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Online Career Intelligence Test: Self-Assessment for Students' Career and Abilities

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Career intelligence is of major importance for students to understand their aptitudes, interests, and abilities. The aims of this quantitative research are 1) to develop an Online Career Intelligence Test (OCIT) for Thai high school students, and 2) to confirm factor analysis of the test. Multistage random sampling was performed on a sample of 2,000 high school students from 6 regions of Thailand. The instrument was an online individual test (OCIT) to identify students' career abilities, based on several different Theories integrated into a concept with a Thai context namely Gardner's Multiple Intelligence Theory and Holland's Theory, and Career Interest. The data was analysed using confirmatory factor analysis (CFA), means (M), and standard deviation (S.D.). The results were: 1) This test was composed of 9 factors; verbal-linguistic Intelligence, logical and mathematical intelligence, spatial and visual intelligence, bodily or kinesthetic intelligence, musical intelligence, interpersonal intelligence, intrapersonal intelligence, natural intelligence, and existential intelligence, totaling 90-items. 2) The findings of CFA showed that nine components of the OCIT corresponded significantly with empirical data by CFA (χ^2= 48.89, df=17, χ^2/df=2.87, RMSEA=.031, RMR=.00, GFI=.99, AGFI=.99). The OCIT can be used to assess students both effectively and conveniently.

Keywords: online career intelligence test, high school students, self-assessment, career ability, confirmatory factor analysis

INTRODUCTION

World progress and social changes have affected the lives of individuals in society. People need to learn and be aware of their abilities, be able to cope with the changes in society, and adapt to new situations in society in order to succeed in life. Therefore, competency and ability are necessary for all people especially students of all ages.

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Nowadays, career guidance is the ultimate objective of vocational guidance services to facilitate students to develop, explore, and make informed career decisions (Suryadi et al., 2020). Hence, choosing a career is an important milestone and an inevitable factor in every individual's life. Career choice is crucial in the developmental life of adolescents as it is associated with positive as well as harmful psychological, physical and socio-economic inequalities that persist well beyond the youthful age into an individual's adult life (Robertson, 2014; Bubić & Ivanišević, 2016). Adolescents and young adults who are reluctant to decide on their career choice are likely to unveil low self-esteem and inadequate educational self-efficacy (Hull-Blanks, 2005). Well-prepared students are prone to set goals and focus on desired academic outcomes which lead to life fulfillment and success (Dotson, 2016). Career planning is immensely pivotal and needs to start in school. Career ability for high school students is essential to identify their capabilities in different career choices and choose the correct one, which helps them to reach great heights.

Although, deciding on a career that suits the needs, aptitudes, and interests of the person especially when they make the right decision would lead them to be happy at work, and increase their chances of career success. The fact that a person makes the right decision is not a coincidence. It must be done with the utmost care, along with many elements of decision-making and careful planning. So, an individual will not be able to do it alone and must know himself, know how to deal with the world of work, and make the right life decisions. Furthermore, choosing the appropriate career development is an important role of high school students. The concept of career development is to support an individual to be the subjects of their own being. (Savickas, 2003 cited in Asrowi., Hanif, & Setiawan, 2021)

The Education system in Thailand comprises of 6 years of primary and secondary schooling each. Grades 1 to 6 are known as Pratom Suksa or primary education while Grades 7 to 12 are called Mattayom Suksa or Secondary education. Secondary education is divided into lower and upper. The age range of 15-17 years old, is upper secondary school (grade 10-12), is considered the time for adolescents to plan their career choices in the form of teaching and learning in Thai society, which is currently at a crossroads. In upper secondary school, students continue their academic education to move on to elective courses, the Mathematics-Science Program, the Mathematics-Arts Program, the Language-Arts Program, and vocational school Program. It is a transition period for adolescents, in which they have a choice to decide between general and vocational programs based on their aptitudes, abilities, and interests. The selection of the study plan will lead to the selection of the faculty and future careers. Unfortunately, the preparation for the career of the current high school students has not been promoted as it should. According to the Labor Market Research Division, Department of Employment, Thailand (2015), only 31.18% of middle and high school students had received any preparation for higher education. Most middle school students had not set goals in life and were not prepared for further study. The majority have never tested either their intellectual ability or emotional intelligence, and few had been tested in terms of career planning and career counseling. The factors related to decision-making in career selection were gender, GPA, parental occupation, parental income, IQ test, and

career aptitude tests. If students are not encouraged to become acquainted with themselves in preparation for their careers they are almost certain to choose a career that does not match their aptitudes or interests, leading to them selecting a career path that does not meet their true needs. (Allen & Robbins, 2010; Leung, et al., 2014; Milsom & Coughlin, 2017; Zainudin, et al., 2020) After graduating, when they step into a profession which they are not prepared for, it makes them feel unhappy, and so they decide to switch jobs. Such low levels of self-efficacy in career development will lead to an avoidance of career decision-making behavior and less job satisfaction (Asrowi., Hanif, & Setiawan, 2021)

In addition, according to the results of prior research by this researcher's team, into the development of occupational skills and the livelihoods of the students, it was found that upper secondary school students who have good career decision-making skills will be satisfied, secure, and succeed in life in the future. The perceptions of students regarding their career and living skills assessment can increase their self-awareness and target them in facilitating their progression to enhance their career and living skills. (Koolnaphadol, et al., 2015)

However, in Thailand, Thai students and the Thai educational organization lack the tools to assess career abilities, mostly using only the vocational interest test which is based on Holland's occupational themes. Traditional psychometric tests and standardized measures of intelligence assess only a few abilities. Hence, there is a need for tool assessment that integrates the concepts of career interests, career abilities, and multiple intelligence in the context of Thai society. According to the factors mentioned above, in this study, the researcher has coined the term "Career Intelligence Test" based on Gardner's theory of Multiple Intelligence (MI). This theory holds merit as it examines a wide range of abilities with 9 types including musical, interpersonal, intrapersonal, spatial, naturalistic, logical-mathematical, bodily-kinesthetic, linguistic, and existential intelligence. (Gardner, 2006). The researchers have defined a career intelligence dimension, which has aroused interest in distinguishing different human abilities. This is crucial for children to achieve success in the future. Thus, the integration concept of career interest and career abilities in a Thai context should be investigated. (Ayriza et al., 2020; Wang, 2013; Gardner, 2006).

In a nutshell, the researcher is interested in developing a career intelligence test, both paper and online based, to assess Thai students and allow them to learn about themselves concretely. This tool can reflect the student identity and modern standards to screen, assess and reflect on student's career perspectives and foster their appropriate qualities in many ways, to recognize self-awareness and self-efficacy; to learn thinking skills; make decisions; to reflect on their abilities, choose the right career, and learn how to live happily.

Research Objectives

1) To develop an Online Career Intelligence Test (OCIT) for high school students in Thailand

2) To confirm factor analysis of the test.

Literature Review

The researchers reviewed literatures as follows:

The concept of Gardner's Multiple Intelligence Theory

The theory of multiple intelligences proposed by Howard Gardner (1983) is a model of intelligence that differentiates human intelligences into specific modalities. According to Gardner, all people have different kinds of "intelligences" and none of these intelligences should be considered superior to the others. The different intelligences are understood as personal tools and a person may be more talented in some than in others (Mirzazadeh, 2012). The theory explains the nine different intelligences: 1) verbal-linguistic intelligence, 2) logical and mathematical intelligence, 3) spatial and visual intelligence, 4) bodily or kinesthetic intelligence, 5) musical intelligence, 6) interpersonal intelligence, 7) intrapersonal intelligence, 8) natural intelligence, and 9) existential intelligence. The theory of multiple intelligences also has strong implications for learning and development.

The Vocational concept of Holland's Theory

Holland's theory and research have contributed in innumerable and significant ways to the field of psychology, by helping to generate core knowledge related to career development, assessment, and practice (Nauta, 2010). That the interest and personality models have several points in common with the theory's core idea is that most people resemble a combination of six personality types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (commonly abbreviated with the acronym RIASEC) (Holland, 1997, Nauta, 2010). The contributions of Holland's theory leads to career intervention which undoubtedly has a strong influence (Rayman & Atanasaff, 1999). Empirical data has provided strong support that in between the types of Holland' RIASEC, there is a congruence between personality and environment.

Career interest in a Thai context

Career interests are central to one's identity and can be conceptualized as

disposition-like attitudes (Deniz, Türe, Uysal, & Akar, 2014; Su, Rounds, & Armstrong,

2009; Low, Yoon, Roberts, & Rounds, 2005 cited in Ayriza et al., 2020). Much research has indicated that the role of career interests in one's life is absolutely crucial because it can predict educational and career choices, job performance, career success, as well as subjective well-being in the future (Rounds & Su, 2014 cited in Ayriza et al., 2020), and persistence in work and academic contexts (Nye, Su, Rounds, & Drasgow, 2012 cited in Ayriza et al., 2020). Individuals' abilities, attitudes, and values could be expressed well when performing their jobs; when the circumstances in jobs fit with individuals' personalities, then satisfaction, stability, and positive performance in their jobs will easily be achieved. Furthermore, career interests depend on child rearing, parenting styles, children's characteristics, children's aptitude, family discipline, and relationships with others are all important in the Thai context.

Therefore, in this research, the instruments are composed based on the integration of Gardner's Multiple Intelligence Theory, Holland's theory, and Career Interest in a Thai context.

METHOD

This research is developmental research, to develop an Online Career Intelligence Test for Thai high school students, examine its reliability and investigate it statistically with Confirmatory Factor Analysis of the test. Then the test needs to be applied to Thai students in the following stages:

Conceptual Framework

This research used a descriptive quantitative approach**.** The conceptual framework is illustrated in Figure 1.

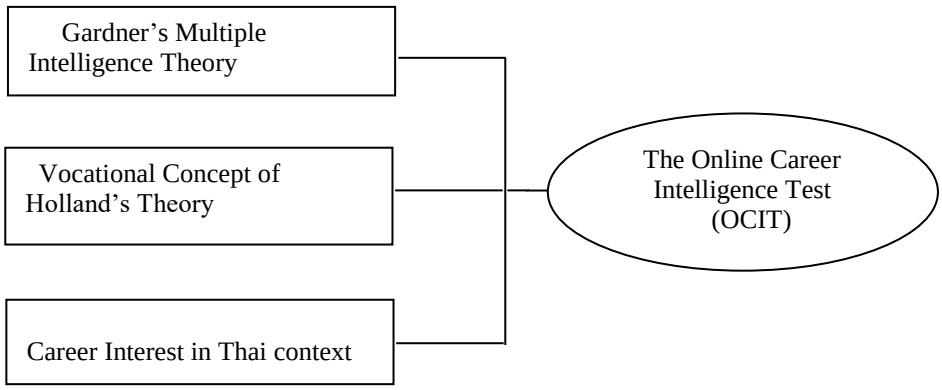

Figure 1
Conceptual framework of the research

Participants

The population of this study were high school students from all six regions of Thailand.

The samples were 2,000 high school students who were studying in grade 10-12, which were derived as follows: the sample size was determined by the concepts of Joreskog and Sorbom (1996), who proposed that when using the Confirmed Factor Analysis, the minimum sample size should vary by 10 to 20 times larger than the number of observed variables. In this research, there were 90 observed variables, 90 point questionnaires, the sample size has ranged between 900 and 1,800 units. Therefore, 2,000 high school students were selected from the population which was recommended to prevent errors in the data collection process. Those samples were taken from six regions of Thailand including Northern, Northeastern, Western, Central, Eastern, and Southern. The researchers used Multistage Random Sampling and the provinces, districts and schools to make selection.

Research Instruments

The researchers developed the instrument Online Career Intelligence Test (OCIT) for Thai students, a five-point Likert scale consisting of 90 items, to identify students' career abilities, based on the integration of Gardner's Multiple Intelligence Theory, Holland's Theory of Vocational, and Career Interest in a Thai context. It was used to measure career intelligence consisting of the following nine factors: (1) verbal-linguistic intelligence; (2) logical and mathematical intelligence; (3) spatial and visual intelligence; (4) bodily or kinesthetic intelligence; (5) musical intelligence; (6) interpersonal intelligence; (7) intrapersonal intelligence; (8) natural intelligence; and (9) existential intelligence with 10 questionnaire items for each.

The instrument validation was conducted by using content validity, and Alpha's Cronbach formula was used to test the instruments' reliability. The results of reliability coefficients were 0.96 for the OCIT. A Quantitative descriptive technique was employed to analyze the data to determine the OCIT. Further, to test the fitness model of OCIT as mentioned in Gardner's Multiple Intelligence Theory, Confirmatory Factor Analysis (CFA) was also employed.

Procedure

Initially, the researchers studied the principles and theoretical frameworks composed of Gardner's Multiple Intelligence Theory, Holland's Theory of Vocational and career interest in a Thai context, synthesizing and integrating both domestic and international frameworks in the context of Thai society. Later, problems related to students' ability to choose careers in various contexts, areas, and cultures was explored through an in-depth interview. The in-depth interview data was analysed for the content analysis, definitions and components of Multiple Intelligence especially in the context of Thai students.

Focus group discussion using researchers and experts discussed and critiqued the definitions and the components of the test.

The Online Career Intelligence Test (OCIT) for Thai students was developed. The content was assessed for accuracy, coverage, and completeness by the experts. Finally, the quality was checked using content analysis and adjusted.

After that, trying out the OCIT with non-sample Thai students verified its validity and reliability.

After the trial test, it was again updated. The test was developed to assess Thai students more effectively in both the paper and computer-based format and accurately interpreting the principles, concepts, theories, and research frameworks.
The OCIT together with the five-item-rating-scale questionnaire, was used to collect the data, which was composed of 9 components and 90 items and to examine concordance of the structural model by Confirmatory Factor Analysis (CFA).

Data Analysis

The statistics used in this study were descriptive, mean)M(, standard deviation)S.D.(, and Confirm Factor Analysis.

FINDINGS

The Online Career Intelligence Test

It is concluded that the career intelligence test for students had nine factors; each factor consisted of 10 items, with a total of 90 items, and all questionnaires were made available. The reliability of the OCIT was 0.96.

The results showed that the mean of the Online Career Intelligence Test for the high school students' range was 2.81-3.54, the standard deviation was .62-.84, the minimum value of 1.00, and the maximum value of 5.0. Meanwhile, the total mean of the Online Career Intelligence Test was 3.19; the standard deviation was .52; the minimum value was 1.39, and the maximum value was 5.00.

Confirmatory Factor Analysis

Table 1
The goodness-of-fit of the Variables Career Intelligence of Thai students Corroborates with the Empirical Data

Goodness-of-fit index (GFI)	Criteria	Statistics	Out come
Chi-square (χ2(		48.89	
p-value	< 0.05	0.00006	Passed
Df		17	
Relative Chi-square: χ2/df	<.2.00	2.87	Passed
GFI	>. 0.90	.99	Passed
Adjusted Goodness of Fit Index: AGFI	>. 0.90	.99	Passed
Root Mean Square Error of approximation: RMSEA	<0.08	.00	Passed

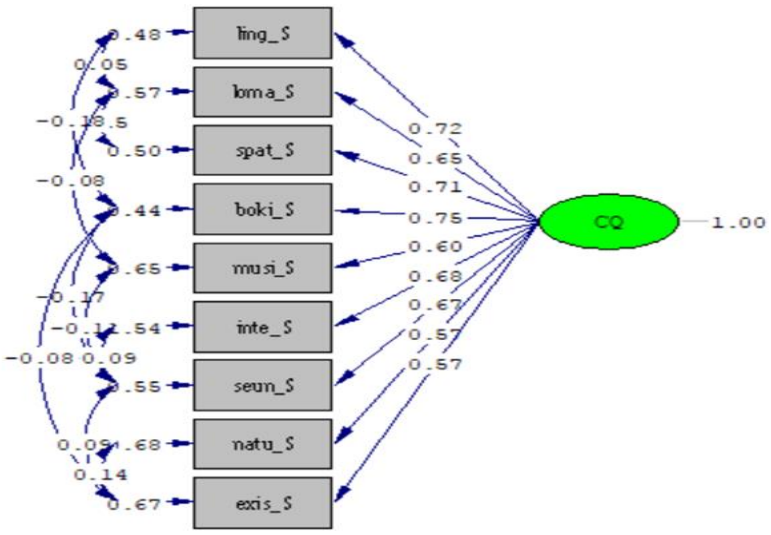

Figure 2
Confirmatory factor analysis of the online career intelligence test (n=2,000)

Confirmatory Factor Analysis of the OCIT, as presented above in Figure 2. The results showed that the normal distribution curve (normal score) of the observed variables was studied in the structural equation model with a chi-square test (χ^2) and was so low that it was not found to be statistically significant (P> .50). It showed that all observed variables are normally distributed (normal distribution), and hence it was appropriate to perform data analysis using the Structural Equation Modeling technique.

DISCUSSION

This study developed instruments for measuring the Online Career Intelligence Test (OCIT) for Thai students. It measures career intelligence in nine aspects: verbal-linguistic intelligence, logical-mathematical intelligence, spatial-visual intelligence, bodily-kinesthetic intelligence, musical intelligence, interpersonal intelligence, intrapersonal intelligence, natural intelligence, and existential intelligence. The instrument is the Likert scale, with 90 items in the student dimension, the researcher gave students the answers for career assessment. The researchers examined the quality of content validity, the structural validity (by employing confirmatory factor analysis), and the Cronbach's alpha coefficient, which was verified after researchers created the norm score of the measurement. The career knowledge of the children fits Gardner's Theory, Holland's Theory of Vocational, and career interest in Thai context.

For the construct validity of the Online Career Intelligence Test by Confirmatory Factor Analysis (CFA), the researchers analyzed Bartlett's Test of Sphericity which must have an equal probability of .00. It showed that the correlation matrix between items or questions was significantly different from the identity matrix at the .00 level. The KMO (Kaiser-Meyer-Olin Measure of Sampling Adequacy) must be greater than .50, and the questions were relevant and suitable for analysis (Joreskog & Sorbom, 1996). The results of Bartlett's Test of Sphericity and KMO were conditional, and hence the model was appropriate. During confirmatory factor analysis, while considering the weight values of the questions, each feature had a change in sub-factors. When the question changed, one unit included the predicted values for the proportion of variances between questions and sub-factors by considering the level of the harmony index. In this analysis, the researchers calculated the chi-square, the degree of freedom, and the goodness of fit index (GFI). The goodness of fit index (AGFI) and the root mean square (RMR) were adjusted and found that the model had an index to show a theoretical model corresponding with the empirical data.

CONCLUSIONS

The research results found that the Online Career Intelligence Test for Thai students had nine aspects: verbal-linguistic intelligence, logical-mathematical intelligence, spatial-visual intelligence, bodily-kinesthetic intelligence, musical intelligence, interpersonal intelligence, intrapersonal intelligence, natural intelligence, and existential intelligence. Each factor consists of 10 items with a total of 90 items, and all questionnaires were available.

Furthermore, the researchers developed the test into another online application platform that is easier to use anytime and anywhere. High school students can assess the test, perceive the results of the test and improve their career ability by themselves to effectively choose a career according to their competencies.

SUGGESTIONS FROM RESEARCH

Suggestions for applying research results

1. The Online Career Intelligence Test: Users should strictly follow and study the manual in order to administer the test, interpret the meaning of the score correctly and be aware that this is only a measurement tool for assessing career abilities.

2. To apply the tests to the students, users should explain to both students and parents that their responses will not affect scores and grades, as well as give students the option to choose the most appropriate answer for the information that best represents students.

3. Conduct a relevant test for the students and then use the results to learn their abilities and improve their learning activities to enhance their performances.

Suggestions for future research

1. A comparative study of career intelligence can be conducted among different students, such as students with an aptitude for languages or mathematics, talented students, special children, and long-term follow-up can be done.

2. There should be research to develop an activity model to increase the career intelligence of students through online lessons so that they can expand their factual knowledge.

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CONFLICT OF INTEREST

No conflict of interest.

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