improve the performance of the public sector by providing opportunities to enhance career success. Various policies have been explored and a budget allocated for the improvement of public service. The 11th Malaysia Plan 2016–2020 and the shared prosperity vision 2030 for Strategic Thrust 3 in accelerating public human capital development are aimed at achieving the highest level of employees' performance (Government of Malaysia, 2016, 2019). The government introduced (i) a new promotion grade 56 (senior deputy director) for public servants in grade 54 (deputy director) who have hit the grade ceiling; (ii) salary increment, allowance readjustment - cost of living allowance (COLA), (iii) bonus for all public servants below grade 56, and (iv) increasing career intervention for job competencies such as in-house training on job competencies and leadership competencies (Azmi, 2010). Such competencies include official letter writing, financial management, drafting human resource policies, auditing, setting sustainable development goals, procedure on disposable management, public service collaboration, and other leadership attributes (INTAN, 2019). All these initiatives implemented by the government are based on traditional approaches which focus on career outcomes as main objective. Nevertheless, positive outcomes in job performances cannot be sustained for the long term (OECD, 2017b). Career success should no longer be viewed in terms of just objectives career success, but consideration should be given to actual personal career success including subjective career success (Briscoe and Hall, 2006).

The government should consider initiatives that shape subjective career success by taking into account idiosyncratic needs, values, and goals underpinning each individual's career choice. Steps should be implemented to encourage behavior that meet the challenges of the career paths of public managers instead of just focusing on incentives such as salary adjustments and promotions. The government should also provide support and launch appropriate socialization programs to enable public servants become more resourceful and competent. Essentially, organization support is important for employees' subjective career success (Kraimer et al., 2011). Appropriate organizational socialization helps employees gain career competencies that enable them to achieve a healthy work-home balance (Akkermans et al., 2013a) and subjective career success (Briscoe and Hall, 2006) which serves as an indicator of successful career development (Akkermans and Tims, 2017), a primary function of human resource development (Hite and Mcdonald, 2008). Such developmental intervention is a combination of structured and unstructured learning and performance-based activities to enhance individual competency, capability, and capacity to cope with and successfully manage change (Potnuru and Sahoo, 2016). Studies have suggested that human resource development intervention based on career competencies contributes significantly towards subjective career success (Akkermans and Tims, 2017). Career competencies are the competencies central to career self-development initiated by own (Akkermans et al., 2014).

Public servants need career competencies to be proactive in managing their careers and navigating them to suit their job competencies (Akkermans et al., 2014; Arthur et al., 1995; Defillippi and Arthur, 1994) through (i) self-reflection on motivation and values, (ii) awareness of the importance of networking and communication, and (iii) taking proactive action on career-related processes (Beheshtifar and Zare, 2013; Kuijipers et al., 2006; Wesarat et al., 2014). Public service providers in western countries have high career competencies to enable them to perform better at their jobs (Akkermans and Tims, 2017; Arthur et al., 1995; Chen et al., 2014; Converse et al., 2012; Defillippi and Arthur, 1994; Joo and Ready, 2012; Kuijpers et al., 2006; Lounsbury et al., 2012; Prabhu, 2013). However, public services management in the East tends to recognize a clear hierarchical and authoritative distance in their respective organizations, where each individual has his or her own defined role to perform, without needing to justify decisions or

policies made by their superiors. They are expected to be told what to do, following their respective job descriptions (Hofstede, 2019).

Lack of career competency practices (Akkermans and Tims, 2017; Arthur et al., 1995; Chen et al., 2014; Converse et al., 2012; Defillippi and Arthur, 1994; Joo and Ready, 2012; Kuijpers et al., 2006; Lounsbury et al., 2012; Prabhu, 2013), poor adherence to classroom training (Ho et al., 2019), limited availability of career competency training (Macnamara, 2018) and rapid changes in the digital transformation era (Bakar et al., 2015; Salleh et al., 2016; World Bank Group, 2019) are factors that favor mobile phone communication as a medium to deliver career intervention based on career competencies to cope with these barriers (Akkermans et al., 2014; Akkermans and Tims, 2017; Darlow and Wen, 2016; Dickmann et al., 2016; KongWang, 2015; Heber et al., 2013; Services, 2007). The intervention delivered through the mobile device as compared to the conventional method of training conducted has the advantage of anonymous accessibility (Heber et al., 2013), convenience, and programs tailored to different contexts of behavior (Riley et al., 2011). Mobile communication intervention is not only suitable for managers in the public sector but is also in line with the budget, as provided for by the 2018-Industrial Revolution 4.0 (IR4.0) which stresses the fact that the government of Malaysia needs to transform to by adopting High Tech and High Touch approaches as the world is rapidly gearing towards change.

Statistics show that individuals, including those working in the Malaysian public sector, frequently use mobile phones (Department of Statistics Malaysia, 2016; Malaysia Communication and Multimedia, 2017; Timmis et al., 2017), either for work-related activities (56.3%) or for study purposes (67.6%) (Malaysia Communication and Multimedia, 2017). In this regard, mobile communication intervention could be implemented to enhance competencies of public servants to provide better public services (Ho et al., 2019). The majority of public servants who attend training nowadays are from Generation Y which comprises 45% of the Malaysian public sector (Public Service Department, 2019b). This is the connected cohort that can be successfully trained via the mobile phone or internet (KongWang, 2015; Services, 2007). Such an approach can improve the quality and frequency of participation in the training (Mercer et al., 2019). Unfortunately, unlike mobile communication intervention in other fields, there are relatively few studies on enhancing competencies of public servants via mobile communication intervention to improve public services.

Mobile communication intervention has been practiced extensively in sectors dealing with health, marketing, and e-learning (Danbjørg et al., 2018; El-Gayar et al., 2013; Noorhidawati et al., 2015; Patwardhan, 2016; Uyanik, 2014). Patwardhan (2016) reported that mHealth application had significant outcomes of early prevention of anxiety programs for middle school students (Patwardhan, 2016). Mobile phone exercise application also helps patients with osteoarthritis to increase their exercising activities (Danbjørg et al., 2018). Similarly, mobile phone application for diabetic care is significantly associated with improved knowledge and attitudes in self-management of diabetes (El-Gayar et al., 2013). Business marketing strategists have exploited the ease of mobile payment as indicated by its increasing usage (Abrahão et al., 2016). However, there is a scarcity of studies on mobile communication for career intervention, especially those investigating the effectiveness of career intervention in enhancing career competency outcomes.

Many current mobile intervention applications are ineffective (Schnall et al., 2017) because existing designed intervention module constructs have poor user-center adaption (Stanziola et al., 2015). Feedback from users' desires, needs, and limitations should be factors to take into consideration in the development of mobile intervention for a fit-to-user's mobile application (Černezel and Heričko, 2013).

Owing to the importance and significance of career competencies to improve public service performances, as well as to achieve optimal effects of the intervention, this study will develop and evaluate the effectiveness of a user and expert centric mobile phone-based career

intervention program for career competencies among Malaysian public managers. This study will adopt the Social Cognitive Career Theory (SCCT) as the framework to develop the mobile phone-based intervention for career competencies.

2. Social cognitive career theory (SCCT) intervention

According to the Social Cognitive Theory (SCCT), a desired behavior is developed through mastery modeling. This is done by strengthening the individual's beliefs of his or her capabilities and talents to enhance self-motivation through the goal system. The SCCT emphasizes the role of self-referential thinking in human motivation and behavior which aims to develop personal interests in the choice of occupational and academic fields (Lent et al., 2002).

SCCT incorporates the individual's behavioral intention regulated through the cognitive processes. The individual needs to be confident (possessing high self-efficacy), and believe in his or her capability to perform the target behavior (action) (Lent and Brown, 2013). Bandura refers to these beliefs as determinants of how people think, behave, and feel, thus influencing career behaviors (Bandura, 1997). Self-efficacy can be learned and acquired through the learning experience which conveys four types of information relevant to self-efficacy, viz. personal performance accomplishments, observational learning (or modeling), social encouragement and persuasion, and physiological and affective states and reactions (Lent and Brown, 2013). The conceptual framework for the study is shown in Fig. 1.

The intervention typically shares the knowledge and skills that help to start and maintain or change to the target career behavior action (Young et al., 2015). The main variables in the SCCT supporting the mobile application for career intervention based on career competencies are person input, learning experience, self-efficacy, and action. Person input is the content of the module which fosters personal value and skill acquired during the intervention; learning experience refers to the mobile-based intervention afforded by the user; self-efficacy is the belief in one's capabilities in executing the desired action; and career behavioral action is the career competencies (proactive in career-related action) which is the dependent variable (Bandura, 1988; Lent et al., 1994).

2.1. Development of mobile phone-based career intervention for career competencies

Users are instructed on career competencies modules through the mobile phone-based career intervention application. The design of the application is based on four learning experiences (i) performance accomplishment, (ii) vicarious learning, (iii) verbal persuasion, and (iv) affective states. The learning experiences that shape the design of the modules are aimed at enhancing user's self-efficacy, thus helping to execute proactive career-related action (career competencies).

The contents of the intervention modules are developed based on three dimensions of Malaysian civil servants' career competencies (i)

reflective (motivation and qualities), (ii) communicative (networking and self-profiling), and (iii) behavioral (work exploration and career control). Reflective career competencies pertain to having awareness of what one's career entails, combining personal reflections with the demands of a professional career. Communicative career competencies relate to being able to communicate effectively with others to enhance one's career success (Mohd Rasdi et al., 2012). Behavioral career competencies pertain to the ability to shape one's career by taking action and being proactive in career development (Chin and Mohd Rasdi, 2014).

The intervention protocol has five modules and is designed in English language. The first module consists of an educational session for a basic understanding of career competencies and their impact on career development. The second module focuses on one's reflection on motivation and qualities as conducted by various tests, questionnaires, and activities to help individuals discover their personal qualities and motivation. The module also contains information that allows self-directed environmental exploration; participants are able to search for information based on personal characteristics, motivation and roles. The third module assists users in working out strategies with others (i.e. communicative and self-profiling competencies) to achieve the targeted aim. The fourth module prompts users to reflect on and narrate their emerging career stories. Goal-setting identification activities are designed for the efficacy of career interventions. Besides, the activities foster the career adaptability resources identified in managing career transitions. The fifth module includes the government's human resource practices, training programs offered, and policies. The fourth and fifth modules require users to reflect on their work exploration and career control career competencies.

The mobile phone application development process incorporates set rules and gamification elements in the modules. Users are required to follow the rules (Donnon, 2012; Paul et al., 2019) according to the routine process (Bhide, 2018). Users have to spend at least 5 min daily to study the modules through their mobile device and complete them within three months (Akkermans et al., 2014). Besides, the gamification elements of storyboard, points, ranking, punishment, and rewards (Deterding et al., 2011) embedded in the mobile device intervention are aimed at enhancing interactivity. The use of positive feedback/rewards, opportunities for engagement with others (social elements), and simple and clear presentation of content, are also in line with the four styles of learning experiences (Bandura, 2007). Taken together, these elements are those that are most likely to increase the longevity of the application (Bunchball, 2010).

Career intervention based on career competencies delivered through mobile phone application is aimed at enhancing self-efficacy by adopting the effectiveness of the four learning experiences (Lent and Brown, 2013) discussed earlier. The modules in the career intervention application based on career competencies are explicitly formulated to increase the three dimensions of career competencies (Akkermans et al., 2014).
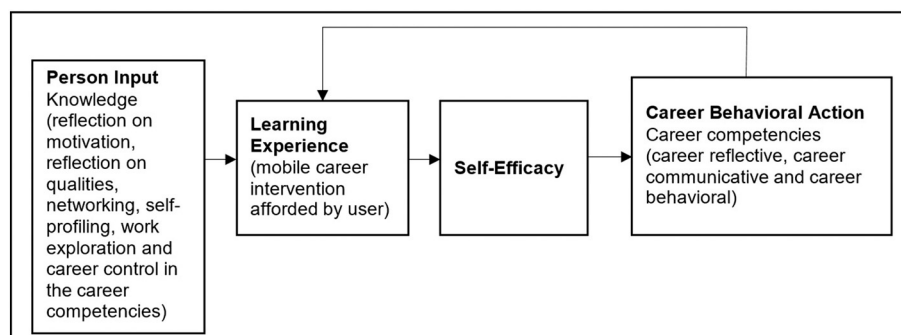

Fig. 1. Conceptual framework for the mobile career intervention based on career competencies using Social Cognitive Theory and Social Cognitive Career Theory.
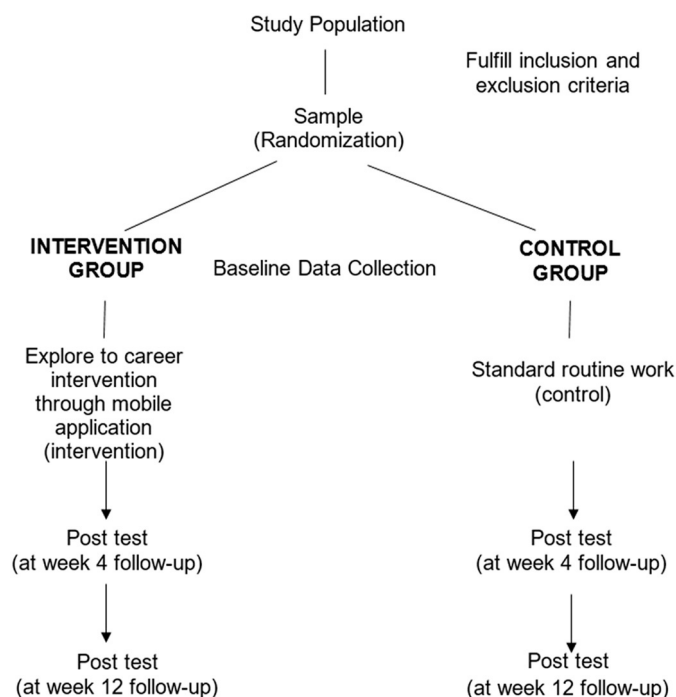
Fig. 2. Consort diagram for the experimental study on the career intervention's effectiveness.

3. Methods

3.1. Study design – sequential exploratory mixed design

This study uses a sequential exploratory mixed design that involves the user (user-centric approach) and expert (expert-centric approach) in the development of career intervention based on career competencies. The user-centric approach collects feedback on the users' desires, needs, and limitations (Černezel and Heričko, 2013), while the expert-centric approach collects feedback from the human resource officers and software developers. These approaches are essential in producing a fits-user (user-centric) and useful (expert-centric) mobile phone application.

This study will be conducted in two phases. The first phase comprises a review of related literature and interviews with public officers in Malaysia. This qualitative approach (Creswell, 2009) is aimed at establishing (i) the elements in the module of career intervention based on career competencies for public servants in Malaysia who are required to learn and manage their careers and (ii) the preferred major features of the mobile device when using government-issued application/ technology. The data collected will be used to generate formative data to guide the development of a module to enhance understanding of a specific culture and context.

The informants will be given the draft intervention module in advance to review. During the interview session, the informants are requested to comment and validate the intervention module and share their insights on the mobile features that are preferred. The interview will be conducted through interviews based on semi-structured standardized questions. This is to collect other information raised spontaneously by the informants (Creswell, 2012). Field notes will be recorded, transcribed, and interpreted to reveal emerging themes. Follow-up interviews via teleconferencing and mobile phone-based communication (WhatsApp) will be carried out when there is a need (Baker et al., 2009).

The outcomes of the first phase study will then be transformed into the mobile phone application paper prototyping, personas, essential uses cases, and storyboard techniques for verifying the product requirement before developing the mobile phone application. The paper

prototyping will then be validated and tailored based on the validation from the user and expert (user and expert centric design). These methodologies aim to improve the users' and experts' experiences in ensuring the usability of the mobile application for career intervention based on career competencies. The assumption of Phase 1 is culture-specific career intervention based on career competencies delivered through mobile phone-communication to provide effective training to public servants in Malaysia in managing their careers.

Phase 2 is a quantitative study to validate and evaluate the effectiveness of the mobile career intervention based on data collected from Phase 1 to ascertain whether the desired outcomes have been achieved. Validation will be conducted with regard to the objectives of the (i) usability of the mobile phone career intervention application, and (ii) evaluation of the effectiveness of career intervention program for career competencies delivered through the mobile phone application. A validated and reliable "Usefulness, Satisfaction and Ease" (USE) Questionnaire (Lund, 2001) will be used to assess usability by measuring the users' performance preferences/opinions of the system based on their rating. The effectiveness of the intervention will be assessed by testing the hypotheses of the experimental study in enhancing the career competencies between baseline and follow-ups at week 4 and week 12 (Akkermans et al., 2014; Akkermans et al., 2013b). The hypothesis proposed are: (i) H1: The use of career intervention on career competencies delivered through mobile phone application is beneficial to public servants (managers) in Malaysia and (ii) H2: Career intervention based on career competencies delivered through mobile phone application is effective in increasing career competencies among public servants (managers) in Malaysia between baseline and follow-ups at week 4 and week 12.

In the sequential exploratory design, equal weight is given to both phases (qualitative and quantitative), i.e. the same priority is accorded to qualitative and quantitative phases and the notation of the mixed-method sequential design. According to Creswell (2012), the sequential exploratory design is important in the development and testing of culture and context-specific instrument of a specific product. As a mixed method approach allows a deeper and more comprehensive analysis (Mangen et al., 2019), the sequential exploratory mixed method adopted here achieves the objectives of the study in developing, validating, and testing the effectiveness of career intervention based on career competencies delivered through the mobile phone application. Fig. 2 shows the consort diagram of the experimental study.

3.2. Sampling of participants

3.2.1. Phase 1: qualitative approach

In this phase, we will use purposive sampling based on the research questions: "Is the user-centric career intervention based on career competencies delivered through mobile phone application beneficial to public servants (managers) in Malaysia?" The participants in this phase include managers from the government department's Human Resource Development office. In this phase, we shall conduct an in-depth exploration of the experiences, perceptions (Creswell, 2009) and patterns (Francis et al., 2017) of the learners.

A minimum of six informants (from users and experts) will be recruited to fulfill the minimum sample size (Creswell, 1998). The recruitment of informants will be finalized when the data meet the saturation point.

3.2.2. Phase 2: quantitative approach

During this phase, we shall utilize a quantitative research survey to determine the usability and effectiveness of the mobile-based intervention for career competencies. To evaluate the usability of the mobile application, five respondents will be recruited from the Public Service Department of Malaysia to answer the USE questionnaire, aiming to detect the usability problems before the effectiveness of the mobile application been evaluated. A minimum of five respondents is required

to evaluate the usability of the system to enable 80–85% of the usability problems to be detected (Abdullah, 2008; Nielsen, 1994).

Randomized controlled trial (RCT) study design is used to evaluate the effectiveness of the mobile-based intervention for career competencies. The recruitment of the sample will involve officers from the Public Service Department Malaysia in grades 41 and 44 (junior and middle management). The sample size is calculated based on Rosner's (2010) formula for calculating a RCT sample size, n, where $n = 2\delta^2(Z1-\alpha/2 + Z1\text{-}\beta)^2/(\mu_1\text{-}\mu_2)^2$ (Rosner, 2010). The largest sample size obtained from the outcome measure of career intervention ($\delta = 0.84$) (Akkermans et al., 2014) will be used as the sample size for this research. Based on the above formula, the minimum sample size required for each group is 26 respondents. Taking into account 20% attrition (Foo et al., 2020), the total required sample size per group is 31. Hence a total of 62 participants is required, with equal numbers in both intervention and control groups.

The officers' name list will be obtained from the Human Resource Department and participants will be selected from the sampling frame using a simple random sampling procedure. All the names will be numbered and chosen using draw logs until 62 names are obtained from the list. The selected participants will then be personally contacted with assistance from the Human Resource Department. Eligible officers who agree to participate in this study will be randomly allocated to either the intervention or the control group using a computer-generated random sequence system.

3.3. Data collection

Table 1 shows the schedule for data collection. The baseline assessment measures the respondents' career competencies. The efficacy endpoint will then be measured at the week 4 and week 12 follow-ups. A structured validated and reliable self-administered questionnaire will be used as a study instrument to collect data. On average, a respondent is expected to complete the questionnaire within 5 min. All instruments adopted English version and used with permission from the authors.

The instruments are as below:

3.3.1. Career Competencies questionnaire (CCQ)

Career competencies are measured using the 21-item Career Competencies Questionnaire (CCQ) (Akkermans et al., 2013a). The items are measured on a 5-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree) based on six subscales (Reflection on motivation, Reflection on qualities, Networking, Self-profiling, Work exploration, and Career control). The total scale of career competencies showed excellent internal consistency with Cronbach alpha values between 0.94 and 0.95.

3.3.2. Usefulness, Satisfaction and Ease questionnaire (USE)

The USE questionnaire is framed based on 30-items of user's perception regarding the Usefulness, Ease of use, Ease of learning, and System satisfaction (Lund, 2001). Consistent with the original measure conducted by Lund (2001), alpha reliabilities were excellent for System ease of use ($\alpha = 0.92$), Usefulness ($\alpha = 0.83$), System ease of learning ($\alpha = 0.92$) and System satisfaction ($\alpha = 0.88$) scale scores, and overall usability score ($\alpha = 0.95$) (Lund, 2001).

Fig. 3 shows the flow chart of the study. Phase 1 involves an interview session and mock module designation from the interview outputs. The finalized module will be transferred for mobile phone application development. Phase 2 involves validation by experts (for the system of the mobile phone application during development) and users. The application will then be evaluated through an experimental study on its effectiveness in enhancing the career competencies.

3.4. Data analyses and statistical methods

3.4.1. Phase 1: qualitative approach

The interviews will be recorded, transcribed and analyzed using a constant comparative method to form categories and themes for the study (Wellington, 2000). Data are managed by using ATLAS. The findings will be validated through the member checking method,
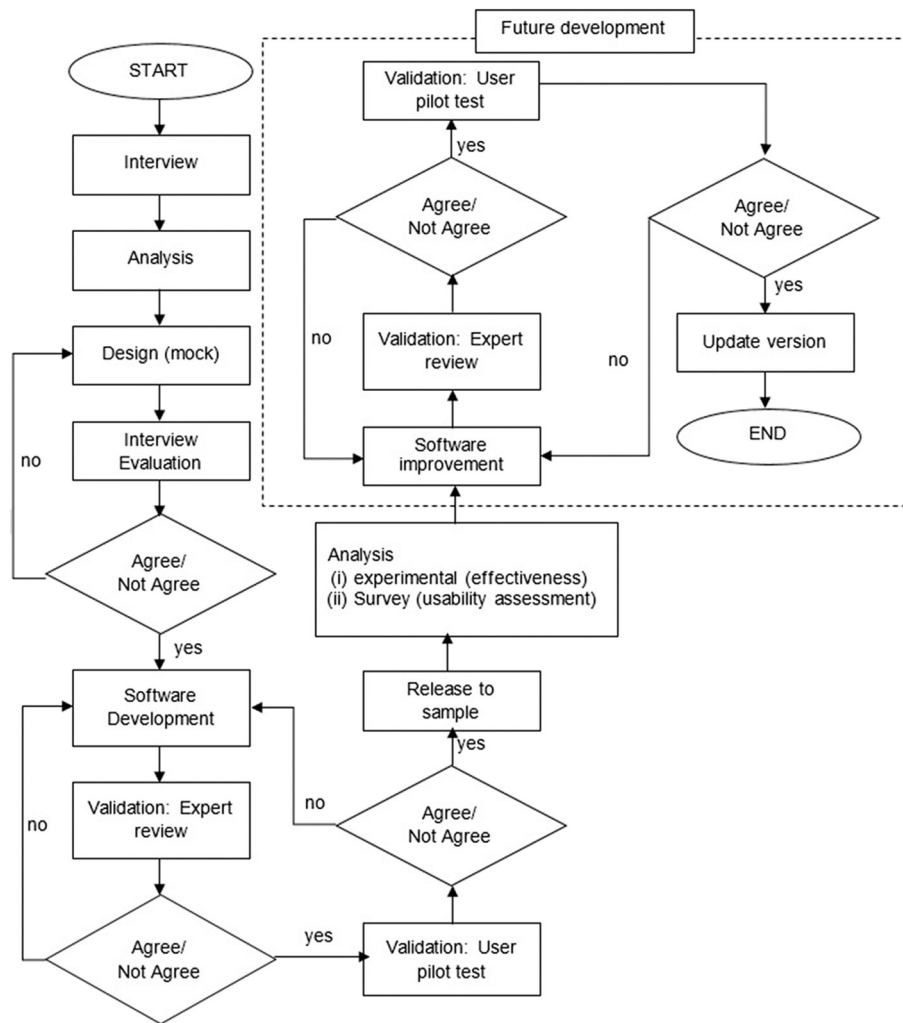
Table 1
Schedule of the assessments.

Time point	Enrolment	Baseline/randomization	Career intervention based on career competencies delivered through mobile application	Follow-up	
	−1	0	Within 12 weeks follow-up	4 weeks	12 weeks
Enrolment					
Eligibility screen	X				
Informed consent	X				
Allocation		X			
Interventions					
Career intervention based career competencies			⟵————————————⟶		
Standard routine work			⟵————————————⟶		
Assessments					
Demographic		X			
Career Competencies		X		X	X
USE	X				

Intervention – Career intervention based on career competencies delivered through mobile application. Questionnaire – (I) career competencies – 21 items and (ii) USE questionnaire – 30 items.

Fig. 3. Study flow chart of user-centric approach and expert-centric approach in developing the mobile career intervention based on career competencies.

whereby each of the transcripts will be verified by each participant to ensure the accuracy of the results (Harper and Cole, 2012). The results from Phase 1 will be used to develop the mobile phone-based application for career competencies intervention.

3.4.2. Phase 2: quantitative approach

For usability outcomes, the data will be analyzed using the descriptive analysis to determine the usability of the mobile-based career intervention. For the effectiveness outcome, data obtained will be analyzed based on an intention-to-treat principle and reporting the effectiveness of the intervention program. The data obtained from participants in the intervention and control groups at baseline, follow-ups at week four (4) and week 12 will be analyzed using the mixed designed ANOVA to determine the main effects of group x time interaction effects for mean scores of career competencies.

4. Ethical aspect

The Ethics Committee of University Putra Malaysia (JKEUPM) has examined the ethical aspects involving human subjects in this study. The ethics approval on the study are based on the fulfilment of the following main principles:

(i) Good Clinical Practice – GCP Standards are fulfilled even though the study is just an intervention on Human Resource Development, and not medical in nature.

- One of the researchers who obtained the approval has been participating in clinical research since 2014.
- Respect for all the human subjects is ensured, and their rights protected.
- The right to self-determination, privacy, and personal information of the subjects is protected.

(ii) Confidentiality of the information – All the information provided will be kept private. The information will be coded with a unique number. The subject's name is linked to the code number on a master list of those who take part in the study. This master list will be kept separate and will only be used by the researchers that govern research quality and safety oversight. The subject's identity will not be used in any published report at any time without his or her expressed consent, in accordance with applicable laws and/or regulations. The information will be archived and kept after the research is conducted.

(iii) Informed consent – It is mandatory to obtain informed consent from the subject before the study is conducted. There are two types of informed consent forms (i) Phase 1 – qualitative informed consent and (ii) Phase 2 – quantitative informed consent (RCT). The subject who wishes to participate in the study is required to sign the forms. For Phase 1, the researcher contacts the participants personally to arrange for an interview session. For phase 2, the researcher arranges for the first group meeting (pre-study) and second group meeting (post-study) to guide the participants on the

Table 2
Study task and proposed timeline.

Data	Task	Status	Main responsibility
Feb 2018 – Aug 2018	Program direction and theory development	Done	All
Jul 2018 – Apr 2019	Evaluation study design and write-up	Done	All
Oct 2018 – Feb 2019	Submit Ethic Approval	Done	RMR HHH
Mar 2019 – Aug 2019	Preparing the draft proposal and direction for the study	Done	RMR HHH
Sep 2019 – Jan 2020	Developing draft career intervention	Done	RMR HHH
Feb 2020 – May 2020	Phase 1 – Interviewing with draft career intervention	Done	MN HHH
Jun 2020 – Aug 2020	Analyze and Developing career intervention module and identify a feature in developing mobile application	Done	MN HHH
Sep 2020 – Oct 2020	Developing mobile application and pilot testing the mobile application	In progress	RI HHH
Sep 2020 – Oct 2020	Recruit control and intervention group	In progress	RMR HHH
Oct 2020 – Jan 2021	Testing career intervention based career competencies delivered through the mobile application (pre and post)		RMR HHH
Jan 2021 – Feb 2021	Analyze data on Outcomes		RMR HHH
Feb 2021 – Mar 2021	Write-up		All

study procedure.

Ethics approval for this study was received from the Research Management Centre (RMC), Universiti Putra Malaysia (UPM) – UPM/TNCPI/RMC/1.4.18.2 (JKEUPM). All ethical guidelines were strictly followed.

5. Timeline

Work plan and the timeline for the 'On Track' project is presented Table 2 below. The study started on March 2019 and expected to be completed on June 2021.

6. Discussion

The study provides an insight into how career intervention for career competencies is developed, delivered, used, and perceived through a mobile phone-based application in a developing country. An overview of the mobile phone application development and its ecosystem is discussed to provide an in-depth understanding of the processes involved in the development of a mobile phone-based application to improve the performance of the public sector. The knowledge acquired in this study will be a modality for further related research and studies.

Current Malaysian public services reforms should place more prominence on individual career management instead of organizational career management (Public Service Department, 2019a). An effective and efficient public service is required for the successful implementation of policies to raise the level of national development as well as to revitalize the national economy. The outcomes of this study contribute to the body of knowledge on mobile-based career intervention for career competencies to assist the Public Services Department in training public servants to be proactive in steering their career and competencies. The intervention can serve as a new modality to enhance career competencies among public managers in Malaysia.

CRediT authorship contribution statement

RMR and HHH are the co-lead researchers responsible for the research design, administrative tasks, contact with public officers, data collection and analysis. RI and MN are the other co-researchers in this research. RI works mostly with research methodologies in design, integrating the outcomes from both the qualitative and quantitative aspects. MN handles the qualitative data and the mobile phone application development.

Declaration of competing interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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