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Development and validation of Indonesian youth career identity scale: the Rasch analysis

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ABSTRACT

Career identity is one of the most important psychosocial developmental tasks for adolescents. The development of career identity in adolescence will prevent humans from experiencing identity confusion which will have an impact on further developmental tasks. This research answers the need for this measurement tool by developing and validating a career identity measurement tool called the Indonesian youth career identity scale (IYCIS). This instrument consists of 55 items in two aspects: career exploration and commitment. This study uses Rasch analysis to test the validity of the IYCIS construct. The construct validity test involved 200 high school students in Yogyakarta, Indonesia. Data analysis using Winstep software provides information about the quality of respondents and instruments, items that are easy and difficult for respondents to agree on, items that are made to order, and unidimensional. The results of applying the Rasch analysis show that IYCIS is good, precise, and has an item fit with the model. IYCIS is a reliable and valid measurement tool for accurately measuring the level of student career identity. This study discusses the implications and recommendations for further research on the implementation of guidance and counseling that contains career identity as a follow-up to IYCIS performance.

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1. INTRODUCTION

Understanding self-identity, especially the career identity domain, is very necessary for adolescent holistically in accordance with religious rules, customs and norms that are highly upheld in society so that teenagers avoid career identity confusion [1]. Identity development during adolescence is very important because it provides a foundation for psychosocial development and interpersonal relationships in adulthood [2]. This is reinforced by the results of Ventegodt and Merrick's research which concluded that the quality of a teenager's understanding of self-identity determines the general level of success of teenagers in life in all fields [3]. The results of research show that factors in Erikson's fifth stage of psychosocial development greatly influence an individual's career identity during late adolescence [4]. Therefore, the task of identity development in adolescents is one of the foundations for success when fulfilling adult development tasks [5].

Understanding self-identity will make it easier for teenagers to choose a major or job that suits their interests and abilities so that they do not get trapped in a situation where they have the wrong major or a job that doesn't suit their field when they graduate [6]. Adolescents who have not been able to assess their abilities and interests, assess the opportunities they can achieve, and make commitments to educational and

employment choices are referred to as adolescents who have not yet achieved self-identity (identity achievement) in the ideal career field [7].

The results of research by the Indonesia Career Center Network (ICCN) in 2017 showed that as many as 87% of students in Indonesia admitted that the major they took did not match their interests [8]. The results of research on 230 vocational school students in Bantul district showed that the career identity profile of students showed that 20% of students were in the achievement career identity, 17% were moratorium students, 3% were foreclosure students, and 60% were diffusion students [1]. Similar research results were also presented by Fajri *et al.*, it was revealed that 78.9% of students had achieved identity status in class and diffusion identity status 3.9% [9].

The urgency of understanding career identity for teenagers today triggers the need for a measuring instrument that can measure the level of career identity of teenagers. Efforts to measure career identity will produce a picture of students' level of career identity. Thus, various related parties can follow up on guidance and counseling interventions to develop career identity in students. Based on the explanation regarding the importance of measuring career identity, the Indonesian youth career identity scale (IYCIS) is a measuring tool that can measure the level of career identity of students at school.

Not much research has developed and tested the usefulness of measuring student career identity. Previous research has produced the Career Identity Development Inventory (CIDI) [10], the Career Development Inventory (CDI) [11], and self identity inventory (SII) [12]. However, both studies used factor analysis techniques, while this study used Rasch analysis. Rasch analysis in testing a data collection instrument has precision and accuracy of data analysis [13], [14]. Thus, as a product of this research, IYCIS is more precise and accurate in capturing the calm level of students, especially students in Indonesia. IYCIS uses two aspects: career exploration [15] and career commitment [7], [16]. This research answers the need for this measurement tool by developing and validating a career identity measurement tool called the Indonesian youth career identity scale.

2. METHOD

2.1. Research design

This study used a quantitative approach by focusing on the analysis of the instrument for measuring the level of career identity IYCIS. IYCIS validation using the Rasch model. Compared to other methods, the advantage of Rasch analysis is the ability to predict missing data based on individual response patterns [17]. Using the Rasch analysis in instrument validation will have more holistic information about the instrument and better meet the definition of measurement [13], [14].

2.2. Participants

The participants of this study were 230 senior high school students. Some simulation studies have suggested that in many cases, 100 to 200 respondents are often sufficient to obtain stable estimates of Rasch parameters. The selection of research participants using a stratified random sampling technique in four senior high schools in Yogyakarta City, Indonesia. The researchers disguise all participants involved in this study, so confidentiality is maintained. So that the security and good name of the participants can be maintained. The distribution of participants in the study is presented in Table 1.

Table 1. Distribution of participants

No	School name	Number of participants
1	Muhammadiyah Senior High School 1 Yogyakarta	50
2	Muhammadiyah Senior High School 2 Yogyakarta	50
3	Muhammadiyah Senior High School 3 Yogyakarta	80
4	Muhammadiyah Senior High School 4 Yogyakarta	50

2.2. Data collection tools

IYCIS measuring the level of career identity in students consists of two aspects: career exploration [18] and career commitment [19]. Career exploration shows the results of students' efforts in searching for information about jobs they are interested in, activities looking for information about jobs and teenagers' considerations about options in their efforts to make decisions as early as possible regarding further studies. Career Commitment is the ability to utilize knowledge, carry out directed activities to implement job choices, identify figures or role models who are suitable for the chosen job, make projections into the future, and show how much students are resistant to shocks in determining further studies Table 2 describes the draft of the tool for measuring the level of career identity in the form of IYCIS.

Table 2. IYCIS instrument grid

Aspect	Indicators	Positive item	Negative item
Exploration	Knowledgeability	1, 6, 11, 16	21
	Activity directed toward gathering information	2, 7, 12, 17	22
	Considering alternative potential identity element	3, 8, 13, 18	23
	Emotional tone	4, 9, 14, 19	24
	Desire to make an early decision	5, 10, 15	20, 25
Commitment	Knowledgeability	1, 7, 13, 19	25
	Activity directed toward implementing the chosen identity element	2, 8, 14, 20	26
	Emotional tone	3, 9, 15	21, 27
	Identification with significant other	4, 10, 16, 22	28
	Projection of one's personal future	5, 11, 17	23, 29
	Resistance to being swayed	6, 12, 18	24, 30

2.4. Data collection

This research has several procedures for collecting the data. The first stage is research preparation. At this stage, researchers make research plans and prepare research materials. This effort can support the implementation of research step by step. The second stage is the formulation of the research instrument draft [20]. In this second stage, the researcher began to draft the IYCIS instrument grid. The draft instrument underwentan expert assessment process to see the appropriateness of the language on each item of the IYCIS instrument. The third stage is the implementation of the research. At the implementation stage of the study, the researcher made the IYCIS instrument format on Google Forms. This effort can make it easier for students to fill out the instrument. The fourth stage is conducting data analysis and preparing reports. At this stage, the researcher conducted data analysis using the Rasch analysis.

2.5. Data analysis

Research data analysis using Rasch analysis with the help of Winstep software [21]. There were two fundamental theorems that form the basis of Rasch's analysis: the level of individual ability/agreement and the level of difficulty of the item to be approved [21]. The psychometric tools that are the basis for analyzing the research data include summary statistics (quality of respondents, quality of instruments, and interactions between person and item). This study also provides item measure (items that are most difficult to agree on and easiest to agree with by respondents), item fit order (items fit and misfit), and unidimensionality (ability to measure what should be measured).

3. RESULTS AND DISCUSSION

The results of validating the IYCIS instrument are one of the studies and research results. The results of the study will describe a description of the quality of the respondents, the quality of the instrument, and the interaction between the person and the item; the items that are the most difficult to agree on, and the easiest to agree with by the respondents; the items that are fit and misfit; and the ability of the instrument to measure what it is supposed to measure. The four data analysis descriptions result from identifying construct validity using Rasch analysis.

Based on the analysis summary statistics shown in Figure 1, the person measure shows the average value of respondents using the instrument. Based on Figure 1, the logit value can be seen person measure obtained, namely 0.98. Referring to the provisions in the Rasch Model, if the value person measures more than logit 0.0, then in this study respondents have a tendency to answer more than agree on statements on various items. Cronbach's alpha aims to measure reliability, namely the interaction between person and item overall. Based on figure, the value can be known Cronbach's alpha obtained (0.95). Refers to the value criteria Cronbach's alpha in the Rasch model, then this value is included in a very good category (>0.8).

Person reliability shows the consistency of answers from respondents. Based on Figure 1, the value can be known person reliability obtained is equal to 0.94. Refers to the value criteria person reliability in the Rasch model, this value is included in the very good category ranges from 0.91–0.94. Item reliability indicates the quality of the items used in the instrument. Based on the figure, the value can be known item reliability obtained is equal to 0.96. Refers to the value criteria Item reliability in the Rasch Model, then this score is included special category (>0.94).

The analysis in Figure 2 presents the results item measure, i.e. focusing on the most difficult and easiest items for respondents to agree on. Based on the analysis item measure shown in Figure 2, it can be seen from the column measure that item number 38 with a value of +1.25 logit is an item that the most difficult to approve by the respondent in the instrument provided. Meanwhile, item number 21 with the value of -1.15 logit is an item that is the easiest to be approved by the respondent.

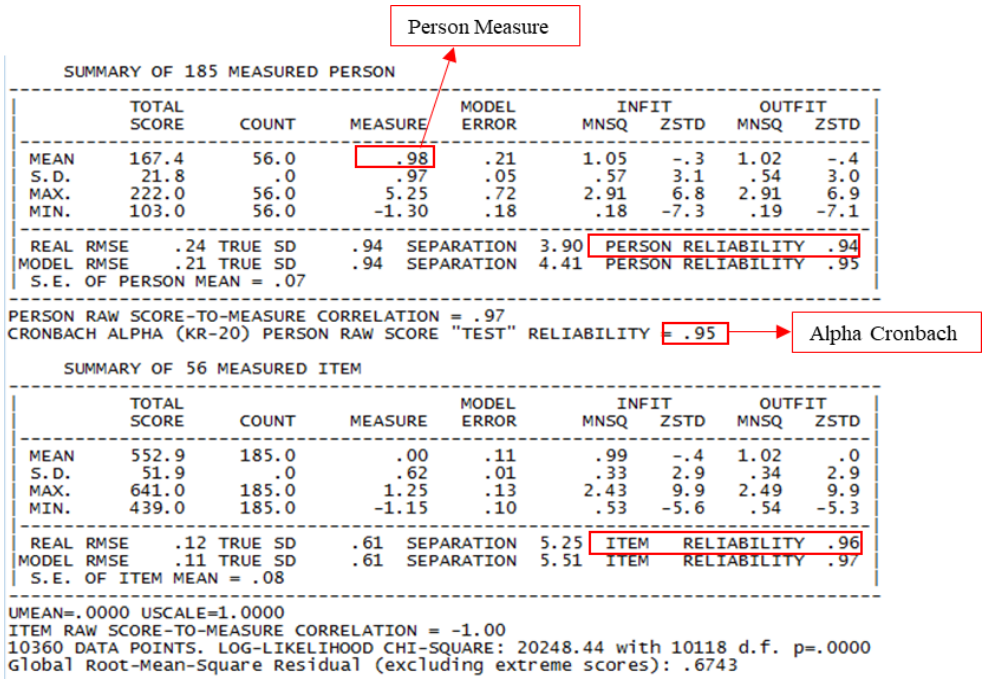

Figure 1. Summary statistics

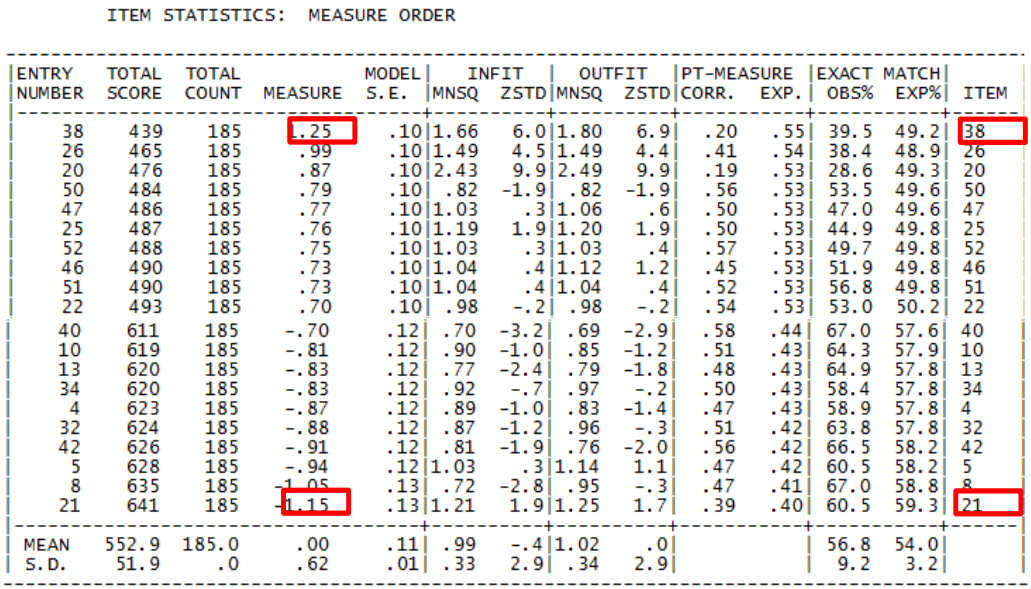

Figure 2. Item measure

Rasch models can also analyze item fit order, namely to determine fit and misfit items. The steps to determine fit and misfit items include adding up the mean and S.D. values, and then comparing them with the INFIT MNSQ value. A logit value that is greater than the sum of mean and S.D, indicates an item that is a misfit (invalid). The results item fit order as shown in Figure 3.

Based on Figure 3, it is known that the ideal logit value obtained is 0.99+0.33=1.32. Thus, there is 7 item which is included in the misfit category with a greater INFIT MNSQ value, namely item number 20 with a value of +2.43, number 38 with a value of +1.66, number 24 with a value of +1.73, number 23 with a value of +1, 68, number 26 with a value of +1.49, number 54 with a value of +1.44, number 55 with a value of +1.39. Unidimensionality is used to determine whether the instrument used can measure what it should measure. The unidimensionality results are presented in Figure 4.

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
20	476	185	.87	.10	2.43	9.9	2.49	9.9	A .19	.53	28.6	49.3	20
38	439	185	1.25	.10	1.66	6.0	1.80	6.9	B .20	.55	39.5	49.2	38
24	538	185	.21	.11	1.73	6.1	1.79	6.1	C .38	.50	41.6	52.8	24
23	528	185	.32	.11	1.68	5.7	1.70	5.6	D .40	.51	39.5	51.9	23
26	465	185	.99	.10	1.49	4.5	1.49	4.4	E .41	.54	38.4	48.9	26
54	507	185	.55	.10	1.44	4.0	1.42	3.8	F .51	.52	43.8	50.8	54
55	495	185	.68	.10	1.39	3.7	1.43	3.9	G .44	.52	43.8	50.2	55
30	558	185	-.02	.11	1.31	2.8	1.43	3.5	H .32	.49	55.7	54.6	30
21	641	185	-1.15	.13	1.21	1.9	1.25	1.7	I .39	.40	60.5	59.3	21
25	487	185	.76	.10	1.19	1.9	1.20	1.9	J .50	.53	44.9	49.8	25
16	544	185	.14	.11	1.07	.7	1.18	1.6	K .43	.50	51.4	53.4	16
3	582	185	-.31	.11	1.06	.6	1.16	1.4	L .45	.47	60.5	56.2	3
36	564	185	-.09	.11	1.06	.6	1.15	1.3	M .43	.48	61.1	55.1	36
35	603	185	-.59	.12	.73	-2.8	.76	-2.2	j .57	.45	68.6	57.1	35
11	526	185	.34	.10	.70	-3.4	.71	-3.1	i .54	.51	59.5	51.9	11
31	534	185	.25	.11	.68	-3.5	.70	-3.2	h .54	.50	61.1	52.5	31
40	611	185	-.70	.12	.70	-3.2	.69	-2.9	g .58	.44	67.0	57.6	40
29	607	185	-.64	.12	.68	-3.4	.68	-3.0	f .55	.44	73.5	57.5	29
19	607	185	-.64	.12	.63	-4.0	.66	-3.2	e .57	.44	71.4	57.5	19
39	544	185	.14	.11	.63	-4.3	.63	-4.1	d .60	.50	67.0	53.4	39
17	528	185	.32	.11	.61	-4.5	.62	-4.2	c .60	.51	69.2	51.9	17
41	610	185	-.68	.12	.60	-4.4	.57	-4.2	b .64	.44	70.3	57.6	41
45	540	185	.19	.11	.53	-5.6	.54	-5.3	a .64	.50	68.6	53.1	45
MEAN	552.9	185.0	.00	.11	.99	-.4	1.02	.0			56.8	54.0	
S.D.	51.9	.0	.62	.01	.33	2.9	.34	2.9			9.2	3.2	

Figure 3. Item fit order

Table of STANDARDIZED RESIDUAL variance (in Eigenvalue units)

		-- Empirical --		Modeled
Total raw variance in observations	=	84.5	100.0%	100.0%
Raw variance explained by measures	=	28.5	33.7%	34.1%
Raw variance explained by persons	=	10.8	12.8%	12.9%
Raw Variance explained by items	=	17.7	20.9%	21.1%
Raw unexplained variance (total)	=	56.0	66.3% 100.0%	65.9%
Unexplned variance in 1st contrast	=	6.1	7.2% 10.9%	
Unexplned variance in 2nd contrast	=	3.3	3.9% 5.9%	
Unexplned variance in 3rd contrast	=	3.1	3.7% 5.6%	
Unexplned variance in 4th contrast	=	2.6	3.1% 4.7%	
Unexplned variance in 5th contrast	=	2.3	2.7% 4.1%	

Figure 4. Dimensionality

Based on Figure 4, the value of raw variance is explained by measures. The instrument obtained in this research was 33.7%, This means that the unidimensionality requirement is fulfilled, namely a minimum of 20%. In addition, in section unexplained variance moving from 2.7% to 7.2% which means meeting the predetermined requirements that the value of variance that cannot be explained by the instrument is no more than 15%. It can be concluded that the instrument used can measure what it should measure, in this case namely the career identity scale.

The results found that IYCIS is a reliable and valid measuring tool for accurately measuring students' career identity status levels. However, IYCIS data needs to be supported and strengthened by other instruments. Thus, IYCIS data shows the actual conditions of students' career identity status. Measuring career identity status is a systematic step to produce valid data. Data on students' career identity status is the basis for stakeholders such as guidance and counseling teachers or other researchers to design guidance and counseling service development programs in schools, especially in Indonesia, to improve students' career identity status. Student career identity is one of the needs of students at school which can stimulate self-actualization in both academic and non-academic fields and avoid confusion about the role of career identity. Individuals who have a career identity always strive to carry out career exploration by understanding who they are, accepting their strengths and limitations, being able to direct themselves, making responsible decisions and self-actualizing. Individuals also have a strong commitment to improving talents, interests and career aspirations, which is the task of developing students for career success in the future.

Weaknesses that emerged in previous studies became one of the backgrounds for the development and validation of IYCIS. Therefore, validation of IYCIS in this study used Rasch analysis. Rasch analysis provides a more accurate picture of the validation results of measuring instruments, produces more holistic information about the instrument, and better meets the measurement definition [22]–[24]. Rasch analysis to develop and validate a measuring instrument can provide weaknesses and strengths of an instrument's statement items [13]. This condition increases the accuracy of the measurement data from an instrument. Due to the importance of measurement in the field of education, Rasch analysis is the answer to various problems of instrument validity and reliability [25].

Guidance and counseling teachers in schools are parties who have the potential and opportunity to utilize IYCIS. Rasch analysis provides holistic data from instrument validation results. Furthermore, Rasch

became one of the analyzes that developed in the field of counseling psychometrics [26]. Some examples of the application of Rasch analysis in psychometrics in counseling include the psychological well-being measuring tool for adolescent victims of violence [27], development and validation of Indonesian peace of mind scale: the Rasch analysis [20] and the self-efficacy scale in career decision making [28]. However, to increase the accuracy of data collection, this research focuses on developing and validating IYCIS using Rasch analysis to strengthen students' career identities at school.

As a benchmark for the level of career identity status among students in Indonesia, IYCIS involves two core aspects, namely career exploration and career commitment [29]. Career exploration refers to the extent to which an individual shows the results of efforts to search for information regarding employment or further studies of interest, activities seeking information about employment or further studies, and consideration of options in an effort to make a decision as early as possible regarding employment or further study options [30]. Career commitment is the ability to utilize knowledge, carry out directed activities to implement job choices, identify figures or role models who are suitable for the chosen job, project into the future, and show how much the student is able to withstand shocks in the field of work [31].

The research findings that can describe the peace measuring tool in the form of IYCIS have implications for efforts to improve students' career identity status as a provision in determining future study and work choices. Measuring students' career identity using IYCIS can be a basis for planning career guidance and counseling programs in schools [32]. With more direct language, IYCIS accommodates assessments of students' career identity status portraits. Career identity is very important so that students do not experience confusion about the role of career identity in a disruptive era like today. In this way, students can have a good perception of themselves, explore the environment around them and make responsible decisions regarding their choice of further study or employment in the future.

The parties involved in the school environment are also responsible for creating career guidance and counseling programs based on measurement results using IYCIS. One of the parties that can improve students' career identity is the guidance and counseling teacher at school. To improve students' career identity in the school environment, guidance and counseling teachers must collaborate with various parties to obtain data other than that documented through IYCIS. Guidance and counseling services that are oriented towards career identity aspects are one of the recommendations for guidance and counseling teachers to follow up on IYCIS measurement results.

Not much research has developed and tested the usefulness of measuring student career identity. Previous research has produced the career identity development inventory (CIDI) [10] and the career development inventory (CDI) [11]. However, both studies used factor analysis techniques, while this study used Rasch analysis. Rasch analysis in testing a data collection instrument has precision and accuracy of data analysis [20], [22]. Thus, as a product of this research, IYCIS is more precise and accurate in capturing the calm level of students, especially students in Indonesia. IYCIS uses two aspects: career exploration [33] and career commitment [34]. The urgency of understanding career identity for teenagers today triggers the need for a measuring instrument that can measure the level of career identity of teenagers.

Efforts to measure career identity will produce a picture of students' level of career identity. Thus, various related parties can follow up on guidance and counseling interventions to develop career identity in students [35]–[37]. Based on the explanation regarding the importance of measuring career identity, IYCIS is a measuring tool that can measure the level of career identity of students at school. IYCIS data can be used as a basis for guidance and counseling teachers in schools and future researchers in developing special career guidance and counseling programs to improve students' career identity.

This research has limitations in the development and validation of IYCIS. Research that develops and verifies the IYCIS needs to involve experts to assess the instrument's statement items. This expert judgment is to increase the validity of the content of the IYCIS instrument. Apart from that, testing this instrument needs to involve respondents on a wider scale so that this instrument can be well received in Indonesia to measure the career identity status of students at school.

4. CONCLUSION

Career identity is one of the most important psychosocial developmental tasks for adolescents. To achieve a career identity, humans need to explore and make career commitments. The development of career identity in adolescence will prevent humans from experiencing identity confusion which will have an impact on further developmental tasks. This research answers the need for this measurement tool by developing and validating a career identity measurement tool called the Indonesian youth career identity scale. The results of applying the Rasch analysis show that IYCIS is good, precise, and has an item fit with the model. IYCIS is a reliable and valid measurement tool for accurately measuring the level of student career identity.

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