



UNIVERSITI PUTRA MALAYSIA

***DEVELOPMENT AND VALIDATION OF AN 'INTENTION TO STAY'
SCALE FOR MEDICAL ACADEMICS IN PUBLIC UNIVERSITIES IN
MALAYSIA***

WAN ISMAHANINI BINTI ISMAIL

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MALAYSIA**

By

WAN ISMAHANINI BINTI ISMAIL

**Thesis submitted to the School of Graduate Studies, Universiti Putra Malaysia, in
Fulfilment of the Requirements for the Degree of Doctor of Philosophy**

May 2018

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DEDICATION

This thesis is dedicated to

My parents, husband, family and lovely kids:

With love, respect and a bunch of memories

Indeed, we belong to Allah SWT and indeed to Him we will return.



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

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May 2018

Chairman : Associate Professor Roziah Mohd Rasdi, PhD
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There are few prominent scales that are normally being used by researchers to measure intention to stay or leave. Most scales use limited number of items, and some other measures are lacking in information on metric properties. There is lack of scale tailored to the needs of medical academics’ mission and able to measure their intentions level towards staying or leaving the university. In contrast to previous studies that were using theory or model that did not explain the formation of intention, this study employs dimensions of feelings, beliefs and desires based on the integration of Belief-Desire-Intention (BDI) Model and Integrated Behavioural Model (IBM). Moreover, there was a significant increase of employing Rasch model as compared to Classical Test Theory (CTT) which is normally used in the social sciences for quantifying and assessing psychological construct and personality evaluation. Rasch models have been demonstrated to be better over CTT in the construction of variable and validation. Although a significant number of articles have been published on intention to stay, there is a shortage of investigators using a systematic approach to determine a research question that would enable them to fix their research questions. The target population of this study is medical academics from eleven Malaysian Public Universities. The development and validation of the scale involved six phases that consist of purpose of the scale, define construct, scale development, scale testing and Rasch analysis.

Three main dimensions generated from the main elements of BDI model and IBM that explain the formation or underlying structure conception of intention. Items clarity is aligned with the scale’s purpose, research framework and theoretical construct. The items of Intention to Stay Scale (ITSS) also have adequate fit statistics, displaying that each item relates to the variable and measurement tool in a meaningful way. The person-item distribution for ITSS is well targeted, and the scale has high item reliability which shows that the item adequacy to measure what should be measured and demonstrate high separation. The scale also has met the expectations of the Rasch model for unidimensionality and the items adequately represent the construct and make sense as a

“ruler”. ITSS is unbiased between genders and able to create valid inference regarding the intention of current medical academics to stay in Malaysian public universities.



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

**PEMBANGUNAN DAN VALIDASI INSTRUMEN 'NIAT UNTUK KEKAL'
BAGI PENSYARAH PERUBATAN DI UNIVERSITI-UNIVERSITI AWAM
MALAYSIA**

Oleh

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Beberapa skala utama biasa digunakan oleh penyelidik untuk mengukur niat untuk kekal bekerja atau berhenti kerja. Kebanyakan skala menggunakan bilangan item yang terhad, dan alat ukur lain tidak mempunyai maklumat yang cukup tentang sifat-sifat metrik. Pada masa ini, masih terdapat kekurangan skala yang disesuaikan dengan keperluan misi ahli akademik perubatan dan boleh mengukur tahap niat mereka untuk kekal bekerja atau berhenti daripada universiti. Berbeza daripada kajian-kajian lepas yang menggunakan teori atau model yang tidak menerangkan tentang pembentukan niat, kajian ini menggunakan dimensi-dimensi perasaan, kepercayaan dan keinginan berdasarkan penyepaduan Model Kepercayaan-Keinginan-Niat dan Model Tingkah Laku Bersepadu. Di samping itu, penggunaan model Rasch menunjukkan peningkatan yang ketara berbanding dengan Teori Ujian Klasikal yang biasanya digunakan dalam bidang sains sosial untuk menyukat dan menaksir konstruk psikologi dan penilaian personaliti. Model Rasch telah dibuktikan lebih baik daripada Teori Ujian Klasikal dalam pembangunan pemboleh ubah dan pengesahan. Walaupun sejumlah besar artikel telah diterbitkan tentang niat untuk kekal bekerja, masih kurang penyelidik yang menggunakan pendekatan sistematik untuk menentukan soalan penyelidikan yang akan membolehkan mereka membetulkan soalan-soalan penyelidikan mereka. Sasaran populasi kajian ini ialah pensyarah perubatan dari sebelas Universiti Awam di Malaysia. Pembangunan dan pengesahan skala melibatkan enam fasa yang mengandungi tujuan skala, takrifan konstruk, pembangunan skala, pengujian skala dan analisis Rasch.

Tiga dimensi utama dihasilkan daripada elemen-elemen utama model Model Kepercayaan-Keinginan-Niat dan Model Tingkah Laku Bersepadu yang menerangkan tentang pembentukan atau struktur dasar konsepsi niat. Kejelasan item dijangka dengan tujuan skala, kerangka penyelidikan dan konstruk teori. Item dalam Instrumen Niat untuk Kekal (ITSS) juga mempunyai statistik padanan yang mencukupi, dan ini menunjukkan yang setiap item berkait dengan pemboleh ubah dan alat ukur secara bermakna. Taburan orang-item untuk ITSS didasarkan dengan baik, dan skala mempunyai keandalan item yang tinggi yang menunjukkan kecukupan item untuk mengukur perkara yang perlu

diukur dan menunjukkan pemisahan yang tinggi. Skala ini juga memenuhi jangkauan model Rasch bagi ekadimensi dan item-item adalah mencukupi untuk mewakili konstruk serta boleh diterima sebagai “pengukur”. ITSS tidak berat sebelah antara jantina dan boleh menghasilkan penyimpulan yang sah berkenaan niat ahli akademik perubatan pada masa ini untuk kekal bekerja di universiti-universiti awam di Malaysia.



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I certify that a Thesis Examination Committee has met on 10 May 2018 to conduct the final examination of Wan Ismahanini binti Ismail on her thesis entitled “Development and Validation of an ‘Intention to Stay’ Scale for Medical Academics in Public Universities in Malaysia” in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student is awarded the Doctor of Philosophy.

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LIST OF ABBREVIATIONS

ITSS	Intention to Stay Scale
ITS	Intention to Stay
ITL	Intention to Leave
CTT	Classical Test Theory
IRT	Item Response Theory
BDI	Belief-Desire-Intention Model
IBM	Integrated Behavioural Model
TRA	Theory of Reasoned Action
TPB	Theory of Planned Behaviour
FB	Feelings about Behaviour
BB	Behavioural Beliefs
NB	Normative Beliefs
CB	Control Beliefs
EB	Efficacy Beliefs
D	Desires
MoHE	Ministry of Higher Education
MPU	Malaysian Public Universities
HRD	Human Resource Development
USM	Universiti Sains Malaysia
HUSM	Hospital Universiti Sains Malaysia
UM	Universiti Malaya
UMMC	University of Malaya Medical Centre
UKM	Universiti Kebangsaan Malaysia

HCTM	Hospital Tuanku Muhriz
UPM	Universiti Putra Malaysia
UiTM	Universiti Teknologi MARA
UIAM	Universiti Islam Antarabangsa Malaysia
IIUMMC	International Islamic University Malaysia Medical Centre
UPNM	Universiti Pertahanan Nasional Malaysia
USIM	Universiti Islam Sains Malaysia
UniSZA	Universiti Sultan Zainal Abidin
UNIMAS	Universiti Malaysia Sarawak
UMS	Universiti Malaysia Sabah
DIF	Differential Item Functioning
PMC	Point Measure Correlation
PCA	Principal Component Analysis



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CHAPTER 1

INTRODUCTION

Background of the Problem

In line with the rapid development of science and technology, the field of medicine is a critical niche needed by developing countries, particularly to expand existing medical knowledge and new discoveries (Department of Higher Education, 2010). Based on the report from Ministry of Health Malaysia (2011), the shortage of doctors (including medical academics) in Malaysia is actually much higher (a ratio of about 1:1000 people) compared to the global ratio (1:800), and to other developed countries such as Japan, which has the ratio of 1:500, whereas the ratio given by the Organization for Economic Co-operation Development (OECD) on average is only 1:350. One of the contribution to the shortage of doctors or medical academics is through their resignation. There are just over 7,000 specialists in the country, including about 4,000 in the public sector, and these are not enough to meet Malaysia's medical needs (Rajaendram, 2017).

There are many reasons or factors that have been identified which contribute towards the resignation of medical academics both nationally and internationally (Hagander et al., 2013; Pati et al., 2013; Smith & Bunton, 2012; Wai et al., 2014). The resignation of medical academics in Malaysian public universities (MPU) comes down to a number of reasons. First, the discrepancies between salaries offered in the private practice and public universities which are "just too large" (Chin, 2014). Next is the current promotion policies and salary schemes offered (Cruetz, 2014) which do not attract these individuals to stay at the universities. Rigid career development pathways that restrict the degree to which MPUs are able to retain the best talent (Ministry of Education Malaysia, 2015). The number of resignations of such professionals still remains at a high rate despite the improvements that have been made in the government's decision to improve career advancements of medical officers, dental officers and pharmacists in the Ministry of Health Malaysia. These conditions adversely affect the education quality of medical students in public universities and medical expertise in teaching hospitals of the Ministry of Higher Education (MoHE) (Medical Deans' Council of Public Universities, 2015).

Numerous efforts have been implemented by the Malaysian government in collaboration with public universities in making careers of medical academics at public universities more attractive to be able to retain them for a longer period of time. The attention given to medical academics is more profound if compared to other schemes, whereby since 2005, nine service circulars, service circular letters and guidelines have been issued in order to improve the medical academic service schemes and career paths (Ministry of Higher Education, 2015b; Public Service Department, 2005, 2008, 2010a, 2010b, 2010c, 2012, 2013, 2016).

These efforts were also apparent in 2010, whereby two service circulars and one service circular letter particularly focused on matrix salary scheduled improvements, incentive

fees and changes in the supply of promotion scheme services were issued by the government in that year. In fact, there is a specific circular issued on incentive fees for medical academics in order to appreciate and recognize their efforts in educating, learning, clinical tasks and pre-clinical tasks. Despite various efforts undertaken by the government, the number of medical academics withdrawing from universities is growing exponentially and lacks a mechanism or specific tools such as instrument to measure their 'Intention to Stay'. There are a few prominent items that are normally used by researchers to measure 'Intention to Stay', intention to leave or turnover intention such as by Kim et al. (1996); Price and Kim (1993) and Price (2001) with four questions asked to assess intent. There is also only one item used which specifically measures health professionals' 'Intention to Stay' or leave by Bucklin et al. (2014); Steinmetzv et al. (2014). Moreover, most of the scales available to measure 'Intention to Stay' or leave or turnover intention use only a limited number of scale items, and some other measures lack in information on metric properties (Bothma & Roodt, 2013).

The rationale for developing a scale to measure medical academics' 'Intention to Stay' is due to the lack of studies developing a scale tailored to the needs of medical academics' missions and their ability to measure the intention level towards staying for a longer period of time in the respective Universities. According to ICRAM (2004), medical academics are involved with tripartite or more known as triple mission that consists of research, teaching and clinical practice, and the interrelationship between them. In Malaysia, medical academics have at least three main tasks, namely clinical work (similar to Ministry of Health specialists), academic's job (teaching, supervision, preparing exam papers, vetting questions and marking papers) and research (similar to academics in other faculties) (Cruetz, 2014). This is similar to the details given by Department of Higher Education (2010), medical academics not only have commitment towards undergraduate students, but also have to train physicians (postgraduates), perform specialist's basic tasks and conduct research. Besides that, few scales have been developed to measure concepts like turnover intention, intention to leave, and 'Intention to Stay'. Nevertheless, there is always some misunderstanding between variables involved and its suitability to be used in different industries, sectors and regional applications (Dileep & Normala, 2014). This includes theoretical construct which is not explicitly made by the researcher's attempt in demonstrating it in their items (Bond & Fox, 2015). According to Sondergeld and Johnson (2014), it is essential for researchers to look at the previous scales that have been developed to evaluate whether they meet the researcher's requirements, or if necessary, a new scale is, in fact, required. Additionally, the researchers must give justification for the reasoning behind the need of the scale and how the results should be used.

Efforts to measure 'Intention to Stay' in academia have been on the rise through the development and validation of scale for physician assistants by Graham and Beltyukova (2015). However, the development of the scale was only to measure factors that may influence employees to remain in the academia field without concentrating on the actual meaning of the construct 'Intention to Stay' in academia, formation of elements under the construct (based on theories or models which explains about the construction of intention) and how it relates to main academic activities such as research, teaching and clinical practices. Although they used a reliable measurement model named as the Rasch model to analyse their data with multiple types of validities, they still failed to fulfil the requirements of the Rasch model under unidimensionality. Therefore, it is crucial to

develop a scale which can measure existing medical academics' intention towards staying in the university using suitable theories or models in line with the medical academic's triple mission.

Model and Measurement Used for Scale Development

In contrast to previous studies, this study is using a model which specifically focuses on intention to perform behaviours which are the Belief-Desire-Intention (BDI) model and the Integrated Behavioural Model (IBM). The BDI, developed by Bratman (1987) through his Theory of Human Practical Reasoning model, was originally introduced as a way of explaining future-directed intentions. The underlying structure under the concept of intention in action involves two basic types of mental states, namely beliefs and desires or evaluations. What makes an action intentional, or done with a certain intention, is the fact that it stands in an appropriate relation to these two types of mental states (Bratman, 1987). On the other hand, the IBM is an extension of Theory of Reasoned Action (TRA) and Theory of Planned Behaviour (TPB). Through the combination of elements from TRA and TPB, the most important determinant of behaviour in the IBM is the intention to perform behaviours. Therefore, in line with the objectives of this study, these models permit this study to use intention to perform behaviours determined by three main construct categories that consist of feelings regarding behaviours, beliefs and desires to measure 'Intention to Stay' for medical academics.

In terms of measurement, there is a significant increase of researchers in various fields using the Rasch model and they have published their papers especially in human science disciplines (Bond & Fox, 2015). Even though the Classical Test Theory (CTT) is normally used in social sciences for quantifying and assessing psychological construct and personality evaluation, Rasch methods have demonstrated to be better compared to CTT in the construction of variables and validations (Sondergeld & Johnson, 2014).

Based on prior discussion on the needs to develop a scale to measure 'Intention to Stay', it has been concurred that the purpose of this study is to develop a scale that can measure medical academics' 'Intention to Stay' using the Rasch model. Having a comprehensive and meaningful psychometric approach (i.e. the science of measuring mental capacities and processes) to measure medical academics' 'Intention to Stay' will help the top management and administration of the university, to understand their employees' intention and provide a more stable frame of reference for assessing intention in future (Graham and Beltyukova, 2015). Simultaneously, it would help human resource managers at the respective universities in developing, designing and planning the right and suitable training and development sessions; and career paths for medical academics based on the assessment of their 'Intention to Stay'.

The justification for using Rasch measurement model instead of other models such as classical test models is that it would provide a mathematical framework against which scale developers can compare their data with. The Rasch model is based on the idea that worthwhile measurement contains investigation of only one human attribute at a time

(Bond and Fox, 2015). Therefore, person and item performance that deviate from the line of inquiry (whether more than or less than) (Bond and Fox, 2015) give a sign to the scale developer to reconsider the wording of the item and interpretations of the score of the data. The uniqueness of this model is that it has the ability to estimate each item's difficulty and person's ability on a common logit scale, and each of these estimates has a degree of error connected to it. One magnificent aspect when using Rasch model to analyse data is its ability to show the relationship between person and item in a meaningful pictorial or in a 'map' form (or person-item map/ Wright map) (Bond and Fox, 2015).

The basic framework for measurement that should be given attention to by scale developers are as follows; unidimensionality; item fit (quality control); estimation (that includes difficulty, ability, and precision); reliability (which contains person reliability index and item reliability index) and Differential Item Functioning (DIF). All aspects mentioned were practised in this research. Sondergeld and Johnson (2014) recommended that to meet the unidimensionality specifications for all Rasch models, a set of items must measure only one thing at a time (a single construct at a time). According to Rasch measurement, data must fit the mathematical model, and if not, new data must be acquired. In accordance to unidimensionality, if items do not measure the same latent trait (as indicated by fit statistics that cater for quality control) they need to be either eliminated or modified to better fit the model. However, there will be authors that mention about "unidimensionality is a Rasch model assumption and that misfitting items should be deleted", as notified by Bond and Fox (2015), these kinds of authors do not understand the importance of Rasch measurement principles.

While social science researchers may use the Rasch model less frequently than CTT, especially in developing and validating a scale, there have been recent push factors for this study to use the Rasch model. First reason being, the fundamentals of measurement which have been explained clearly in a unique perspective by Bond and Fox (2015) especially on the main role of Rasch measurement as a priori in the construction and monitoring in terms of quality assurance of scales. Secondly, framework established by Liu (2010) was then demonstrated by Sondergeld and Johnson (2014) to structure the survey development process of the STEM awareness Community Survey (SACS) using Rasch measurement. Then, Graham and Beltyukova (2015) illustrated how to analyse pilot data using Rasch analysis through their previously made survey, "Supportive Environment Scale", which was developed to measure 'Intention to Stay' in academia for Physician Assistant Faculty. And finally, explanations on validation aspects by Wolfe and Smith (2007a, 2007b) are used in this study.

Development of 'Intention to Stay' Scale for Medical Academics

To understand the underlying elements which trigger medical academics' 'Intention to Stay', it is pivotal to grasp differences between 'Intention to Stay' and 'Intention to Leave' so that the items formed are dedicated towards measuring such a construct. "Intention to Leave" (ITL) has been used interchangeably with the more positive construct which is "Intention to Stay" (ITS). Care should be taken when using ITS or ITL interchangeably, particularly when measuring these concepts in an institution as well

as when developing a scale. Some scales mix up both positive and negative items even though they are measuring ITS. Evidence suggests that, there are differences between ITS and ITL and failure to cater for the exclusivity in the respective constructs risks increase error variances and reduce precision of estimates (Nancarrow et al., 2014). There can be a difference between effort to maximize retention and effort to minimize turnover. Effort to maximize retention (or employees' 'Intention to Stay') is by making the working environment as "sticky" as possible, whereas efforts to minimize turnovers (or employees' intention to leave) can be seen as an organization's initiative to avoid or reduce cost based on Cardy and Lengnick-Hall (2011). 'Intention to Stay' is a stable determinant of employee retention (Cowden and Cummings, 2012), it is also dissimilar from the typical negatively outlined questions asked in studies, which normally confirm leaving (Steinmetz et al., 2014). Therefore, this study focuses on measuring 'Intention to Stay' rather than intention to leave through forming items with positive questions.

Resulting from the rationalization of Mor Barak et al. (2001) which focuses on 'intention' rather than actual behaviour, the method seems practical for two reasons. First, there is evidence which proves that before actually leaving the job, employees usually make cautious considerations to do so. Second, compared to longitudinal studies to see if they have left or to conduct retrospective studies and risk hindsight biases, it is more practical to measure employees 'intention to quit or stay' in a cross-sectional study. As such, more precise scale to measure medical academics' 'Intention to Stay' and leave should be created. On the other hand, it is also able to help organizations to take possible corrective actions before actual action takes place (Bu et al., 2011) especially for those have low 'Intention to Stay'.

The development of current intention to stay is strongly influenced by the increase of resignation rates among medical academics which continues to be endemic not only in Malaysia but also at the global level. In Malaysian Public Universities, there were a total of 328 medical academics, who resigned in 2006 to 2009 and this number increased to 428 academics between 2010 and 2013 across grades and public universities as reported in Table 1 and further graphically illustrated in Figure 1 (resignation trend based on university and grade) and Figure 2 (resignation trend across the grades between 2006 - 2009 and 2010 - 2013). The resignation rates among medical academics are also said to be rising, for example between 2012 until 2017 there were 369 medical academics resigned from Malaysian Public Universities and it contribute on average between 10 – 12 percent per university per year (Medical Deans' Council of Public Universities, 2017). Malaysian Public Universities lost their medical academics to private medical schools, private hospitals, Ministry of Health or other public universities (Medical Deans' Council of Public Universities, 2015).

Table 1: Number of Medical Academics Resigned from Malaysian Public Universities, 2006 – 2013

No.	Public University	Grade				Total
		VK5/6/7	DU54/53	DU52/51	DU45	
1	UM	16	49	52	41	158
2	UKM	18	41	64	11	134
3	UiTM	22	26	36	39	123
4	USM	2	54	21	0	77
5	UPM	1	54	3	17	75
6	UNIMAS	6	22	13	28	69
7	UMS	7	27	17	8	59
8	UIAM	1	12	15	9	37
9	USIM	7	5	1	5	18
10	UniSZA	3	2	1	0	6
Total		83	292	223	158	756

Source: Medical Deans' Council of Public Universities (2015, p. 1-3)

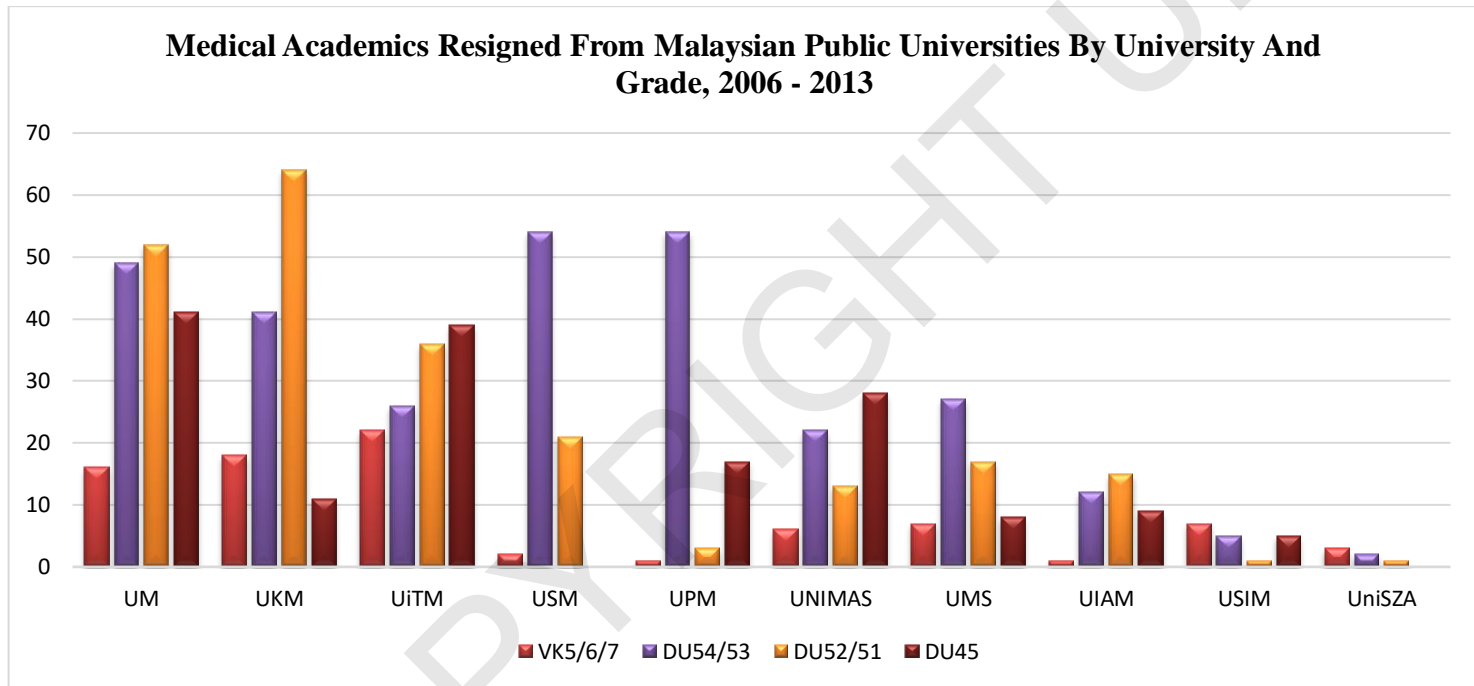


Figure 1: Number of Medical Academics' Resigned from Malaysian Public Universities by University and Grade, 2006 – 2013
 (Source: Medical Deans' Council of Public Universities, 2015, p. 1-3)

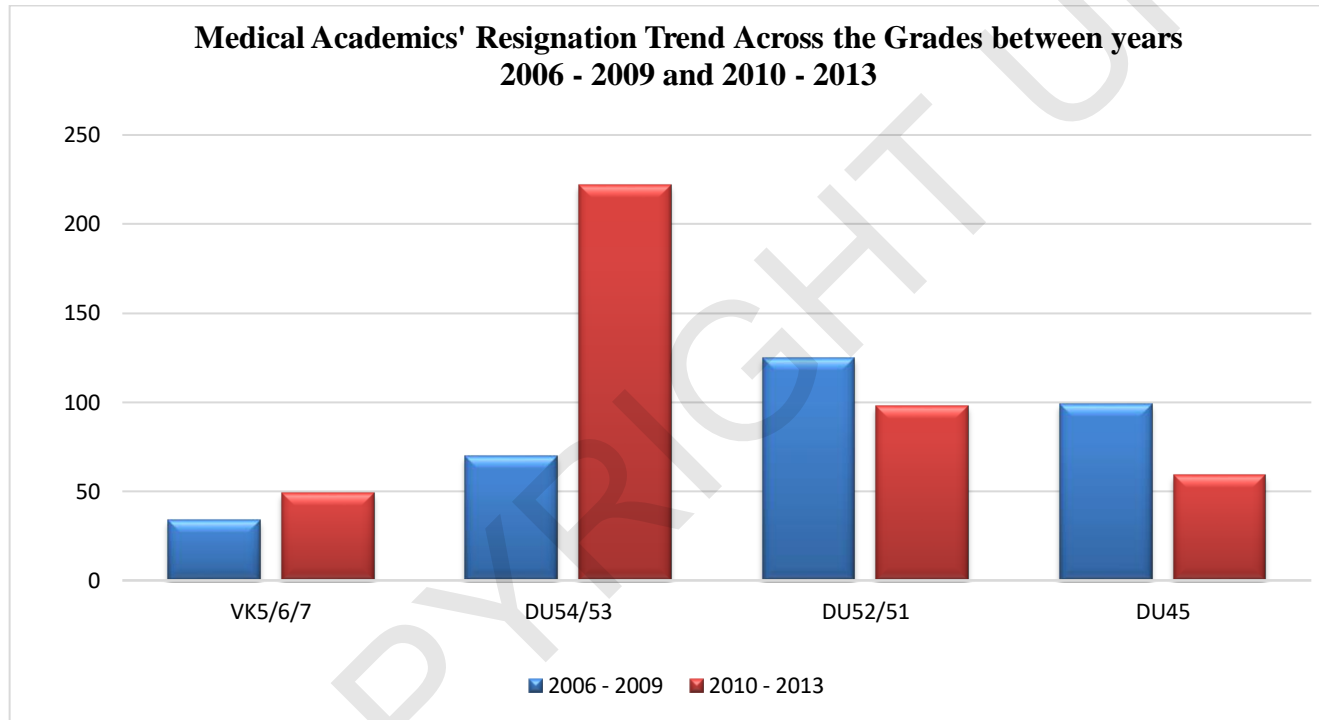


Figure 2: Medical Academics' Resignation Trend across the Grades between years 2006 – 2009 and 2010 - 2013
 (Source: Medical Deans' Council of Public Universities, 2015, p. 1-3)

Based on the increasing trends of resignation of medical academics in Malaysian Public Universities across grades, it is beneficial to have a scale that is able to measure existing medical academics intention stay in public universities. Through the scale, interpretation of medical academics level 'Intention to Stay' in Malaysian Public Universities could be executed.

Statement of the Problem

This study was designed to help address the problem of inadequate scale that able to measure medical academics 'Intention to Stay' in Malaysian Public Universities. There are a few authors that developed scales to measure 'Intention to Stay' and intention to leave (Dileep and Normala, 2014a, 2014b; Graham and Beltyukova, 2015), unfortunately all of them developed scales only to measure factors (or predictors) which influence intentions without paying attention to the actual meaning of both constructs, the proper theory or model, explaining on the formation of intention leading towards the behaviour (i.e. retention or turnover) and the dimensions under that construct. In the beginning, their studies which mentioned the weaknesses of previous instruments measuring 'Intention to Stay' or leave using a single item used only a limited number of scale items. However, in the end, they still did not contribute in defining the 'Intention to Stay' or leave construct but instead, contributed in highlighting factors which leads towards it. As a result, the scale that had been developed remained to be the same and did not achieve the objectives given.

Graham (2012) identified that the restrictions of using the present measurement to measure intentions take account of: (a) the insufficiency of a single item; (b) shortage of predictive validity; and (c) paucity of appropriate interval variable measurement. In tallying with her thesis, then Graham and Beltyukova (2015) suggested to add other indicators for 'Intention to Stay' in academia besides "Supportive Environment Scale" with further iterations and calibrations of the scale, although their study provided evidence that 'Intention to Stay' in academia is a quantifiable construct with multiple types of validities applied. One regrettable consequence of their scale development is that, they failed to achieve the stringent expectations of the Rasch model for unidimensionality, which is one of the most important elements in Rasch model.

Even though researchers normally use Classical Test Theory (CTT) compared to Item Response Theory (IRT) (i.e. Rasch model). However according to Hambleton and Jones (1993), classical test models are frequently regarded to as the "weak models" because test data fairly easily meet the assumptions of these models. On the other hand, item response models are referred to as solid models because the underlying assumptions are rigorous and therefore, less likely to be met with test data. A key advantage of scale development using Rasch model is that it can be used repeatedly to measure latent variable same as the measurement for weight and height (Azrilah et al., 2013). Besides that, Rasch's analysis allows the researchers to modify scales based on empirically driven recommendations to delete some items, modify others, and change scales to elicit a unidimensional measurement. These survey scales and item changes further help to produce a scale that optimises results obtained from data collected and minimises measurement errors. In survey research, this has great value since researchers only have

one opportunity to communicate with respondents through the gathering of their feelings, beliefs or attitudes in response to the survey (Sondergeld & Johnson, 2014).

There are also prominent scales typically used by researchers to measure 'Intention to Stay' or leave by Kim et al. (1996); Price and Kim (1993) and Price (2001). Four questions asked to assess intent are: (1) I would like to leave my present employer (Reverse); (2) I plan to leave my present employer as soon as possible (Reverse); (3) I plan to stay with my present employer as long as possible; and (4) under no circumstances will I voluntarily leave my present employer. However based on findings by Conrad et al. (2004), using reversed items can cause confusion and burden to respondents and deleting (or not using) them will improve validity without loss of reliability.

Besides reversed items, the problem with the previous item may measure different things especially when they use the word "plan" instead of "intent/intention". For instance, "I intend to stay" is not the same as "I plan to stay", as plans reveal other properties that are crucial to an understanding of reasoning-centred commitment (Bratman, 1999). Plans are mental states comprising appropriate kind of commitment to action, for example, I have a plan to stay only if it is true of me that I plan to stay. It is similar to the intention implementation introduced by Gollwitzer (1993), whereby intention must be established first before we want to measure for commitment to action. Reasoning towards an intention does not necessarily lead to a plan of action (Malle and Knobe, 2001).

Based on the literatures, only a few items represent 'Intention to Stay' or leave tailored specifically for medical academics, for instance, by only asking "whether a person expects to be working for the current employer in the next year", "are you considering leaving the School of Medicine in the next five years?", "in the past 12 months, I have seriously leaving my current institution" and analogously worded item that questioned about "seriously considering leaving academic medicine" (Bucklin et al., 2014; Pololi et al., 2012; Steinmetz et al., 2014).

Besides, it is usually debated that it is hard to achieve measurements in the social sciences compared to the hard sciences (Ewing et al., 2005). No doubt, social scientists have to deal with intangible attributes (for example intention) that do not reveal their additive structure as conveniently as observable variables (for example length). 'Intention to Stay' is a latent variable of human behaviour, or an abstract psychology construct (Graham, 2012) that is not directly observable. A scale developed to measure latent variable (i.e., 'Intention to Stay') is intended to estimate its actual magnitude at the time and place of measurement for each person measured. This "actual magnitude" is the true score (Devellis, 2003).

Eagle Research Design Framework

Although a significant number of articles have been published on 'Intention to Stay', there is a shortage of investigators using a systematic approach to determine a research

question that would enable them to fix their research questions. Therefore, this study refers to Ibrahim (2008, 2011) the Eagle Research Design Table to define the research questions (RQ) as an inquiry that leads towards obtaining a solution through systematic and verifiable steps. The steps are based on “WHO” is the “element” used in or impacted by the study, “WHAT” is the “body of knowledge” which the researcher must know in order to solve the problem and “HOW” it constructs the “action” taken or the “impact” that will take place on the “element” or the “body of knowledge” in the study. The selection of Eagle Table is because of its ability to guide the researcher in designing and formulating research questions’ (RQ) constructs, sub-research questions and research objectives (RO) and appropriate strategies of inquiry as constructed in Table 2. Through this table, this study was guided on how to determine the final inquiry results and knowledge contributions (K Contribution) for the study.

Table 2: Eagle Research Design Table (adapted from Ibrahim, 2008, 2011)

Research Question (RQ) Construct	Description of RQ Construct	Sub-RQ	Research Objectives (RO)
WHAT 1	Dimension	What are the dimensions of ‘Intention to Stay’ Scale?	RO1: To develop ‘Intention to Stay’ Scale for medical academics in Malaysian Public Universities using Rasch Model
WHAT 2	Clarity and accuracy	What are mechanism to ensure clarity of items of ‘Intention to Stay’ Scale?	
HOW	Validity evidence	What are the validity evidence generated by using Rasch Model?	RO2: To provide validity evidence of ‘Intention to Stay’ Scale for medical academics in Malaysian Public Universities using Rasch Model
WHO	Medical Academics in Malaysian Public Universities	Note: This Sub-RQ has a secondary priority. Therefore, it would suffice to cover this aspect in chapter 3.	

Research Objectives

General Objective

The overall objective of this study was to develop and validate ‘Intention to Stay’ scale for medical academics in Malaysian Public Universities using Rasch Model.

Specific Objectives

The specific objectives of this study were:

1. To develop ‘Intention to Stay’ Scale for medical academics in Malaysian Public Universities using Rasch Model; and

2. To provide validity evidence of 'Intention to Stay' Scale for medical academics in Malaysian Public Universities using Rasch Model.

Significance of the Study

For theoretical advancements, this study offers added value to the expansion of Belief-Desire-Intention (BDI) and Integrated Behavioural Model (IBM) (an extension from Theory Reasoned Action and Theory of Planned Behaviour) for the development of 'Intention to Stay' Scale (ITSS) designed for medical academics in Malaysian Public Universities. These models allow the researcher to use behavioural intention determined by three main construct categories that consist of feelings about behaviour, beliefs and desires to measure 'Intention to Stay'. It should be noted that, this is one of the studies that develop a scale that specifically measures medical academics' 'Intention to Stay' that focuses on the medical academic mission using the combination of two models. While, IBM and other reasoned action theories have been widely used to investigate a broad range of health behaviour (Yzer, 2012) but not popularly used to measure 'Intention to Stay', especially among medical academics. By using these models as the underpinning theory to develop the scale, it is expected that this scale can help the institutions especially human resource managers to understand the level of medical academics' 'Intention to Stay', providing a stable frame of reference to assess 'Intention to Stay' of medical academics in future and plan for suitable training and development in order to sustain them for a longer period of time.

With institutions' consciousness towards Human Resource Development (HRD) globally and locally, this scale is integrated with the medical academic mission, outlined by Ministry of Higher Education (MoHE) and ICRAM (2004) which comprised of clinical service; teaching and supervision; and research and publications. Besides knowing the level of medical academics' 'Intention to Stay', the scale is also able to discover medical academics' needs for career development based on their scheme, their views on the existing benefits offered such as scheme of service, teaching allowance and so on; and training and development related to the core medical academic missions. Career and training development are fundamental elements in the HRD of any organisation especially higher institutions, and it is important to improve the capability of the education service sector workforce, so they will be able to deliver a better service.

The present study aims to provide a useful contribution to research on developing quality social science measurement, where measurement in social science is not impossible anymore. Measurement to unobservable traits like 'Intention to Stay' for medical academics can be made the same as measuring weight and height when using Rasch model. The limited and unfitting scale which has been developed, tailored to the needs of medical academic triple missions which will be able to measure their intentions towards staying for a longer period in the university and the weaknesses of the previous scales represented a gap in the current literature.

The development and validation of 'Intention to Stay' scale is paramount because there are still inadequate scales designed for the purpose of management of the universities,

particularly universities' administrator in the systematic gathering and quantification of data relevant to medical academics intention to continue working in the university. The outcome of the research also may provide insight into universities' top management, faculty of medicine leaders, human resource managers and government to improve current policies and practices related to academic activities to reduce the resignation of medical academics from public universities through understanding their intention.

Present study is one of the studies that develops and validates the scale that measures existing medical academics' 'Intention to Stay' with their current university integrated with the triple academic mission and promotion guideline. The findings of this study are valid and reliable for future use as a measurement to measure 'Intention to Stay' especially for medical academics or academics in the university or the academic medicine context.

Assumptions

The key assumption underlying this study is, through the development and validation 'Intention to Stay' Scale (ITSS), it helps to measure existing medical academics' intention to continue as an academic in Malaysian Public Universities. This scale is also capable of splitting medical academics' involved in the study into few levels, namely; very high, high, moderate and low 'Intention to Stay', as well as the items involved referring to each groups such as easy, average or difficult item. It means that not every group of medical academics endorses the same items.

Present study also assumed that the available scales developed by previous scholars are not fitting for this study to measure 'Intention to Stay' for medical academics, particularly in the university or academic medicine context. Therefore, the development and validation of the scale are essential.

It is assumed that the outcomes from this study are able to help human resource managers in public universities to get an idea how to plan, design, improve and implement the right and appropriate career development and training and development for medical academics in order to fulfil their needs and make them stay longer in the universities. The outcomes of the research also provide insight into faculty of medicine leaders, universities' top management and government especially Ministry of Higher Education to improve current policies and practices that related to academic activities to reduce the resignation of medical academics from public universities through understanding their intention.

This study believes that construct validity evidence can be provided through the application of Rasch model to prove that the items on the scale can measure 'Intention to Stay' for medical academics in Malaysian Public Universities. Besides that, the items would function in the same way for medical academics with different gender irrespective of public universities.

Finally, it is assumed that all the possible improvements implemented after item analysis iterations and through the results that appeared in the person-item map (or Wright map) and assumptions about current measurement of 'Intention to Stay' for medical academics in Malaysian Public Universities can be generated.

Limitations of the Study

Several limitations encumber the study. Firstly, respondents for this study involved only medical academics with scheme DU from eleven Malaysian Public Universities. This study did not include academics from medical faculty with scheme DM or DS, pre-clinical and medical academics in private universities because it takes into account the information provided by Medical Deans' Council of Public Universities which only reports cases of resignation among medical academics in public universities. This is also because of the scale being built was based on three main aspects of medical academics' job responsibilities in public universities which are; teaching, research and clinical practice.

Long-term follow-up of the respondents to determine their retention as medical academics in Malaysian public universities and which factors most influence medical academics' 'Intention to Stay' were beyond the scope of this study. This study was only focusing on the development and validation of medical academic's 'Intention to Stay' due to lack of studies developing a scale tailored to the needs of medical academics and their ability to measure the intention level towards staying for a longer period of time in the respective Universities.

This research was not proposed to identify which variable is appropriate to be placed either as dependent or independent variables. The focus of the study was entirely concentrated on the development and validation of the scale which were able to yield valid and reliable evidence of these six variables to measure 'Intention to Stay'. Thus, no manipulation was done to these variables.

Then, for the study, implementation intention was not selected as one of the dimensions that measures 'Intention to Stay' for medical academics. This is because, the use of implementation intention is only suitable for researchers doing intervention studies and rationale being implemented among respondents who have strong positive intentions or medical academic who have high level of 'Intention to Stay'.

This study did not use simple random or stratified random sampling. The population of medical academics all over Malaysia is large and it becomes difficult and expensive to identify each sampling unit. In such cases the use of cluster sampling is more appropriate.

No concurrent validity was carried out in this study to assess the relation of scores from other instrument with ITSS. This study had no intention to identify whether the instruments measure the same thing (i.e., the same construct).

Finally, another limitation of this study was the likelihood of nonresponse bias from medical academics which also cannot be identified, especially for those who were planning to leave and not motivated to answer the questionnaire. Therefore, to address these problems, they were given a detailed explanation about the purpose, relevance and importance of the study and any questions that respondents may have can be clarified through face to face conversations.

Definition of Terms

Malaysian Public Universities

Public universities in Malaysia are predominantly funded by the government with Ministry of Higher Education (MoHE) playing an important role in creating the best higher education ecosystem. Malaysian Public Universities are categorised into three groups: Research Universities, Focused Universities (technical, education, management and defence) and Comprehensive Universities. Research Universities focus on research, Focused Universities concentrate on specific fields related to their establishment, while Comprehensive Universities offer a variety of courses and fields of study (Ministry of Higher Education, 2015a).

Medical Academic

Medical academic is placed under the classification of Education Service with the scope of duties to give lectures, tutorial, supervision, conduct research, produce publications and perform clinical tasks (Ministry of Higher Education, 2015).

‘Intention to Stay’

In defining the term of ‘Intention to Stay’, Johari et al. (2012) stated that it is about the intention of employees to stay longer with their current employers and Graham and Belyukova (2015), defined ‘Intention to Stay’ as “anticipation or willingness to continue in an academic role”. While, according to Mobley (1977), intention to quit or stay is a “final stage in the psychological decision-making process of a person before leaving”. Therefore, in this study, ‘Intention to Stay’ is defined as a psychological decision making to remain as medical academic in university or academic medicine that is characterised by feelings about behaviour, beliefs and desires.

Feelings about behaviour

Watson et al. (1988) defined positive affect (or positive feelings) as a dimension reflecting one's level of pleasurable engagement with the environment. High positive feelings are composed of terms indicating one's eagerness, energy level, mental

readiness, interest, happiness, and willpower, whereas low positive feelings are best characterised as a lack of energy and enthusiasm, and mental or physical exertion or illness. For this study, feelings about behaviour are defined as positive feelings towards remaining in the university as an academic.

Behavioural Beliefs

In their model, Montano and Kasprzyk (2008) defined behavioural beliefs as beliefs that behavioural performance is connected with certain positive or negative feelings. In this study, behavioural beliefs are defined as beliefs towards academic support, benefits and rewards that they get for remaining in this university or academic medicine as an academic.

Normative Beliefs

As cited by Montano and Kasprzyk (2008); and Fishbein (2007) subjective norm, as defined in TRA/TPB is indicated as an injunctive norm (normative beliefs about what others think one should do and motivation to comply and beliefs about whether each referent performs the behaviour). Therefore, for this study, normative beliefs are defined as individual's beliefs in specific referents or social networks, such as family, close friends, peers or colleagues, which influence them in making a decision to stay in the university, and perceptions about specific referents such as colleagues who remain in the university.

Control Beliefs

According to Ajzen (1991), perceived behavioural control is influenced by individual's experience with the behaviour, by the experience of friends and acquaintances, and other factors that increase or reduce the perceived difficulty of performing the behaviour. For this study, perceived behavioural control or control beliefs is defined as the individual's beliefs that are shaped by their own experiences as an academic in the university, and also by their own personality.

Efficacy Beliefs

In the Integrated Behavioural Model, efficacy beliefs are defined as perceived ability to overcome each facilitating or constraining condition (Montano & Kasprzyk, 2008). According to Bandura (1997), self-efficacy is one's perceived ability to perform a behaviour successfully. Based on both definitions, an efficacy belief for this study is defined as individual's beliefs towards their ability in performing functions and roles as an academic in the university.

Desires

Based on the definition given by Bratman (1999 p. 6), desires include a wide range of “-attitudes”- wanting, judging, desirable, caring about, and so on - and also may admit of degrees. For this study, desires are defined as individual’s goals to be accomplished as a medical academic in the university.



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