

# Analysis of Employability Skills Scale on Vocational High School Students

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**ABSTRACT**---World developments in the 21st century have a big impact on various sectors of life, including education and industrial sectors. One of the important things that needed in the 21st century is employability skills for entering the industrial revolution era 4.0. Employability skills are known as the transferable group's core skills that describes the main functions of the knowledge, skills, and attitudes needed in the workplace of the 21st century. The purpose of this paper is to develop the employability skills assessment tool that will be used to measure the employability skills of vocational high school students (SMK). Base on the analysis of relevant literature, this study developed 78 items which were intended collectively to reflect the employability skills. The sample was selected are 34 students of SMK 13 Bandung. Items validity and scale reliability were measured by The Rasch model. The results show that 1) Cronbach Alpha score was 0.93 which means it is in the very good category, 2) coefficient of item reliability was 0.91 which means it has very good items, and 3) coefficient of person reliability was 0.92 which means that students respond consistently to each item. Base on the result of the Rasch model analysis, this paper retained 43 valid items while 35 others were invalid and have low discrimination power.

**Index Terms:**—Employability skills, Instrument scale, Vocational student, Career Guidance and Counseling.

## I. INTRODUCTION

The global development in the 21<sup>st</sup> century is moving very dynamically. Several decades on, the impact of the rapid technological advancements are seamlessly vary in various fields of life (Gubler, 2011), including education and industrial sectors. Education today is facing an ever increasing number of challenges, brought about to a great extent by technological advancement and globalization phenomenon. Technology is advancing daily and bring people into the industrial revolution era 4.0. It changes the activities and behaviors of human life, such as lifestyle, work routines, leisure activities, holidays and games. The industrial revolution tends to make people live in global uncertainty. Therefore humans should have the ability and sensitivity to face uncertainty challenges, dynamics and fluctuations of the 4.0. industrial revolution era (Zhong, Xu, Klotz, & Newman, 2017).

One of important things needed to face the challenges of change in the 21<sup>st</sup> century is employability skills. With regard to this issue, Overtoom explained that employability skills are transferable core skill groups that represent essential functional and enabling knowledge, skills, and attitudes required by the 21<sup>st</sup> century workplace. They are

necessary for career success at all levels of employment and for all levels of education in everyday life (Widodo, 2009). According to Ju, Zhang, & Pacha (2012) employability skills are general abilities and nontechnical competencies needed to be successful in a wide range of jobs, regardless of type and level of employment.

Currently, the industrial workplaces in Asian countries such as Malaysia, Japan, Singapore and Hong Kong emphasizes the importance of employability skills (Zaharim, Yusoff, & Omar, 2009). Not only the industrial world, but also employment in various fields of sports and tourism (Tsitskari, Goudas, Tsalouchou, & Michalopoulou, 2017) and the field of physiotherapy (Ramli, Nawawi, & Chun, 2010), and chemical engineering (Fletcher, Sharif, & Haw, 2016). This does not seem really strange and far away because entrepreneurs have hope that university graduates have access to high category in relation to employability skills thus it enables them for competing in global markets (Madar *et.al*, 2008). Employability skills are not only required for university graduates, but also for high school graduates (Sermsuk, Triwichtkhun, & Wongwanich, 2014). It is therefore argued that career guidance for the development of employability skills is not only needed at the level of higher education, but also at the level of secondary education, especially at vocational education institutions such as Vocational High Schools (Amirullah, 2017). From such observations, this underlies the need for education to give more serious attention as an attempt to develop employability skills for learners in schools (Argos & Ezquerria, 2014).

One possibly conducted phase is to build good integration between the workplace and the education world (Abas & Imam, 2016; Jackson, 2013, 2015; Jackson & Jackson, 2014; Saunders & Zuzel, 2010). Another feasible strategy that can be conducted is to optimize the career Guidance & counseling services programs for students, because they have significantly demonstrated effective in improving employability skills (Buchori & Ilfiandra, 2015; Pellicer, Botía, & Palma, 2014; Jones, Torezani, & Luca, 2012). These needs are the reason for the importance of developing the employability skills scale especially for vocational students in Indonesia in which it is used to measure the ability of their employability skills. Measurement results can be taken into consideration in providing appropriate career guidance and counseling services to develop students' abilities, thus, they can appear competitive in the workplace.

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## II. LITERATURE REVIEW

The literature review of this paper divided in two sub topics, the first discusses about the Conceptual framework of employability skills and the second discusses about employability skill as part of 21<sup>st</sup> century skills.

### A. The Conceptual Framework of Employability Skills

Yorke & Knight has defined employability skills as a set of achievements, skills, understandings and personal attributes that makes graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the work force, the community and the economy in which they serve (Knight & Yorke, 2003; Yorke & Knight, 2004). Aspects of employability according to Yorke & Knight consist of 1) personal qualities, such as self-awareness, self-confidence, emotional intelligence, adaptability, initiative, and stress management; 2) Core skills, such as effective reading skills, numbers, capturing messages, oral and written communication, and creativity; and 3) Process skills, such as using computers, political sensitivity, overcoming conflicts, making decisions, planning and teamwork.

Robinson, (2000) explained that employability skills are the fundamental skills needed by someone to seize, retain, and carry out his duties properly, employability skills cover the skills, attitudes, and behaviors that help a person to be able to cooperate with others in their work, as well as being able to adapt to the changing demands of the job. Robinson (2000) divided the employability skills into three elements, as follows; (1) the Basic Academic Skills of these skills such as reading, writing, science, math, oral communication, and listening. (2) Higher-Order Thinking Skills, these skills include learning, reasoning, creative thinking, decision making ability, and problem solving. (3) Personal Qualities, these skills include the attitude of responsibility, self-control, self confidence, social skills, honesty, ability to adapt, have integrity, punctuality, ability of working in a team, good working attitude, have a purpose in life, eye-catching, cooperative, having self-motivation and self-management. Within Yorke and Knight, point of views they emphasize employability as a set of skills, understanding, and personal attributes that make individuals have a more open tendency or opportunity to achieve success in workplace. Forasmuch, the definition expressed by Robinson emphasizes the fundamental abilities that need to be provided as a provision to achieve optimal results in the workplace.

Bloom & Kitagawa, (1999) in The Conference Board of Canada employability skills explained that employability skills are the generic skills, attitudes and behaviours that are desired by employers against new workers and these skills can be developed through various training programs. It divided into: 1) academic skills, those skills which provide the basic foundation to get, keep and progress on a job and to achieve the best results such as, communicate, think, and learn; 2) Personal Management Skills, the combination of skills, attitudes and behaviours required to get, keep and progress on a job and to achieve the best results such as, positive attitude and behaviors, responsibility, and adaptability; 3) Teamwork Skills, those skills needed to

work with others on a job and to achieve the best results namely work with others.

Ju et al., (2012) revealed that employability skills are referred as general abilities and non-technical competencies required to get a job, regardless of type and level of work. Furthermore according to Ju et al., (2012) employability skills are divided into five types. 1) basic skills, consisting of communication skills, active listening, and conveying ideas through writing; 2) high order thinking skills, consisting of the ability to think critically, overcome problems, use technology, think creatively, and be able to make plans; 3) basic work skills, consisting of time management, being able to follow schedules, working in teams with different backgrounds, and completing assignments; 4) Social skills consist of the ability to respect others, speak politely, respect the rights of others, accept criticism, and be able to work without supervision; and 5) personal traits, consisting of integrity, honesty, adaptation to change, and showing interest and motivation in work. The definition expressed by Ju et al., (2012) emphasizes on general and non-technical abilities as provision for demonstrating a job regardless of age and type of work performed.

In general, various perceptions define the employability skills as general, fundamental understanding, attitude and skills needed by individuals either youth or old, male or female, to be in a positive work environment. From several above experts' explanations, it can be concluded that employability skills have been referred as a basic set of general abilities and personal attributes that makes individuals more likely to gain employment and be successful in their chosen occupations, which benefits themselves in the world of work.

### B. Employability Skills as Part of 21<sup>st</sup> Century Skills.

In fact, there has been a very dramatic acceleration in global competition and collaboration over the past thirty years, spurred by information and communication technology (Bellanca & Brandt, 2010). These developments now lead to ease of connection globally by using the internet. The presence of the 4.0 industrial revolution cannot be separated from the development of the internet to support one of the principles of industry revolution 4.0, familiarly called as the interconnection between machine tools and humans (Müller, 2018). The consequences of world development in the 21<sup>st</sup> century and the challenges of the industrial revolution era 4.0 have helped to change the standard of success in education, career, and society nowadays with the last 50 years (National Education Association, 2012). One of the most widely discussed in order to respond to new challenges in the world of industry and education is the so-called - the 21<sup>st</sup> Century Skills. They are displaced as a set of competencies needed to continue to compete in the 21<sup>st</sup> century and achieve success in the midst of this competition (Zubaidah, 2016). Another understanding expressed by Ananiadou & Claro (2009) that 21<sup>st</sup> Century Skills is the skills and competencies that young

generations shall serve to be effective workers and knowledgeable citizens in the 21<sup>st</sup> century.

The term 21<sup>st</sup> Century Skills is actually not something very new, it is just more important to be understood and mastered at the recent condition (Silva, 2009). There is simply said nothing new because several skills such as critical thinking and problem solving have been important skills in the industrial world for a long time, and in turns, these skills are increasingly demanded and increasingly felt to mean their existence in the current era (Beers, 2011; Chu et al., 2012). The 21<sup>st</sup> Century Skills is the framework oftenly used to define what students should know, possess and can do as subjects to enter the workforce and make choices in the modern era (McComas, 2014).

The Asia Society and the U.S. The Council of Chief State School Officers defines 21<sup>st</sup> Century Skills as the capacity to understand and act on issues that are globally significant and are the necessary issues by students (Saavedra & Opfer, 2012). Students who have such competency will be able to achieve investigations related to the world outside their surroundings, recognize their own perceptions and perspectives of others, to communicate ideas effectively with a variety of audiences, and to take action to improve conditions (Saavedra and Opfer, 2012). Employability skills have close relevance to the development of the world in the 21<sup>st</sup> century. Employees in the 21<sup>st</sup> century have been acquired to have competencies that can make them survive and appear to be assured amidst global competitiveness. Returning briefly from such observations, it has emerged as an area for attention to the needs to make concrete efforts that are productive in acquiring human resources in the face of challenges in the 21<sup>st</sup> century. Employability skills have also become an important issue in the discussion of education in the 21<sup>st</sup> century (Griffin, McGaw, & Care, 2012), especially for learners in secondary schools (Unesco and Unicef, 2013).

Explanation of experts related to skills in the 21<sup>st</sup> century is closely related to the discussion of Employability skills. Their aspect development for students is a significant contribution to equip students to face career and life challenges in the 21<sup>st</sup> century. Research conducted by Wagner and Change Leadership Group at Harvard University in 2010 on hundreds of informants from business leaders of nonprofit institutions and education, revealed that students need 7 survival skills to deal with life and work challenges in the 21<sup>st</sup> century (Zubaidah, 2016). These skills include hard skills (technical or discipline-specific) and generic or soft skills, such as: 1) critical thinking and problem solving; 2) collaboration and leadership; 3) agile and adaptive; 4) initiative and entrepreneurship; 5) effective oral and written communication; 6) access and analyze information; 7) curiosity and imagination. Clearly, the employability skills are important and an inseparable part of developing life skills in the 21<sup>st</sup> century. At this point, Trilling and Fadel (2009) have provided a simple illustration of the position of employability skills (career skills) in the 21<sup>st</sup> century with the following rainbow illustrations:

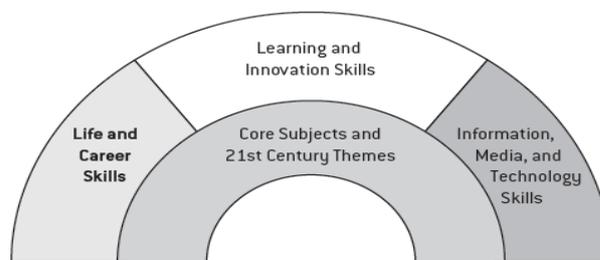


Fig. 1: The 21<sup>st</sup> Century Knowledge and Skills Rainbow (Trilling & Fadel, 2009)

### III. OBJECTIVE

Vocational High Schools (SMK) in Indonesia become one of the places to prepare well-competent resources to enter the workforce. It allows learners to tailor their studies and develop a range of in-demand skills adaptable across various careers and industries. The previous explanation has demonstrated the importance of employability skills for learners, thus, they have declared the readiness to perform fairly certain amid multiple challenges to the global competitiveness. The first phase that shall be conducted is to figure out the profile of employability skills of vocational students. The profile becomes the material for analyzing the extent of readiness that students possess.

In addition, the framework of employability skills can provide an overview of aspects of employability skills that become lack of students hence they can be immediately corrected. The discussion about employability is generally still dominated by university and student levels (Yusof, et.al, 2012), nonetheless the need and understanding of employability skills is not only necessary for students at the university level, but also for students in secondary school especially vocational high schools (Sermsuk, Triwichtkhun, & Wongwanich, 2014). However, these formulated matters have challenges with the limited scale of employability skills measurement that can be used for vocational high school students. Therefore, the purpose of this paper is to generate a valid and reliable scale that might be employed to capture profile description of employability skills among the students in vocational high school regardless with cognitive, affective, and psychomotor aspects.

### IV. METHODOLOGY

The preparation of the conceptual framework and scale development has carried out through three stages: 1) construct item statements, 2) qualitative evaluation by experts, and 3) empirical evaluation and data analysis. Scale arrangement is based on the conceptual framework of employability skills described by the experts before. Based on such cited description, it can be concluded that the employability skills are divided into three main aspects, called as aspects of cognitive, affective, and psychomotor. These three aspects form the basis for item preparation based on the indicators mentioned by experts. These indicators are especially prepared based on conceptual analysis from those described by them.



First stage is construct item statements. This stage begin with define the conceptual basic of employability skills based on conceptual analysis described by experts before. Therefore, employability skills in this paper defines as transferable core skill groups that represent essential functional and enabling knowledge, skills, and attitudes required by the 21<sup>st</sup> century workplace. Employability skills cover three mandatory aspects, called as follows: cognitive, affective, and psychomotor. For scale development, the cognitive aspect called with basic aspect, the affective aspect called with personal aspect, and the psychomotor aspect called with interpersonal aspect. The results of the analysis of these aspects and indicators form the basis for the preparation of items that reflect every aspect of the employability skills indicators. Every aspect of the skill is clearly defined as follows:

- 1) Basic aspect is the ability of students to use reasoning power. Indicators from basic aspects include, critical and innovative thinking, problem solving, and decision making.
- 2) Personal aspects are positive attributes in the form of values and beliefs inherent in students. Indicators from personal aspects include, confidence, integrity, discipline, enthusiasm, adaptability, positive towards the task, self management, responsibility,
- 3) Interpersonal aspect is the ability of students to interact with others productively. Indicators of this aspect include, communication, cooperation and appreciation.

The second stage is qualitative evaluation by expert. Items that have been compiled are then tested rationally (qualitative evaluation) through a judgment process by experts. Qualitative evaluation aims to examine whether the written item is in accordance with the blue print and indicators of employability skills that have been revealed (Azwar, 2012). Qualitative evaluation of the scale is carried out on the suitability of the construct, content, and editorial by weighing and reviewing the scale items by expert guidance and counseling. The employability skills scale is based on 3 aspects, namely cognitive, affective, and psychomotor. The results of qualitative analysis will produce items with qualifications accepted, revised, or rejected. The follow-up to qualitative evaluation is the finalization of scale items that will be used to obtain profiles among the vocational students.

The last stage is empirical evaluation and data analysis to determine the quality of the scale system. The scale is tested on subjects who have the same characteristics as the subject of the scale to be measured later (Azwar, 2012). The empirical test aims to analyze the scale so that the scale of the employability skills can be obtained which has valid and reliable items. Empirical tests were conducted on a sample of 34 Vocational High School students. Such formulated number is taken with consideration of the estimated size of the study sample that is feasible at  $\pm 1$  log it calibration item and 99% confidence level, and in the sample range of 27-61 (Linacre, 1994; Sumintono & Widhiarso, 2014). The number of items tested empirically is 78 items.

## V. RESULT

This section discusses the results of the analysis of the work skills scale for Vocational High Schools. Scale analysis includes the validity test result, reliability analysis, and item difficulty levels.

### Validity Test Results

Validity Test of item statements was conducted through the Rasch Model analysis (see appendix 1). Testing the item validity in the Rasch model was performed by applying the norms stipulated in the MNSQ Outfit column and the ZSTD Outfit score. If in the column row according to the problem number demonstrated the MNSQ Outfit score is  $> 0.5$  and  $< 1.5$ , with the Outfit ZSTD score  $> -2.0$  and  $< 2.0$  thus the item was highly considered to fit the ideal measurement model (item fit) and item could be categorized into valid. In addition, the column Pt. Measure Correlation ( $0.4 < \text{Pt. Measure Corr} < 0.85$ ) this standard indicated that there was nothing to worry about. Based on the output of instrument items results in relation to employability skills (attached), it is therefore concluded that from the total 78 statement items, there were only 43 valid items in view of the calculation of the Rasch model analysis, as follows:

**Table 1: Valid and invalid item number information**

Item number	Item information	
	Valid items	Invalid items
	3, 5, 6, 9, 12,	1, 2, 4, 7, 8,
	14, 18, 20, 21, 24,	10, 11, 13, 15, 16
	25, 28, 30, 32, 35,	17, 19, 22, 23, 26,
	38, 39, 40, 41, 43,	27, 29, 31, 33, 34,
	45, 46, 47, 49, 51,	36, 37, 42, 44, 48,
	53, 56, 58, 60, 61,	50, 52, 54, 55, 57,
	62, 63, 64, 65, 66,	59, 74, 75, 76, 77,
	67, 68, 69, 70, 71,	
	72, 73, 78	
<b>Total item</b>	<b>43 items</b>	<b>35 Items</b>

### B. Reliability Analysis

Scale measurement of reliability test has employed coefficient approach in regard to the Alpha Cronbach number through the Rasch model. Instrument reliability testing results were demonstrated in the following table:

TABLE 3.1 DATA UJI COBA INSTRUMEN KECAKAMPAN KERJA ZODONRINS.TXT Tgl 31 23:14 2018  
 IMPFIT: 34 PERSON: 78 ITEM: REPORTED: 34 PERSON: 78 ITEM: 9 CATS: 405ITEMS 3,79

SUMMARY OF 34 MEASURED PERSON							
TOTAL	SCORE	COUNT	MEASURE	ERROR	MNSQ	ZSTD	OUTFIT
MEAN	309.9	78.0	1.21	1.6	1.08	0	1.08
S.D.	28.7	0	.56	.02	.48	2.4	.52
MIN.	305.0	78.0	2.55	.21	2.63	5.2	2.37
MAX.	257.0	78.0	.33	.12	.49	-4.1	-.50
REAL RMSE .16 TRUE SD .53 SEPARATION 3.33 PERSON RELIABILITY .92							
MODEL RMSE .14 TRUE SD .54 SEPARATION 3.82 PERSON RELIABILITY .94							
S.E. OF PERSON MEAN = .10							
PERSON RAW SCORE-TO-MEASURE CORRELATION = .99							
CROBACH ALPHA (K-R 20) PERSON RAW SCORE TEST RELIABILITY = .93							
SUMMARY OF 78 MEASURED ITEM							
TOTAL	SCORE	COUNT	MEASURE	ERROR	MNSQ	ZSTD	OUTFIT
MEAN	335.5	34.0	.80	.22	1.01	-1	1.00
S.D.	18.7	0	.84	.08	.49	1.7	.71
MIN.	168.0	34.0	2.35	.71	3.22	4.1	5.02
MAX.	67.0	34.0	-2.91	.17	.41	-3.1	-.47
REAL RMSE .26 TRUE SD .80 SEPARATION 3.12 ITEM RELIABILITY .93							
MODEL RMSE .24 TRUE SD .80 SEPARATION 3.39 ITEM RELIABILITY .92							
S.E. OF ITEM MEAN = .10							
MEAN = .0000 USCALE = 1.0000							
ITEM RAW SCORE-TO-MEASURE CORRELATION = .95							
2652 DATA POINTS, LOG-LIKELIHOOD CHI-SQUARE: 5861.15 with 2538 d.f., p=.0000							
Global Root-Mean-Square Residual (excluding extreme scores): .8449							

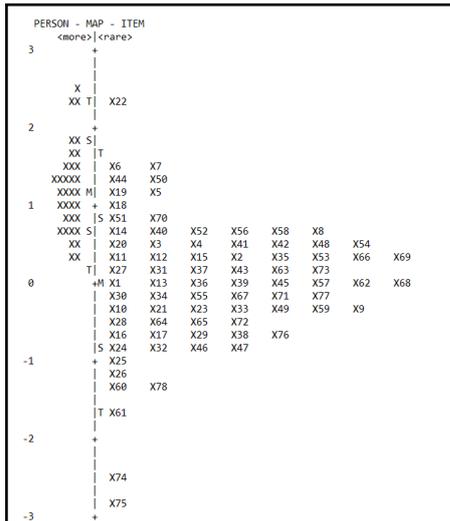
**Fig. 2: Summary of Reliability Analysis**



Reliability testing results showed that Cronbach Alpha reliability has demonstrated a coefficient of 0.93, which meant that such formulated instrument was in a very good category. In addition to demonstrating the reliability of the instrument, the analysis using the Rasch model also revealed reliability based on person (subject) and based on item statement items. Based on table figure 2 the coefficient of person reliability was in a very good category as indicated by the number of 0.92. At this point, this simply suggested that the students were able to answer either correctly or consistently on each item of this instrument. In regard to this, the coefficient of item reliability showed a number of 0.91. Therefore, this meant that the instrument has provided very good items, and in turn, the consistency of scores on each item, as a whole, was a matter not seriously to worry about.

**C. Item Difficulty Level.**

The distribution of item difficulty level as an essential statistic in evaluating item quality could be seen in the analysis of Wright’s map above which might be indicated that the most far away and difficult item was relied in point 22. Nonetheless, the expected item, categorized into the pretty easy item due to the fact that all students were able to answer correctly, were items point 75, 74, 61. Moreover, items that indicated easy category answered by students were point 24, 32, 46, 47, 25, 26, 60, and 78. The distribution of item difficulty level as an essential statistic in evaluating item quality could be seen in the analysis of Wright’s map following :



**Fig. 3: The Distribution Of Item Difficulty Level**

**VI. DISCUSSION**

This paper reports the employability skills scaling up process and the quantitative analysis process using the Rasch model. The end result of the process carried out is to get a valid and reliable scale item to measure the employability skills of Makassar Telkom Vocational School students. Scale arrangement is based on the conceptual framework of employability skills described by previous experts. Based on the conceptual description of employability skills, it is concluded that employability skills have been defined as a set of general basic abilities and

personal attributes that make an individual more likely to secure to master personal development successfully, optimally, and meaningfully for success in the workplace. Employability skills in this paper are divided into three aspects, namely: cognitive aspects (basic aspects), affective aspects (personal aspects), and psychomotor aspects (interpersonal aspects). These three aspects form the basis of items preparation.

Measurement in the context of career guidance and counseling is not something new. Various previous studies showed development and validation efforts about career inventory. Assessment in career guidance and counseling is a base to develop the guidance program for student (Crişana, Paveleab, & Ghimbuţ, 2014). The scale instruments that were developed previously were arranged based on the country and culture context (Babarovic & Sverko, 2018; Cheung, Jin, & Cheung, 2016; Ginevra et al., 2012; Hughes & Thomas, 2006; Kim, Praskova, & Lee, 2017), or contemporary career paradigms (Bravo et al., 2016; Chan et al., 2015; Porter, Woo, & Tak, 2015) that would be revealed.

Contemporary career discussions related to employability skills. therefore, efforts are needed to develop an instrument scale to measure employability skills. The existing employability skills scale focuses more on preparing the scale to measure student employability skills at the university level or employers in the world of work such as: 1) Employability skills for entry-level human resources management positions: Perceptions of students and employers (Chowdhury & Miah, 2016); 2) Career Compromise, Career Distress, and Perceptions of Employability: The Moderating Roles of Social Capital and Core Self-Evaluations (Creed & Gagliardi, 2015); 3) Evaluating Employability Skills: Employer and Student Perceptions (Saunders & Zuzel, 2010); and 4) Adaptation and Validation of Self-Perceived Employability Scale: An analysis of Sports Department Students and Graduates (Karli, 2016). With regard to this issue, this paper has tended to focus on vocational high school students. The arrangement of scale items has been divided based on aspects, this is relatively new because the preparation of the previous item of employability skills is based on the division of types or dimension of employability skills such as Employability Skills: 1) Self-perceived employability: development and validation of a scale (Rothwell & Arnold, 2007); 2) The Conceptual Framework & Scale Development (Kumaret al., 2011); and 3) Development and Initial Validation of a Perceived Future Employability Scale for Young Adults (Gunawan, Creed, & Glendon, 2018).

The arranged items are then tested rationally through the process called expert judgment. Rational tests are carried out on the suitability of the construct, content, and editorial by experts’ guidance and counseling. Instrument of employability skills has been made based on the 3 aspects mentioned. Follow-up of the results of weighing by experts is to make revisions and improvements to prepare the final instrument that will be used in revealing the profile of





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