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Life and career skills of primary school students: A tentative model and an online scale

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Abstract

Life and career skills are essential attributes for living in the 21st century because they are important to both learning and working in local and international workplaces. This study tried to create a measurement model of life and career skills and develop an online scale for investigating the psychometric property of the scale. The participants consisted of 646 primary students in Northern, Central, Southern and North eastern regions of Thailand. Then, the classical test theory, the multidimensional item response theory and the confirmatory factor analysis (CFA) were used for data analysis. The analysis of data appeared as item of difficulty index, discrimination power index and reliability of the scale. In addition, the multidimensional analysis and the CFA of data showed item fit and construct validity of the scale. This may lead to the development of clear and correct measure of students' life and career skills structure. Policy implications are discussed.

Keywords: Life and career skills, tentative model, online scale, construct validity.

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1. Introduction

Life and career skills are important skills in living in the 21st century that Thailand is defined in the 12th National Economic and Social Development Plan. It is consistent to the 20 years National Strategy (2017–2036) that focusing on people development especially early childhood development for good physical and mental health to have brain skills, learning skills, life skills and social skills. In addition, the development also focusing on building life foundation as appropriate skills in each age group range that respond the labour market needs and the 21st century living. Moreover, the latest National Education Plan also focuses on education as the basic right of all Thais. The government must provide for the development of Thai people at all ages to thrive on all aspects. This is an important intellectual cost for developing skills, professional competency and living with others in society happily. This will lead to the stability of society and the nation equal to other countries in the fast-changing world of the 21st century (12th National Economic and Social Development Plan, 2016–2036; Chapman, 2010; Constitution of Thailand, 2016; Ministry of Education, 2017; Partnership for 21st Century Skills, 2007).

Today's life and work environments require far more than thinking skills and content knowledge. The ability to navigate the complex life and work environments in the globally competitive information age requires students to pay rigorous attention to developing adequate life and career skills. The factors of life and career skills consist of five components. The first is flexibility and adaptability (FA) composing of adapting to change and being flexible. Students should adapt to varied roles, jobs responsibilities, schedules and contexts and working effectively in a climate of ambiguity and changing priorities. Furthermore, they should incorporate feedback effectively, deal positively with praise, setbacks and criticism and understand, negotiate and balance diverse views and beliefs to reach workable solutions, particularly in multi-cultural environments. The second factor is initiative and self-direction (IS) consisting of managing goals and time, working independently and being self-directed learners. This factor means the students should set goals with tangible and intangible success criteria, balance tactical (short-term) and strategic (long-term) goals, utilise time and manage workload efficiently. Moreover, they should monitor, define, prioritise and complete tasks without direct oversight. They should go beyond basic mastery of skills and/or curriculum to explore and expand one's own learning and opportunities to gain expertise. In addition, they should demonstrate initiative to advance skill levels towards a professional level, demonstrate commitment to learning as a lifelong process and reflect critically on past experiences in order to inform future progress. The third factor is social and cross-cultural skills (SC) composing of interacting effectively with others and working effectively in diverse teams. This means that students should know when it is appropriate to listen and when to speak and conduct themselves in a respectable and professional manner. Furthermore, they should respect cultural differences and work effectively with people from a range of social and cultural backgrounds, respond open-mindedly to different ideas and values and leverage social and cultural differences to create new ideas and increase both innovation and quality of work. The fourth factor is productivity and accountability (PA) composing of managing projects and producing results. It means the students should set and meet goals even in the face of obstacles and competing pressures and prioritise, plan and manage work to achieve the intended result. Moreover, they should demonstrate additional attributes associated with producing high quality products. The final factor is leadership and responsibility (LR) consisting of guiding and leading others and being responsible to others. This factor means that the students should use interpersonal and problem-solving skills to influence and guide others toward a goal, leverage strengths of others to accomplish a common goal and inspire others to reach their very best via example and selflessness. Furthermore, they should demonstrate integrity and ethical behaviour in using influence and power and act responsibly with the interests of the larger community in mind [Office of the Basic Education Commission (OBEC), 2017; Panich, 2012; Partnership for 21st Century Skills, 2009].

Most current measurement and evaluation systems focus on testing that cannot take students to the 21st century skills because most of the exams are memorised and focused on content. It is essential to develop high-quality measurement tools that valid learning indicators and learning

standard (Buathong, 2017). Moreover, the results of the meeting of the National Institute of Educational Testing (NIET) Service concluded that the development of measurement systems is not complete according to the goals of the NIET. There was cognitive measurement but there was not non-cognitive or affective measurement. It was necessary to develop the measurement system more complete and cover all students' attributes (NIET, 2017). In education, the non-cognitive measures are rarely used to assess students (Kyllonen, 2005). Still, research has shown that non-cognitive factors predict grades in K-12 as well as social outcomes (Caprara, Barbanelli, Pastorelli, Bandura & Zimbardo, 2000). Moreover, meta-analyses have shown that non-cognitive measures provide a 20% improvement over cognitive ability measures in predicting training success and job performance (Schmidt & Hunter, 1998). In addition, The Big Brothers Big Sisters programme, a non-cognitive intervention, has been shown to increase school success, reduce drug and alcohol involvement and lead to better relationships with parents (Tierney, Grossman & Resch, 1995, cited in: Kyllonen, 2005). Nowadays, world measurement and evaluation organisations pay attention at non-cognitive measures for example, Educational Testing Service (ETS). This organisation offers methods for non-cognitive measures for example others' ratings, situational judgement tests, etc (Kyllonen, 2005).

Situational judgement tests are related to work rather than a measurement of personality or measurement of intellectual ability and it has less impact than measuring intelligence. It is a useful tool for trying to understand respondents thinking. What will they do or should do when facing the conditions in the question, workplace, classroom (Reeder, 2013). It also plays an important role in selecting and forecasting performance of personnel. Situational judgement test involves a scenario that describes a problematic work situation. The test takers must use general knowledge and experiences to assess the situation then choose the most appropriate or preferred answer (McDaniel & Whetzel, 2007, cited in: Wei, 2014). Furthermore, the situational judgement test is an aptitude test or psychometric measure that measures the behaviour and aptitude of a person in a work-related situation. This type of measurement defines a challenging situation that the examiner may use decision-making skills. In each situation, a number of possible events are identified (McDaniel & Nguyen, 2001, cited in: Shoemaker, 2007) or defined from a situation or similar situation happening in the workplace. The questions in the situational judgement tests contain content that reflects the actual situation (Schmitt & Chan, 2006). In addition, there may be simulations that mimic the nature of the work (Lievens & De Soete, 2012, cited in: Miller, 2015). The simulations will vary depending on the model of simulations. The option makers will rely on content experts and/or those who have not experienced or are unfamiliar with the task before to create the best and worst case scenario option. The answer is based on reason or asked a specialist to determine the best answer or maybe based on empirical data (Hanson & Ramos, 1996, cited in: Shoemaker, 2007). The situational judgement tests have the form of questions and answers that each question is related to the work situation (McDaniel & Nguyen, 2001, cited in: Shoemaker, 2007). There are two types of situational judgement tests: paper and pencil and video which the respondents can answer by watching video (Weekly & Jones, 1997, cited in: Shoemaker, 2007). Most of the situational judgement tests are used in the company but it is rarely used commercially (Hanson & Ramos, 1996, cited in: Shoemaker, 2007).

Now, an online measurement tool is popular because it is efficient and effective in measure. Online measurement tools were started using in the United States by military testing. Siebert and Snow were the initiators of online measurement tools that applied computer-based military testing systems called film-based assessments (Siebert and Snow, 1965, cited in: Schoech, 2001). Graduate Record Examinations (ETS, 1998a), Test of English as a Foreign Language (ETS, 1988b) and Advanced Placement Language Tests by The College Board are the instances of standard online testing system (Schoech, 2001). Moreover, The National Council Licensure Examination by National Council of State Boards of Nursing is a standard computer-based test. Objective structured clinical examinations and USMLE that applying video clip and situation questions (Thanaboonpuang, 2014). Chulalongkorn University Test of English Proficiency is also the standard online testing system.

As a result, this study aims to create a measurement model of life and career skills, develop an online scale together with investigating the psychometric property of the scale for elementary school students in the context of Thai society. It is the starting point for standardised testing systems. Furthermore, information from measurement also helps learners discover their strengths or disadvantages oneself.

2. Method

2.1. Participants

The participants were 646 elementary school students, who were studying in Primary 6 in schools under the OBEC of Thailand. The sample size was determined by G*Power 3. Multi-stage random sampling was used to select the sample from Northern, Central, Southern and North eastern regions.

2.2. Measures

The Life and Career Skills Scale was designed based on the 21st century skills. The content of the scale composed of five factors that were FA, IS, SC, PA and LR. The situation judgement test was applied for test format design. The test items consisted of real life situations that contained not only text but also video clips together with questions. There were four options for each item that the test takers choose the best answer. The scale was designed as an online testing system. The test takers had to login to take the test by using specific user name and password. The scale was inspected by the specialists before pre-testing for a psychometric properties inspection was conducted. All items of the scale got 1.00 of IOC index that showing basic content validity of the research instrument.

2.3. Procedure and design

A research and development design was employed for this study. First, this study started by documentary research to create a measurement model of life and career skills. After that, the scale was designed based on the hypothesis model for data collection. Then, the scale was tried out for psychometric properties inspection. The data were collected by the 646 elementary school students, who were studying in Primary 6 in rural and urban schools classified by schools size. Finally, the data were analysed by classical test theory (CTT), multi-dimensional item response theory (MIRT) and confirmatory factor analysis (CFA). The norm referenced test analysis was analysed for difficulty and discrimination power index and KR-20 formula was analysed for reliability. The MIRT and CFA were analysed to examine construct validity of the scale.

3. Results

3.1. The psychometric properties of the scale

The CTT showed the difficulty index scale of 0.42–0.88, discrimination power index of 0.20–0.52 together with 0.82 of reliability (r_{tt}). In addition, the MIRT indicated difficulty parameter a) of -2.01 – 1.31 and discrimination power parameter b) of 0.29–3.04. These constituted the strong evidence showing discrimination power and reliability of the research instrument.

3.2. The construct validity of the model

The life and career skills model was tested for model data fit by Chi-square difference testing. This helped to confirm the appropriateness of the model between the uni-dimensional model and the multi-dimensional model. The data analysis indicated that the life and career skills model was better fit to the multi-dimensional model than the uni-dimensional model at the level of significance 0.01 with Chi-square difference of 15.520, $df = 5$, $p = 0.0084$. Moreover, the CFA indicated that the

hypothesis model had congruence to the empirical data with $\chi^2 = 50.302$, $df = 37$, $p = 0.0711$, CFI = 0.990, TLI = 0.986, RMSEA = 0.024 and SRMR = 0.025. This portrayed the strong evidence of construct validity of the life and career skills model. In addition, the standardised coefficient of factor loading of all observed variables were at the level of significance 0.01 that meant the model was measured by all of indicators. Moreover, the coefficient of determination (R^2) of all observed variables showed 4.50%–54.60% explaining the variance of the model as shown in Table 1 and Figure 1.

Table 1. CFA of the life and career skills model

Variables	Factor loading			Factor score	R^2	
	<i>b</i>	SE	<i>t</i>			β
FA	1.000	-	-	0.935**	-	0.873
FA1	1.000	-	-	0.543**	0.100	0.294
FA2	1.153**	0.108	10.657	0.646**	0.149	0.417
IS	1.222**	0.123	9.924	0.997**	-	0.993
IS1	1.000	-	-	0.571**	0.090	0.326
IS2	1.189**	0.098	12.078	0.681**	0.142	0.463
IS3	0.398**	0.084	4.726	0.212**	0.023	0.045
SC	1.328**	0.126	10.506	0.899**	-	0.808
SC1	1.000	-	-	0.704**	0.251	0.495
SC2	0.807**	0.078	10.351	0.540**	0.106	0.291
PA	1.315**	0.134	9.840	0.863**	-	0.745
PA1	1.000	-	-	0.672**	0.243	0.452
PA2	0.669**	0.080	8.364	0.442**	0.108	0.195
LR	1.375**	0.137	10.030	0.798**	-	0.638
LR1	1.000	-	-	0.739**	0.356	0.546
LR2	0.523**	0.074	7.021	0.387**	0.100	0.150

SE = standard error. $\chi^2 = 50.302$, $df = 37$, $p = 0.0711$, CFI = 0.990, TLI = 0.986, RMSEA = 0.024 and SRMR = 0.025.

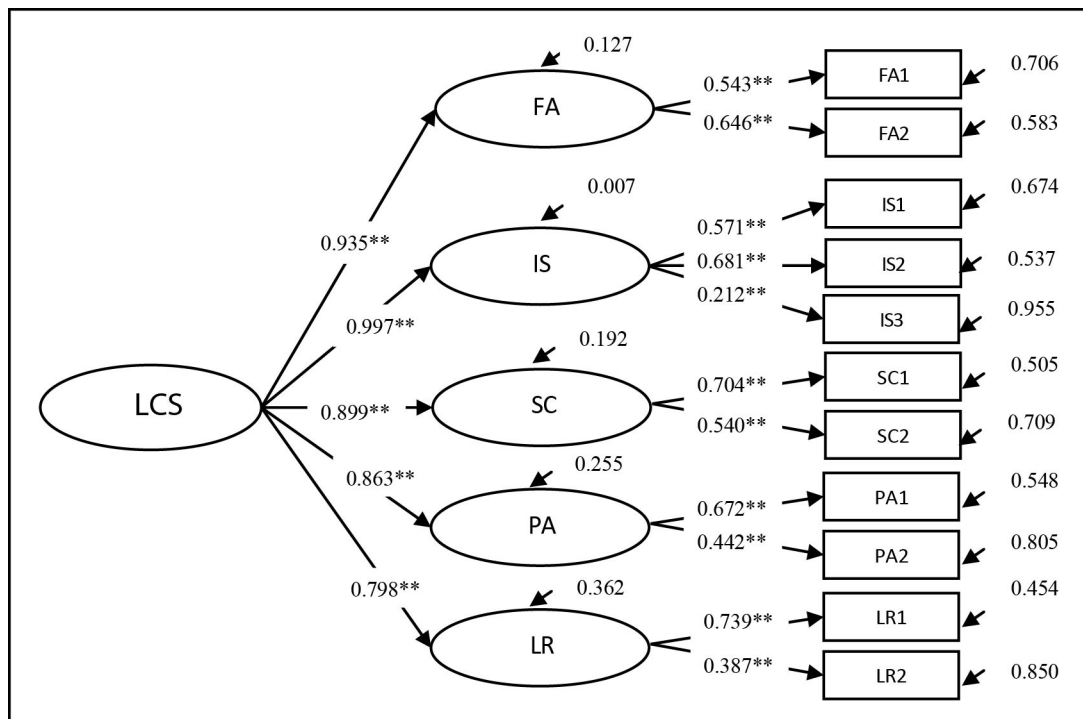


Figure 1. The measurement model of the Life and Career Skills

4. Discussion and conclusion

The life and career skills were a multi-dimensional trait that indicated validity evidence by the CFA. The measurement model concerned FA, IS, SC, PA and LR. This was consistent with the research results of Phanphungphu (2014) who studied the life skills components of junior high school students. The research found that life skills component consists of four components, namely thinking skills, mental skills, action skills and social skills. It was also consistent with Kase, Iimura, Bannai and Oishi (2016) that develop life skills measure for adolescents and adults. The structure of the tool is composed of four components: 1) decision making 2) interpersonal relationship 3) effective communication and 4) coping with emotion. In addition, the finding also had congruence with Cronin and Allen (2017). The study developed and validated the Athlete's Life Skills Scale. The 47 items scale composed of seven elements: 1) teamwork 2) goal setting 3) time management, 4) emotional management skills 5) interpersonal skills 6) social skills 7) leadership and 8) problem solving and decision making skills.

The Life and Career Skills Scale applied the situation judgement test for test format design. The test items consisted of real life situations that contained not only text but also video clips together with questions. This was corresponding to McDaniel and Nguyen (2001, cited in: Shoemaker, 2007) who stated that situation judgement test concerned situation similar to what might happen at work. The questions in the situation judgement test always included content that reflects the actual situation. This may lead the students apply knowledge in real life situations that bring to achieve the 21st century skills. In addition, the scale was designed as an online test, so it also emphasised the standard of the scale because now an online measurement tool is popular with efficient and effective measure (Thanaboonpuang, 2014) It is the starting point for standardised testing systems. Furthermore, information from measurement also helps learners discover their strengths or disadvantages oneself.

The implication of this study was utility for school, educational service area office and OBEC in measurement of students' life and career skills and applying the measurement information for students development because life and career skills are important skills in living in the 21st century.

This is an important intellectual cost for developing skills, professional competency and living with others in society happily. This will lead to the stability of society and the nation equal to other countries in the fast-changing world of the 21st century (12th National Economic and Social Development Plan, 2016–2036; Chapman, 2010; Constitution of Thailand, 2016; Ministry of Education, 2017; Partnership for 21st Century Skills, 2007). For future research should explore the behaviour level of students' life and career skills considering by regions, school site and school sized using the Life and Career Skills Scale because these variables may indicate the different level of student's behaviour. In addition, the researchers should create standard setting for score interpretation that brings to more complete measure of student's life and career skills.

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