

# CHAPTER THREE

## RESEARCH METHODOLOGY

### **Introduction**

This chapter will illustrate the procedures and methods used to conduct this research. The research is designed by using a survey research methodology in order to examine the relationship or the causal relations of the management and decision-making styles at Universities A, B, C, D and E with academic staff's job satisfaction.

### **Location of the Study**

This study was conducted at five prestigious Malaysian Public Universities. The names of the universities have not been mentioned for the sake of confidentiality. Therefore, the names have been replaced and labeled as University A, B, C, D and E. Besides, the universities were selected from three Malaysian states: Kuala Lumpur, Selangor and Perak. Furthermore, this study will typically focus only on academic staff at those mentioned universities. The staff will be selected by faculty or department and the sample will be taken from each faculty as a representative.

### **Respondents for the Study**

#### ***Study Population***

The population of this study comprises all the academic staff, from which the derived sample will consist of staff from the majority of the faculties in the year 2008/2009 academic year as per their educational levels. At university A, from the total population of the academic staff ( $N=2443$ ), 72.04% ( $n=1760$ ) were male while 27.95% ( $n=683$ ) were female. For the educational level, 10.10% ( $n=269$ ) of the academic were

professors, 18.33% (n=448) were associate professors, 34.30% (n=838) were assistant professors while 36.34% (n=888) were lecturers.

For university B, from the total population of the academic staff (N=1344), 57.38% (n=774) were male while 42.41% (n=570) were female. For the educational level, 13.91% (n=187) of the academic were professors, 27.90% (n=375) were associate professors, 30.87% (n=415) were doctorates while 27.30% (n=367) were lecturers.

University C, from the total population of the academic staff (N=1350), 54.88% (n=741) were male while 45.11% (n=609) were female. For the educational level, 12.37% (n=167) of the academic were professors, 23.48% (n=317) were associate professors, 21.62% (n=292) were senior lecturers while 42.51% (n=574) were lecturers.

Regarding university D, from the total population of the academic staff (N=6105), 41.44% (n=2530) were male while 58.55% (n=3575) were female. For the educational level, 1.13% (n=69) of the academic were professors, 14.69% (n=897) were associate professors, 3.21% (n=196) were doctorates, 3.39% (n=219) were medical doctors, 75.52% (n=4611) were lecturers while 2.17% (n=113) were assistant lecturers.

Referring to university E, from the total population of the academic staff (N=483), 57.94% (n=280) were male while 42.02% (n=203) were female. For the educational level, 4.55% (n=22) of the academic were professors, 6.41% (n=31) were associate professors, 21.32% (n=103) were senior lecturers, 67.08% (n=324) were lecturers, while 21.32% (n=103) were tutors. Refer to appendix 1.

## **Characteristics of Respondents and Sampling Procedure**

Generally, this section outlines the sampling procedure. In addition, it describes the determination of the sample size that will be used to run/conduct this research by using the proportion of the sample. Moreover, a considerable sample of the respondents will be considered in this study with the aim of avoiding or decreasing the errors in

analysis. As the sample size increases, the standard error decreases (Babbie, 2001). As it was stated, when the sample size is too small it can affect the generalizability of the study to the whole population (Gay, 1992; Moser & Kalton, 2001).

### **Determination of Sample Size of the Study**

Gay (1992) suggested that for descriptive research, a sample size of approximately 10% of the population is adequate. According to Babbie (2001), 50 percent from the response rate is adequate for analysis and reporting in a survey research, while 60 percent of response rate is considered good as well as 70 percent rate is very good. However, “these are only rough guides and do not seem to be built on strong statistical bases” (p.256). Another issue to emerge from the review was that of sample size. SEM suggests sample size of 100 as a minimum based on rule of thumb (Medsker et al., 1994). However, to generate valid fit measures and to avoid drawing inaccurate inferences, it has also been suggested that a sample size of 200 is required (Marsh et al., 1988; James, 1989; Boomsma, 1982; Medsker et al., 1994).

In this study, academic staff from Malaysian Public Universities were selected based Rasch and Structural Equation Model requirement of sample. It is recommended by Rasch and SEM a sample of 200-300 for any research using both methods. Therefore, 200-250 academic staff were taken from each university. Stratified sampling was used by choosing samples from each faculty and department of Universities A, B, C, D, and E. Therefore, the totality of the sample size considered in this study was 1,117 academic staff from five Malaysian Public Universities (IPTA).

To determine the sample size for Structural Equation Modeling (SEM), the sample size should not be small as it relies on tests which are sensitive to sample size as

well as to the magnitude of differences in covariance matrices. In the literature, sample sizes commonly from 200-400 for a model with 10-15 indicators. Sample sizes with 100 examinees according to Kline (1998) are considered to be “untenable” in (SEM), while 150 are too small especially when the covariance coefficients are not relatively large enough. With the Loehlin (1992) recommendation, 100 cases at least or 200 preferably. In addition, parameter estimates could be generally unstable and significance tests may lack power when the sample size is 200 or under 200 with over ten variables.

As a rule of thumb, at least 8 correct responses and 8 incorrect responses are needed for reasonable confidence that an item calibration is within 1 logit of a stable value. Besides, to determine sample size of the studies involving Rasch model, a minimum of 20 items and a sample size of 200 examinees are recommended (Wright & Stone, 1979).

### **Sampling Procedure**

In this study, “Purposive Sampling is used for sampling the academic staff in five universities. Purposive Sampling is a judgmental sample and could be applied in a situation when the researcher selected a sample based on his or her experience or knowledge of the group to be sampled. This section of samples could be proportional based on knowledge of the researcher of that particular people, area and location (L.R. Gay & Peter, 2000). Besides, “much of the research in qualitative research is purposive” (p.138).

Therefore, purposive sampling is used in this study because has kept a certain purpose in minding of selecting five Malaysian public universities and purposively selecting not less than 200 academic staff in each university as samples for the study.

Purposive is applied for the prior knowledge and experience that the researcher has about Malaysian public universities, their locations and area the universities situated at.

With the purposive sampling, there many advantages such as the people who do not fit the requirement will be excluded. In addition, the sample of a study uses purposive sampling is considered an accurate or near to accurate representation of the population. In deed, the results from purposive are expected to be more accurate, time management, less time consuming and cost.

## **Instrumentation**

### **Questionnaire**

In this study, Alan Howe and Richard O. Mason's inventory of management styles, was used for decision-making styles and Rensis Likert's management 4 system instrument (vision 3) on management styles was used for management styles, while the "Teacher's Job Satisfaction Questionnaire" (TJSQ) developed by Lester, which was constructed based on Herzberg's Theory was used for job satisfaction.

## **Validity and Reliability of the Instrument**

### **Management Styles**

#### ***Likert's System 4***

Historically, Likert's system 4 Theory of management was developed and theorized based on the data collected from thousands of managerial officers in hundreds of various organizations (Likert 1967; Likert & Likert 1976). The theory is named after an ideal model of how to run and manage the organization. Thus, Likert formed broadly four management styles for continuum: autocratic which links to task-centred. Hence, the autocratic end of the continuum represents System 1; the participative end of the continuum is called System 4 as it is shown in Table 3.6 below.

For the validity of Likert's instrument, factor analysis was used in the Likert instrument in a research conducted in Brazil by D. Anthony and George (1972). Thus, factors were only partially consistent over time and for different hierarchical levels did not yield the six dimensions predicted by Likert's theory. The theory hypothesizes four systems of management, and it was argued that system 4, the most effective system is "participative-group". Indeed, a significant amount of scientific research was presented in supporting the theory and all these researches were done in United States settings. More recently, Likert's management styles theory has been tested across the world in places such as Japan and Yugoslavia, applying different versions of a "profile of organizational characteristics" (Likert, 1967; Kavcic, Rus, & Tannenbaum, 1971).

Furthermore, the profile is a questionnaire which explains an organization along the lines of Likert's theory, and has come to be known and recognized as the "Likert Organizational Profile", or LOPS. In United States, the LOP has also been used and frequently used in studies and research about changes (Marrow, Bowers, & Seashore, 1967; Golembiewski & Carrigan, 1970a; Blumberg & Wiener, 1971). Initially, to measure six basic organizational processes: leadership, motivation, communication, decision making, goal setting, and control, the short form of the LOP was designed to perform the measurement. A principal components analysis was used to determine the reliability and validity using varimax rotation for six factors. The factors are at best and fit mixtures of the dimensions proposed by the theory except for the first factor, which is about leadership, failed to be on its best. After second factor analysis was performed, leadership and resistant seemed to measure the proposed model though, in a different other.

Further, six theoretical dimensions of organizational processes were grouped and divided into items. From Item 1 to 4 measures leadership; 5-7 for motivation; 8-12 for communication; 13-15 for decision making; 16 – 17 for goal setting; and 18 – 20 for control. According to Golembiewski & Carrigan, (1970a); Kavcic, Rus & Tannenbaum, (1971) both individual item and index scores obtained the fundamental dimensions used in previous research (Blumberg & Wiener, 1971; Marrow, Bowers, & Seashore, 1967). In this regard, it is proof that, system 3 “consultative” management style, with system 2 attributes in the area of decision- making and goal setting were used in 13 financial institutions.

On the other hand, there none corresponding of the factor structure for LOP in six hypothesized organizational processes. This is not considered as a serious drawback, but it suggested using the subscales with great caution. Besides, there is recognition from Likert himself the difficulty of the factors corresponding accurately to the proposed dimensions (Likert, 1967). Likert argues that the ideal or actual scores might not yield clearer factors within a single organization. As a result, the scores for LOP could only moderately stable over time. For the reliability, the reliability of .52 could be only obtained from test-retest, while it was statistically significant but not high by traditional testing standards of D. Anthony and George (1972).

Therefore, for the inconsistency of the Likert instrument factors, this present research has made a huge step to determine the good reliability of the items and its validity by using the Rasch model during the pilot study for item difficulty and Exploratory factor Analysis or Principal Component Analysis as well as Structural Equation model during the actual study.

Table 3. 1.

**Organizational and performance characteristics of different management systems based on a comparative analysis**

<i>Operating Characteristics</i>	<i>System of Organization</i>		
	<i>Authoritative</i>	<i>Participative</i>	<i>Participative</i>
	Exploitative Authoritative	Benevolent Authoritative	Participative Group
a. Amount of interaction and communication aimed at achieving organization's objectives	Very little	Little	Much with both individuals and groups
b. Direction of information flow	Downward	Mostly downward	Down, up, and with peers
c. Downward communication			
1. Where initiated	At top of organization or to implement top directive	Primarily at top or patterned on communication from top	Initiated at all levels
2. Extent to which communications are accepted by subordinates	Viewed with great suspicion	Often accepted but at times viewed with suspicion. May or may not be openly questioned	Generally accepted, but if not, openly and candidly questioned
d. Upward communication			
1. Adequacy of upward communication via line organization	Very little	Limited	A great deal
2. Subordinates' feeling of responsibility for initiating accurate upward communication	None at all	Relatively little, usually communicates "filtered" information but only when requested. May "yes" the boss	Considerable responsibility felt and much initiative. Group communicates all relevant information

Source: *Likert's Organizational and Performance Characteristics of Different management Systems*



Table 3. 1 (continued)

Organizational and performance characteristics of different management systems based on a comparative analysis			
3. Forces leading to accurate or distorted information	Powerful forces to distort information and deceive superiors	Occasionally forces to distort; also forces for honest communication	Some forces to distort along with many forces to communicate accurately
4. Accuracy of upward communication via line	Tends to be inaccurate	Information that boss wants to hear flows; other information is restricted and filtered	Information that boss wants to hear flows, other information may be limited or cautiously given
5. Need for supplementary upward communication system	Need to supplement upward communication by spy system, suggestion system, or some similar devices	Upward communication often supplemented by suggestion system and similar devices	Slight need for supplementary system; suggestion system may be used
e. Sideward communication, its adequacy and accuracy	Usually poor because of competition between peers and corresponding hostility	Fairly poor because of competition between peers	Fair to good
f. Psychological closeness of superiors to subordinates (that is, how well does superior know and understand problems faced by subordinates?)	Far apart	Can be moderately close if proper roles are kept	Fairly close
1. Accuracy of perceptions by superiors and subordinates	Often in error	Often in error on some points	Moderately accurate
			Usually quite accurate
			Good to excellent
			Usually very close

Source: *Likert's Organizational and Performance Characteristics of Different management Systems*

## **Job Satisfaction**

### ***Herzberg's Theory Instrument***

In this study, the research adopted the Teacher Job Satisfaction Questionnaire (TJSQ) which was slightly modified to suit the research objects and situation in Malaysia such as replacing the word “teacher for lecturer” and deleting some sentences due to their unsuitability.

Teacher job satisfaction is the extent to which a teacher perceives, defined by Lester (1982), and values various factors such as evaluation, collegiality, responsibility, and recognition. Lester has made a great contribution by developing this instrument namely as the Teacher Job Satisfaction Questionnaire (TJSQ) purposely for people in educational settings to benefit from it and use it in various educational arena. Besides, there are 66 items in 9 subscales incorporated in the TJSQ. Supervision, colleagues, working conditions, pay, responsibility, work itself, advancement, security, and recognition are defined the subscales. After selection of the questionnaire format and content, in order to avoid biasness on responses, approximately 50% of the items were constructed by Lester in a positive form and 50% in a negative.

The TJSQ presented items with Likert responses set in a scale from one to five. To generate taxonomy for the development of the TJSQ instrument, there was a birth of Maslow (1954) and Herzberg's (1972) theories to explore for job satisfaction source and were recognized in the development of the TJSQ. In these theories, there are specific concepts related and matched up with factors found in an educational organization. Besides, there is a classification supporting the conceptual foundation in these theories provided a system for this study and other studies using TJSQ instrument.

The determination of TJSQ's reliability took place in New York by distributing 1600 questionnaires to teachers in the selected schools. To determine the reliability, the total and for each of the nine factors or subscales was ran for reliability. Eventually, by computing an Alpha coefficient, the TJSQ was determined and the internal consistency was consistent. In this regard, the Alpha level of .93 was obtained for the total scale of the sample. Range from .71 for scale coefficients was obtained for the factor of security, to .92 for the factor of supervision. In addition, there was a usage of split-sample technique for data cross-validity by analyzing them separately. Inferentially, "Factor Analysis was used as an exploratory technique to find out underlying factors and patterns among variables and also as a psychometric procedure for the development and modification of the TJSQ" (Lester, 1982, quoted by Victoria, 2006).

### **Decision-Making Styles Instrument**

In this study, Decision Style Model developed by Alan Rowe and Richard O. Mason (1987) was employed and the survey instrument of this theory was used in this study. Besides, Rowe and Mason (1987) Decision Style Inventory" (DSI) has been used worldwide to measure the decision styles of the managers such as the managers' decision-making styles in Florida's state university main libraries by Alqarni (2003). Thus, it was applied in obtaining demographic data of the respondents such as gender, age, ethnicity, educational level, educational major, current position, and administrative experience in the research conducted by Alqarni (2003) in Florida.

The Decision Style Inventory has been used by over 10,000 individuals, including presidents of companies, board chairs, nurses, architects, planners, etc. Face validity is high, as over 90% of the people who take the inventory agree with its findings. According to the Decision Style Model, behavioural decision style, followed by the conceptual decision style was found to be predominant decision style for the

majority of Florida's state university main libraries'. The findings from Alqarni (2003) also show that these managers use directive decision style frequently and mostly. In terms of decision style patterns, the findings illustrate that the majority of the main libraries' managers in Florida's state university use right side of the brain rather than the left side.

Table 3.2.  
*Scores from the BSRI, DSI and LOQ: means, standard deviations, Cronbach Alpha*

Scale	Means	Std-deviation	Cronbach alpha
Directive	75.38	14.67	0.75
Analytic	86.08	18.45	0.84
Conceptual	74.77	13.29	0.79
Behavioural	63.73	17.52	0.86
Task	45.48	4.68	0.91
Relationship	43.23	5.38	0.88

Note:  $N=86$  for each scale

Source: Daewoo (1996)

Table above shows another research done by Daewoo (1996) using the Rowe Inventory. College-aged men and women were the respondents for the study. For sample size, 90 students of senior-level from undergraduate management classes (50 females and 40 males) were selected with the average age of 22 years. This data or research could link Rowe and Mason decision-making styles with leadership styles.

In addition, the validity and reliability of item-factor relationships with other model adequacy indices have been investigated, taking samples from both Western and Asian populations. However, the confirmation of DSI's reliability and validity were obtained by Robey and Taggart' studies, with "a very high face validity and reliability.

Respondents have almost invariably agreed with their decision styles as shown on the test instrument” (Rowe & Boulgarides, 1994, p. 28).

The four forces or factors where are directive, analytic, conceptual, and behavioural (1962) could have a relationship with McClelland’s typology needs. Initially, it is the McClelland’s proposal stating that behavior decision-making style could be motivated by the achievement’s needs, power and affiliation. Besides, in his recognition here proclaimed that the need for achievement may be a factor for satisfaction either intrinsically by taking on new challenges or could be extrinsically by receiving praise and recognition.

In addition to Rowe’s instrument reliability (DSI), research conducted recently in the United States of America using the Rowe instrument by Clare (2002), surveying 994 managers, using SPSS with Multiple Regression Analysis, shows the good reliability and validity of the instrument. The instrument is valid and reliable and it has demonstrated face validity of 0.9 or better. Reliability was found to be in the 0.7 range.

### **Pilot Study**

The aim of the pilot study was to establish the reliability of the instruments. Mostly, “in quantitative studies and pre-testing, a pilot study is needed either to try out the instrument or to supply the findings for actual study” (Kerlinger, 1992, p.648). Thus, it was to ensure that the subjects were able to understand the test items without any difficulties. A pilot study was conducted in this research to test the reliability and develop an instrument for the study by using the Rasch Model to discover the difficulty of items, to determine the ability of the respondents in responding to the items and the discrimination between the items and the respondents at two out of five selected public universities. Moreover, content, construct and face validity were considered as a method

by consulting some lecturers on this field to indicate the appropriateness, content and the structure of the items.

With aim of describing a set of data, models are frequently used. Hence, there could a modification, either accepted or rejected in parameters based on how their fitness to the data. In contrast, the application of Rasch or its objective is to obtain data fitting the model (Andrish, 2004). In fact, it has been suggested by the researchers that Rasch analysis should be used to identify if there is inappropriateness in item construction or to discover problematic items. Besides, it was advised that Rasch should be conducted to avoid misuse of scales and to avoid misleading findings. In this study, Rasch analysis was conducted using WINSTEPS software (Wright & Linacre, 2000 version 3.64.2) which was used to examine item statistics related to the ordering of Likert scale categories across the 76 items (Bond & Fox, 2001).

WINSTEPS produces different tables displaying the raw scores, measures and ZSTDs, which are mean-square fit statistics standardized to an approximate theoretical mean 0 and standard deviation 1, INFIT ZSTDs and the standardized unweighted item person fit statistic, which are sensitive to irregular inlying patterns. OUTFIT ZSTDs are the standardized unweighted item person fit statistics, which are sensitive to unexpected rare extremes. Using the Rasch model, the mean-square is considered as important because it illustrates “the size of the randomness, i.e. the amount of distortion of the measurement system. 1.0 is their expected value. Values of less than 1.0 indicate observations are too predictable (redundancy, data overfit the model) and values of greater than 1.0 indicate unpredictability (unmodelled noise, data underfit the model)” (Bond & Fox, 2001, Linacre 2004) as it is shows in Table 3.8.

Table 3.3.  
Rasch Mean-square Value

Mean-square Value	Implication for Measurement
$\geq 2.0$	Distorts the degree of measurement system
1.5-2.0	Unproductive for construction of measurement, but not degrading
0.5-1.5	Productive for measurement
$\leq 0.5$	Less productive for measurement, but not degrading

*Linacre (2004)*

### Fit Statistic

#### Job Satisfaction

Mean-square value was used to determine the fitness of the items. Based on expert's guidelines in diagnosing misfitting items, items with a mean square of between 0.5 to 1.5 are considered productive for measurement. It was found in this study that all the items under management and decision-making styles with job satisfaction fall within the range of  $\leq 0.5$  to  $\geq 2.0$  as shown in Tables 3. 11, 3.14 and 3.17. This indicates that some items fall within the perfect range, some were distorted and some were less productive but not degrading. Thus, these items are still considerable and accepted by the researchers.

Table 3.4

*Summary of 30 measures for Job Satisfaction (Non Extreme) Items*

	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD
MEAN	389.5	96.9	.00	.10	1.02	.1	1.03	.1
S.D.	108.3	16.9	.64	.04	.25	1.8	.26	1.8
MAX.	531.0	100.0	1.16	.31	1.57	3.7	1.57	3.8
MIN.	21.0	6.0	-1.30	.08	.60	-3.7	.61	-3.5
REAL RMSE	.12	ADJ.SD	.63	SEPARATION	5.31	Item	RELIABILITY	.97
MODEL RMSE	.11	ADJ.SD	.63	SEPARATION	5.87	Item	RELIABILITY	.97
S.E. OF Item MEAN = .12								

Table 3.5.

*Summary of 100 measured Person for Job Satisfaction*

	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD
MEAN	116.9	29.1	.29	.17	1.03	-.3	1.01	-.3
S.D.	12.3	.2	.37	.02	.65	2.3	.64	2.1
MAX.	161.0	30.0	2.23	.31	3.45	6.3	3.46	6.1
MIN.	92.0	29.0	-.35	.15	.18	-4.5	.18	-4.3
REAL RMSE	.19	ADJ.SD	.32	SEPARATION	1.72	Person RELIABILITY	.75	
MODEL RMSE	.17	ADJ.SD	.33	SEPARATION	1.98	Person RELIABILITY	.80	
S.E. OF Person MEAN = .04								

Tables 3.4 and 3.5 show the reliability of both Items and Persons. The examination of both the separation of items and person indices and reliability for job satisfaction yield a very good level of 5.87 and R .97 for items while level 1.98 and 80 for person, respectively. Nevertheless, the person reliability as visually seen from the Tables 3.4 and 3.5 is significantly low compared to the item reliability. The result can be interpreted that respondents might totally respond to the items convincingly which consequently reflects on the overall person reliability (Mikail, 2007 in press).

**Item Difficulty and Reliability**

The level of the academic staff was determined in terms of how easily the items involved can be endorsed. Furthermore, the easiness and hardness of an item was uttered through the direction of item estimation. The negative sign of an item according to Rasch shows the easiness of the items to endorse. It shows the high degree with the content of the item and the positive sign indicates the hardness of items to endorse which is the low agree with the content (Bond, 2001).

In this study, the person separation reliability is 75. This indicates that the items estimates were acceptably dispersed along the study item value continuum. Items separation reliability was .97, indicating high reliability of items and that the items were well spread out along the perceived value continuum. The standard deviation (SD) of



the items calibration was .64. In sum, there is a strong reliability for respondents responding to the items and the items themselves. The items were considered easier for them to understand and measure the respondents' response. The respondents also measured the items. Therefore, the person and reliability is ( $R=.75$ ) and the items were reliable ( $R=.97$ ) which shows that the items in this study are free from difficulty and the respondents exhibited reliability in responding to the items. Therefore, item deletion is not recommended.

### **Item and Person Mapping**

Figure 3.1 below for person mapping shows that only Item 18 was considered as the most difficult item under job satisfaction for the academic staff at Universities “A and B” to endorse because their ability is low or it is hard for them to answer and the item was above the person mean. Hence, there is little probability of examinees answering the question. Moreover, Items 27, 13, 29, 15, 4, 12, 16, 2, 21 and 14 were considered as the lowest items for examinees to answer because these items were below the person mean which means there is high probability for the academic staff (examinees) to answer them and they were considered as the easiest items for them to endorse.

*Figure 3.1.*  
Item by Person Mapping (Job Satisfaction)

Persons -	MAP -	Items
	<more> <rare>	
3	+	
2	+	
	T	18 <b>My immediate Head in the faculty treats everyone equitably.</b>
1	.# T+	17 Lecturing at the University does not provide me the chance to develop new methods.
		24 Management is willing to listen to suggestions
	##	6 The work of a lecturer consists of routine activities.
	#### S S	26 The work of a lecturer in the University is very pleasant.
		28 I try to be aware of the policies of the University
		5 No one tells me in the University that I am a good lecturer.
		9 My immediate Head offers suggestions to improve my teaching.
	.#####	10 Being a lecturer at the University provides a secure future.
	#####	7 I receive recognition from my immediate Head.
	.##### M	1 Being a lecturer at the University provides me with an opportunity to advance professionally.
		19 Lecturing at the University provides an opportunity for promotion.
		22 Management provides assistance for improving instruction.
		25 A lecturer's income in the University is barely enough to live on.
	#####	23 I do not get cooperation from the people I work with.
0	#### +M	8 I do not have the freedom in the University to make my own decisions.
	.## S	11 I get along well with my colleagues at the University.
		20 I am responsible for planning my daily lessons.
		3 Being a lecturer at the University provides an opportunity to use a variety of skills.
	#####	30 Lecturing in my University provides limited opportunities for advancement.
	.	27 <b>Management makes me feel uncomfortable.</b>
	T	13 <b>Lecturing at the University provides me the opportunity to help my students learn.</b>
		29 <b>Lecturing at the University provides me with financial security.</b>
	S	15 <b>Lecturing at my University is a very interesting profession.</b>
		4 <b>Insufficient income in my job keeps me from living the way I want to live.</b>
		12 <b>Working conditions at the University are comfortable.</b>
		16 <b>I never feel secure in my lecturing at the University.</b>
		2 <b>A lecturers' income at my University is adequate for normal expenses.</b>
-1	+	21 <b>I am well paid as a lecturer in proportion to my ability.</b>
-2	T	14 <b>I like the staff with whom I work at my University</b>
	+	
	<less> <frequ>	

Table 3.6.

*The Item Estimations for Job Satisfaction*

Person: REAL SEP.: 1.72 REL.: .75 ... Item: REAL SEP.: 5.31 REL.: .97												
Item STATISTICS: MISFIT ORDER												
ENTRY	RAW			MODEL	INFIT	OUTFIT	PTMEA	EXACT	MATCH			
NUMBER	SCORE	COUNT	MEASURE	S.E.	MNSQ	ZSTD	MNSQ	ZSTD	CORR.	OBS%	EXP%	Item
17	252	100	1	0	1.51	3.7	1.57	2.8	A .15	29.0	27.5	ITEM 17
1	21	6	0	0	1.57	1.2	1.54	1.2	B .26	16.7	25.1	ITEM 1
26	316	100	1	0	1.45	3.6	1.46	2.6	C .18	17.0	25.1	ITEM 26
28	307	100	1	0	1.39	3.2	1.43	2.4	D-.01	22.0	25.2	ITEM 28
21	516	100	-1	0	1.42	2.1	1.41	2.1	E .22	43.0	46.7	ITEM 21
6	288	100	1	0	1.37	3.0	1.37	2.9	F .28	21.0	25.3	ITEM 6
7	358	100	0	0	1.19	1.6	1.21	1.7	G .24	24.0	26.7	ITEM 7
5	318	100	1	0	1.21	1.8	1.21	1.8	H .20	27.0	25.2	ITEM 5
18	232	100	1	0	1.13	1.0	1.13	.9	I .29	39.0	28.3	ITEM 18
11	438	100	0	0	1.08	.6	1.05	.4	J .48	33.0	34.5	ITEM 11
20	439	100	0	0	1.04	.3	1.05	.4	K .50	28.0	34.5	ITEM 20
16	506	100	-1	0	.99	.0	1.04	.3	L .36	48.0	46.5	ITEM 16
24	273	100	1	0	1.03	.3	1.03	.3	M .25	21.0	25.8	ITEM 24
8	410	100	0	0	.98	-.1	.94	-.4	N .37	36.0	31.3	ITEM 8
9	325	100	1	0	.97	-.2	.98	-.2	O .25	24.0	25.3	ITEM 9
29	474	100	-1	0	.92	-.4	.97	-.2	o .24	45.0	43.0	ITEM 29
19	385	100	0	0	.95	-.4	.94	-.4	n .51	24.0	29.0	ITEM 19
14	531	100	-1	0	.94	-.3	.91	-.4	m .42	42.0	46.6	ITEM 14
2	505	100	-1	0	.92	-.4	.88	-.7	l .56	43.0	46.6	ITEM 2
27	462	100	0	0	.89	-.7	.91	-.5	k .38	39.0	40.4	ITEM 27
3	439	100	0	0	.86	-1.0	.90	-.6	j .43	39.0	34.5	ITEM 3
22	385	100	0	0	.88	-1.0	.89	-.8	i .50	26.0	29.0	ITEM 22
23	402	100	0	0	.86	-1.0	.84	-1.2	h .43	39.0	30.2	ITEM 23
10	333	100	1	0	.83	-1.6	.83	-1.6	g .48	30.0	25.2	ITEM 10
12	497	100	-1	0	.82	-1.0	.80	-1.2	f .30	54.0	45.7	ITEM 12
30	446	100	0	0	.79	-1.5	.80	-1.3	e .39	42.0	37.0	ITEM 30
4	488	100	-1	0	.78	-1.3	.77	-1.4	d .48	48.0	44.6	ITEM 4
13	469	100	0	0	.70	-2.0	.65	-2.4	c .53	57.0	41.9	ITEM 13
15	483	100	-1	0	.66	-2.2	.65	-2.3	b .50	50.0	44.3	ITEM 15
25	387	100	0	0	.60	-3.7	.61	-2.5	a .50	42.0	29.1	ITEM 25
MEAN	389.5	96.9	0	0	1.02	.1	1.03	.1		35.0	34.0	
S.D.	108.3	16.9	1	0	.25	1.8	.26	1.8		11.1	8.2	

**Decision-Making Styles**

Table 3.7.

*Summary of 100 measured Persons*

SCORE	RAW	COUNT	MEASURE	MODEL	INFIT	OUT		
				ERROR	MNSQ	ZSTD	MNSQ	ZSTD
MEAN	86.9	25.4	.34	.19	1.06	-.4	1.06	-.5
S.D.	151.0	.6	.77	.03	.88	2.6	.95	2.6
MAX.	151.0	26.0	3.89	.47	5.49	7.0	6.93	7.1
MIN.	34.0	24.0	-1.74	.17	.06	-6.4	.06	-6.4
REAL RMSE	24. ADJ.SD		.73 SEPARATION	3.01			Person RELIABILITY	.90
MODEL RMSE	.19 ADJ.SD		.74 SEPARATION	3.84			Person RELIABILITY	.94
S.E. OF Person	MEAN = .08							

Table 3.8.  
*Summary of 26 measured Items*

SCORE	RAW	COUNT	MEASURE	MODEL ERROR	INFIT		OUT	
					MNSQ	ZSTD	MNSQ	ZSTD
MEAN	334.3	97.7	.00	.10	1.05	-.5	1.13	-.2
S.D.	40.4	8.0	.43	.01	.76	3.2	.91	3.7
MAX.	402.0	100.0	1.03	.11	3.98	9.9	4.38	9.9
MIN.	216.0	67.0	-.73	.09	.62	-3.3	.60	-3.4
REAL RMSE	11.	ADJ.SD	.42	SEPARATION	4.34	Person RELIABILITY	.94	
MODEL RMSE	.19	ADJ.SD	.74	SEPARATION	3.84	Person RELIABILITY	.95	
S.E. OF	Person	MEAN =	.09					

Tables 3.7 and 3.8 show the reliability of both Items and Persons. The examination of both the separation of items and person indices and the reliability for decision-making styles yield a very good level of 3.84 and R .95 for items and a level of 3.84 and 94 for persons, respectively. Nevertheless, the person reliability as can be seen from Tables 3.7 and 3.8 is significantly low compared to the item reliability. The result can be interpreted that respondents might have totally responded to the items convincingly which consequently reflected on the overall person reliability (Mikail, 2007 in press).

In sum, there is a strong reliability for respondents responding to the items and for the items themselves. The items were considered easier for them to understand and measured the respondents' response. The respondents also measured the items. Therefore, the person reliability is ( $R=.90$ ) and the items were reliable at ( $R=.94$ ) which shows that the items in this study are free from difficulty and the respondents had the reliability to respond to the items. Therefore, item deletion is not recommended.

Table 3.9.

*The Item Estimations for Job Satisfaction*

Person: REAL SEP.: 3.01 REL.: .90 ... Item: REAL SEP.: 3.80 REL.: .94  
 Item STATISTICS: MISFIT ORDER

ENTRY NUMBER	RAW SCORE	COUNT	MEASURE	MODEL		INFIT		OUTFIT		PTMEA ZSTD CORR.	EXACT OBS%	MATCH EXP%	Item
				S.E.	MNSQ	ZSTD	MNSQ	ZSTD	MNSQ				
2	216	73	0	0 3.98	9.9 4.38	2.9 A-	.03	20.5	33.7	2 conceptual	1	2	
1	232	67	0	0 3.18	8.6 3.48	2.2 B	.04	20.9	35.2	1 Analytic	1	2	
15	352	100	0	0 1.05	.4 2.60	2.3 C	.45	41.0	34.8	15 directive	3	2	
16	357	100	0	0 1.40	2.7 1.43	2.8 D	.38	35.0	35.0	16 analytic	4	2	
25	369	100	0	0 1.28	1.9 1.28	1.9 E	.44	45.0	38.9	25 behavioral	9	0	
3	346	100	0	0 1.08	.6 1.08	.6 F	.65	45.0	34.5	3 analytic	2	2	
10	402	100	-1	0 1.03	.3  .96	-.2 G	.57	40.0	36.3	10 conceptual	3	2	
6	350	100	0	0 1.00	.0  .96	-.3 H	.64	40.0	34.7	6 directive	1	2	
26	366	100	0	0  .97	-.1  .93	-.4 I	.58	42.0	42.4	26 conceptual	7	0	
4	349	100	0	0  .87	-1.0  .88	-.8 J	.67	46.0	34.6	4 conceptual	2	2	
9	339	100	0	0  .87	-1.0  .86	-1.0 K	.65	44.0	34.2	9 analytic	3	2	
23	344	100	1	0  .82	-1.4  .85	-1.1 L	.69	46.0	36.7	23 directive	4	0	
8	340	100	0	0  .84	-1.2  .81	-1.5 M	.67	57.0	34.2	8 directive	2	2	
24	372	100	0	0  .79	-1.6  .75	-1.9 m	.70	51.0	40.0	24 analytic	6	0	
18	363	100	0	0  .78	-1.7  .77	-1.8 n	.66	50.0	35.1	18 analytic	5	2	
5	343	100	0	0  .75	-2.0  .72	-2.2 k	.71	45.0	34.3	5 behavioral	1	2	
17	374	100	0	0  .74	-2.0  .72	-2.2 j	.65	47.0	35.7	17 behavioral	6	2	
22	323	100	1	0  .71	-2.3  .71	-2.3 i	.74	43.0	36.8	22 behavioral	8	0	
14	355	100	0	0  .70	-2.4  .67	-2.7 h	.73	45.0	34.9	14 behavioral	5	2	
21	315	100	1	0  .69	-2.6  .69	-2.5 g	.75	37.0	37.0	21 conceptual	6	0	
7	300	100	0	0  .68	-2.7  .68	-2.6 f	.68	45.0	33.7	7 behavioral	2	0	
20	313	100	1	0  .66	-2.7  .66	-2.7 e	.77	48.0	38.0	20 behavioral	7	0	
13	321	100	0	0  .65	-3.0  .64	-2.0 d	.77	48.0	33.5	13 behavioral	4	2	
11	355	100	0	0  .63	-3.1  .63	-2.1 c	.76	41.0	34.9	11 behavioral	3	2	
19	298	100	0	0  .63	-3.2  .60	-2.4 b	.71	51.0	33.9	19 conceptual	5	2	
12	298	100	0	0  .62	-3.3  .62	-2.2 a	.74	54.0	33.9	12 conceptual	4	2	

*Figure 3.2.*  
Item by Person Mapping (Decision-making Styles)

---

Persons -	MAP		- Items
	<more> <rare>		
4	+		
3	+		
2	+		
	T		
	#		
	.##		
	##		
1	###	S	21 Management is confident to handle the tasks.
	.####	+  T	20 Management is good at interacting with the academic staff.
	#####		22 Management is open-minded and polite towards me.
	#####		
	#####	S	23 Management is aggressive in dealing with academic matters.
	#####	M	24 Management is disciplined in dealing with the workers.
	#####		25 Management is supportive to me.
	#####		26 Management decisions are flexible.
	#####		12 Management decision planning emphasizes my future goals.
	#####		19 Management is good at seeing many possibilities.
	#####		2 Management decision-making style helps me to achieve recognition in my
work.			
	#	+M	7 Management expects suggestions from me regarding academic issues.
0	.##		13 Management decision planning emphasizes developing my career.
	.##		3 Management decision-making style assists me in having a variety of
teaching methods.			
			5 Management involves me in their decision making.
			8 Management looks for practical results from me.
			9 Management asks for best solutions from the academic staff.
	.		1 Management decision-making style helps me to be the best in my field.
	.		11 Management makes decisions that provide a good working environment
for me.			
			14 Management solves problems by relying on their feelings.
			15 Management uses specific facts for seeking information.
			16 Management searches for facts to make decisions.
			18 Management is good at solving difficult problems in the University.
			4 Management decision-making style encourages me to have independent
action.			
			6 Management decision style helps me to be productive and do the job on
time.			
	. S	S	17 Management waits for the academic staff before making a decision
	.#####		10 Management uses new approaches to decision making.
	#	T	
-1	#	+	
	#	T	
-2	+		
	<less> <frequ>		

## Person and Item Mapping

Figure 3.2 above for person mapping shows that all the items under decision-making styles were easy for the academic staff at Universities “A and B” to endorse because the person ability is above the items and the person mean is above the items mean. Hence, there is a high probability of most examinees answering all the questions and only very few examinees at the bottom may have difficulty in answering them.

## Management Styles

Table 3.10.

*Summary of 100 Measured Persons*

SCORE	RAW	COUNT	MEASURE	MODEL ERROR	INFIT		OUT	
					MNSQ	ZSTD	MNSQ	ZSTD
MEAN	42.3	19.0	-.60	.36	1.03	-.1	1.05	-.1
S.D.	9.7	.0	1.28	.10	.55	1.6	.60	1.6
MAX.	75.0	19.0	5.02	1.03	3.44	4.2	3.16	4.3
MIN.	20.0	19.0	-5.03	.33	.18	-4.3	.19	-4.0
REAL RMSE	.42	ADJ.SD	1.21	SEPARATION	2.88	Person	RELIABILITY	.89
MODEL RMSE	.38	ADJ.SD	1.22	SEPARATION	3.25	Person	RELIABILITY	.91
S.E. OF Person MEAN = .13								

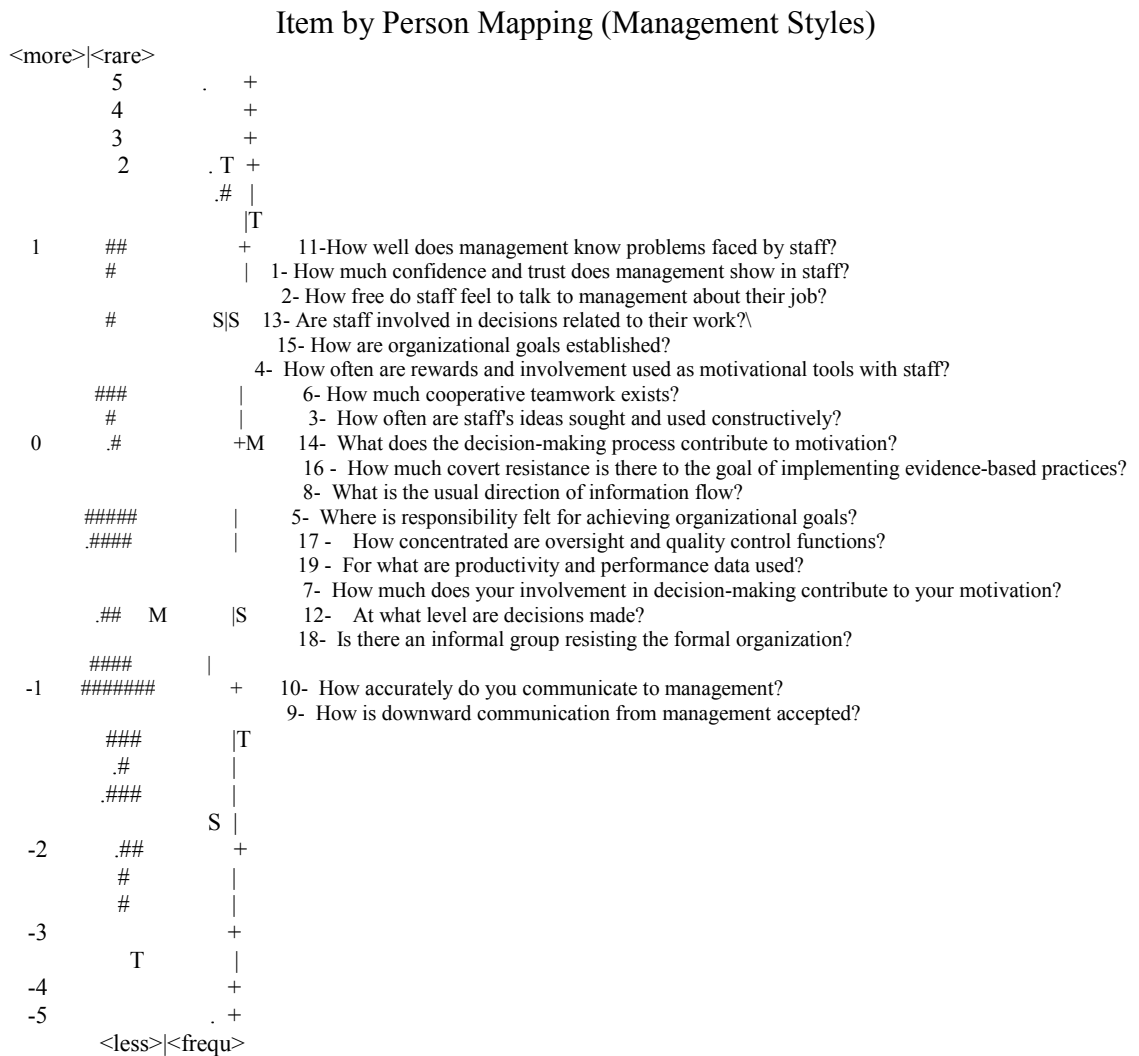
Table 3.11.

*Summary of 100 Measured Items*

SCORE	RAW	COUNT	MEASURE	MODEL ERROR	INFIT		OUT	
					MNSQ	ZSTD	MNSQ	ZSTD
MEAN	220.4	99.0	.00	.36	1.03	-.1	1.05	-.1
S.D.	27.3	.0	.56	.01	.18	1.3	.29	1.6
MAX.	273.0	99.0	.92	.19	1.38	2.6	1.86	4.1
MIN.	170.0	99.0	-.95	.13	.76	-1.7	.69	-1.5
REAL RMSE	.16	ADJ.SD	.54	SEPARATION	3.38	Item	RELIABILITY	.92
MODEL RMSE	.15	ADJ.SD	.54	SEPARATION	3.50	Item	RELIABILITY	.92
S.E. OF Item MEAN = .13								

Tables 3.10 and 3.11 show that there is a strong reliability for respondents responding to the items and for the items themselves. The items were considered easier for them to understand and measure the respondents’ responses. The respondents also measured the items. Therefore, the person reliability is ( $R=.89$ ) and the items were reliable ( $R=.92$ ). Therefore reliability of the person was .89 and that for the items was .92 which shows that, the items of this study are free from difficulty and the respondents had the reliability to respond to the items. Therefore, item deletion is not recommended.

Figure 3.3.



Person and Item Mapping

Figure 3.3 above for person mapping shows that all the items under management styles were easy for the academic staff at Universities “A and B” to endorse because the person ability is above the items and the person mean is above the items mean. Hence, there is a high probability of examinees answering all the questions.



Table 3.12.  
The Item Estimations for Management Styles

ENTRY NUMBER	RAW SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	PTMEA CORR.	EXACT OBS%	MATCH EXP%	Item	G
5	220	99	-.12	.13	1.38	2.6	1.86	4.1	A .48	42.4	47.0	5	0
7	239	99	-.42	.14	1.24	1.8	1.63	3.5	B .50	51.5	50.7	7	0
10	273	99	-.93	.16	1.38	2.3	1.36	1.9	C .44	58.6	61.4	10	0
8	208	99	.04	.15	.84	-1.1	1.29	1.6	D .67	62.6	56.1	8	0
18	253	99	-.61	.13	1.24	1.8	1.19	1.1	E .52	37.4	47.1	18	0
4	187	99	.66	.16	1.10	.7	1.13	.8	F .60	61.6	58.4	4	0
19	241	99	-.40	.14	1.05	.5	1.05	.4	G .58	63.6	50.7	19	0
16	225	99	-.03	.16	1.01	.1	.99	-.1	H .61	57.6	58.9	16	0
3	208	99	.28	.15	.99	.0	.95	-.3	I .63	56.6	55.3	3	0
17	226	99	-.33	.16	.93	-.4	.96	-.2	J .64	62.6	61.7	17	0
14	225	99	-.09	.15	.94	-.4	.91	-.6	i .64	60.6	54.2	14	0
6	217	99	.34	.14	.93	-.6	.91	-.6	h .64	49.5	49.5	6	0
13	204	99	.65	.19	.88	-.7	.87	-.8	g .67	71.7	67.9	13	0
15	197	99	.53	.16	.88	-.9	.85	-1.0	f .68	61.6	55.6	15	0
11	179	99	.92	.16	.84	-1.1	.87	-.8	e .69	66.7	57.0	11	0
9	265	99	-.95	.15	.86	-1.0	.84	-1.1	d .65	61.6	53.9	9	0
1	247	99	-.65	.17	.85	-1.1	.83	-1.2	c .67	61.6	59.3	1	0
2	203	99	.32	.14	.81	-1.5	.79	-1.4	b .69	60.6	50.9	2	0
12	170	99	.81	.15	.76	-1.7	.69	-1.5	a .71	56.6	56.6	12	0
MEAN	220.4	99.0	.00	.15	1.00	.0	1.05	.2		58.2	55.4		
S.D.	27.3	.0	.56	.01	.18	1.3	.29	1.6		7.9	5.2		

Table 3.12 shows the item estimation and two items were above .2 but the reliability for both persons and items is high. Therefore, the two items could be retained for the good and high reliability of persons and items as shown in Tables 3.10 and 3.11.

## Reliability

Reliability is the extent to which measures are free from error (Litwin, 1995). Gay (1992) and McMillan and Sehumacher (1993) defined reliability as the degree to which a test consistently measures whatever it measures. Normally, reliability is established by determining how each item relates to all other items on the total test. According to Gay (1992), Cronbach Alpha is the most appropriate way of establishing reliability. In another definition by Nueman (1997), reliability deals with an indicator's dependability. Thus, the information provided by indicators or a questionnaire does not vary because of the characteristics of the indicator, instrument, or measurement device

itself. Besides, the reliability can be determined by conducting the Cronbach Alpha level of the Statistical Package for Social Science (SPSS) Program. It has been stated by Nunally (1978) and others that items with Alpha values of .70 are deemed as reliable and acceptable.

Furthermore, in order to properly address the threats facing the reliability of the study and to enhance its reliability as well as the potential for replication of the research findings, it is advisable to follow survey data collection procedures closely (Fink, 1995). In this study, the reliability of the items was obtained by using Rasch Model Analysis during the pilot study, Exploratory Factor Analysis (EFA) or Principal Component Analysis (PCA) and Confirmatory Factor Analysis (CFA) to confirm the reliability of the items, the goodness-fit and the measurement of each construct.

## **Validity**

In this study, the threats to validity will be addressed to maximize the quality or value of the survey and to improve the generalizability of the findings. However, validity refers to the degree to which a test measures what it is supposed to measure (Gay, 1992). In another definition, validity is a matter of degree; it cannot be determined directly. In other words, validity is part of a dynamic process that grows by accumulating evidence over time, and without it, all measurement becomes meaningless (Bohrnstedt, 1992b). This study/harnessed/used two types of validity which are:

**a) Content Validity:** content validity is perceived as the degree to which a test measures the intended content area. It involves both item validity and sampling validity. Item validity is concerned with testing for items' relevance with the measurement of the intended content area. To measure the content, sampling validity might be involved and

sampling validity is concerned with how well the test sampling represents the total content area being tested, or whether items cover important areas of measurement (Gay & Airasian, 2000). Thus, this validity addresses the question of whether the full content of a definition represented in a measure in terms of ideas and concept is well constructed (Bohrnstedt, 1992b).

In this study, the content validity of the adopted questionnaire involved lecturers and experts on research methodology and social statistics from the faculty to validate the items of the instrument based on the research method used and the statistical tool employed by the researcher. The academic staff were requested to comment, give suggestions, share their views and to criticize the method and content of the items.

**Construct Validity:** construct validity is perceived as the degree to which a test measures an intended hypothetical construct (Gay, 1997). The construct validity of this research was established by developing a theoretical frame and items were modified based on certain theories.

## **Data Collection Procedure**

In this section, the procedure of obtaining the data from the respondents and the use of the selected statistical techniques for analyzing such as SEM and Rasch will be discussed.

### Obtaining the Data from the Respondents

This research is a fully quantitative research and the data will be collected by using surveys. The distribution was made through personal contact with respondents by going from office to office of the academic staff to collect the data. The questionnaires

were administered to 200 academic staff from Universities “A, B, C, D and E” based on proportional stratified random sampling and based on the sample size required by the research statistical methods of the study (SEM).

Furthermore, to obtain the data from the academic staff at Malaysian public universities, official permission had to be sought and obtained from the universities’ authorities in order to perform the study especially since this study covers an area of controversial and sensitive research. The questionnaire contains information about academic staff as shown in Table 3.13.

Table 3.13.  
*List of Academic Demographic Data used in the study*

<i>No</i>	<i>Demographic Data</i>	<i>Division</i>
1	Gender	Male Female
2	Age	30 Years below 31 Years above
3	Nationality	Malaysian Non-Malaysian
4	Faculty	Economic, Business Humanities & Sciences
5	Teaching Experience	10- Years below 11-Years above
6	Educational Level	Master Ph.D.
7	Position	Prof. Assoc Prof. Assist Prof. Lecturer Teacher

## **Data Analysis**

In this study, statistical analysis will be used as a tool to answer the research questions. Descriptive and inferential statistics will be used by running the SPSS (16.5) program.

### **Descriptive Statistics:**

- Descriptive statistics will be employed to answer research questions number four, five and six:

### **Research Question 4:**

*To what extent the academic staff agreed and disagreed that their university management style is consultative/participative?*

### **Summary and Justification**

- a) The use of Descriptive Statistics in this study is to determine the rate or percentage of academic staff who strongly agreed or disagreed that university management style is consultative/participative in nature.
- b) Descriptive Statistics were used to establish the level of involvement of academic staff at Universities “A, B, C, D and E” in the decision- making process and the number of the academic staff that agreed or disagreed that their university’s decision-making style is conceptual/behavioural in nature.

### **Inferential Statistics:**

Path Analysis from Structural Equation Modelling (SEM) was employed to answer research question 1.

### **Research Question 1**

*Do the university management and decision-making styles have a direct effect on academic staff job satisfaction in Universities “A, B, C, D and E”?*

### **Research Questions 2 and 3**

Confirmatory Factor Analysis (CFA) was used to answer research questions 2 and 3. CFA is used to determine the best indicator and predictor for latent variables by considering the high item loading and reliability.

### **Research Question 2**

*Which management and decision-making styles are practised or applied by the top management at the five universities?*

### **Research Question 3**

*What are the first item indicators and factor predictors for management and decision-making styles as well as job satisfaction in all five universities?*

### **Summary and Justification**

- a) The use of SEM in this study is to examine the relations of management and decision-making styles with academic staff job satisfaction at Malaysian public universities. Besides, SEM is used in this study to determine the indicators and predictors for each variable.
- b) SEM helps to know the causality of management and decision-making styles on their job satisfaction.
- c) The Rasch Model was employed during the pilot study to determine item difficulty, reliability; items measuring persons and persons measuring items

### **Statistical Methods for the Study**

Statistically, this study intends to employ inferential statistics such as the Rasch method of measurement to validate the instruments which were adopted and adapted slightly to suit the research scope and to see whether each construct fulfils the requirement of unidimensionality as well as whether the interval scale condition was obtained. Besides, the Rasch model is applied in this study to predict the ability of the academic staff to answer the difficult items. This will assist in knowing whether the items are too hard or too difficult to answer and it will help to identify if there is any ambiguity in understanding the meaning of the items.

The Rasch model is employed and its prime objective is to obtain data which fit the model (Andrich, 2004). However, the Rasch model specifically has a measurement property providing a criterion for the success of measurement. Thus, Rasch model is

distinguishes based on its formal property from other models applied to model people's responses in terms of items or questions. Rasch can be used for information diagnose and knowledge regarding how good the criterion is met. Its application models also provide information about goodness of items or questions in measuring the ability or trait on assessments work (Alagumalai, & Hungi, 2005).

After the establishment of the Rasch model, another inferential statistic: Structural Equation Modelling, such as Confirmatory Factor Analysis (CFA) was used to validate the instruments to obtain the good-fitness of the items and to know whether the items really measure what they have to measure. SEM is considered as a statistical methodology for the multivariate analysis of structural theory standing on certain phenomena. Characteristically, this theory determines "causal" procedures that create some remarks on multiple variables (Bentler, 1988). The word of Structural Equation Model suggests two important elements of the processes: (a) the causal studies imply a series of structural (i.e., regression) equations. And (b) structural relations are about modeling pictorially with the ability of clearing the conceptualization of the theory under study (Bentler, 1988).

Moreover, the notion of applying full Structural Equation Model typically includes both a measurement (CFA) and a structural model. Hence, there is a situation where full model represents a system of variables and where you could see latent factors regressing on other factors as predicted by theory and seeing the appropriateness of observed measures factors. In other words, the directionality reflects the hypothesis' bearing on the causal structure of variables in the model. Moreover, Exploratory Factor Analysis (EFA) was considered to determine how the item measurements (the observed variables) are related to the underlying latent constructs (Bentler, 1988).

## **Conclusion**

This chapter presents the research methodology that will be used for the study as follows; introduction to methodology, respondents for the study, study population, Characteristics of respondents, sampling procedure, sample of the study, instrumentation, pilot study, reliability and validity and data analysis. The methodologies that were used in this study are very unique, advanced and robust. They are purposely used to measure the items in terms of their reliability, good-fitness and inter-correlation with the construct such as (PCA, CFA & Path Analysis). Besides, Path Analysis was used to show the causal relation between independent and dependent variables.

Rasch analysis provides an investigation into how well each item fits within the underlying construct and the difficulty and ability or fit of the respondent in analyzing the items (Smith, 1991a, 1992a, 2000; Smith & Miao, 1994; Wright & Masters, 1982; Wright & Stone, 1979). Besides, it is the only method in the human sciences that estimates the errors and handles or deals with missing data (Bond & Fox, 2001). Furthermore, SEM is used in this study to determine the items' goodness of fit and path to determine the causal relations between the endogenous and exogenous variables.