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The Work Readiness Inventory:

A Measurement Model to Assess Graduates' Work Readiness in Higher Vocational Educations

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***Abstract*—The skills gap of higher vocational education graduates is still very wide. There is a need for graduates' readiness to enter the world of work. The research objective was to develop a measurement model to assess work readiness of higher vocational education graduates. The research was conducted using an online survey method. The research respondents were final year students who are currently carrying out industrial work practices. The research data were analyzed using confirmatory factor analysis. This study confirms a model for measuring graduate work readiness, called the Work Readiness Inventory (WRI). This WRI model consists of 42 job readiness attributes, which are divided into 6 constructs, namely: personal resources, family support, industrial work practice experience, work expectations and information, learning environment, and career guidance. The WRI model has a very good degree of fit, and able to measure the work readiness of vocational higher education graduates with valid and reliable.**

Keywords—work readiness, work readiness inventory, higher vocational education

I. INTRODUCTION

Higher vocational education is one type of education designed to develop skills, abilities and understanding, attitudes and work habits so that graduates are ready to work. The open unemployment rate for higher education graduates in Indonesia is still quite high. In the last 5 years, the average open unemployment rate for academy/polytechnic graduates is 3.1%, and university/institute graduates are 8.6% [1]. The high rate of unemployment is partly due to the skills gap of graduates with the needs of the world of work. This means that graduates are unprepared to enter the world of work because the skills possessed by graduates do not match the needs of the world of work.

In order for graduates to compete in the job market, work readiness is required. Work readiness indicates mastery of knowledge, skills and work attitudes and can immediately carry out work without the need for more training. Work readiness is the skills, knowledge and attitudes possessed by graduates to enable them to contribute productively to the achievement of organizational goals in the workplace [2]. Work readiness is defined as the extent to which graduates are considered to have attitudes and attributes that make them ready to work or ready to succeed in the work environment [3]. Work readiness shows a person's ability to complete work in accordance with the provisions without experiencing difficulties and obstacles with maximum results and according to specified targets [4].

Work readiness is formed from a multidimensional construct. The dimensions of work readiness consist of personal characteristics, organizational acumen, work competence, and social intelligence [3]. The ACT [5] identified foundational cognitive skills and non-cognitive behaviors as predictors of a person's ability to succeed at work. Foundational skills include workplace skills that are portable across all occupations, such as information reading, applied mathematics, problem solving, critical thinking, and communication. Non-cognitive behaviors are defined as personal characteristics and behaviors that increase individual interaction, performance, and career prospects in various work fields.

Graduates work readiness of higher vocational education is relevant to be studied because open unemployment contributed by academy and polytechnic graduates are still quite high. On the other hand, researches on developing instruments to measure work readiness of higher vocational education students are limited. It is important to formulate the attributes

that can be used to measure the level of graduates' work readiness. The purpose of this study was to develop a measurement model to assess work readiness of higher vocational education graduates. This measurement model can be used to develop programs and capacities to increase graduate work readiness.

II. METHODOLOGY

This study used a non-experimental quantitative approach, carried out with an online survey method. The research objective was to develop a measurement model to assess work readiness, based on the perceptions of final-year students who are currently implementing industrial work practices. Data were collected in May - July 2020 by means of self-administered questionnaires, where respondents answered the questions contained in online questionnaire without any help from data collection officers [6].

The research population is final year students of the Department of Accounting, Business Administration, and the Department of Tourism of the Bali State Polytechnic who have completed or are carrying out practical field work in the industry for the 2019/2020 academic year. The total population of the study was 897. The sample selection was carried out using purposive sampling method, namely the sampling technique using certain considerations or criteria. Purposive sampling is a sampling technique using the boundaries of the research object that can provide information according to the criteria desired by the researcher [7]. The main criterion for selecting research samples is the willingness of respondents to participate in this study by filling out an online questionnaire. There were 582 students who participated in this research.

The questionnaire was developed by adapting previous research [3,5]. Work readiness is measured using indicators: personal resources (8 items), family support (6 items), industrial work practice experience (6 items), job expectations and information (7 items), learning environment (8 items), and career guidance (7 items). There are 42 attributes of work readiness, measured using a 5-point Likert scale ranging from 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. The Pearson Correlation Product Moment ranges from 0.478 to 0.919, and all of them are significant at the level of α = 5%. Meanwhile, the reliability test shows Cronbach's Alpha varies from 0.827 to 0.938, including the very good reliability category.

The data were analyzed using confirmatory factor analysis, aims to confirm whether the observed variables can validly and reliably explain the constructs of work readiness. Interpretation of the analysis results using the loading factor (λ) $\geq$ 0.30, the construct reliability (CR) $\geq$ 0.70, and the variance extracted (VE) $\geq$ 0.50 [8]. The fit model is tested using the Minimum Fit Function Chi-Square (Sign Value), Root Mean Square Error of Approximation (RMSEA), Normed Fit Index (NFI), Non-Normed Fit Index (NNFI), Goodness of Fit Index (GFI), Comparative Fit Index (CFI), and Adjusted Goodness of Fit Index (AGFI). Confirmatory factor analysis was carried out with the help of the LISREL 8.51 for Windows program.

III. RESULTS AND DISCUSSION

A. Results of Data Analysis

The proposed measurement model for graduate work readiness consists of 42 attributes, which are divided into six constructs. The results of descriptive statistical analysis showed that in general the final year students' perceptions of job readiness attributes were in the agree and strongly agree category. Emotional control, good habits, work expectations, work attitudes and professionalism, and a sense of optimism are the top five attributes with the highest average score. Meanwhile, teaching and learning support, introduction to the business sector, job search, a replica of the workplace, and interpersonal relationships are the five attributes with the lowest average score (Table 1).

Work readiness constructs include personal resources, family support, industrial work practice experience, job expectations and information, learning environment, and career guidance. Industrial work practice experience has the highest average score (M = 4.578), followed by family support and personal resources, while the lowest was career guidance (M = 4.225) (Table 1).

The standardized solution confirmatory factor analysis is shown in Figure 1, and a summary of the analysis was presented in Table 1. The results of the second order analysis show that the loading factor value (λ) of each attribute varies between 0.46 to 0.87. Developing self-potential, independent personal, real work experience, understanding the world of work, attitude and work professionalism are the top five attributes with the highest loading factor. Meanwhile, learning support, non-academic activities, interpersonal relationships, self-emotional control, and job expectations are the five attributes with the lowest loading factor.

In the first order analysis, the loading factor value (λ) of each construct variables varies between 0.82 (personal resources) to 0.87 (job expectations and information). The factor loading values are all above the cut-off value ($\geq$0.30). Observed variables also have construct reliability (CR) $\geq$ 0.70, and the variance extracted (VE) value varies between 0.43 to 0.65. It can be concluded that the variables for assessing graduate work readiness have excellent construct validity and reliability.

Model fit test is intended to evaluate the goodness of fit (GOF) between empirical data and the model. The result of fit index as follows: Minimum Fit Function Chi-Square = 3216.64 (P = 0.0); Root Mean Square Error of Approximation (RMSEA) = 0.075; Normed Fit Index (NFI) = 0.83; Non-Normed Fit Index (NNFI) = 0.85; Goodness of Fit Index (GFI) = 0.78; Comparative Fit Index (CFI) = 0.86; and Adjusted Goodness of Fit Index (AGFI) = 0.75. Based on the fit index, it can be concluded that the resulting model has a good fit between the empirical data and the estimated model. These results mean

that the measurement model built on the basis of theoretical studies is supported by empirical data.

B. Discussion

This study developed a graduate work readiness measurement model for higher vocational education, according to the perceptions of final year students who have completed or are carrying out industrial field work practices. This model is called The Work Readiness Inventory (WRI), consisting of six indicators, namely: personal resources, family support, industry work experience, work expectations and information, learning environment, and career guidance. According to student perceptions, experience during on the job training in industry provides the highest contribution to graduate work readiness. This is indicated by the average score of industrial internship experience reaching 4.578, and then followed by personal resources and family support. Meanwhile, career guidance is perceived as having the lowest contribution with an average score of 4.225.

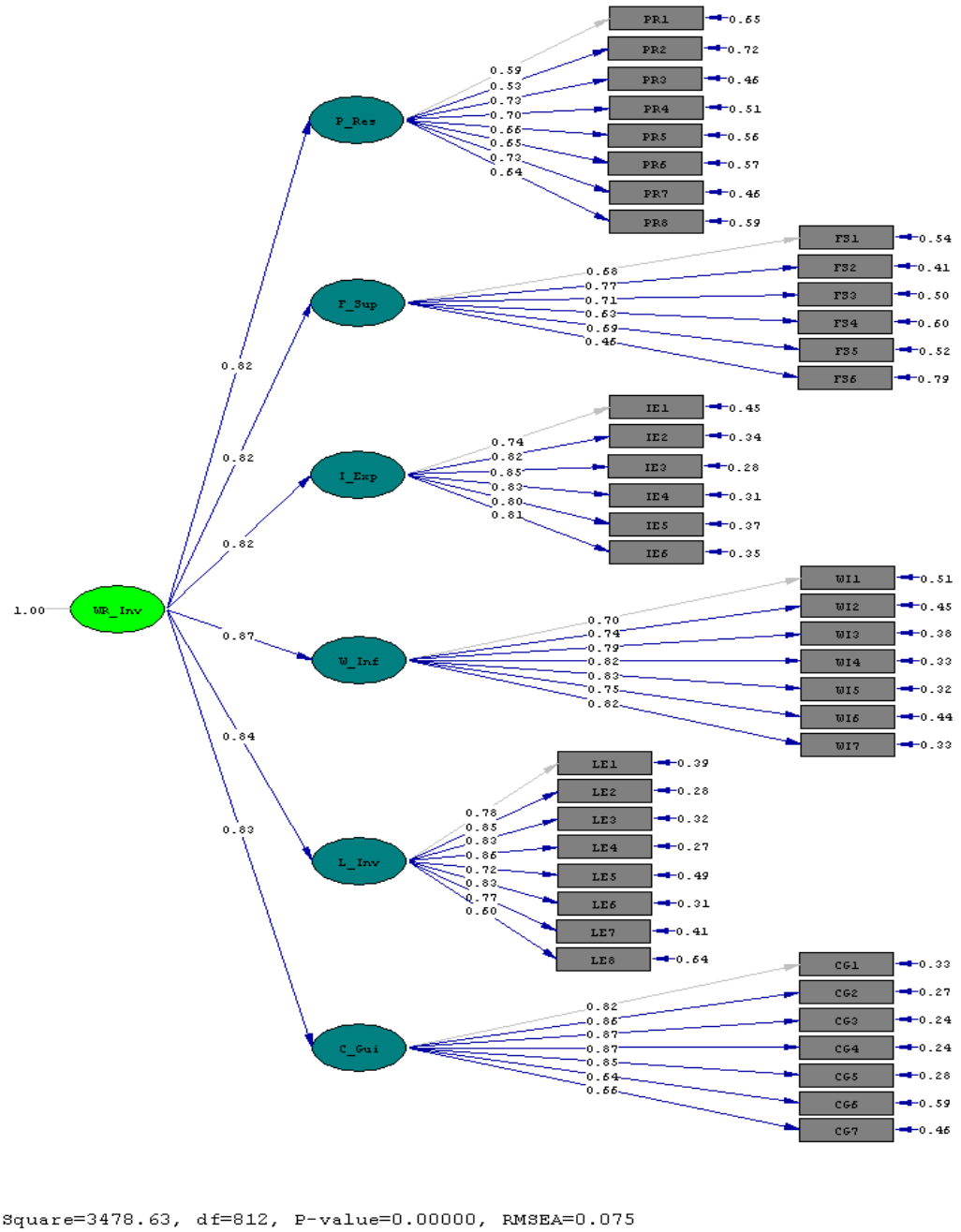

Fig. 1. Measurement model of graduate work readiness.

TABLE I. SUMMARY OF DESCRIPTIVE STATISTICAL AND CONFIRMATORY FACTOR ANALYSIS

Code	Work Readiness Attribute	Mean	SD	Loading Factor	Error	t-Value	Construct Reliability	Variance Extracted
Personal resources		4.430		0.82			0.84	0.43
PR1	Control your emotions	4.698	0.591	0.53	0.65			
PR2	Interpersonal relationships	4.005	0.690	0.59	0.72	0.74		
PR3	Able to act mature	4.596	0.581	0.73	0.46	3.52		
PR4	A sense of optimism	4.615	0.556	0.70	0.51	13.09		
PR5	Able to overcome obstacles	4.223	0.622	0.66	0.56	12.66		
PR6	Be able to adapt	4.378	0.670	0.65	0.57	12.51		
PR7	Work hard	4.531	0.579	0.73	0.46	13.52		
PR8	Able to cope psychological stress	4.393	0.673	0.64	0.59	12.32		
Family support		4.480		0.82			0.80	0.44
FS1	Be openness	4.424	0.767	0.69	0.55			
FS2	Self-actualization	4.529	0.600	0.77	0.41	15.87		
FS3	Good habit	4.660	0.558	0.71	0.50	14.87		
FS4	Learning support	4.158	0.819	0.63	0.60	13.51		
FS5	Character building	4.462	0.677	0.69	0.52	14.58		
FS6	Hope to work	4.646	0.597	0.46	0.79	10.05		
On the Job Training Experience		4.578		0.82			0.83	0.65
IE1	Application of knowledge	4.613	0.595	0.74	0.45			
IE2	Job skills	4.552	0.615	0.82	0.34	19.93		
IE3	Attitude and work professionalism	4.624	0.558	0.85	0.28	20.90		
IE4	Self-Confidence	4.567	0.561	0.83	0.31	20.40		
IE5	Competitiveness	4.505	0.598	0.80	0.37	19.39		
IE6	Increase work readiness	4.607	0.542	0.81	0.35	19.75		
Job Expectations and Information		4.245		0.87			0.84	0.61
WI1	Introduction to the business sector	4.143	0.791	0.70	0.51			
WI2	Introduction to types of work	4.174	0.737	0.74	0.45	16.92		
WI3	Job searching	4.095	0.747	0.79	0.38	17.91		
WI4	Introduction to the workplace	4.371	0.637	0.82	0.33	18.63		
WI5	Job selection	4.359	0.643	0.83	0.32	18.79		
WI6	Information searching	4.198	0.726	0.75	0.44	17.07		
WI7	Information motivation	4.376	0.654	0.82	0.33	18.65		
Learning environment		4.283		0.84			0.86	0.61
LE1	Learning motivation	4.349	0.659	0.78	0.39			
LE2	Competency development	4.297	0.725	0.85	0.28	22.72		
LE3	Practice-based learning	4.289	0.789	0.83	0.32	21.93		
LE4	Real experience	4.308	0.723	0.86	0.27	23.02		
LE5	Career freedom	4.424	0.661	0.72	0.49	18.36		
LE6	Work-based learning	4.306	0.691	0.83	0.31	22.16		
LE7	A replica of the workplace	4.072	0.835	0.77	0.41	20.10		
LE8	Non-academic activities	4.220	0.737	0.60	0.64	14.95		
Career guidance		4.225		0.83			0.85	0.65
CG1	Exploring interests and talents	4.241	0.724	0.82	0.33			
CG2	Understanding of the world of work	4.254	0.695	0.86	0.27	25.23		
CG3	Self-potential development	4.177	0.745	0.87	0.24	25.80		
CG4	Independent personal	4.247	0.702	0.87	0.24	25.78		
CG5	Development of the world of work	4.223	0.722	0.85	0.28	24.89		
CG6	Career planning	4.177	0.779	0.64	0.59	16.92		
CG7	Career readiness	4.256	0.675	0.66	0.46	13.92		

On the job training is an activity to provide work experience in the industry. During on the job training, students are adapted and familiarized with the working environment they will become part of. Students get a hands-on experience using machinery, equipment, tools, materials, etc. Several studies have shown that on the job training in industry can help students hone various skills, both occupation specific skills and employability skills [9-11]. On-the-job training is an effective

method of teaching the skills, knowledge, and competencies needed to perform a specific job within the workplace. Therefore, experience on the job training is an important indicator in assessing graduate work readiness.

The results of the confirmatory factor analysis show that the loading factor of the field work experience is 0.82, the construct reliability is 0.83 and the variance extracted is 0.65. These values are greater than the cut-off value [8]. These results indicate that on the job training experience is a valid and reliable indicator in measuring graduate work readiness. The construct of practical field work experience is formed from six attributes including experience in the application of practical knowledge, application of job skills, attitudes and work professionalism, increasing competitiveness and being more ready to work. In the second order analysis, these six attributes have loading factors varying from 0.74 to 0.85. This means that these six indicators are able to explain the construct of industrial work practice experience well and very well.

Personal resources are identified with personal characteristics, namely characteristics inherent in individuals such as optimism, self-efficacy and resilience are functional, the ability to build interpersonal relationships, the ability to work hard, and the ability to cope with psychological stress. The results of confirmatory factor analysis show that the loading factor of personal resource was 0.82, construct reliability were 0.84 and variance extracted was 0.43. These results indicate that personal resources are a valid and reliable indicator in measuring graduate work readiness. Personal characteristics are one of the constructs of work readiness with high internal consistency [3] and contribute to work readiness [12]. In the second order analysis, personal resource attributes have a loading factor varying from 0.53 to 0.73. The loading factor is greater than the cut-off value, so that these attributes can be interpreted as well and very well to explain the construct of personal resources.

Family support for careers is also very important, as indicated by an average score of 4,480. The family's hope for children to work immediately is the main driver for graduate work readiness. Support for educational success, an open attitude in the family, and the opportunity to self-actualize are key attributes of the family support construct. The results of confirmatory factor analysis show that the loading factor of the family support was 0.82, the construct reliability was 0.80 and the variance extracted was 0.44. These results indicate that family support is a very important indicator in assessing graduate work readiness. This result is in line with previous research [13] which showed that family support has been positive influenced to work readiness of students. In the second order analysis, the attributes of the family support have a loading factor varying from 0.46 to 0.77. This loading factor is greater than the cut-off value, so that these attributes can be interpreted as being able to explain the family support construct very well. Supporting for self-actualization has the highest loading factor, so that it can be interpreted as the main attribute that explain the construct of family support. Self-actualization is seen as a mechanism that stimulates the self-development of the individual and directs its needs, goals and life strategies to fulfill higher requirements [14]. Self-actualization contributes to the achievement of autonomy and independence in the workplace.

Job market information is also important as one of the constructs forming graduate work readiness. The information and expectations of the world of work are formed from the information attributes of the business sector, the type of job, job searching and selection, and searching for information on the world of work. The information and expectations of the world of work have a mean score of 4.245 with a loading factor of 0.87, construct reliability was 0.84 and variance extracted was 0.61. The results of confirmatory factor analysis indicate that job market information is a determining factor in assessing graduate work readiness. In the second order analysis, the information attributes of the world of work have a loading factor that varies from 0.70 to 0.83. The choice of type of work gives the biggest contribution in explaining the information and expectations of the world of work, followed by motivation to obtain information and introduction to the workplace.

First order confirmatory factor analysis showed the loading factor for the learning environment was 0.84 with a mean score of 4.283. These results indicate that the learning environment also shapes graduate work readiness. The construct of a learning environment is formed from attributes such as a learning environment that enables competency development, practice-based and work-based learning, as well as mastery in realizing learning outcomes. The second order analysis showed that the loading factor varied from 0.60 to 0.86. Learning experiences that show real results are the attribute with the largest loading factor, while the choice of freedom career has the smallest loading factor. Overall, these attributes are able to explain the constructs of the learning environment in a valid and reliable manner with construct reliability 0.86 and variance extracted 0.61.

Career guidance is the guidance given to individuals to help them acquire the knowledge, information, skills, and experience necessary to identify career options, and narrow them down to make one career decision. Career guidance programs designed to assist vocational education students in making occupational choices are lacking. This is characterized by career guidance with the lowest average score (M = 4.225). However, the first order confirmatory factor analysis showed the loading factor of career guidance was 0.83 with construct reliability 0.85 and variance extracted 0.65. These values are above the cut-off (≥0.30), the construct reliability (CR) ≥ 0.70, and the variance extracted (VE) ≥0.50 [8]. These results indicate that career guidance is a valid factor to explain graduate work readiness. The career guidance construct is formed from several attributes such as tracing interests and talents, understanding the world of work, developing self-potential, to planning and career readiness. The results of the second order analysis of these attributes show that the loading factor varies from 0.64 to 0.87. This means that all of these variables are able to explain the constructs of career guidance validly and reliably.

The measurement model for assessing the work readiness of higher vocational education graduates also has a very good degree of suitability. This is indicated by the significance level of p = 0.0 (<0.05) and the RMSEA value of 0.075 (<0.08). The other fit index values also have a marginal fit category. These results indicate that the Work Readiness Inventory (WRI) model can be used to assess the work readiness of vocational higher education graduates. This WRI model consists of six factors and 42 attributes.

IV. CONCLUSIONS

This study confirms the student work readiness measurement model, called the Work Readiness Inventory (WRI). This WRI model consists of 42 job readiness attributes, which are divided into 6 constructs, namely: personal resources, family support, industrial work practice experience, work expectations and information, learning environment, and career guidance. The WRI model has a very high degree goodness of fit, and able to validly and reliably assess the work readiness of vocational higher education graduates.

This measurement model was developed based on the perceptions of final year students who are and have completed industrial work practices. It is recommended to conduct further research using the perceptions of students' direct supervisors in industrial work practices. The sample of this research is limited to students in the field of commerce, so it needs to be expanded for students in the technology field.

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