

Rasch Career Self Efficacy Scale Analysis for High School Students

Ni Luh Made Wia Dwiarya Putri¹, Kadek Suranata^{2*)}, Luh Putu Sri Lestari³

^{1,2,3} Universitas Pendidikan Ganesha, Indonesia

*Corresponding author, e-mail: kadek.suranata@undiksha.ac.id

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Abstract: Career self-efficacy is one of the important factors that determine the success of students in carrying out their careers. Likewise with school counselors, measuring students' career self-efficacy will help them understand and develop strategies to develop students' career plans. For this reason, a valid and reliable career efficacy measurement tool is needed. This study aims to analyze the feasibility of student career success scale based on RASCH modeling. Participants in this study were 30 students who were involved as respondents in a 25-item career self-efficacy test. Rasch analysis was made by the WINSTEPS 3.73 program to evaluate the Indonesian version of the career self-efficacy scale by looking at the validity and reality of the item-person fit measure, Cronbach's alpha value, item-person separation index, dimensions, response patterns in the scalogram, and bias items according to gender. The results of this study indicate that of the 25 items there are 5 items that are out of fit or do not meet the RASCH measurement model. The reliability of the Cronbach Alpha scale is 0.96 or very high. The total gross variance described by the measure is 47%, which means this scale is able to predict students' career self-efficacy quite accurately. Overall, it can be concluded that the Indonesian version of the student career self-efficacy scale has good psychometric properties so that it can be used for assessment and research.

Keywords: Career self-efficacy, Measurement scale, Rasch model.



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Introduction

The learning process in the formal education system in this school is one of the factors to improve the quality of education in Indonesia. A successful and supportive learning process creates a high quality education. In (Setiawan, 2020) in this very advanced and practical era, guidance and counseling teachers are also required to always innovate in every service that will be provided to students. Guidance and Counseling services carried out in every educational institution in Indonesia will of course always refer to the needs of their students. Guidance and counseling in schools is responsible for providing services to students to achieve physical and spiritual health during further education. The establishment of guidance and counseling services in every school needs to be done considering that in this case students are going through the teenage stage. According to (Ana & Wibowo, 2017) at this point the individual experiences

many changes both physically and psychologically that should affect his behavior. The stages that teenagers go through make them faced with life choices, including preparation and career choices. This is in accordance with the Student Independence Competency Standards (SKKPD) in the 2016 Middle School Guidance and Counseling Operational Guidelines (SMA) which are included in career readiness insights. Hurlock (Yuwono & Aidah, 2017) suggests that high school students start to think seriously about their future. Therefore, the role of teachers and counselors is needed to reduce and prevent student career problems through various services.

According to Bandura in (Setiaji, 2015) in the career decision-making process, individuals must consider the uncertainty of their abilities in the field of interest, the certainty and prospects of their future career, as well as the identity they seek to overcome the uncertainty about themselves. abilities and results, individuals must have confidence in their abilities and results. self-efficacy or self-efficacy and have an expectation of results. According to (Bandura, 1995) self-efficacy is an individual's belief in his ability to shape behavior in certain situations. Based on the results of research (Sersiana et al., 2013) there are still students who do not have high career self-efficacy and do not have a positive perception of their future career so that maturity in determining career decisions is still low. category. For this reason, Guidance and Counseling Teachers are expected to be able to measure and improve students' career self-efficacy and in terms of student career self-efficacy they must also be able to reduce anxiety related to career preparation, especially high school students.

One strategy to identify the level of self-efficacy that students have is to use an efficacy scale, especially in the career field. The implementation of measuring the level of career self-efficacy of special students in schools currently needs to be updated and modified during the activation process. Considering that the implementation of guidance and counseling services in schools is still not optimal due to the lack of innovation and insight by guidance and counseling teachers in schools in providing services and alleviating student problems, especially in the career field. In (Suranata & Prakoso, 2020) it is explained that the high tendency of students to use the internet, as well as the pandemic conditions that cause the limited implementation of face-to-face counseling. Based on this, in the opinion of (Andrianie, 2013) in delivering information on the selection of appropriate and effective media, it can create good student interactions with counselors and affect the effectiveness of service delivery, especially on career self-efficacy for BK teachers. at school. In research conducted by (Lönnfjörð & Hagquist, 2018) explains that the self-efficacy measurement scale, namely the General Self-Efficacy Scale (GSES) developed by Schwarzer and Jerusalem (1995), has been translated into 31 different languages. According to (Ardiyanti, 2016) in Indonesia, the development of self-efficacy instruments in career decision making is in the form of adaptation, namely carrying out the translation process of the self-efficacy scale in career decision making belonging to Taylor & Betz. (1983)

This study focuses on developing a self-efficacy measurement tool in the career field using Rasch modeling analysis. According to (Muntazhimah et al., 2020) the use of the Rasch model is considered capable of complementing the validity and reliability that is seen but can estimate missing data, similarity of answers, and level of difficulty of answers. , even though the respondent is serious or not in providing answers based on responses from individuals. In this study, the process was tested online, this was based on the Covid-19 pandemic where all processes of providing education and guidance and counseling services at schools were carried out online. Based on the explanation above, the purpose of this research is to develop a career self-efficacy scale for students that can be used to obtain information about the condition of students' abilities who are preparing for career planning and their future career readiness. It is hoped that by knowing the condition of students, strategies in planning and alleviating student problems related to career self-efficacy can be solved with methods and services that suit their needs.

Method

Research Design

An online survey was conducted on 30 high school students in South Badung Regency, Bali, Indonesia, aged 17-18 years. Participants consisted of 18 female students and 12 male students. All participating participants filled out the instrument voluntarily. The blueprint for the career self-efficacy scale is presented in table 1.

The Indonesian version of self-efficacy scale used in this study uses the theory of Taylor and Betz (1983) which consists of five career and decision-making dimensions, where the scale is named the Career Decision-Making Self-Efficacy Scale or CDMSE (Bandura, 1997). This scale is used to state how high career self-efficacy is in research subjects.

Table 1. Blue Print of Indonesian version of Career self-efficacy scale

No	Dimensi	Nomor Butir	Jumlah
1	Self appraisal	5, 9, 14, 18, 22	5
2	Occupational information	1, 10, 15, 19, 23	5
3	Goal selection	2, 6, 11, 16, 20	5
4	Planning	3, 7, 12, 21, 24	5
5	Problem solving	4, 8, 13, 17, 25	5
Total			25

The scaling method used in this scale is the summated ratings (Linkert) method with five response options as follows: 1 (very unsure), 2 (not sure), 3 (fairly sure), 4 (sure), 5 (very sure) for measure students' career self-efficacy. The data analysis technique used is the Rasch model approach through the WINSTEP program. In the Rasch model approach, in addition to paying attention to items, it also pays attention to respondents' aspects and calculates the magnitude of the correlation (Ardiyanti, 2016). The results of the analysis produced are summary statistics, item accuracy index, respondent accuracy index and rating scale and reliability analysis. According to (Van Zile-Tamsen, 2017) all Rasch models, information is provided about item difficulty, person ability, and reliability, but in the case of non-achievement measurements will also get results referring to how many latent traits individuals must have before they positively support the item.

Results and Discussion

There are several steps taken to determine the quality of the developed career self-efficacy measurement scale, namely determining 1) validity, 2) reliability, 3) Item Dimensions 4) scalograms 5) variable maps and 6) DIF (Differential Item Functioning). Based on the steps above, the results of the feasibility assessment of this scale are presented as follows.

Items response Validity

The results of the calculation of the validity of the data showing the invalid item can be seen in table 2. Determination of validity in table 2 is done by looking at the fit and outfit from the calculation results, which are then matched back with the item fit order bubble chart. The parameters used to show between infit and outfit from the mean square use a squared value with an ideal range of $0.5 > \text{MNSQ} < 1.5$, a standard value of Z with an ideal range of $-2.0 > \text{ZSDT} < +2.0$ (Wahyudi et al., 2020) and point correlation (PT Measure Corr) with a value range of $0.4 < \text{Pt Measure Corr} < 0.85$ (Muntazhimah et al., 2020). Based on table 2 above, it shows that there are 5 items that are declared invalid or invalid with details of item numbers 13, 1, and 17 in iteration 1, item number 19 in iteration 2, and item number 23 in iteration 3. In the third iteration, the item which is suspected to be number 15 is invalid, but after checking again on the bubble chart item number 15 did not cross the outfit limit so item number 15 was declared valid on condition that it had been corrected by the editor of the question. Thus, the results obtained in this validity test as many as 5 statement items were removed from the career self-efficacy measurement scale. Rasch analysis was created by the WINSTEPS 3.73 program to evaluate the Indonesian version of the career self-efficacy scale by looking at the validity and reality of the item-person fit measure, Cronbach's alpha value, item-person separation index, dimensions, response patterns in the scalogram, and biased items according to gender.

Table 2. Resume of out of fit items

No Item	Pernyataan	Outfit MNSQ	Outfit ZTSD	PT Measure Cor	Iteration	Ket
13	<i>Merubah jurusan jika anda tidak suka pada pilihan jurusan pertama anda</i>	2.91	4.9	.42	1	Outfit
1	<i>Mencari Informasi di perpustakaan mengenai pekerjaan yang menarik perhatian anda</i>	2.3	3.2	.43	1	Outfit
17	<i>Mengubah pekerjaan jika anda tidak puas dengan pekerjaan yang ada masuki</i>	1.67	2.1	.46	1	Outfit
19	<i>Bicara dengan orang yang sudah bekerja di bidang yang anda minati</i>	1.69	2.1	.56	2	Outfit
23	<i>Mencari informasi tentang sarjana atau sekolah profesional</i>	1.63	2.0	.64	3	Outfit
15	<i>Cari tahu tentang pendapatan tahunan rata-rata orang di suatu bidang pekerjaan</i>	1.56	1.8	.60	3	Outfit

Based on the person fit order, it was found that there were still some people who did not meet the fit and outfit criteria from the mean square that was used as a reference, but because of person reliability, the results were very high at a value of 0.94. So, it is considered not to exclude people/respondents. In this case, it means that the lack of person in the outfit in the idea range of $0.5 > \text{MNSQ} < 1.5$, the standard value of Z with an ideal range of $-2.0 > \text{ZSDT} < +2.0$ (Wahyudi et al., 2020) can cover or replace deficiencies in people. that do not meet the criteria for ideas. So if the reliability is high, then the person does not need to be removed.

Reliability Index

Based on Figure 1, the value of person reliability shows results of 0.94 and Cornbach's Alfa value of 0.96 which is included in the very high or good category. The average value of more than logit 0.0 indicates the tendency of respondents to choose a lot according to statements in various items (Sumintono & Widhiarso, 2015). Based on the separation of people, it has a value of 3.93, meaning that the classification of people is divided into 4 scales, namely people/respondents who are very difficult to agree with, people/respondents who have difficulty agreeing, people/respondents who are easy to agree with, and people/respondents who are very easy to agree with. This shows that the consistency of respondents' answers is good. While the reliability of the item shows a result of 0.61 which is included in the sufficient category and a separation value of 1.26, which means that the item is only able to group respondents into 2, namely students who have high self-efficacy and students who have low self-efficacy. Self-Efficacy. In this case, the items have not been able to identify students with moderate self-efficacy and the items developed show sufficient quality.

SUMMARY OF 30 MEASURED Person

	TOTAL SCORE	COUNT	MEASURE	MODEL ERROR	INFIT		OUTFIT	
					MNSQ	ZSTD	MNSQ	ZSTD
MEAN	44.0	20.0	-1.52	.37	1.03	-.1	1.03	-.1
S.D.	14.6	.0	1.71	.10	.53	1.7	.53	1.8
MAX.	96.0	20.0	4.06	.74	2.34	3.5	2.31	3.4
MIN.	22.0	20.0	-5.16	.28	.18	-3.8	.17	-3.9
REAL RMSE	.42	TRUE SD	1.65	SEPARATION	3.93	Person	RELIABILITY	.94
MODEL RMSE	.38	TRUE SD	1.66	SEPARATION	4.38	Person	RELIABILITY	.95
S.E. OF Person MEAN = .32								

Person RAW SCORE-TO-MEASURE CORRELATION = .98
 CRONBACH ALPHA (KR-20) Person RAW SCORE "TEST" RELIABILITY = .96

SUMMARY OF 20 MEASURED Item

	TOTAL SCORE	COUNT	MEASURE	MODEL ERROR	INFIT		OUTFIT	
					MNSQ	ZSTD	MNSQ	ZSTD
MEAN	66.1	30.0	.00	.28	.98	-.1	1.03	.1
S.D.	6.0	.0	.47	.01	.25	.9	.27	.9
MAX.	78.0	30.0	1.02	.31	1.60	2.0	1.56	1.8
MIN.	54.0	30.0	-.88	.26	.61	-1.6	.56	-1.4
REAL RMSE	.29	TRUE SD	.37	SEPARATION	1.26	Item	RELIABILITY	.61
MODEL RMSE	.28	TRUE SD	.38	SEPARATION	1.35	Item	RELIABILITY	.65
S.E. OF Item MEAN = .11								

DELETED: 5 Item

Figure 1. Summary Statistic

Item Dimensionality

Item dimensionality is an important measure to evaluate whether the developed item is able to measure what variables should be measured (Sumintono & Widhiarso, 2013). The analysis of the Rasch model uses principal component analysis of the residual, which is to measure the extent to which the diversity of the instruments that measure what should be measured (Wahyudi et al., 2020). The variable measured in this scale is career self-efficacy in high school students. The results of the analysis as in fig. 2

Table of STANDARDIZED RESIDUAL variance (in Eigenvalue units)

		Empirical	Modeled
Total raw variance in observations	=	47.6 100.0%	100.0%
Raw variance explained by measures	=	27.6 58.0%	57.4%
Raw variance explained by persons	=	19.0 40.0%	39.6%
Raw Variance explained by items	=	8.5 17.9%	17.7%
Raw unexplained variance (total)	=	20.0 42.0%	100.0% 42.6%
Unexplnd variance in 1st contrast	=	2.6 5.5%	13.0%

Figure 2. Item Dimensionality

Based on Figure 2, it can be seen that the total raw variance in observations is 47.6% which is included in the good category, this shows that the prerequisites in the item dimensionality of at least 20% can be met (Sumintono & Widhiarso, 2015). Other data that can be seen from the table of item dimensionality results is that the variance that cannot be explained by the instrument ranges from 2-20%, this indicates that it is in the ideal category because the category of items that cannot be explained in the instrument or scale is at the maximum limit of 40% (Sumintono & Widhiarso, 2015).

Scalogram

Scalogram is filling in the responses given by each participant/respondent in an exam or survey, the responses are sorted systematically from low to high ranking making it easier to analyze and provide explanations and provide predictions on the individual abilities of respondents as well as the level of difficulty of the questions. or items (Sumintono & Widhiarso, 2013). The results of the scalogram analysis are shown in fig. 3.

GUTTMAN SCALOGRAM OF RESPONSES:

Person	Item
	221 121 11 1 1 22
	84104325558664971220
5	+55555555445535555555 05P
20	+2444444444333333233 20P
30	+3243434344423333233 30L
11	+55513422134342422313 11L
29	+34343242442132224313 29P
21	+4333232322332222322 21P
1	+4432333323222232221 01P
10	+3232333243332222222 10P
6	+2422214342332222222 06P
24	+3233332222322232222 24L
7	+3232322233222232222 07L
8	+223322223332223322 08L
9	+34224222132232321311 09P
17	+2223332333322122121 17P
23	+2322222332223222222 23P
16	+32442224123222112121 16L
18	+2222232222222222222 18P
12	+1232222231222221232 12P
13	+3224322221223111211 13L
14	+4122211222222231222 14P
15	+3231222112123133122 15P
4	+2221212222221322211 04P
2	+32311223112311111132 02L
3	+12231321211111112321 03P
22	+21112111212113223111 22L
25	+31131112311112111131 25L
27	+11211221212121211121 27L
28	+22121112111321111111 28P
26	+1112112111112111111 26P
19	+1111112111111211111 19L
	221 121 11 1 1 22
	84104325558664971220

Figure 3. Scalogram

The results in the scalogram analysis showed that there were no responses that were filled out by similar respondents or formed other patterns. Overall, the results of the analysis on the items and student respondents showed that no items were missed to be answered by student respondents or all respondents answered all items completely and in accordance with the conditions of each respondent.

Variabel Map

The next stage of testing is testing using the Variable (Wright) Map which aims to find out which test instrument items (items) are the most difficult and the easiest for students to answer. The results of the Wright map analysis show the map variables (items and respondents) as shown in Figure 4.

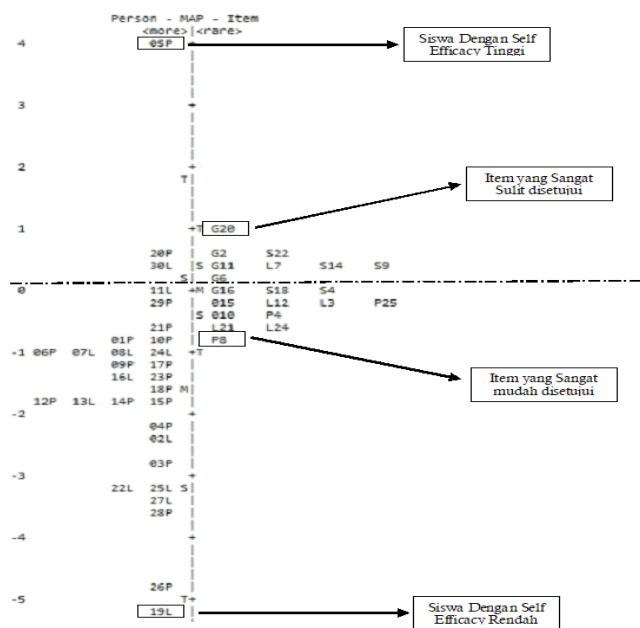


Figure 4. Variable Map

Based on Figure 3, it can be seen that the item that is very difficult to be agreed upon by the respondents is item G20. It can be seen in logit 1.02 which is the highest value among other items. While the item that is most easily approved by respondents is item P8 which is indicated by a value of -0.88 logit which is the lowest value among other items. In other words, item G20 has the highest difficulty (1.02 logit) and item P8 has the lowest difficulty. The average value of respondents in this student career self-efficacy scale is 0.0 logit. Student respondents who have a high level of career self-efficacy are student respondents 05P as indicated by the logit value obtained at 4.08 which is the highest score. While student respondents who have a low level of career self-efficacy are 19L student respondents, this is indicated by the obtained value of -5.16 logit which is the lowest value of all student respondents. The grouping of student respondents is in accordance with the results of the separation index calculation. Based on the results of the variable map above, it can be shown that the scale forms a normal curve. The function of the obtained measurement information is shown in the figure. 5

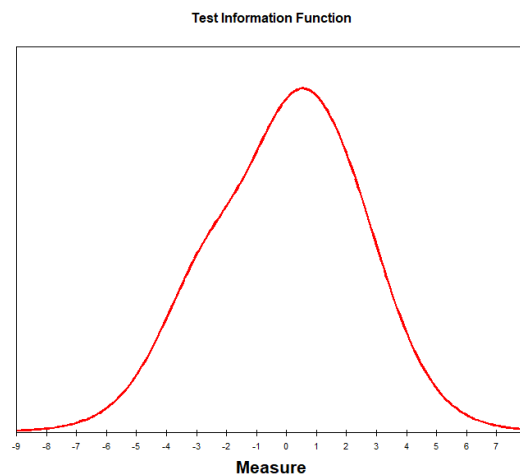


Figure 5. Test Informtion Function

DIF (Differential Item Functioning)

The Rasch model can also analyze the Item Differential Function (DIF). The questions in the test kit that are influenced by factors other than those to be measured are called item bias (Sudaryono, 2012). The terms item bias and the term Differential Item Functioning (DIF) are often used by measurement experts to refer to the same concept. The DIF analysis performed in this study was based on gender. The Graph of Item Differential Functions Based on Gender is shown in Figure 6.

DIF on fig. 6 shows that it is indicated that there is an item bias deviation based on gender in the number S5 (Mengukur kemampuan anda secara akurat), O15 (Cari tahu tentang pendapatan tahunan rata-rata orang di suatu bidang pekerjaan) and S18 (Mencari tahu apa anda siap dan tidak untuk berkorban sesuatu demi mencapai tujuan karir anda) all of those item show the probability value under criteria (Sudaryono, 2012) The criteria used in the analysis is to use the PROB value, if prob < 0.05 it means that the item contains a bias (DIF). However, after checking again on the DIF Person table, it was found that only item number S18 had a Prob value of <1.0>0.5, which was 0.982 which did have the lowest value among all existing Prob values. Thus, there is no item bias on the student career self-efficacy measurement scale developed by researchers.

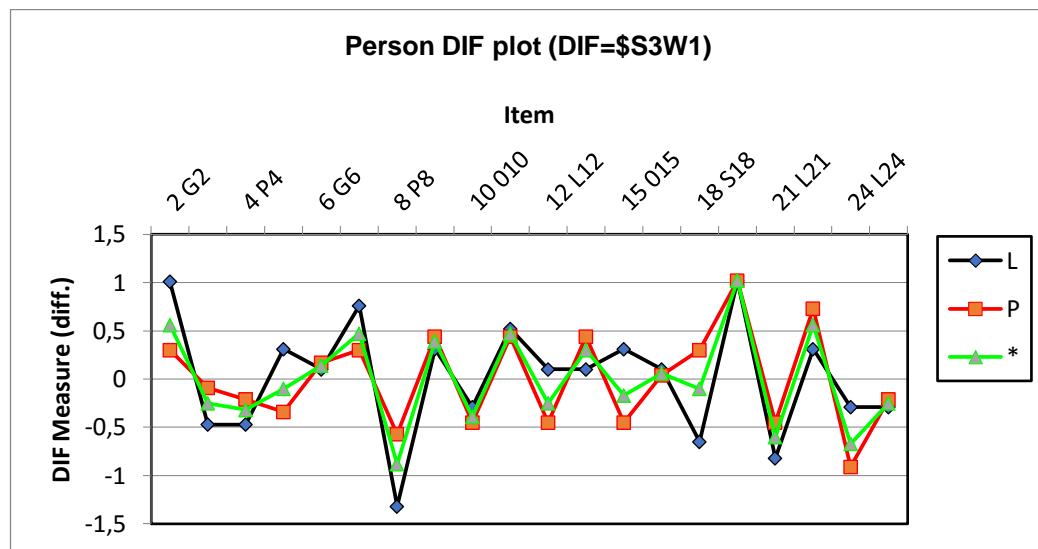


Figure 6. Person DIF Plot

Conclusion

Based on the results of research and discussion in developing a career self-efficacy measurement scale, it can be concluded that the overall career self-efficacy measurement scale developed is in the good category. It can be seen that based on the validity test found 5 items that failed and 1 item was declared valid with revisions, namely items P13, O1, P7 in iteration 1, item O19 in iteration 2, item O23 in iteration 3, and item O15 in iteration 3. In the reliability results, the results of people's reliability showed results of 0.94 and Combach's Alfa values of 0.96 which were included in the very high or good category, and item reliability showed results of 0.61 which were included in the very high or good category. enough category. Thus, in this case the items have not been able to identify students with moderate self-efficacy, and the items developed show sufficient quality only in grouping students with high self-efficacy categories and students with low self-efficacy. This career self-efficacy measurement scale has a total raw variance of 47.6% on observations which is included in the good category and has been able to identify student career self-efficacy variables. In filling out the self-efficacy measurement scale, students have filled out all the questions properly and according to their conditions. Thus, it was also found that students who had high self-efficacy were 05P students and students with low career self-efficacy were 19L students. The item that is most easily agreed by student respondents is P8 and the item that is the most difficult to agree on is G20 so that it can show a graph of the measurement information function as a normal curve. In this self-efficacy measurement scale, there are also no items that affect the results of these items.

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