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Reliability And Validity Of Wrong Belief System Detector Instrument Among Higher Education Students In Malaysia

Mohd Nur Al Sufi Bin Romele[1], Syed Mohamed Shafeq Bin Syed Mansor[2]

[1]PhD, University Teknologi Malaysia
[2] University Teknologi Malaysia

Abstract: **Purpose of this study to develop Wrong Belief System Detector Instrumen. Constructs of this instrument are values, experiences, educations and sosioeconomic status. The design used in this study is quantitative methods. The quantitative study involved 240 respondents in the actual survey. All respondents were selected among university students who in the pure sciences, social sciences and engineering sciences in Malaysia. Quantitative data were collected and analyzed by Rasch Measurement Model using Winstep Software Version 3.69.1.11. Preliminary results showed that 36 items were identified. Analysis of the findings of the analysis conducted with respondents reliability index was 0.84, while the index of reliability was 0.99. Separation of respondents was 6:30 and the separation of items iwas 8.85. Cronbach Alpha showed the reliability of item was 0.87. Infit MNSQ value in range 0.89 to 1:20 and the outfit MNSQ in the range 0.88 to 1.28 was show the suitability of the measuring instrumen. The analysis actually shows that the variance explained by measures (%) shows the instrumen has a value of 57.0 and the unexplained variance in 1 st contrast showed that 2.3% is indicated item was very good.**

Keywords: **Wrong Belief System, Rasch Measurement Model, Reliability, Validity.**

I. INTRODUCTION

A student of Higher Education Institutions is an asset for developing countries. Students face many challenges, particularly in their academic learning. Students are constantly exposed to the problems that would interfere with academic stress them in achieving excellent results (Alzaeem, Azhar, Solomon, & Mitchell, 2010). Therefore, the process of counselling is one of the methods used in solving this problem (Alzaeem et al, 2010).

In the process of counselling, the best method of diagnosis is to identify any system of beliefs that cause the student to be stress (Beck, 2005). To help students handle thier academic stress, counsellors need to assess exactly one belief system to help students get the correct belief system and can reduce the stress faced by these students (Kuyken, Kurzer, Derubeis, beck, & Brown, 2001; Ellis, 1994). However, if a counsellor had an inaccurate and irrational belief system. This will led counsellor to diagnose and provide recommendations to the client by the counselor's own belief system (Blackburn & Davidson, 1995, 1996). Counseling process cannot be carried out smoothly and the client problems will become worse (Marof, 2001).

The problems to identify belief system of clients occur when the counsellors have their own belief system that is not right and irrational (Bernard, 1998). The counsellor will lead clients to their own perceptions of the problems (Culley & Bond, 2005). This problems will the counseling process to a condition called unfinished business (Sharil and Habib, 1999). This can be solved by provide to the counselor a guide in detecting wrong belief system (Lonna, 2000; Brosschot et al, 2005).

The study, conducted by Bernard, (1998), Giuseppe, Leaf, Exner, teasing, (1988) and Linder et al., (1999) showed that the cognitive component can be used to diagnose problems that exist within the persons. Emotional and behavioral

problems can also be identified by using cognitive measures (Solomon et al., 2003). Emotional and behavioral problems based on cognitive measures can prove emotional and behavioral stability is closely linked with the control system of beliefs (Beck et al., 2001; Bhar et al., 2012; Butler, Beck, & Cohen, 2007; Vanderhasselt & De Raedt, 2012).

According Bhar et al., (2012), cognitive measures was significant in identifying depression and stress. Most counsellors in Malaysia was measure stress through stress factors and symptoms of stress (Alzaeem et al, 2010). Through stress factors and symptoms of stress, the client will determine the level of stress experienced. However, by only identify stress factors and symptoms of stress, counsellors cannot detect the exact cause of stress (Adam, 1999). This means that detection of the stress factors only detect in surface cause but not leading to real cause that exist within belief system in the individuals. Similarly, the measurement of stress symptoms is a measurement of stress levels after stress has occurred. Measurement of stress symptoms are aimed to determine the existence of the effect of stress in the individual but cannot detect a real problem for stress situations (Alzaeem et al, 2010). So there must have current and accurate method for detecting real the stress of individual by identify wrong belief systems that exist within the individual resulting from the value, experience, education and socioeconomic status of an individual (Mohd Nur Al Sufi & Syed Mohammed Bin Romel Shafeq Syed Mansor, 2014). Detection of belief systems will be able to help a counsellor to formulate an effective intervention to solve stress problem (Brosschot et al, 2010).

II. STATEMENTS OF PROBLEM

Based on the background of the studies that have been presented, clearly showing that the cognitive component particular belief system is an extremely important component in influencing behavioral and emotional problems, especially stress. Wrong belief systems will provide a negative effect on behavior and emotions. (Eriksen, Murison, Pensgaard, & Ursin, 2005; Ursin & Eriksen, 2004, 2010). In the process of counselling for academic stress cases, counsellors often use instruments that measure the level of stress, stress factors, sources of stress and stress symptoms. Using this method, counsellor only measure and detect stress in general without detecting wrong belief system (values, experience, education and socioeconomic status). This is because the wrong belief systems were the main roots of the stress problems (Beck et al., 2001; Bhar et al., 2012; Canel-Cinarbas et al., 2011; Alzaeem, Azhar, Solomon, & Mitchell, 2010; Willem Kuyken et al., 2001; Wenzel et al., 2006). That mean, a belief system detection instruments should be developed to meet current demand, which is one method that is effective in solving the problem of academic stress among students in universities.

III. OBJECTIVES OF THE STUDY

The objective of this study is to identify reliability and validity a psychological test called the Wrong Belief System Detector to help the counsellors to diagnose wrong belief system among student at university in Malaysia.

i. To identify reliability and isolation of item and respondent in wrong belief system among university students who are experiencing academic stress.

ii. To detect Item Polarity by Point Measure Correlation (PTMEA CORR) values among university students who are experiencing academic stress.

iii. To identify the suitability of item by construct among university students who are experiencing academic stress.

iv. To identify dimensionality of item among university students who are experiencing academic stress.

IV. METHODOLOGY OF RESEARCH

This study is a quantitative research using Rasch Measurement Model to identify reliability and validity of wrong belief system instrument. The samples of study were 240 respondents. Respondents were randomly selected group of university students that have high stress levels. This stress level measured using an instrument developed by Lovibond and Lovibond (1995), namely Depression, Anxiety and Stress Scale (DASS21). Respondents were selected from four universities, namely University Teknologi Malaysia, University Kebangsaan Malaysia, University Utara Malaysia and University Malaysia Terengganu. The validity and reliability of the instruments performed using Rasch Measurement Model Analysis.

The collected data were analyzed using Rasch measurement model of reliability and isolation of respondents item, item polarity detection measure the constructs through the PTMEA CORR, suitability item measure constructs,, Differential

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Item Functioning (DIF) on gender, fitness measurement scale through the use of structural and unidemensi category. Data were analyzed using the software Winstep 3.69.1.11.

V1. RESULTS OF STUDY

Researchers using Rasch Measurement Model to identify the validity and reliability of detection instruments belief system is wrong. Here are the findings of a study conducted data:

A. Reliability And Isolation Item Respondents

Findings for reliability and separation of items and the respondent is as below:

Table 1: Reliability and Separation of Respondents

	TOTAL SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	108.3	36.0	50.49	2.08	.99	-.4	.99	-.4
S.D.	13.4	.0	5.74	.03	.57	2.3	.56	2.3
MAX.	142.0	36.0	64.94	2.23	2.91	5.6	2.90	5.6
MIN.	75.0	36.0	35.52	2.04	.34	-3.8	.33	-3.9

REAL RMSE	2.29	TRUE SD	5.26	SEPARATION	6.30	Person RELIABILITY .84
MODEL RMSE	2.08	TRUE SD	5.35	SEPARATION	6.57	Person RELIABILITY .87
S.E. OF Person MEAN = .37						

Person RAW SCORE-TO-MEASURE CORRELATION = 1.00
CRONBACH ALPHA (KR-20) Person RAW SCORE "TEST" RELIABILITY = .87

Table 1 shows the findings of the data obtained reliability and isolation of respondents indicate the index that meets the criteria established in the Rasch Measurement Model. The reliability index is good because respondents approaching 1.00. The value of reliability index was 0.84. Reliability respondents can be further enhanced if the respondents had dumped abnormality instruments when assessing the suitability of polarity respondent. Separation of respondents overall index is 6.30 which is very good because it has a high value. According to Bond and Fox (2007) and Linacre (2006) values above 2.0 are acceptable value. If reliability is increased or misfit individuals detected, that individual will be removed from the analysis, isolation index will increase. For more in-depth look at the analysis, the researchers also looked Outfit and Infit MNSQ to ensure more accurate data findings. Outfit and Infit MNSQ is necessary approaching 1.00 to avoid misfit. Data in this study showed Outfit MNSQ is 0.99 and Infit MNSQ is 0.99, that mean the Outfit and Infit MNSQ is accepted. In addition, Outfit and Infit ZSTD is necessary approaching 0.00 to avoid misfit. Data in this study showed Outfit ZSTD is -0.4 and Infit MNSQ is -0.4, this shows the Outfit and Infit MNSQ is accepted. Cronbach alpha for this instrument is high and 0.87 and is acceptable.

Table 2: Reliability and Separation of Items

	TOTAL SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	722.2	240.0	50.00	.81	1.00	-.3	.99	-.3
S.D.	116.5	.0	7.54	.02	.28	3.0	.27	3.0
MAX.	886.0	240.0	65.52	.86	1.83	7.4	1.82	7.3
MIN.	487.0	240.0	39.55	.79	.61	-5.3	.61	-5.2

REAL RMSE	.85	TRUE SD	7.50	SEPARATION	8.85	Item	RELIABILITY .99
MODEL RMSE	.81	TRUE SD	7.50	SEPARATION	9.31	Item	RELIABILITY .99
S.E. OF Item MEAN = 1.28							

Table 2 shows the findings of the data obtained by actual research conducted. Reliability and isolation item indicates the index that meets the criteria established in the Rasch Measurement Model. The reliability index is a good item for

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approaching 1.00. The value of reliability index was 0.99. Reliability item can be further enhanced if the item has abnormality instruments polarity and removed when assessing the suitability of the item. The overall index is 8.85, Isolation of item is very good because it has a high value. According to Bond and Fox (2007) and Linacre (2006) values above 2.0 are acceptable value. If reliability is increased or misfit items detected, that item will be removed from the analysis, isolation index will increase. For more in-depth look at the analysis, the researchers also looked Outfit and Infit MNSQ to ensure more accurate data findings. Outfit and Infit MNSQ is necessary to avoid approaching 1.00 misfit. Data in this study showed Outfit MNSQ is 0.99 and Infit MNSQ is 1.00, this shows the Outfit and Infit MNSQ is accepted. In addition, Outfit and Infit ZSTD is necessary approaching 0.00 to avoid misfit. Data in this study showed Outfit ZSTD is -0.3 and Infit MNSQ is -0.3 this shows the Outfit and Infit MNSQ is accepted.

B. Identify Polarity Item By Point Measure Correlation Values.

To detect the polarity item, the researchers looked PTMEA CORR value that does not exceed the predetermined range.

Jadual 3: Item Measures

ENTRY NUMBER	TOTAL SCORE	TOTAL COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	PT-MEASURE CORR.	PT-MEASURE EXP.	EXACT MATCH OBS%	EXACT MATCH EXP%	Item
25	487	240	65.52	.86	.84	-2.1	.82	-2.3	.44	.40	47.1	46.3	C5
29	493	240	65.08	.85	1.40	4.3	1.35	3.9	.38	.41	39.2	46.4	C9
19	494	240	65.01	.85	1.28	3.1	1.25	2.8	.30	.41	51.7	45.8	B9
32	501	240	64.51	.85	.96	-.4	.96	-.4	.38	.41	50.0	46.0	D3
26	547	240	61.31	.83	1.08	1.0	1.07	.9	.35	.41	45.8	46.2	C6
20	596	240	58.04	.81	.91	-1.0	.91	-1.1	.44	.42	58.3	45.0	B10
27	611	240	57.05	.81	1.41	4.2	1.41	4.2	.44	.42	42.5	45.0	C7
35	618	240	56.60	.81	.80	-2.3	.80	-2.4	.65	.42	54.2	45.0	D6
24	619	240	56.53	.81	1.65	6.2	1.64	6.1	.42	.42	37.9	45.0	C4
16	646	240	54.78	.81	1.05	.6	1.05	.6	.41	.42	42.5	45.9	B6
30	665	240	53.55	.80	1.09	1.0	1.08	.9	.40	.42	46.7	47.0	D1
28	695	240	51.63	.80	1.31	3.1	1.30	3.1	.48	.42	41.7	48.5	C8
6	704	240	51.05	.80	.68	-3.9	.68	-4.0	.51	.42	61.3	48.7	A6
15	705	240	50.99	.80	1.83	7.4	1.82	7.3	.53	.42	30.0	48.7	B5
4	723	240	49.84	.80	.77	-2.7	.76	-2.8	.48	.42	62.1	48.9	A4
11	728	240	49.52	.80	1.02	.3	1.03	.4	.51	.42	46.7	49.0	B1
23	738	240	48.89	.80	.69	-3.8	.69	-3.8	.55	.42	53.8	48.9	C3
18	739	240	48.82	.80	1.21	2.2	1.21	2.2	.48	.43	34.6	48.9	B8
17	742	240	48.63	.80	.94	-.7	.94	-.6	.40	.43	47.1	48.7	B7
5	758	240	47.62	.80	.72	-3.4	.71	-3.5	.64	.43	60.0	48.4	A5
21	763	240	47.30	.80	.93	-.7	.94	-.7	.47	.43	38.8	48.3	C1
22	779	240	46.29	.80	.84	-1.9	.84	-1.8	.41	.43	56.3	48.2	C2
2	782	240	46.11	.79	.84	-1.8	.84	-1.8	.41	.43	55.0	47.6	A2
33	787	240	45.79	.79	1.08	.9	1.07	.9	.47	.42	39.6	47.6	D4
3	796	240	45.22	.79	.71	-3.6	.70	-3.7	.48	.42	56.7	47.4	A3
34	810	240	44.34	.79	1.13	1.5	1.13	1.5	.59	.42	34.2	47.0	D5
36	817	240	43.90	.79	.92	-.9	.93	-.8	.46	.42	35.8	46.5	D7
10	823	240	43.53	.79	.93	-.8	.91	-1.0	.43	.42	41.3	46.1	A10
7	831	240	43.02	.79	1.07	.8	1.07	.8	.51	.42	37.9	45.8	A7
12	838	240	42.58	.79	.61	-5.3	.61	-5.2	.52	.42	50.4	45.1	B2
14	840	240	42.46	.79	.89	-1.3	.89	-1.3	.59	.42	43.3	45.1	B4
9	852	240	41.70	.79	.67	-4.3	.67	-4.4	.46	.42	54.6	43.7	A9
13	852	240	41.70	.79	.68	-4.1	.68	-4.2	.61	.42	44.2	43.7	B3
8	866	240	40.82	.80	.68	-4.2	.68	-4.3	.48	.42	51.7	42.5	A8
31	868	240	40.69	.80	1.13	1.5	1.15	1.7	.33	.42	38.8	42.5	D2
1	886	240	39.55	.80	1.04	.5	1.06	.8	.34	.41	35.8	42.6	A1
MEAN	722.2	240.0	50.00	.81	1.00	-.3	.99	-.3			46.3	46.4	
S.D.	116.5	.0	7.54	.02	.28	3.0	.27	3.0			8.5	1.9	

Table 3 shows values that indicate the polarity item for detecting wrong belief system. Correlation measure point value (PTMEA CORR) is well accepted and the item has a value between 0.20 to 0.79 (Linacre, 2002). Items that have a negative value and under 0.20 is necessary aborted because these items are not measuring instruments studied. If the item has a positive value or above 0.20 shows work items at the same level in line with the construct being measured. Polarity analysis showed that all items that are measured in these instruments within suitable values. This means all item moves in a direction parallel to measure the constructs to be measured.

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C. The Suitability Of Item By Construct

Following was a method of detecting the suitability item measure constructs:

Table 4: The Suitability Of Item By Construct

Construct	Measure	Model S.E	INFIT		OUFIT		PTMEA CORR
			MNSQ	ZSTD	MNSQ	ZSTD	
Value	0.80	0.06	1.04	0.60	1.14	0.62	0.63
Experience	0.90	0.04	1.22	0.91	1.30	0.95	0.59
Education	0.92	0.03	0.91	0.79	0.94	0.83	0.54
Sosioeconomic Status	1.04	0.05	0.86	1.19	0.80	1.19	0.60

Table 4 shows the results of the research findings regarding the appropriateness of the item in suitability with the constructs. According to Bond and Fox (2007), the logits 0.6 to 1.4 range logits is accepted on the Likert scale and grading. Values greater than 1.4 indicate an item is not homogeneous with other items in a scale of measurement and the value is below 0.6 indicates attachment constructs with other items. The values in the statistics were evaluated and researchers have identified that the entire item and constructs are compatible with a predetermined value that is statistically Infit MNSQ within 0.86 to 1.22 and outfit MNSQ within 0.80 to 1.30 and measurement (measure) in the range of 0.80 to 1.04.

D. Detecting Single Item Measure Constructs or Unidimensionality

Principal component analysis (PCA) was used to determine the items in the instrument detection system measures the belief that only one single construct. Linacre (2005) states that for sure items are produced only measure a single construct, the size of the variance (Variance explained by measures) preferably> 40%. Next, the unexplained variance in 1st constrast <3.0 is good, and <5% was well accepted. It is also clear that there is no existence of the second dimension.

Table 5: Unidimensionality

		-- ------ Empirical	------ --	Modeled
Total raw variance in observations	=	57.2 100.0%		100.0%
Raw variance explained by measures	=	21.2 57.0%		56.6%
Raw variance explained by persons	=	3.7 16.4%		16.4%
Raw Variance explained by items	=	17.5 40.6%		40.3%
Raw unexplained variance (total)	=	36.0 43.0%	100.0%	43.4%
Unexplned variance in 1st contrast	=	5.9 2.3%	3.4%	

Table 5 shows that the variance explained by measures (%) shows the instrument have a value of 57.0%, higher than the value of a good variant of more than 40%. Next, the unexplained variance in 1 st contrast values showed that less than 3, there was 2.3%, indicating that the instrument is well established and can be used.

VI. IMPORTANCE OF STUDY

Establishment of Wrong Belief System Detector Instruments is based on cognitive theory, which is very significant to the world of counseling and psychology. Theories used are focused thinking irrational and dysfunctional that affect the lives of individuals from the point of emotional and behavioral problems. Instrument that was detecting wrong belief system was not been testing with accurate method. It is supported by Akhbariah (2007), who said that to construct a strong item at least takes about 5 years to complete. According to Croker & Algina (1986) and Snatase (1997) that testing all the items are very important and necessary to ensure accuracy, stability and high reliability. This study also provides

guidance and its implications for the construction of instrument. Construction schedule item in this study developed through literature review and focus group interviews in depth. According to Azma (2006), the statement is built suatau point on the continuum of criteria to measure construct.

VII. CONCLUSION

Analysis conducted on 240 respondents to the findings of the analysis of the reliability index of respondents is 0.84, while the index of reliability is 0.99. Isolation of respondents is 6:30 and the separation of items is 8.85. Cronbach Alpha showed the reliability of 0.87. Polarity analysis showed that all items that are measured in these instruments within suitable values. This means all item moves in a direction parallel to measure the constructs to be measured. The values in the statistics were evaluated and researchers have identified that the entire item and constructs are compatible with a predetermined value that is statistically Infit MNSQ within 0.86 to 1.22 and outfit MNSQ within 0.80 to 1.30 and measurement (measure) in the range of 0.80 to 1.04. The analysis shows the variance explained by measures (%) shows the instrument has a value of 57.0%, higher than the value of a good variant of more than 40%. Next the unexplained variance in 1 st contrast showed that values less than 3, that was 2.3%, indicating that the instrument is well established and can be used. This shows that every item in this instrument is only measuring the constructs. Winstep software run two-tailed t test to detect the presence of differential item functioning or Differential Item Functioning (DIF) to examine significant differences between the two indices of difficulty. Studies show that all the respondents is there is not detected any significant items and items free of GDIF and the results show 20 items easily agreed upon by the men and 16 difficult items agreed upon by men. There are 25 items readily agreed to by the women and 11 difficult items agreed upon by women.

Construction of Wrong Belief System Instrument that this could be an instrument capable of measuring the construct of cognitive elements that have value, experience, education and socioeconomic status. This instrument has high reliability and validity, and suitable for use in significantly among university students and can be upgraded to the next stage of a broader and diverse. Use of this instrument in the education system at the university level will be able to develop belief systems better and so can be applied in the form of individual self-development intervention. This coincided with a passion and philosophy of education towards excellence not only in academics even psychological development of a healthy and balanced.

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