Journal for the Education of Gifted Young Scientists, 8(3), 1147-1161, Sept 2020
e-ISSN: 2149- 360X
jegys.org

Young Wise Publishing
youngwisepub.com

Research Article

Consistency between personality career interest with sciences field among gifted and talented students

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Article Info

Received: 13 March 2020
Revised: 27 July 2020
Accepted: 20 August 2020
Available online: 15 Sept 2020

Keywords:
Career interest
Gifted and talented students
Personality
Sciences interest

Abstract

This research is conducted to identify the profiles of career personality and interest towards sciences field among the gifted and talented students (GTS) in Malaysia. The career interest tendency in science is based on the consistency according to Holland Three Letter Code (HTLC). A total of 213 GTS aged 15 to 17 years old were randomly selected to respond to Self-Directed Search–Form Easy (SDS) instrument. Data was collected through questionnaire distribution. Data were then analyzed using SPSS Window 23.0 and Excel 2010 software. The result from the study shows that out of six career interest personality, GTS demonstrate an inclination towards three personality characteristics which are Investigative ($\bar{X}$ =22.15), Social ($\bar{X}$ =19.88) and Artistic ($\bar{X}$ =15.94). Based on the HTLC analysis, the study indicates a higher inclination towards sciences career interest (73.24%) as compared to non-sciences career interest (26.76%). "$\bar{X}$" for mean values and "%" for percentages. The findings also showed the existence of a mixed inclination on sciences and non-sciences or multi-potentiality among GTS. Its proven that GTS have a high sense of inquisitory which allows them to think scientifically and creative in finding solutions in their fields of interest. This study supports the past research findings that showed GTS have a high interest in sciences. The findings of this study have implications in the following areas; career counseling services, career guidance, and academic guidance to guide GTS on developing interest in science related fields of study.

To cite this article:

Yusof, R., Mokhtar, M., Sulaiman, S.A.N., Syafril, S. & Mohtar, M. (2020). Consistency between Personality Career Interest with Sciences Field among Gifted and Talented Students. *Journal for the Education of Gifted Young Scientists, 8*(3), 1147-1161. DOI: http://dx.doi.org/10.17478/jegys.667323

Introduction

Career decision is a critical process for most students specifically for GTS. Researches have shown that GTS undergoes unique experiences and high challenges in exploring and planning their career path (Chen & Wong, 2013; Greene, 2002). Due the difficulties experience, they require assistance in career planning (Emmert & Minor, 1993; Hickson, 1992; & Kelly & Colangelo, 1992). According to Kaufmann (1981); Kerr (1981); and Watley (1969) the difficulties are caused by some psychological issues as well as the gifted needs which are different from average students from the same age. Among the issues related to difficulties in making career decisions by GTS are (a) the multiple interests and abilities or multi potentiality, (b) early maturity in deciding career interests (early emergence), (c) difficulties in making decisions, (d) difficulties in shaping career identity that affecting career choices, (e) lack of knowledge in meaningful jobs, (f) unhealthy perfectionism, (g) pressure of expectations from significant others such as parents, teachers and society, and (h) lack of role model (Corey, 1996; Emmert & Minor, 1992; Kelly & Colangelo, 1992; Kerr & Erb, 1991; White & Perrone, 1997). All of these issues may contribute to stunted career development and cause difficulties for GTS in determining career path.

Discovery of the mentioned issues has yielded models of career counseling education program that look into students' needs in career planning aspects and intervention programs from problems arising in students' career

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development process for GTS (Putranta & Jumadi, 2019; Silverman, 1993). Hence, career counseling education programs are important to help gifted students expand their career knowledge and skills. National Information Coordinating Committee (1999) eport stated that career education programs need to enclose learning processes regarding future life planning and the relationship with career life. This means students need to go through the process of awareness, exploration, planning and making career decisions for them. For such reason, GTS need to be guided in order to understand the importance of career planning based on their personality, ability, interest, value and academic achievement.

In accordance with the preparation of a competent workers and excellent national human capital, Malaysian Ministry of Education (2013) has outlines six important points that must be embedded in career development curriculum program for schools, namely (a) self-knowledge; such as self-personality awareness, career interests, knowledge of occupational value, positive self-concept, interactional skills, and comprehension regarding growth effect and youth self-development, (b) exploration of career information sources, (c) career planning, (d) exploration in education and training opportunities, (e) decision-making skills, and (f) job preparation skills. The suggestion is in accordance with career development concept in the theory of Super's Career Development (1971), Holland's Career interest (1973), Super's Model of Career Program (1971), Model of National Career Development Guidelines K-Adult Career Program (Kobylarz, 1996), Model of American School Counselor Association Career Program (Dahir, Sheldon, & Valiga, 1998), Model of Career Awareness (Jamaat, 2009) and Model of Career Development (Halit, 2007, 2011). In summary, all of these theories and career development models have made self-knowledge skills as the basis of career development process.

Self-Knowledge on Personality

Self-knowledge skill is a combination of all information about oneself that include personality, interest, value and skill for the purpose of choosing a career (McKay, 2003). McKay's view about the evaluation of oneself as the first step in making career decision has supported Super, Savickas & Super (1996) on the importance of self-knowledge in helping individuals' understanding about their potential, specialty, and self-concept besides being aware of self-personality, interest, talent, perception attitude, and ability in the interested scope of career. Accordingly, a local researcher Azimullah (1996) suggested before a student makes a career choice, they need to first know themselves especially from the aspect of personality. Krishan (1996) additionally recommends students to choose a career based on the compatibility between one's personality and their career interest. The congruency between personality and career field environment may contribute towards maturity of career personality (Holland, 1996). Hence, accuracy in choosing career field will help individual's effectiveness in planning, implementing, conducting, readiness to face challenges and overall, generating life satisfaction as a result of being successful in the chosen field.

Career Personality

Holland (1996) explained that individual's interest has resulted from personality, and career choices are based on personality expression besides compatibility of career environment. Additionally, compatibility between personality and environment not only can predict individual's level of satisfaction in life but also contribute towards stability, achievement as well as motivation related to career or education (Holland, 1997). In relation to that, many researches showed a significant relationship between personality and career choices among students including the Gifted and Talented students (GTS) (Cheng, 2011; Kass & Cavallaro, 2010; Ogurlua, Kayab & Hizlic, 2015; Sajjad, Muhammad, Khurram & Syeda, 2012; Stewart, 1999; Watters, 2010). As such, career choices and planning must be carried out meticulously, systematically, and consciously for the results will affect individual's satisfaction and lifestyle in their future career life. Meanwhile, research of Abidin, Amat, Mahmud, Bakar, & Bakar (2019) finding that gifted and talented students are different from their normal peers in terms of career decision making self-efficacy. More than 60% of the participants of this study have high level of career decision making self-efficacy. For the rest 40% who has moderate and low level of specific program need to be developed by school counselors to help elevate their Career decision making self-efficacy (CDMSE).

The importance of congruency between personality and career field environment has been discussed in-depth in Holland's career interest theory (1973). The basis used in Holland's theory is; (i) career choices are based on the expression of individual personality besides identification with job stereotype specifically, (ii) the person's interest comes from his/her personality, (iii) an individual from the same type of job possesses similarity from the aspect of personality pattern, and (iv) compatibility between personality and environment will enhance work performance, achievement, stability and satisfaction.

Holland's Theory of Career Choice

Holland's Typology Career theory is easily comprehensible and can be tested empirically according to individual and environment compatibility (Holland & Rayman, 1986). This theory has three main components required; which are individual, environmental and compatibility between individual and environment. An individual's career choices are based on personality and several other variables associated to the job's background (Holland, 1973). According to Holland (1978), satisfaction in choosing career is based on individual's personal favourite orientation. This means satisfaction in career will be achieved when that person chooses career that is compatible with their personality and environment. An individual's career choice depends on their personality and several other variables related to the background of the job (Holland, 1973). Satisfaction will be achieved when the individual creates strong career orientation. If the career orientation built is weak, it is possible that satisfaction is less likely to be achieved. In relation to that, the basis in Holland career theory (1996) states four assumptions which are:

- All individuals can be categorized into any one of six types of personalities namely Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E) and Conventional (K). All of these personalities are produced from characteristics of interaction between various cultures, inheritances and individual urges including peers, social classes, and physical environment. Such situation will raise interests among individuals.
- There are six types of career environment that support individual personality and dominated by certain types of personalities which are Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E) and Conventional (K). The acronym for these six types of career environment is RIASEK.
- Individuals will find environment or career that conforms to personality that enables them to display their skills and abilities as well as nurtures attitude and values. Individuals will feel satisfied if they can adapt in such environment. For example, individuals who have realistic personality will feel satisfied when they work in a realistic environment.
- An individual's behavior can be determined based on interactions between personality and criteria of environment. If an individual knows about personality pattern and its environment, they will indirectly be able to predict few aspects related career choice, career achievement, competency, educational and social behavior as well as job exchange.

Holland (1973) explains that personality can be arranged according to Holland's Three-Letter Code. For instance, code 'RIA' refers to individual who possesses working characteristics of Realistic, Investigative and Artistic. According to Holland, each of personality group has work field personality and environment characteristics.

Interest in Sciences among Gifted and Talented Students

Past researchers have shown an inclination of GTS' interests in fields related to science that is translated through high inquisitive characteristics by producing abundant of questions, displaying profound interests through diligence in tasks of interest, and giving extraordinary ideas in problem solving (Watters & Diezmann 2003). In the earlier years, Fox (1978) evaluates the pattern of career interest inclination of GTS and found out that gifted students obtain a highly significant score towards career interest of intellectual pattern such as writing, mathematics, sciences, public speaking, medical science and adventure. The ability in mathematics or verbal reasoning are inclined to have strong interest in academic learning (Humphreys, Lubinski, & Yao, 1993). However, Ozarslan and Certin (2018) claimed that the GT students' interest in sciences were given less attention within the context of preparing them for environment that supports the expansion of sciences interest to their full potential. In fact, career planning aspect for GTS is found to be given lack emphasis by parents or teachers as compared to academic planning, despite many pieces of evidence showing GTS do not usually show or obtain satisfaction and achievement in career life. This seems contradicted to Holland's point of view (1973) on the importance of individual satisfaction that may result from the congruencies of career environment and the individual's personality.

Gifted and talented education in the field of science has received wide attention in research literature (Putranta, Jumadi, & Wilujeng, 2019). The emphasis of science education specifically for GTS is seen as an important contributor to the technological society in the future (Watters & Diezmann, 2003). This is due to GTS being seen as a group who possesses extraordinary thinking capacity, high sense of creativity and natural reasoning ability that can contribute to the well-being of a nation and society's future through results that encourage productivity and creativity.

Hence, there are researches that prove GTS to have interest in science field and have strong urges as well ready to research in sciences, especially in biology, and conduct projects related to science (Putranta & Kuswanto, 2018; Van & Stambaugh, 2009). Biology is reported to be one of the many basic science fields favoured by GTS. Specifically, research by Ozarslan and Cetin (2018) showed that GTS have huge interest in science field related to animals and plants. Cepni, Gokdere, and Kucuk (2002) found that when GTS observe their new products and research result in science field, their interests increase. This is due to GTS' main characteristics that are high curiosity and sense of exploration is fulfilled. This makes them continuously strive to search for new discovery and favoured science field (Hidi & Renninger, 2006; Van & Stambaugh, 2009).

Inclination of interest in science is manifested through high sense of curiosity and the need to explore knowledge and to guide them, ask more questions, produce extraordinary ideas, solve problems diligently, and entertained from exploring meaningful relationship between things that are seen unrelated (Ozarslan & Cetin, 2018). Research of career interest using Holland's Personality Career Interest Inventory by Vock, Koller, & Nagy (2013) reported that GTS have strong interest in personality domain of investigative and realistic but low interest in social domain compared to group of common students. Furthermore, the research has identified GT students who obtained high academic achievement are found to have inclination towards high investigative and artistic characteristics. Likewise, when seen from gender aspect, research found that female GTS portrays flat profile career interest whereas the male GTS displays high characteristics at realistic and investigative domain and low in social inclination. Multivariate regressions analysis test thus shows high academic achievement in school revealed that stable career interest profile and can be used to predict inclination of career interest for GTS. Results from this research support previous research on male GTS in Korea by Wu (2000), talented male students in science field was found to have inclination of high investigative career interest and this result fits with their performance of academic achievement in science subject.

Therefore, GTS' educators are encouraged to identify GTS' career personality and the inclination of interest in science field by using various instruments. Educators need to design and develop learning activities that conform to students' type of interest. To arrange this, interest, curiosity and needs must be identified in education process of GTS.

Career Development Issues among Gifted and Talented Students

Early Emergence

Research on gifted and talented students revealed the psychological factors related to career development that affect their career counselling needs. The factors are related to how the gifted may think specifically about their careers, such as the concept of early emergences, multi potentiality, and foreclosure.

Gifted children can be an early emergence due to the career crystallization or early maturity. Literature reviews on career choice have associated GTS with early emergence career choice. Gifted early emerges have extremely focused career interest due to the passion for an idea, successful achievement in certain academic subject, and an early commitment to a certain career area of interest (Perrone, Male, & Karshner, 1979; Bloom 1985; Kass & Callavaro, 2010). Early emergence among gifted children should be thought as an opportunity that may be acted upon by noticing the unusually strong talent or enthusiasm, training in skills necessary to exercise the talent, providing resources and keeping an open mind about the future of the interest or talent (Kerr, 1990). However, according to Greene (2006), gifted children may miss opportunities by focussing on one academic areas and mistaken self-efficacy beliefs if they are marginally less able in one area than the other. In fact, an early ability in one area may create premature foreclosure.

Multi Potentiality

Multi potentiality refers to individuals who have numerous and diverse abilities and interests (Putranta & Supahar, 2019). It is the ability to do many things at a very high level of competence and enjoyment (Greene, 2006; Robinson, Shore, & Enersen, 2007). This is reflected on obtaining high scores on multiple aspects of abilities and achievements as well as displaying inclination of various career interests (Achter, Lubinski, & Benbow 1996; Emmett & Minor 1993; Kerr & Claiborn, 1991; Milgram, 1991; Sanborn, 1979; Silverman, 1993). According to Fredrickson (1979), individuals with multiple potentials or *multi potentiality* are individuals who if given the right environment, will enable them to choose and build any kind of competency and efficient to the highest level possible**.** Gifted students can experience high abilities across domains, and high, flat interest inventories. Previous researches explain that *multi potentiality* is identified when gifted students obtain high and consistent scores in all abilities and achievement (high flat profile) as well as display inclination of multiple career interest at equal

observational stage (Sanborn, 1979). Therefore, these *multi potentiality* students are said to face issues of over choice syndrome that are equally attractive, sinking them into possibilities of uncertain career determination (Fredrickson, 1979; Kerr & Ghrist, 1988). Results from this unique conflict are believed to affect many GTS in making decisions related to career choices (Fredrickson, 1979; Jepsen, 1979; Kerr & Ghrist, 1988; Marshall, 1981; Sanborn, 1979). This view is proven by GTS report in a research by Colangelo and Zaffrann (1979) that states GTS are afraid to be committed to wrong career choice and eventually making them stuck in the process of making career choices. This situation may end with GTS venturing into unsuitable career due to unorganized planning.

Career Counselling Needs for Gifted

From the perspective of other GTS career researchers, what is worrying is when GTS is tied to a single field before they can explore their abilities and talents in other fields. This makes them as if their talent is denied in choosing other careers that can fulfil their needs. Based on that view, several researchers summarized that career counselling guidance for GTS needs to be given extra attention towards the needs and values of careers compared to solely on merely having any jobs or careers. According to them, the method of matching students' abilities and interests to certain careers will contribute to GTS satisfaction at least (Colangelo & Zaffrann, 1979; Putranta & Supahar, 2019).

Furthermore, there is also a view suggesting that career education guidance for GTS group needs to be changed from giving attention towards ability and interest elements into the aspects of personal value and making career decisions (Perrone, 1986). The view, however, is rebutted by several researchers who states the evaluation of interest and ability inclination aspects among GTS can be conducted well if it uses *above-level instrument* (instrument that is beyond the students' level) (Stanley, 1990). This is due to the belief that same level profiles frequently exist among GT students especially due to the use of inappropriate testing tools. Thus, GTS needs a career instrument that is far above their age and grade level. Consequently, research by Putranta, Jumadi, and Wilujeng (2019) showed that there is a possibility that adult GT students obtaining beneficial career profiles when Holland's Career Interest Inclination (1985) instrument is used. Therefore, the use of career inclination instrument for GT students need to consider the level aspect of said instrument, whereby instrument for adults is more appropriate to be used for GT group of students, compatible with their career maturity characteristics (Hansen & Campbell, 1997).

Problems of Research

Malaysia Ministry of Education has undertaken various efforts to increase student interest in science. However, several studies by local researchers have shown that Malaysian student interest in science has yet to reach its target and portrayed a downside of performance (Chodhury, 2018; Kamisah, Zanaton, & Lilia, 2007; Nordin & Ling, 2011). Earlier studies on attitude toward sciences by Kamisah, Zanaton, and Lilia (2007) showed that the level of students' scientific attitudes between gender, ethnicity and across educational levels is found to be low. There exist a weak relationship between students' attitudes toward science and scientific attitudes among the Form 2 and matriculation students. The findings indicated that students' self-concept in science and motivation in science require further attention compared to the other dimensions of attitudes toward science. A similar findings by Nordin & Ling (2011) on the relationship of Science Subjects to Mastery Sciences concept of Secondary Student in Johor state in Malaysia showed that most (54%) Form Two students (aged 14) had a negative attitude toward Science subjects but had a high level of mastery of basic concepts (62.9%). The study also found that attitudes toward Science subjects have a significant but weak relationship with the mastery of basic Science concept. Both studies reflected on the challenges faced by science subject teachers as mentioned by Chowdhury (2018) on the current situation educators are facing a huge challenge as students' interest and motivation towards science subjects are declining.

Kolej GENIUS@Pintar Negara, Universiti Kebangsaan Malaysia is a National Gifted centre in Malaysia that provides comprehensive gifted education programs, begin with the gifted students' identification, enrichment program, a high school program, and a pre-university program. This centre is located at the National University of Malaysia as a school on campus. The operational cost for the gifted school was funded by the Ministry of Education (MOE) and the governance was under the Ministry of Higher Education. The vision of this program is to be a fountain of inspiration for Science, Technology, Engineering, Mathematics (STEM) and Research in Gifted and Talented Education. After ten years of running a gifted program, studies on career interest specifically interest in sciences field have not been carried out. Therefore, this study will look at the aspects of GTSs' career interests, career personality characteristic, and their inclination towards the sciences field. Awareness in understanding personality and utilizing it in making career choices will help to increase learning motivation for GTS to achieve academic excellence which in turn, will stimulate personal potential development. Besides that, the finding will

provide a clear picture of the congruency between the program mission statements with the reality students' inclination towards the sciences field.

Research Focus

The purpose of this research is to identify the profiles of career personality interest and the inclination on the sciences field among the gifted and talented students (GTS) in Malaysia. In order to achieve this, this research is guided by the following research objectives and questions:

Research Objectives:

- To identify the career interest personality code of GTS at Kolej GENIUS@pintar Negara UKM
- To identify the career personality characteristic of GTS at Kolej GENIUS@pintar Negara UKM
- To examine the inclination of interest in sciences field based on Holland Three Point Code in Career Interest Test among GTS.

Research Questions

- What is the career personality interest code of GTS at Kolej GENIUS@Pintar Negara UKM?
- What is the career personality characteristic of GTS at Kolej GENIUS@Pintar Negara, UKM?
- What is the inclination of interest in sciences field based on Holland Three Point Code in Career Interest Test among GTS?

Method

Research Background

The study was conducted using a quantitative approach with the Cross Sectional Survey Designs, which is data collected only during the study conducted from the subjects involved to obtain information on personality career interests, and to examine the congruencies with sciences field. Through Cross Sectional Survey Designs researchers gather detailed and comprehensive information on the variables that are the focus of this study (Creswell, & Creswell, 2017; Connelly, 2016; Gay, Mills, & Airasian, 2009; William, W. 2009; Vogt, 2007; Glasow, 2005; Noah, 2003; Cohen, Manion, & Morrison, 2001). Some research experts say that the Cross Sectional Survey Designs study is useful for identifying variables related to a phenomenon without questioning why the variables exist in the phenomenon (Creswell, & Creswell, 2017; Gay, Mills, & Airasian, 2009; William , W. 2009; Cohen, Manion, & Morrison, 2001). They also state that Cross Sectional Survey Designs are suitable when researchers involve a relatively large number of samples. Therefore, to save time, energy and cost of using instruments such as questionnaires, the use of measuring instruments is a more practical way of collecting data, as practiced in this study. Detailed discussion of the sample, the instrument used, and the process of data analysis are discussed in detail below.

Research Sample

This quantitative study involved 213 randomly selected GTS who have undergo at least one year of the Secondary Education Program at Kolej GENIUS@pintar Negara Universiti Kebangsaan Malaysia. GTS aged between 15 to 17 years old (23.5% aged 15, 32.86% aged 16, and 43.77% aged 17) are involved in this research. All of these students hold high score on intellectual quotient (IQ) that was identified through IQ test score (UKM1, UKM2, and UKM3 tests) before they were accepted to enrol at Kolej GENIUS@pintar Negara UKM. IQ tests: UKM1 and UKM2 test from the aspect of cognitive ability in *Verbal Comprehension, Perceptual Reasoning, Working Memory, and Processing Speed* whereas, UKM3 test on competency and efficiency in subjects like Chemistry, Physics, Biology, Algebra, Calculus, Research, Emotional Intelligence, Creativity and Stress Test. Based on the UKM3 score, gifted and talented students will proceed to a gifted high school program which emphasize on STEM education. 213 samples randomly selected from a population of 450 students are sufficient to draw conclusions. According to Neuman (2007) who stated that 300 subjects (approximately 30%) of the population of 1000 people were sufficient for accuracy in concluding a survey study. On the other hand (William, 2009) stated that sample size between 200-500 people is sufficient to conduct a study. In light of these points, the number of samples involved in this study is considered sufficient and is assumed to provide comprehensive data for this study.

Data Collection

This study employs a survey method and data was collected in a classroom environment. The study was carried out 4 years ago. A translated and adapted Career Interest Test by Amla (2010) was used in the data collection process. The instrument consists of three parts, part A comprises of items related to things that individual favour or disfavour to do, Part B comprises of items related to things that individual able or disables to do, whereas Part C comprises of items about individual interest in certain occupations. For every part, there are six constructs which are Realistic, Investigative, Artistic, Social, Enterprising and Conventional (RIASEC) and for each construct has 10

items. Choice of answers is between Yes (positive) and No (negative). Total items for each construct is 30 (three parts) and overall total items for this instrument is 180 items. The instrument has high reliability value ((∞ = range between 0.85 and 0.97 (Amla & Puteh, 1992) has been used by many researchers in Malaysia to examine career interest profiles of Malaysian students at various level (Norazhar, Rahman, & Bakar, 2018). Next, the compatibility of GTS's personality code with inclination of interest in science field is obtained through division according to categories of compatibility degree of Holland's Three Point Code (1979).

Validity and Reliability of Data Collection Instruments

As it is shown in the abstract of this study that the instrument used is the Career Interpretation Test version of Adaptation by (Amla 1992). Amla has used the back to back translation method of the SDS-E instrument (Holland, 1973). The instrument adaptation process was performed through a rigorous scientific procedure involving 2231 new students of the National University of Malaysia session 1987/1988. The counter balance method was used to see the validity and reliability of the translated and adapted instruments.

The instrument consists of three main sections, namely: (i) Part A contain items related to the subject liking or the dislike of the subject. (ii) Part B contains items relating to the ability or disable to do the matter (competency). (iii) Part C contains items relating to the subject's interest in the work (filed of career). Each part of the instrument contains six constructs, and each construct contains 10 items (total items for each construct are 30 items), with the answer option "Yes (positive) or No (negative)". So the total number of items in this instrument is 180 items. The six constructs in question are; Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C) with the term RIASEK.

Principal Components Analysis (PCA) and Factor Analysis (FA) through varimax rotation have been used to derive the six personality types measured in this instrument, as are commonly used by many researchers in instrument development and Evaluation (Green, & Salkind, 2016; Kimberlin & Winterstein, 2008; Pallant, 2013; Tabachnick & Fidel, 2007). For the purpose of this study the researcher reviews the validity of this instrument before using it in the actual study. However to look at the validity of the instrument of the researcher using a method that is quite different from that done by some previous researchers, the method used in this study is the "Inter-Item Correlation Matrix" which is one of the ways that researchers can see the quality of measurement used, and a good instrument is to have items and constructs that are interrelated (Gulliksen, 1945; Piedmont & Hyland, 1993). Thus for this study researchers refer to this view to see the validity of this Career Interest instrument. The validity of the obtained instrument is shown in Table 1 below.

Table 1.

Inter-Item Correlation Matrix to See the Validity of the Instrument for Each Construct

Construct	I	A	S	E	C
R	0.091	0.085	0.010	0.186	0.418
I		0.103	0.190	0.167	0.001
A			0.407	0.362	0.087
S				0.620	0.306
E					0.482

R = Realistic, I = Investigative, A = Artistic, S = Social, Enterprising, C = Conventional

The reliability of this instrument has been seen and tested many times by several previous researchers through a variety of methods, including KR 20, Test and retest, Two-part test, Counterbalance and Cronbach Alpha. Generally such researchers have found the reliability of the instrument from high to very high in the range of 0.67 to 0.97 (Amla, 1992). For this study the researchers tested the reliability of this instrument using Cronbach Alpha. The overall reliability value obtained was 0.743. Among the instrument reliability values of some of the previous researchers that researchers can report to this study, as shown in Table 2 below.

Table 2.
The Reliability of the Instrument from Several Previous Studies to This Study

No	Researcher	Method	Reliability value α
1.	Amla Mohd Salleh	Counterbalance	0.97
2.	Wan Hamzah Wan Daud	Alpha Cronbach	0.96
3.	Gan Mui Eng	Alpha Cronbach	0.93
4.	Anida Tumiran	Alpha Cronbach	0.91
5.	Kamariah Mohd Said	Alpha Cronbach	0.93
6.	Nooroziyana Abdul Jalil	Alpha Cronbach	0.92
7.	Rorlinda Yusof	Alpha Cronbach	0.74

Experts stated that reliability values range from 0 to 1, and values of 0.60 to 0.70 are the lowest and still acceptable (Robinson, Shaver, & Wrightsman, 2013; Hair, Anderson, Tatham & Black, 2006; Konting, 2005). In light of these points, generally the reliability of this instrument is at a practical level. This indicates that the instrument is relevant to this day.

Data Analysis

The data obtained in this study were analyzed using Statistical Package for Social Science (SPSS) Windows version 23.0 software and Excel 2010 software (Grant, Ries, & Thompson, 2016; Kaushik & Mathur, 2014; Treiman, 2014; Bryman & Cramer, 2012; Greasley, 2007; Spriestersbach, Röhrig, Du Prel, Gerhold-Ay, & Blettner, 2009; Nick, 2007; Blaikie, 2003; Sprinthall & Fisk, 1990). Scoring is done through a summary of positive answers only which is Part A, "Favour" scores only; Part B, "Can" scores only; and Part C, "Interested" scores only. Scores from all parts (A, B and C) for every construct (Realistic, Investigative, Artistic, Social, Enterprising, and Conventional) are summed to determine the personality score and career personality of the sample being studied. The values obtained are then calculated by computing the Holland Three-Point Code based on the three highest scores from the six constructs previously shown.

The following data analysis involve Holland's Three Point Code determined based on three highest scores from six constructs obtained by each individual. For example: Realistic score = 10, Investigative score = 15, Artistic = 18, Social = 20, Enterprising = 10, and Conventional = 9. Thus, Holland's Three Point Code is determined by taking three highest scores which are S, A, and I (Social, Artistic, and Investigative). Data analysis for this Holland's Three Point is used to determine inclination of interest in science field among GTS.

According to Holland, realistic, investigative, and conventional constructs portray personality characteristics related to fundamental sciences such as analyzing, exploring, accepting, systematic, naturalist, observing, elaborating, introspective, curiosity, theorist, righteousness, structured, organized, careful, and routined. However social, artistic, and enterprising constructs portray personality characteristics related to social science such as artistic, imaginative, intuitive, expressive, aesthetic, emotional, reflective, original/pure, free, sensitive, idealistic, social, helpful, cooperative, friendly, sociable, patient, extrovert, empathy, kind, responsible, trustworthy, leader traits, love for achievements, energetic, highly persuasive, influential, manipulative, explorer, confident, optimistic, visionary, ambitious, social, striving, self-promoter, extrovert, and communicatively smart.

In relation to that, based on Holland's Three Point Code, aspect of career interest inclination in this research is divided into two main parts which are: (A) Inclination of interest in sciences field, and (B) Inclination of interest in non-sciences or social sciences field. Interest in sciences field is divided into four categories namely: (i) high inclination of interest in sciences that is reflected through having all three personality code related to sciences field which are realistic (R), investigative (I), and conventional (C) based on Holland's three point code, (ii) medium high inclination of interest in sciences reflected through two science personality codes (R or I or C) which ranks consecutively in Holland's three point code, (iii) medium low inclination of interest in sciences reflected through two sciences personality code which ranks separately (for example; Investigative, Social, Conventional) and (iv) mixed science and non-science inclinations which are reflected through the sciences personality code as the main code (R or I or C) followed by social science codes (S, A, E) on the Holland's three point code (multi potentiality characteristics). On the other hand, interest in non-science or social science field is divided into three categories which are incline personality of (i) Artistic, (ii) Social, and (iii) Enterprising.

Results

RQ 1: What are the personality codes of career interest for GTS?

Based on Table 1, career personality research result shows that gifted and talented students obtain inclination on Investigative (22.15) code followed by Social personality (19.88), Artistic (15.94), Conventional (15.64), Realistic (14.79), and finally Enterprising (11.60).

Table 3.

Pattern of Career Interest Personality of Gifted and Talented Students

	Realistic	Investigative	Artistic	Social	Enterprising	Conventional
	R	**I**	**A**	**S**	**E**	**C**
N Valid	213	213	213	213	213	213
Mean	14.79	22.15	15.94	19.88	11.60	15.64
Std. Deviation	6.955	4.574	6.420	4.893	6.111	5.958

RQ 2: What are GTS' career personality characteristics?

Based on Holland's code of personality analysis, three main code of personality for GTS students are Investigative, followed by Social, and Creative. Investigative personality shows that GTS possess characteristics of observing, analyzing, rationalizing (making justifications), researching, intellectual, introverted, introspective, optimist, high curiosity, theorist, and accurate. These characteristics place them in the category of a thinker.

This is followed by the second highest code of personality that is Social. Social code demonstrates that GTS having characteristics of sociable, helpful, cooperative, friendly, patient, extrovert, empathy, kind, responsible, and trustworthy. These social characteristics put them in the category of individuals who like to provide assistance.

The third personality inclination is artistic. This code shows that GTS possessing characteristics of creative, imaginative, intuitive, expressive, appreciative of aesthetical values, emotional, introspective, reflective, likes freedom, sensitive, and idealistic. These characteristics categorize them as individuals who are inventive.

RQ 3: What are the inclinations of interest in science field based on Holland Three Point Code in Career Interest Test among GTS?

This result is divided into two parts which are (a) inclination of personality in science field, and (b) inclination of personality in non-science (humanity) field. Based on Table 2, research results show that 73.24 % GTS that are being researched have the career tendency in science field where as 26.76 % is in non-science field.

(a) Aspects of tendency towards science field career interest personality are seen from the existence of science field code which are realistic (R), investigative (I), and conventional (C) on the pattern of Holland's Three Point Code for every sample. Data of personality inclined towards interest in science field is divided into four parts which are first, high inclination of personality in science that is reflected through all three codes of realistic, investigative, and conventional (RIC) as on the pattern. Result shows that 6.57% of GTS are in this category. Secondly, medium high inclination of personality in science reflected through two science codes that positions consecutively (R or I or K). Result shows that 15.49% of GTS are in this category. Thirdly, medium low inclination of personality in science reflected through two science codes (R or I or K) that positions separately in the Holland's Three Point Code. Results show that 21.13% of GTS are in this category. Furthermore, the fourth is a mixed inclination of sciences personality that reflected through the first or main code of interest in science (R or I or K) followed by non-science code in Holland's Three Point pattern. Results show that 30.05% of GTS fall in this category.

(b) Furthermore, from the aspect of inclination of career interest in non-science or humanity field, the main codes existing in Holland's Three Point Code are Social (S), Artistic (A), and Enterprising (E). Data analysis for inclination in humanity (non-science) field is divided into three parts which are personality tendency of Artistic, Social and Enterprising. Research result shows that 16.43% GTS have the tendency of interest in social field, followed by 7.98% tendency in artistic field, and only 2.35% interest in enterprising field.

Table 4.
Tendency of Personality in Gifted and Talented Students' Career Interest based on Holland's Three Point Code

Career Interest Personality	Overall %	Category	Category Description	HOLLAND'S THREE POINT CODE (HTPC)	N	%
Science Tendency	156 (73.24)	(i) Personality of high inclination for science	All HTPC on sciences field	RIC, RCI, IRC, ICR, CIR	14	6.57
		(ii) Personality of medium high inclination for science	Two HTPC on sciences field (consecutively)	RIA, RIS, RIE, RCS, IRA, IRS, IRE, ICA, ICS, CRS, CRE, CIS, CIE	33	15.49
		(iii) Personality of medium low inclination for science	Two HTPC on sciences field (separated)	ISC, IER, IES, IEC, ICE, CSI REC (2) RSC (1) IAC (3), ISR (14), IAR (4)	45	21.13
		(iv) Personality of mixed inclination for science	Two HTPC on Sciences field and non-science (Multi potentiality)	RAS, RSA, RSE, IAS, IAE, ISE, ISA,CSE,CES,	64	30.05
Non-Science Tendency	57 (26.76)	Personality of Artistic tendency	Main code on Artistic	ARI, ARS, AIR, AIS, AIK, ASR, ASI, ASE	17	7.98
		Personality of Social tendency	Main code on Social	SRC, SIR, SIA, SIE, SIC, SAI, SAE, SEC, SCR, SCE,	35	16.43
		Personality of Enterprising tendency	Main code on Enterprising	EAS, ESI, ECI	5	2.34
Total					**213**	**100**

Discussion

Overall, the results based on Holland's Career Interest Code have shown that most of GTS are inclined towards science fields namely; Realistic, Investigative, and Conventional. This is in line with Realistic personality that according to Holland (1996), these students have science related characteristics such as practical, mechanical, materialistic, preference towards application of tools and machines, introverted, agreeable, natural, sensible, pure, strict, and principled. While Investigative personality on the other hand, demonstrated science related characteristics such as being observant, analytical, rational, meticulous, intellectual, introverted, introspective, optimistic, curious, theorist, and reasonable. Followed by individuals with Conventional code is said to have personality characteristics that are highly structured, meticulous, high endurance, agreeable, practical, rules abiding, defensive, obedient, careful, efficient, and routine. This finding supports Putranta and Kuswanto (2018) concept of interlocking cluster of traits defined giftedness with the views that GTS possessed high level of cognitive ability, displayed high level creativity and task commitment. They used their inquisitive mind (cognitive abilities) in solving problems by using higher order thinking skills as well as placed a high task commitment as portrayed in conventional code. All these authentic personality traits have formed the interest towards fields of science and research. These fields required the capacity of focusing, researching, analyzing, and exploring the task with strong commitment and persistence in finding solutions to problems or making a discovery. This is in line with the characteristics of continuous curiosity that involved in-depth observation, and ability to focus for a great length of time in preferred field (National Association for Gifted Children, 2011).

This research finding also showed that there are 30% GTS who have mixed personalities between science and non-science fields. It means, although the studied GTS possesses personality characteristics of science such as investigative or realistic or conventional, they still appear to have strong social or creativity characteristics. Combination of these personalities showed that there is a prevalence of multi potentiality among GTS, as portrayed

to have scored in various aspects of abilities besides demonstrating inclination of interest in multiple career fields (Achter, Lubinski, & Benbow, 1996; Emmett & Minor, 1993; Kerr & Claiborn, 1991; Milgram, 1991; Sanborn, 1979; Silverman, 1993). Therefore, this research suggests that GTS are given a proper guidance to explore and plan their career pathway through an action plan and several strategies for them to really understand their inclination of career interest fields. This can be done by providing exposure of experiences in several job industries to assist GTS in undergoing real working environment (Tapper, 2014). This experience will eventually help them in making choices to venture into fields that are congruent or compatible with their own personality.

GTS are also found to have inclination to non-science personalities. Result shows that there are GTS who have Social characteristics as the main code, that reflected on characteristic of being helpful, cooperative, friendly, sociable, patience, extroverted, empathy, kind, responsible, and trustworthy. These characteristics are important in shaping social nature to balance their own personality and also crucial characteristics to form strong leadership identity. Other than that, GTS are also found to have Artistic code of personality that portrays them as individuals who are imaginative, intuitive, expressive, aesthetical, emotional, introspective, reflective, pure, free, sensitive, and idealistic. This result clearly supports Renzulli's (2007) view who states that GTS possesses high sense of creativity beside intellectually intelligent and strong sense of task commitment. The final inclination of career interest is Enterprising. Results show that GTS was lacking on enterprising characteristics; such as leadership, ability to influence, manipulative, confidence, optimistic, visionary, ambitious, striving, self-promotion, extroverted, and communicatively smart (Holland, 1997). This is in line with study on leadership among GTS that showed they have moderate level of leadership, especially on leadership efficacy, influences, leaders motivation, and self-monitoring (Putranta & Supahar, 2019). In relation to that, the study recommended that GTS been guided to identify their own leadership talents because they do not usually see themselves as leaders and have low self-efficacy and self-confidence in leading others (Chan, 2003; Landau & Weissler, 1991). Therefore, the development of GTS' leadership must be conducted across their learning activities in both curriculum and co-curriculum because continuous cultivation will be able to reinforce confidences and blend the characters within themselves. This way will form leadership culture within GTS, in line with the Malaysian Gifted and Talented education visions which is developing balanced GTS who possess inquisitive minds to be able to contribute as world leaders, thinkers, inventors and strong sense of humanity (Pusat PERMATApintar UKM's Annual Guidebook, 2018).

Conclusion

In conclusion, the results of this research provide implications on the roles of career counselors and academic teachers in GT educational institution. GTS career counseling and guidance services need to be strengthened to help GTS find the best career path for themselves. Among recommendations that can be implemented are: (a) providing various work experience programs such as in-depth exploration activities on career interest through preparation of career folio that displays information on bibliographies of key figures in the career field, (b) exposing GTS to career field experts closely by giving them opportunities to interview or obtain service advisor, (c) hosting shadowing programs with chosen field experts. Experiencing beside field experts by observing the practices of that field work themselves in real environment will be able to help students understand their interests or the opposite, and (d) providing job-discovery session by encouraging students to build their own Career Vision Board and begin career path through volunteerism activities in related industries to their career interest. The ability of teachers to embed contents among subjects in teaching and learning sessions and integrate several subjects in one task or evaluation as well as relate them to their career of interest may enable to generate knowledge acquisition in multiple disciplines and help students see the importance of the subjects learned as requirements in real career world. In short, the roles of school counselors and subject matter teachers are important to guide, stimulate and explore interests as well as provide planning of career path that best suits GTS. In consequence, this pool of GTS that comprises strong cognitive ability and talent can be fully developed in order to contribute to national human capital of great quality, hence contributing towards the development of high income nation.

Acknowledgements

This research was supported by the Young Researcher Grant of Universiti Kebangsaan Malaysia (GGPM-2016-085)

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