



Developing Instruments for Employability Skills Measurement for Trainee Teachers in Technical and Vocational Education Field

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Abstract: The purpose of this research is to identify the key elements of an employability skill which is important and should be mastered by trainee teachers in the field of technical and vocational education. These research also can produce instruments to measure the employability skills for the trainee teachers. These instruments can also be used to identify the extent to which lecturers integrate the skills employability that is important in the student. Modified Delphi Techniques and Rasch model approach was used to examine the reliability, validity and suitability of individual items. The final instrument of employability skills measurement among trainees in technical and vocational education field has been verified which encompasses nine key elements of employability skills consists communication skills, critical and creative thinking, information management, teamwork and collaboration, self-management, professional ethics and morals, leadership, entrepreneurship and social skills and representing 81 skills items. Verily, all these elements of employability skills need to be mastered by graduates in order to produce highly qualified and competitive professionals teachers.

Keywords: instrument, employability skills, Delphi, Rasch model, trainee teachers

1. Introduction

Human capital development is an important investment as well as a core of productive innovation and high-income economy. Nevertheless, to produce a comprehensive and world-class workforce in Malaysia is not an easy matter and this is a challenge to Malaysia. The need for employability skills among graduates is an important criterion to enable them to gain a place in the job market. It is therefore important to include the elements of employability skills across the teaching and learning curriculum for each course or field of study offered at the Institute of Higher Education.

Rahmah et al., (2011) mentioned that one of the factors that contribute to the unemployment problem among the Malaysian graduates is the quality of the graduates. The impact of these weaknesses causes graduates to have difficulty obtaining the desired jobs in parallel with their qualifications. Abd Hair et al. (2007) states that the employability skills factor determines a graduate to get a job. Employers and industry also argue that the curriculum in education should be revamped as they find that most graduates of higher education do not have satisfactory job competency (Report of the National University of Malaysia, 2007). In the context of today's education, if the knowledge is only tailored to a specific discipline, it is seen to be inadequate in producing competent and competitive graduates (Siti Zaleha et al., 2007).

While the study conducted by Mohd Zaki, Mohd Salleh & Wahid (2008), looking at the application of skills employability to students in the process of teaching and learning found that most lecturers at higher education are aware of the need for the application of skills of employability among students in the teaching process and learning but

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there are some problems faced to apply these skills in the teaching and learning process. Among the problems faced is the lack of knowledge and skills in applying and assessing the skills of employability in teaching and learning, time constraints (due to the need to spend on course courses syllabus) and lack of reference materials or documents that can help them perform such activities. Yahya and Juliana (2008) agree that the main problem faced by instructors to apply employability skills is that they lack the knowledge of the importance of employability skills themselves.

Through a study conducted by Ridzwan et al. (2015), the findings show that graduates in the field of Living Skills and Agricultural Sciences at the Sultan Idris Education University are weak in terms of communication skills especially in English, problem-solving skills, technology-based skills and creative and critical thinking skills. Furthermore, the findings also show that these graduates require skills and information regarding interview skills training as well as information and job opportunities related to the programs being followed. Since some of the education-based programs offered by any institutions of higher education are open market programs, hence the need to integrate steady and persistent employability skills among students is very important to produce graduates who can not only educate either in the public or private sector can even succeed in other sectors as well.

Azah, Farah Liza & Haryati (2007) agree that employability skills need to be applied in the process of teaching and learning and integrated into the curriculum. Therefore, researchers are keen to carry out this study to identify the key elements of an important employability skill that is mastered by the trainee teachers in the field of technical and vocational education as well as to produce instruments measuring their employability skills. These instruments can also be used to identify the extent to which lecturers integrate skills employability that is important to be mastered among students. Therefore, the purpose of this research is to identify the key elements of an employability skill which is important and should be mastered by trainee teachers in the field of technical and vocational education as well as to produce instruments measuring their employability skills. These instruments can also be used to identify the extent to which lecturers integrate the employability skills that is important in the student.

2. Related Works

Studies on the skills of this employability are largely carried out by western researchers (SCANS,2001; Brenda, 2003; Kruger, 2006; Bracey, 2006; Dacre & Sewell, 2007). However, researchers in Malaysia have also felt that studies related to these employability skills need to be increased because these skills of employment are important in producing highly competent graduates. Ratna Roshida & Fazal Mohamad (2009) stated that the current phenomenon of unemployment is not due to the level of academic achievement but the phenomenon is due to less emphasis on employability skills in the education system. Shahrom et al. (2007), also agreed that the application of soft skills in teaching and learning based on problem solving in technical courses was able to build a student's soft skills in teamwork, leadership skills, interpersonal skills, communication skills, self-esteem, high confidence in reading opinions and awareness of the importance of environmental care.

Kahiroh et al. (2008) also noted that the mastery of engineering students at Universiti Tun Hussein Onn Malaysia (UTHM) on the element of employability skills is still low compared to technical skills. In fact, employability skills such as problem solving skills and collaborative skills are the skills that graduates need to master because it guarantees a company to grow and become competitive. Zainudin et al. (2005) has suggested that the skills of employability required by an employee to compete in a knowledge-based economy are like problem solving skills and critical thinking skills, creative thinking skills, information control skills, communication skills, group work skills, application skills technology, autonomous learning skills and skills in understanding cultural clashes. According to Abdullah & Ainon (2006), there are four factors that influence the success of an individual in the workplace, namely self-motivation, ability to encourage other individuals, communication skills and technical expertise. Overall, it appears that these employability skills are essential skills and must be mastered by today's graduates to make them a skilled and always competitive employee.

3. Methodology

3.1 Research Methodology

This research uses exploration design. Through research explorers, initially conducting qualitative and quantitative studies conducted through a qualitative study will guide for conducting quantitative studies such as the formation of a questionnaire (Creswell, 2007). Specifically, this study involved Delphi's modified three-round technique and survey studies.

3.2 First Stage: Delphi Participants

Through a study using this Delphi technique, the panel of the selected experts do not have to meet each other. Therefore, the selected panel of experts can express any comments or views without being influenced by other experts. The study conducted using the modified Delphi technique aims to identify the essential elements of the skills that must be mastered in the field of education particularly the technical and vocational education. For this study, the number of

expert panels involved in this three-round Delphi technique is five and has experience in teaching or working in the industry over 6 years, having curriculum-related knowledge in the field of technical and vocational education and employability skills.

3.3 Second Stage: Survey Participants (Participants for Pilot Research and Actual Study)

Participants in the survey research involved lecturers teaching in technical and vocational education at the Institute of Higher Education and Public Skills Training Institute. A total of 30 respondents were involved in pilot study and 30 respondents were involved in the actual study.

3.4 Third Stage: Reliability and Validity of Generated Instruments

Reliability and validity of built-up instruments were obtained through pilot research conducted and actual studies through Rasch Model analysis. Through Rasch Measurement, the validity of an instrument can be identified by referring major analyzes such as item polarity, individual item maps, individually-itemized mismatches, individual item segregation, unidimensional, individual-item compatibility and rating scale (Bond & Fox 2007). In this regard, this study was conducted to produce empirical evidence of the validity and reliability of measuring instruments and the integration of employability skills among trainees in the field of education, especially technical and vocational education teachers using the Rasch Measurement Model.

4. Findings

4.1 Analysis Delphi Technique

Through Delphi's technical process, the results of the study show that there are nine main and essential employability skills elements mastered in the field of technical and vocational education, namely communication skills, critical and creative thinking, information management, teamwork and collaboration, self-management, ethics and professional morals, leadership, entrepreneurship and social skills. However, to verify the reliability and validity of this instrument, survey through pilot research and actual studies have been conducted

4.2 Analysis of Survey Research (Pilot Research)

Pilot research was conducted to obtain the validity and reliability of the questionnaire instrument. There are three important indicators used to test the reliability of the built-in questionnaire instrument ie the standardized alpha value, the alpha cronbach value if the item is discarded (cronbach alpha If Item Deleted) and corrected item total correlation value (Hair et al., 2010). Table 1 shows the reliability of the built-in questionnaire instrument obtained through pilot study. For corrected item correlation-total correlation, it measures the correlation between the item and the overall scale score tested (Hair et al., 2010). Therefore, item with total item correlation value less than <0.50 should be removed from the constructs of the questionnaire as it does not help to measure what is measured by the combination of other items (Hair, et al, 2010). Besides, standardized alpha values that exceed > 0.70 show good reliability and acceptable index (Hair et al, 2010). Overall, the reliability index of the employability skills element is 0.99.

Table 1- Reliability index of the Instrument

No	Employability Skills Elements	Cronbach alpha
1	Communication Skills	0.956
2	Critical and Creative Thinking Skills	0.941
3	Information Management Skills	0.927
4	Team and Collaboration Skills	0.953
5	Self-Management Skills	0.951
6	Professional Ethics and Moral Skills	0.928
7	Leadership Skills	0.910
8	Social Skills	0.923
9	Entrepreneurial Skills	0.962

4.3 Analysis of Survey Research (Actual Research)

This actual research was conducted to verify the instrument that was built and the results were analyzed using the Rasch Measurement Model analysis.

4.3.1 Realibility, Separation Item and Respondent

The statistical summarizes that measure nine elements and 91 items of Likert scale indicate the individual reliability index is 0.97 and the item reliability index is 0.78. and the item has high reliability (Bond & Fox 2007). Individual and item reliability can be shown to the extent of item compatibility to Rasch Model (confirm to fit) and individual separator index and items. Table 2 shows the item reliability index for nine constructs of employability skills instruments. According to Bond and Fox (2007), the reliability value of more than 0.8 is a strong acceptable value, while the value of 0.6 0.8 is less accepted and less than 0.6 is not accepted. Therefore, the constructability of cooperative teamwork is 0.52 considered weak, but still acceptable. However, item items in this construct need to be viewed again as item items may not measure what should be measured for the constructs concerned.

Table 2 - Reliability analysis and Separation index for each construct of employability skills

No	Construct.	Total Items	Reliability of Isolation Items	
1.	Communication Skills.	19	0.81	2.09
2.	Creative and Critical Thinking Skills	11	0.77	1.84
3.	Information Management Skills	8	0.69	1.48
4.	Team and Collaboration Skills	7	0.52	1.03
5.	Self Management Skills.	9	0.62	1.29
6.	Professional Ethics and Moral Skills	8	0.61	1.25
7.	Leadership Skills	9	0.70	1.54
8.	Social Skills	5	0.56	1.12
9.	Entrepreneurial Skills	5	0.67	1.41

Linacre (2005), the separation values of items and individuals over the value of two are considered good and acceptable. Values less than two are weak. Table 2 shows the item separation index for the collaborative teamwork construct is the lowest, ie 1.03. Therefore it is necessary to look back at the suitability of the item for the construct and the individual who answered.

4.3.2 Polarity of the Items

Table 3 shows item items that have a positive value and no negative item items. There is one item less than .30 namely from the construction of KPD (Self-Management Skills). This indicates that one item does not meet construct criteria. Therefore, the item needs to be fixed or aborted. This analysis is a basic step for measuring the validity of the constructs used to construct and verify the employability skills instrument. PTMEA Index will increase if misfitting of item is removed from measurement of item. Overall, the findings of the research using the Rasch Measurement Model gained the reliability of the item and the individual was moderate. Construct teamwork teamwork achieves the lowest item reliability value and is considered weak, but still acceptable (Bond & Fox 2007).

Table 3 - PTMEA Item Values

Construct	KB	KBKK	KPM	KBB	KPD	KEMP	KK	KS	KKe
Item 1	.39	.48	.58	.44	.24	.82	.37	.56	.72
Item 2	.38	.44	.42	.52	.40	.61.	.58	.89	.66
Item 3	.35	.55	.69	.52	.80	.74.	.52	.73	.77
Item 4	.31	.76	.48	.82	.74	.81.	.66	.56	.73
Item 5	.58	.68	.62	.73	.76	.78.	.70	.42	.85
Item 6	.55	.61	.55	.83	.70	.57	.71		
Item 7	.69	.72	.72	.90	.83	.37.	.65		
Item 8	.75	.73	.73	.64	.64	.59			
Item 9	.49	.56	.55	.65					
Item 10	.40	.73							
Item 11	.47	.72							
Item 12	.59								
Item 13	.44								
Item 14	.77								
Item 15	.71								
Item 16	.61								
Item 17	.58								
Item 18	.50								
Item 19	.60								

KB =Communication Skills, KBKK =Critical and Creative Thinking Skills, KPM = Information Management Skills, KBB = Team and Collaboration Skills , KPD = Self Management Skills, KEMP = Professional Ethics and Moral Skills, KK =Leadership Skills, KS =Social Skills, KKe =. Entrepreneurial Skills

It is very important to ensure that each item in a test is unidimensional (item items measuring the same trait), has a different and fair level of difficulty for all individuals who respond to the instrument being constructed. The reliability of items and respondents should be taken seriously so that the instruments built with the respondents are consistent. Therefore, instruments can produce more meaningful measurements. Table 4 shows the number of final items available in the instrument of employability skills among students, especially in technical and vocational education. This instrument is also able to measure the level of employability skills among students and to identify the extent to which the skills of employability skills among the lecturers towards the students.

Table 4 - Number of Items of Final Employability Skills

	Skill Element	Number of Original	Items Final Number of Items
1.	Communication Skills.	21	19
2.	Critical and Creative Thinking Skills	13	11
3.	Information Management Skills	9	8
4.	Team and Collaboration Skills.	8	7
5.	Self Management Skills.	10	9
6.	Professional Ethics and Moral Skills	9	8
7.	Leadership Skills	9	9
8.	Social Skills	6	5
9.	Entrepreneurial Skills.	6	5

5. Discussion and Conclusion

The final instrument of employability skills measurement among trainees in technical and vocational education field has been verified by reliability and validity through Delphi technique, alpha cronbach techniques and using the Rasch Model measurement analysis which encompasses nine key elements of employability skills which are important to the students' ability of communication skills, critical and creative thinking, information management, teamwork and collaboration, self-management, professional ethics and morals, leadership, entrepreneurship and social skills and representing 81 items. The important elements of employability skills which should be mastered by trainees in the field of technical and vocational education are interconnected with the integration of the skills in the teaching and learning process.

The findings of the study by Zaliza Hanapi (2015) found that employability skills among graduates in Electrical Colleges through the teaching and learning process were less pragmatic. The findings of this study were supported by the study conducted by Erdiana (2006) which also found that the integration of employability skills by lecturers at the Faculty of Education at one of the universities in Malaysia through subjects taught to a low level. As such, when there is a skill requirement set or criteria set by the employer, there is a problem of unemployment among graduates. Hence, the current unemployment phenomenon is not due to the level of academic achievement but the phenomenon is due to the lack of soft skills or employability skills in the education system (Ratna Roshida & Fazal Mohamad, 2009).

In addition, the quality of a lecturer is also an important factor in determining the quality of students who have graduated from a central institution. Lecturers are not only responsible for the day-to-day tasks in educating but the lecturers' behavior will be examples and examples to students (Nur Zakiah Hani & Masnora, 2011). According to Ashraf & Ibrahim (2009), the quality of education is difficult to quantify and defined as learning outcomes received by students from educators as well as the environment of the institution itself. In fact, every developed curriculum should focus on the skills aspect that can meet the needs of employers in the industry today.

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