Jurnal Teknologi, 56 (Sains Sosial), Sept. 2011: 99–112

THE VALIDITY AND RELIABILITY OF GENERIC SKILLS INSTRUMENT FOR LECTURER EVALUATION OF PRE-UNIVERSITY STUDENTS USING THE MEASUREMENT MODEL IN CONFIRMATORY FACTOR ANALYSIS (CFA)

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Abstract. The purpose of this study is to measure the validity of the Generic Skills Instrument for Lecturer Assessment (IKGPP). The research instrument contains 77 items and was administered by two lecturers on 98 pre-university students at a Ministry of Education Matriculation College. The instrument was designed to measure nine skill constructs, i.e. Communication; Leadership; Teamwork; Lifelong Learning and Information Management; Critical Thinking and Problem Solving; Ethics and Moral Professionalism; Entrepreneurship; Management and Social Responsibility. Data analyses were done using the Rasch Model, of which Winstep 3.64.2 was used. 16 items were eliminated and the remaining 61 items were analyzed for validity using the measurement model in Confirmatory Factor Analysis (CFA) with the AMOS 5.0. The index values for Comparative Fit Index (CFI ≥ 0.9), Tucker Lewis Index (TLI ≥ 0.9), and RMSEA (≤ 0.08) were used to verify the items retained. Final results showed that all nine IKGPP constructs fit the empirical data based on the Comparative of Fit Index (CFI) and Tucker Lewis Index (TLI) in the 0.058 to 1.018 range and value in the > 0.9 range. The RMSEA value is in the acceptable range of < 0.08. All 61 items were retained by correlating the items in the constructs. The current IKGPP instrument could be used to assess the pre-university students in matriculation college.

Keywords: Generic skills; structural equation model (SEM); measurement model; confirmatory factor analysis (CFA); generic skills instrument for lecturer assessment (GeSILA).

Abstrak. Tujuan kajian ini adalah untuk mengukur kesahan Instrumen Kemahiran Generik Penilaian Pensyarah (IKGPP). Instrumen ini mengandungi 77 item dan ditadbirkan oleh 2 orang pensyarah kepada 98 pelajar pra-universiti di salah sebuah kolej matrikulasi Kementerian Pelajaran Malaysia. Instrumen ini direka bentuk untuk mengukur 9 konstruk kemahiran iatu Komunikasi; Kepemimpenan; Kerja Berpasukan; Pembelajaran Sepanjang Hayat dan Pengurusan Maklumat; Pemikiran Kritis dan Penyelesaian Masalah; Etika dan Moral Profesionalisme; Keusahawanan; Pengurusan dan Tangungjawab Sosial. 16 item telah digugurkan

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dengan menggunakan Model Rasch dalam Perisian Winstep 3.64.2. Sejumlah 61 item yang dikekalkan dianalisis kesahannya dengan menggunakan model pengukuran dalam *Confirmatory Factor Analysis (CFA)* dengan perisian AMOS 5.0. Nilai indeks *Comparative Fit Index* (CFI ≥ 0.9), *Tucker Lewis* Index (TLI ≥ 0.9), dan RMSEA (≤ 0.08) digunakan untuk mengesahkan item item yang dikekalkan. Hasil akhir kajian menunjukkan kesemua 9 konstruk IKGPP *fit* dengan data empirical berdasarkan *Comparative of Fit Index (CFI)* dan *Tucker Lewis Index (TLI)* berada dalam julat di antara 0.958 hingga 1.018 dan berada dalam julat >0.9. Manakala nilai RMSEA berada pada julat <0.08 yang merupakan indek yang boleh diterima. Kesemua 61 item dapat dikekalkan dengan membuat *correlation* di antara item-item di dalam konstruk-knostruk tersebut. Instrumen terkini IKGPP ini boleh digunakan untuk menilai pelajar pra-universiti di kolej matrikulasi.

Kata kunci: Kemahiran generic; model persamaan struktural (SEM); model pengukuran, confirmatory factor analysis (CFA); instrumen kemahiran generik penilaian pensyarah (IKGPP)

1.0 INTRODUCTION

The importance of generic skills, human skills or soft skills had long been a topic of discussion, especially among academicians and researchers all over the world. Everyone needs generic skills to function effectively while doing something using the specific skills they have, and these skills develop through natural processes such as growth, maturity and aging (Megat Aman, Zahiri, Baharudin Aris, Jamaluddin Harun & Mohd Zolkifli, 2007). Generic skills have also been discussed at various levels, including primary school, secondary school, and Higher Learning Institutions (HLIs). Competition for employment has made Human Skills even more important. The fourth objective of the Ministry of Higher Education (MOHE) is to produce competent graduates who would be able to meet national and international employment needs, with 75% graduates able to gain employment in relevant area within six months after graduating. Making this a reality requires a very high commitment from HLIs.

With rapid development and stiff global competition in the 21st century, each Malaysian student needs to master generic skills, in addition to academic knowledge, in order to succeed and excel in life. Students need to master a variety of generic skills in order to meet the needs and demands of society and its employment market. Academic excellence alone does not guarantee that a graduate would be able to gain employment due to the stiff competition in today's global employment market. For most employers, academic achievement is not the main criteria for recruitment; instead they are also looking for graduates with strong generic skills. Generic skills are crucial in determining how well graduates

adapt their knowledge and skills in the real employment world. The mastery of various generic skills could be enhanced at the pre-university level.

In the last few years, institutions of higher learning have begun to focus on course curriculum delivery methods that are generic skills oriented. The focus of HLIs on the mastery of generic skills at tertiary level indicates that educational institutions offering pre-university programs, such as matriculation programs under the purview of the Ministry of Education, should also be giving more attention to generic skills. The generic skills imparted and mastered by students while in school could be enhanced at pre-university level and further reinforced when these students enter HLIs. It is obvious that pre-university education could be a place to further enhance students' generic skills.

In order to cultivate generic skills in the educational system, a pre-university matriculation program was established by the Ministry of Education (MOE) in 1998 with the establishment of the Matriculation Division at KPM. Until 2009, the MOE Matriculation Program was used in nine matriculation colleges and two MARA colleges throughout the country. The main objective of the program is to coordinate all existing matriculation programs. The main function of the MOE matriculation program is to prepare *bumiputera* students who excelled in their SPM from the science and accounting stream. These students would later enrol in universities in the country and abroad.

Generic skills have also been embedded in the teaching and learning process at institutions of higher learning (Siti Rahayah Ariffin, Noriah Mohd Ishak, Roseni Ariffin, Abdul Ghafur Ahmad & Rodiah Idris, 2008d). Therefore, in order to ensure that these skills are imparted during teaching, a variety of teaching and learning methods were introduced (Aminah, Noor Shah & Maria, 1007). An instrument to measure generic skills is being developed and work is still being done to improve the instrument (Mohd Majid & Zakaria, 2007). At University Kebangsaan Malaysia (UKM), a group of researchers led by Dr. Siti Rahayah has measured 13 generic skills constructs in the Higher Education Generic Skills Instrument (IKGePT) or Malaysian Generic Skills Instrument for Higher Education (GeSIHE), i.e. Social Responsibility Skills; Environment Appreciation Skills; Ethical Morals and Professionalism Skills; Spiritual Skills; Communication Skills; Leadership Skills; Teamwork Skills; Critical Thinking Skills and Problem Solving; Information Technology and Communication Skills; Lifelong Learning Skills; Globalisation Skills; Entrepreneurship Skills and Management Skills.

Based on the above, the Generic Skills Instrument for Lecturer Evaluation (IKGPP) was developed as an alternative to help HLIs measure generic skills among pre-university students. The IKGPP instrument is used to assess the level of students' generic skills from the lecturers' perspective. IKGPP was constructed by making adaptation from lecturer-based evaluation and the language was simplified from the one used in the Higher Education Generic Skills Instrument. (IKGePT). This instrument was developed based on nine constructs. These constructs consist of indicators which were formed as items or variables to be observed by lecturers to evaluate the level of Generic Skills of pre-university students' at MOE Matriculation Colleges. These constructs are Communication; Leadership; Teamwork; Lifelong Learning and Information Management; Critical Thinking and Problem Solving; Ethics and Moral Professionalism; Entrepreneurship; Management; and Social Responsibility.

2.0 OBJECTIVES

The objectives of this study are to: (1) determine the validity and reliability of the IKGPP instrument; (2) determine if the items constructed measure the nine skills construct, i.e. Communication; Leadership; Teamwork; Lifelong Learning and Information Management; Critical Thinking and Problem Solving; Ethical and Moral Professionalism; Entrepreneurship; Management and Social Responsibility.

3.0 METHODOLOGY

The Generic Skills Instrument for Learner Evaluation (IKGPP) is used to measure students' generic skills and was administered by two lecturers. The evaluation done by lecturers were believed to be more objective and satisfies the measurement characteristics compared to direct evaluation or perception evaluation by the students concerned. Lecturers' evaluation and perspective represent a high level of professional evaluation and is deemed qualified to represent the needs of work force industry and workforce markets, and views regarding the pattern of human capital needed by the nation.

IKGPP was used to measure nine constructs in a 77-item generic skills. The constructs are (1) Communication – com (9 items); (2) Leadership – lead (12

items); (3) Teamwork – team (7 items); (4) Lifelong Learning and Information Management – life (9 items); (5) Critical Thinking and Problem Solving – critic (8 items); (6) Ethical and Moral Professionalism – ethic (8 items); (7) Entrepreneurship – entrep (9 items); (8) Management – manage (8 items); and (9) Social Responsibility – social (7 items). IKGPP is a five-point likert scale instrument (very low, low, moderate, high and very high). This study was conducted using the quantitative approach. The population study included 582 matriculation students. Clustered random sampling was done based on two streams, Science and Non-Science. All instruments were administered by two lecturers of the same ability during a three-month observation period. This time period is necessary to give the lecturers time to get to know the group of students being evaluated through lectures, presentations, tutorials and other programs. This study involved a sample of 98 students. 45 students were allocated to one evaluator while the remaining 53 students were allocated to the other evaluator.

A first stage quantitative test of IKGPP items using the Winstep 3.62.4 software (Linacre 2007) based on the Rasch Model (Rasch 1960) was used to determine items' fitness and function differential based on two evaluators. Results from a test using the Rasch Model eliminated 16 items and retained 61 items in IKGPP. The items eliminated using the Rasch Model were the constructs from the following skills: (1) Communication (1 item) (com5); (2) Leadership – 1 item (lead5); (3) Teamwork – 1 item (team5); (4) Critical Thinking and Problem Solving - 3 items (critic6, critic7 and critic8); (5) Ethical and Moral Professionalism – 3 items (ethic1, ethic5 and ethic6); (6) Management – 3 items (manage3, manage5 and manage7); (7) Social Responsibility – 4 items (social2, social4, social5, social7).

Confirmatory factor analysis (CFA) was used to answer the research objectives and was conducted on structural modal based on the nine factors using the Analysis Moment of Structure – AMOS version 5 (Arbuckle 1989, 1999). The measurement model in CFA was used to verify the items measuring the themes in a construct (Byrne 2001; Hoyle 1995; Kline 2005) in generic skills.

Analyses of the measurement model in CFA were done to determine if the items in IKGPP measure the constructs they were intended to. The use of CFA is suitable when researchers have very little knowledge regarding the items making up the latent variable structures (Byrne 2001). Therefore, researchers need to carefully consider the construct assumptions and indicator signs in using SEM to carry out factor testing. Researchers use SEM to measure a model in CFA to determine model fitness based on empirical data and verify the model. The

advantage of using SEM on CFA is that the main validity of factor structure could be evaluated on a variety of goodness of fit indices (Quintana & Maxwell 1999).

According to Hair, Anderson, Tatham and Black (1998) model evaluation in this research utilized a number of indices representing the type of model fitness measurement. Fitness measurements used in this study are Root Mean Square of Error Approximation (RMSEA) to represent Absolute Fit Measure, Tucker-Lewis Index (TLI), and Comparative Fit Index (CFI) to represent Incremental Fit Measure to verify item model. The measurement value indices proposed by Hair et al. (2006), i.e. Comparative Fit Index (CFI ≥ 0.9), Tucker Lewis Index (TLI ≥ 0.9), and RMSEA (≤ 0.080 were used in this study. A 61-item measurement model was analyzed to determine the fitness index. According to Arbuke and Wothke (1999), a model is deemed fit when the index shows that: (1) CFI and TLI indices approaching 1 indicate a suitable fitness; and (2) RMSEA index of 0.8 or less show a reasonable and acceptable estimated error. This helps the researcher retain and eliminate unsuitable items in measuring the level of students' generic skills.

4.0 RESEARCH RESULTS

Modification indices from AMOS suggested that improvements in model fit could be made by correlating several measurement errors (Byrne, 2001; Joreskog, 1993). Table 1 shows the fitness index for hypothesized model and revised model based on parameter values for each of the nine IKGPP constructs which have been tested for measurement model in CFA. To determine validity factor, a hypothesized model to correlate latent variable, i.e. communication generic skills, with the eight observed items, i.e. com1, com2, com3, com4, com6, com7, com8 and com9 was constructed. Based on SEM output, the RMSEA, CFI and TLI values did not satisfy the criteria of fitness suggested by Rex B. Kline (2005), i.e. RMSEA < 0.08, CFI > 0.9 and TLI >0.9. Therefore, an adjustment was made by correlating four items (com2, com7, com8 and com9), i.e. com2 with com9, and com7 with com8. Correlating these items resulted in RMSEA = 0.062, CFI = 0.986 and TLI = 0.978. Table 1(a) shows the revised model with the index values satisfying the criteria for a fit model.

Table 1 Hypothesized and revised model of IKGPP construct

	(Fitness Index)						*Correlation*
	RMSEA		CFI		TLI		
Construct	Hy'sized Model	Revised Model	Hy'sized Model	Revised Model	Hy'sized Model	Revised Model	Items after Revised Model
(a) Communication	0.172	0.062	0.875	0.986	0.825	0.978	com2<=>com9;com7<=> com8
(b) Leadership	0.178	0.079	0.829	0.973	0.786	0.958	lead1<=>lead2; lead2<=>lead3; lead2<=>lead7; lead5<=>lead6; lead6<=>lead9;lead7<=>lead11; lead8<=>lead12;lead10<=>lead11 lead11<=>lead12
(c) Teamwork	0.148	0.078	0.957	0.989	0.928	0.980	team6<=>team7
(d) Lifelong learning and management	0.203	0.078	0.839	0.984	0.786	0.968	life1<=>life2; life1<=>life3; life1<=>life6; life1<=>life7; life1<=>life9; life2<=>life3; life6<=>life87; life7<=>life8; life8<=>life9
(e) Critical Thinking and Problem Solving	0.156	0.000	0.948	1.000	0.896	1.015	critic1<=>critic2; critic2<=>critic3
(f) Ethical and Moral Professionalism	0.000	-	1.000	-	1.018	-	-
(g)Entrepreneurship	0.157	0.069	0.893	0.984	0.857	0.972	entrep1<=>entrep8; entrep3<=>entrep9; entrep4<=>entrep7; entrep5<=>entrep9; entrep6<=>entrep9; entrep8<=>entrep9
(h) Management	0.129	0.059	0.973	0.996	0.947	0.989	manage4<=>manage6
(i)Social Responsibility	-	-	1.000	-	-	-	-

To determine validity factor, a hypothesized model to correlate latent variable, i.e. teamwork generic skills with the six items observed, i.e. team1, team2, team3, team4, team6 and team7, was constructed. Table 1(c) shows the index values for RMSEA, CFI and TLI based on the hypothesized model of teamwork generic skills. SEM output shows that the RMSEA, CFI and TLI values did not satisfy the criteria of fitness suggested by Rex B. Kline (2005), i.e. RMSEA < 0,08, CFI > 0.9

and TLI > 0.9. Therefore an adjustment was made by correlating two items, i.e. item6 with item7. Correlating these items resulted in RMSEA = 0.078, CFI = 0.989 and TLI = 0.980. Table 1(c) shows the revised model with the index values satisfying the criteria for a fit model.

A hypothesized model to correlate the latent variable, i.e. lifelong learning and information management generic skills, with the nine items observed, i.e. life1, life2, life3, life4, life5, life6, life7, life8 and life9, was constructed to determine validity factor. SEM output showed that the RMSEA, CFI and TLI values did not satisfy the criteria of fitness suggested by Rex B Kline (2005), i.e. RMSEA < 0.08, CFI > 0.9 and TLI > 0.9. Therefore an adjustment was made by correlating seven items (life1, life2, life3, life6, life7, life8 and life9), i.e. life1 with life2, life1 with life3, life1 with life6, life1 with life7, life1 with life9, life2 with life 3, life6 with life7, life7 with life8, and life8 with life9. Correlating these items resulted in RMSEA = 0.078, CFI = 0.984 and TLI = 0.968. Table 1(d) shows the revised model with the index values satisfying the criteria of a fit model.

Table 1(e) shows the index values for RMSEA, CFI and TLI based on the constructed hypothesized model of critical thinking and problem solving generic skills with five observed items, i.e. critic1, critic2, critic3, critic4 and critic5. SEM output shows that the RMSEA, CFI and TLI values did not satisfy the criteria of fitness suggested by Rex B. Kline (2005), i.e. RMSEA < 0.08, CFI > 0.9 and TLI > 0.9. An adjustment was made by correlating three items (critic1, critic2, critic3), i.e. critic1 with critic2, and critic2 with critic3. Correlating these items resulted in RMSEA = 0.000, CFI = 1.000 and TLI = 1.015. Table 1(e) shows the revised model with the index values satisfying the criteria for a fit model.

To determine validity factor, a hypothesized model to correlate the latent variable, i.e. ethical and moral professionalism generic skills, with the five observed items, ethic2, ethic3, ethic4, ethic7 and ethic8, was constructed. Table 1(f) shows the index values for RMSEA (0.000), CFI (1.000) and TLI (1.018) based on the hypothesized model for ethical and moral professionalism generic skills domain show a high degree of validity based on the given index values.

A hypothesized model to correlate the latent variable, i.e. entrepreneurship generic skills, with the nine observed items, entrep1, entrep2, entrep3, entrep4, entrep5, entrep6, entrep7, entrep8, entrep9, was constructed to determine validity factor. The SEM output shows that the RMSEA, CFI and TLI values did not satisfy the fitness criteria suggested by Rex B. Kline (2005), i.e. RMSEA < 0.8, CFI > 0.9 and TLI > 0.9. An adjustment was made by correlating eight items (entrep1,

entrep3, entrep4, entrep5, entrep6, entrep7, entrep8, and entrep9), i.e. entrep1 with entrep8, entrep3 with entrep9, entrep4 with entrep7, entrep5 with entrep9, entrep6 with entrep9, and entrep8 with entrep9. Correlating these items resulted in RMSEA = 0.069, CFI = 0.984 and TLI = 0.972. Table 1(g) shows the revised model with the index values satisfying the criteria of a fit model.

Table 1(h) shows the index values for RMSEA, CFI and TLI based on the constructed hypothesized model of management generic skills with the five observed items, manage1, manage2, manage4, manage6 and manage 8. SEM output shows that the RMSEA, CFI and TLI values did not satisfy the fitness criteria suggested by Rex B. Kline (2005), i.e. RMSEA < 0.08, CFI > 0.9 and TLI > 0.9. An adjustment was made by correlating two items, manage4 with manage6. Correlating these items result in RMSEA = 0.059, CFI = 0.996 and TLI = 0.989. Table 1(h) shows the revised model with the index values satisfying the criteria for a fit model.

To determine validity factor, a hypothesized model to correlate the latent variable, i.e. social responsibility generic skills, with the three observed items, sosial1, sosial3 and sosial6, was constructed. Table 1(i) shows the index values for CFI (1.000) based on the hypothesized model for social responsibility generic skills. SEM output shows that CFI value satisfies the criteria of fitness suggested by Rex B. Kline (2005), i.e. CFI > 0.9. This shows that the social responsibility generic skills domain has a high degree of construct validity based on the given index value.

Hence, all items under each construct were tested and validated using the measurement value indices proposed by Hair *et al.* (2006) and have satisfied the criteria for a fit model and is sufficiently stable to be used.

5.0 DISCUSSION

The use of CFA measuring model to verify IKGPP is very effective and reliable in obtaining a generic skills instrument which measure nine constructs, i.e. Communication, Leadership, Teamwork, Lifelong Learning and Information Management, Critical Thinking and Problem Solving, Ethical and Moral Professionalism, Entrepreneurship, Management and Social Responsibility. Students' achievements were measured using the IKGPP instrument, and the

teaching and learning program could be implemented by taking into account students' generic skills achievement (Siti Rahayah, Rodiah & Noriah, 2010).

The advantage of IKGPP is that it is able to show that each item utilized contributes toward the measurement of its respective construct. All nine constructs show a high degree of validity based on the RMSEA ≤ 0.08, which is acceptable in determining construct validity. The CFI and TLI values approached 1 of are ≥ 0.9. This shows that IKGPP is sufficiently stable to be used continuously at any other time on similar or almost similar sample group. This is proven by the index values in Comparative Fit Index (CFI) ≥ 0.9 (Arbuckle, 1997), Tucker Lewis Index (TLI) ≥ 0.9 (Arbuckle 1997), and The Root Mean Square Error of Approximation (RMSEA) ≤ 0.08 (Browne & Cudeck, 1993). Overall analysis based on the first order measurement model using the confirmatory factor analysis (CFA) showed that 37 items were correlated in their respective constructs. These items were correlated when first order hypothesized model showed that seven constructs of the model's suitability indices were not fit, i.e. RMSEA , 0.08, CFI > 0.9 and TLI > 0.9. Analysis of first order revised model showed that all seven model suitability indices were fit, i.e. RMSEA < 0.8, CFI > 0.9 and TLI > 0.9, after adjustments were made by correlating those items. Improvement of the correlated items must be carried out with care so as to produce a good instrument with a higher degree of consistency and reliability. It is proposed that full measurement model testing for all nine IKGPP constructs in CFA is done multi-dimensionally.

The results of the study showed that there are a number of important theoretical implications. The construction of IKGPP was based on the Malaysian Qualification Framework (MQF) (Sharifah Hapsah, 2006), which in turn was based on cognitive, behaviourism and social theories. The formation of all items measuring the latent constructs (latent variable) was also based on the theory of each of the nine constructs. As proposed by Stapleton (1997), CFA was used to determine the reliability and validity of the constructs in the study.

Generic competency is very crucial during the duration of university or college education. It is embedded in the teaching delivery system of a lecturer in his lecture or teaching (Goldfinch & Hughes 1008; Kearns, 2001). HLIs are the most suitable places to enhance generic skills (Allan & Calrke, 2007; Ballantine & Larres, 2007; Bennett, Dunne & Carre, 2000; Biggs, 2003; Havard, Hughes, & Clark, 1998; Jager & Nassimbeni, 2005; Lizzio & Wilson, 2004; Lublin, 2003). There is concrete evidence in research that graduate marketability in employment is related to the development of their generic skills (Assiter, 1995; Alexander,

2006; Drew, Thorpe & Bannister, 2002; Hoban *et al.* 2004; Kember & Leung, 2005; Mayer, 1992; Thompson et al., 2008; Wright, 1995). The delivery system must cater to the abilities of each student because each person has multiple abilities. (Honey & Mumford 1992, 2006). Therefore a person's learning style differs with his competency (Graham & Westwood, 2005). Hence, lecturers need to modify their teaching style to fit their students' learning styles (Rodiah, Siti Rahayah & Noriah, 2010).

6.0 CONCLUSIONS

Students' abilities in order to meet employment market among graduates of HLIs in Malaysia have always been debated. Various theories and conclusions have been made regarding these issues. In order to make human capital even more effective and holistic, the development of human capital must also focus on generic skills in addition to academia and knowledge. It has Mastering generic skills enables a student to enter the employment market easily, in addition to giving them the competitive edge and making them more flexible in facing the challenges of globalization and challenging future. Generic skills assists graduates to keep up with global trends in equipping them to survive in the competitive working environment as well as to be able to work with the advancements of today's technologies. Realizing the importance of generic skills, this study was carried out to determine the validity and reliability of the generic skills instrument for lecturer evaluation (IKGPP) which is a lecturer-based evaluation of pre-university students at the MOE matriculation program. The basis for this study, performance-based assessment, is suitable with the current needs which emphasize on competency or skill.

A valid and highly reliable generic skills measurement is crucial to enable relevant parties to evaluate students' generic skills objectively. This study shows that our education program and curriculum requires improvement. Matriculation colleges, institutions of higher learning and employers could benefit from the input of this study. The practical implications of this study are that it facilitates the construction of a valid and reliable instrument to measure the generic skills of pre-university students at matriculation colleges based on a solid CFA measurement model. Thus, the nine-construct structure containing 61 items gave a valid and reliable measurement model. IKGPP is useful in assessing the achievement and

level of generic skills. The result of an evaluation will help relevant parties or educators at an institution to devise intervention programs that would enhance competency or generic skills observed in students' behaviour (Siti Rahayah *et al.*, 2010). Students would also be aware of their achievement during their study, and would be able to improve the skills they have yet to master before entering institutions of higher learning and later the employment world.

Research to construct an instrument to assess generic skills, specifically in-depth evaluation of cognitive, meta-cognitive, affective, social and motivation aspects, must be continued (Rodiah, Siti Rahayah & Noriah, 2008). Generic skills assessment could be improved if tests were done based on perception, performance, and activity programs. It should also be implemented according to the country's needs, trends and development.

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