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Psychological Potential Identification of a Private Vocational High School Students, Indonesia: Suitability of Interests, Aptitude, and Selected Majors

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ABSTRACT

One of private Vocational High School in Indonesia has not implemented a selection system based on aptitude and interest, which is very important in the success of students when following the learning process. This study aims to help the school to identify the psychological otential of new students. The collection of data used psychological tests: intelligence, aptitudes, and interests tests. The subjects of this study were grade X (ten) students from the Pharmacy major (69 students) and Industrial Chemistry (14 students). The results show that the average level of intelligence of students majoring in pharmacy was higher than that of industrial chemistry. The more prominent aptitude in both majors was on understanding, more than 50% of students had a score in the category of enough. The aptitude of calculating was balanced between those in which the categories were enough and below average, while for the reasoning, the majority was in the categories of below average. The results of the interest inventory showed that the majority of students already had a consistent interest and in accordance with the choice of their current majors. It appears that students had a strong interest, even with less prominent abilities. The program that needs to be prepared by the school is to optimize this high interest as an encouragement for students to be actively involved in learning, accompanied by learning methods that are more practical, giving gradual and simultaneous assignments, and learning evaluation are done more frequently, for example at the end of each subject.

Keywords: Mapping psychological potential; Self-development; Psychological potential; Wrong majors; Vocational High School students.
JEL classification: I20; I28; I29; Z00.

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1. Introduction

Vocational education or vocational high school, according to the explanation of Law Number 20, the Year of 2003 Article 15, is secondary education that prepares students mainly to work in specific fields. (Mardiyati & Yuniawati, 2015) also added that vocational education is a program in education that aims to prepare students to become professional workers who are ready to enter the workforce. Vocational education consists of Vocational High Schools (SMK), and Vocational Aliyah Madrasahs. Vocational Schools have many expertise programs. The expertise program carried out in SMK adjusts to the needs of the world of work and the demands of society. The expertise program in this report is called the expertise package.

One of the characteristics of vocational education can be seen from the development of curriculum planning. The vocational curriculum is made so that students are ready to jump right into the world of work. The contents of the curriculum in vocational schools are arranged in such a way that it is in accordance with the needs of the existing workforce in accordance with the changing times. It is done so that students are prepared and do not experience significant difficulties when entering the workforce. The aim of the vocational high school curriculum, according to (Asmara & Haryanto, 2015), is to prepare human resources in Indonesia to become individuals who are productive, innovative, creative, effective, faithful, and able to contribute to society and the country. The vocational curriculum is expected to deepen students' knowledge about the chosen field through fieldwork practices. (Jatmoko, 2013) also added that the vocational high school curriculum is inseparable from developing knowledge about a particular field, but must also coincide with preparing productive student skills.

It is reinforced by the issuance of Regulation of the Minister of Industry No. 3 of 2017 concerning Guidelines for Competence-Based Vocational High School Development and Development that is Link and Match with Industry (Ministry of Education and Culture, 2019). The Minister of Industry, Airlangga Hartarto, stated that the regulation would be a guideline for Vocational High Schools in organizing vocational education that has links and equivalence with industry, whereas, for companies, the guidelines facilitate guidance to Vocational High Schools in producing skilled and competent industrial workers (Director of Vocational Development of the Director-General of Primary and Secondary Education Ministry of Education and Culture, 2019).

With a study period of around three or four years, Vocational High Schools are expected to answer these challenges by supplying graduates who are skilled and competent and ready to contribute optimally in the industrial world. Thus, careful planning is needed in managing the Vocational High School, starting from the input, the process, to the output. One of the preparations that should be considered is the input stage when prospective students will determine the expertise package to be selected at the Vocational School. To get the right input, considering the abilities, aptitudes, and interests of prospective students, it becomes a crucial stage. Sianturi, Rizanti, and Cahyani (2018) added that majors in vocational schools were not only influenced by intelligence but also greatly influenced by aptitudes and interests so that the learning process was more directed because it was in accordance with their respective interests. It was reinforced by (Asmara & Haryanto, 2015; Rohman & Darmawan, 2013; Sianturi, Rizanti, & Cahyani, 2018) who stated that the selection of vocational majors was carried out at the beginning of semester XI, which aimed to place and be able to channel the interests and aptitudes of the students.

The suitability between the aptitudes and interests of students with the majors or expertise packages taken will greatly determine the success of these students in undergoing the learning process. Aptitudes and interests of students play a vital role in achieving success in the department or package of expertise chosen. Therefore, by knowing the aptitudes and interests of prospective students, it can help and facilitate the school in determining the right direction for students (Asmara & Haryanto, 2015; Rohman & Darmawan, 2013). Iddekinge, Putka, and Campbell (2010) added that people who have aptitudes and interests in accordance with their package of expertise would (a) be able to adjust to the environment, (b) be more satisfied with their environment, (c) able to have a good performance, (d) and able to survive in this environment compared to people who do not have the appropriate interests and aptitudes.

Conversely, if there is a mismatch between the chosen majors with the aptitudes and interests of students, there will be many obstacles during the learning process, even students may fail. Guidance

Counseling (BK) teachers at Vocational High School often complain of several problems, including the lack of students' motivation to actively participate in the teaching and learning process, skills that have not significantly increased or are not mastered by students, lack of student interest in entrepreneurship according to their expertise, frequency the students' absence in high schools, or even not going up to class or dropping out. The results of research conducted by Argyropoulou, Dimakakou and Besevegis (2007) also showed the results that students felt less clear about their interests, making them doubt related to their ability to obtain high grades in the chosen department. Furthermore, research conducted by (Arifin & Ristadi, 2017; Lestari & Pardimin, 2019) explained that the high unemployment rate of Vocational High School graduates was due to the mismatch of skills and knowledge students had. These problems (Argyropoulou, Dimakakou, & Besevegis, 2007; Arifin & Ristadi, 2017; Lestari & Pardimin, 2019) turned out to be not only problems in Indonesia. Likewise, the results of research from Amoah, Kwofie, and Kwofie (2015) also showed the form of obstacles faced by Middle School Counseling Teachers in Greece, including the barriers to learning, fatigue, problems with peers, and career changes that occurred.

In reality, the idealism to place students in their majors or expertise packages in accordance with their abilities, aptitudes, and interests has not yet been fully implemented by the school. Concerning the system of selection and placement of vocational students, the majority of which are implemented by schools is through the selection of report cards (representing aspects of ability), the choice of prospective students towards the majors provided, administrative selection related to funding, commitment, and parental support. The selection is not based on an objective measurement or test related to students' aptitudes and interests. It is reinforced by research conducted by (Akmal, Arlinkasari,& Kumalasari, 2017; Asmara & Haryanto, 2015), who stated that the considerations used in the process of placing majors on students were using report cards, physical conditions, and/or guidance of Guidance teachers Counseling (BK).

The importance of the role of interests and aptitudes of students is very influential in the success of students, both knowledge and skills in the chosen majors (Asmara & Haryanto, 2015). The world of education is the base of a career that must be prepared because it is very instrumental in the career achievement of students. Vocational students must decide to pursue what majors will be taken according to their interests and aptitudes. Thus, the determination of these majors is very influential for their future. Therefore, research related to the suitability of students' aptitudes and interests with the majors taken is very necessary to know their potential and develop students' knowledge and abilities.

A study showed that there is a positive correlation between interest in vocational learning with an interest in entrepreneurship, $r = 0.927$, and $p = 0.000$. This result shows that students' interest in vocational education is positively related to interest in entrepreneurship. Therefore, choosing a vocational field is the first step for a vocational student to be willing to achieve and master the studied area. It will influence their interest in entrepreneurship. In other words, choosing a major that is not following their interests can reduce students' interest in learning, affect their achievement and interest in entrepreneurship (Suwondo & Subagyo).

Previous studies have focused on vocational students' condition, associated with learning achievement and interest or readiness for a career or entrepreneurship after students graduate. Various vocational schools' reviews evaluate the benefits of vocational education to provide employment opportunities after students graduate. This action provides strategic policies in Indonesia and other countries (El-Hamidi, 2006; Newhouse & Suryadarma, 2009). Meanwhile, this research focuses more on the suitability of students' psychological potential with the chosen major. This current study is very strategic to be used as an evaluation material and input for policymakers to establish student admission procedures with a more comprehensive method. So those talented students who have a strong interest in raw material input are obtained, then follow the learning process at vocational schools, and graduate with competencies and skills following the needs of the world of work.

This study aimed to identify the suitability of students' aptitudes and interests in one of the private vocational high schools in Surakarta, Indonesia, with the chosen majors. The focus of this research was on tenth-grade students majoring in Pharmacy and Industrial Chemistry. The aptitude was revealed through aptitude tests A1 (comprehension), A2 (intelligence), A3 (reasoning), and A5 (numeracy). Meanwhile, interest was expressed using an inventory of RMIB interest. After testing using these instruments, it could be identified how many students who have been in accordance with the

package of expertise and how many students were less appropriate. The results of this identification can be a database for schools to make further interventions so that conditions experienced by students can be handled, and all students studying at the school have the opportunity to continue the next learning process comfortably and achieve the same great success. The rest of this article will describe the literature review, method, result, discussion, and conclusion of the study.

2. Literature review

2.1 Aptitude

Aptitude is an innate potential owned by an individual that is different from other individuals, which, if known early on, will provide several benefits, including to know one's own potential, interests, and values. These aptitudes can be useful later in planning the future, determining the task of activities, determining life planning, and future careers (Basaria & Saraswati1, 2019; Sung, Tien, & Cheng, 2012; Whitfield, Feller, & Wood, 2009).

Various psychological instruments can be used to measure aptitude. Psychological instruments to measure aptitude include the DAT (Differential Aptitude Test), GATB (General Aptitude Test Batterey), and FACT (Flanagan Aptitude Classification Test), where all three are a series of aptitude tests. The aptitude test battery has been adapted in Indonesian and is presented separately. Each aptitude sub-test can be administered separately, and tests selected according to user needs (test objectives) (Aiken & Marnat, 2009; Daulay, 2014).

2.2 Career interest

Besides aptitude, another thing that influences the learning process is interest. Interest is someone's liking or preference for something. According to (Wibowo, Subarkah, & Santoso, 2018; Widiyanti, 2014), interest can be interpreted as a desire, liking, and willingness in a person to generate interest in doing something interesting to him and done consciously in accordance with what is desired. Interest also helps individuals to find satisfaction in an area of work or education, rather than talking about success. According to (Akmal, Arlinkasari, & Kumalasari, 2017; Rohman & Darmawan, 2013; Rounds & Su, 2014), interest is an indicator of student reinforcement so that they are motivated in learning and can display maximum performance at work, giving rise to satisfaction for the individual.

To help students recognize their interest patterns, it can be identified through various interest inventories. One inventory of interests that can be used to guide career or educational possibilities is Rothwell-Miller Interest Blank (RMIB) (Marnat, 2010).

2.3 Intellegence

Various tests are used to evaluate the potential for intelligence, talents, and interests (Urbina & Anastasi, 1997). Individual special intelligence is often referred to as talent, that is, a particular ability often associated with mastering a specific field of work. Intelligence in many studies has a strong correlation with achievement and is also one of the factors that can predict achievement and personality traits, interests, and social intelligence (Kaya et al., 2015; Krapic & Kuljanic, 2017; Ndegwa, 2019). Intelligence tests that were developed by various experts can examine an individual's intelligence. One of them is the intelligence test compiled by Raven, so it is often called the Raven Test (Urbina & Anastasi, 1997).

Longitudinal research for 14 years in more depth of vocational students in Indonesia found that most vocational students were those who have lower intelligence, come from lower social-economic status, and cannot continue to public senior high school. Vocational school ("SMK") is more attractive to students who have low achievement scores. Unfortunately, they tend to get lower appreciation or value than other schools when they graduate. Consequently, a more appropriate curriculum is needed for "SMK" students so that after graduation, they have a service orientation spirit and are more economically calculated (Newhouse & Suryadarma, 2009). Other studies suggest that high and low salaries are more determined by graduates' readiness to display their skills and competencies. For school graduates, on the job training, although it costs a lot of money, impacts job readiness (El-Hamidi, 2006).

2.4 Vocational school "SMK"

One form of secondary education in Indonesia is the Vocational High School (SMK). According to the explanation of Law Number 20 of 2003 in articles 15 and 18 concerning the National Education System, it explains that vocational schools emphasize education in preparing students to master the theory of learning and work practices as a whole and complete. According to (Mardiyati & Yuniawati, 2015; Puruasdi & Mujiyono, 2016). The Elementary and Secondary Education of the Ministry of Education and Culture (2016) also added the objectives of vocational education, including (1) Realizing strong vocational students; (2) Realizing equitable, broad, and equitable access to vocational schools; (3) Realizing quality learning in Vocational High School; (4) Realizing the strengthening of governance and increasing the effectiveness of bureaucracy and public involvement. By expanding the access of prospective students to take vocational education, it can be an attractive choice for governments in developing countries who are trying to improve the quality of skilled labor output (Newhouse & Suryadarma, 2011).

There are four Vocational High School models developed in Indonesia, according to (The Ministry of Education and Culture, 2016), namely marine and maritime affairs, agriculture and food security, creative economy, and tourism. The various majors that can be selected at the Vocational School, according to (Mardiyati & Yuniawati, 2015; Newhouse & Suryadarma, 2011), among others are electrical engineering, mechanical engineering, computer engineering, tourism, accounting, audiovisual, catering, fashion, shipping, and so on. Quoted from (Candiasa, Natajaya, & Widiartini 2018), currently, vocational schools are available in four fields, namely engineering, administration, information, and health.

2.5 Aptitude and career interest regarding the appropriateness of school's major choice

Appropriate aptitudes and interests are needed as material for students' consideration in determining majors in schools so that students can be optimal in their learning and career planning processes (Asmara & Haryanto, 2015; Iddekinge, Putka, & Campbell, 2010; Rohman & Darmawan, 2013). One of the results of research conducted by (Pyari, Mishra, & Dua, 2016) using the DAT test in the selection of mathematics majors as a career choice showed that students already knew their abilities, interests, and aptitudes.

However, not all school majors are based on students' interests and aptitudes. Individuals in choosing jobs are according to their preferred interests and avoiding jobs that are not desirable (Navarro, Flores, & Worthington, 2007; Pabler & Hell, 2012; Tracey & Hopkins, 2001). Septian (2011) said that the placement of majors in schools was based on the final exam scores and their wishes in the majors. A study Wati, Riza, and Sugandi (2019) showed data that students in choosing majors, 86% of them were influenced by parents on the grounds that after graduation, it was easy to find work, and 52% were influenced by peers.

The results of Ermayanti's research (2009) showed that the main factors in choosing a major are ability and motivation. The data showed that as many as 356 students out of a total of 368 students were included in the wrong major category, while 12 students were right in choosing majors. The results of other studies (Candiasa, Natajaya, & Widiartini,2018) related to the suitability and incompatibility of selected majors found that as many as 68% of students showed a match between the results of aptitude tests and the chosen majors. Of the 32% of students whose aptitudes did not match the chosen majors, 78% were aware of their incompatibility with the chosen majors. The remaining 22% were unaware of their discrepancies in the majors taken. Students who were aware of their incompatibility with the chosen program stated that 58% chose the program because they followed friends, advice from parents, and others, 26% chose it because it was easy to find work, and another 16% could not answer.

Some other research results also prove that gender influences interest in entering vocational schools. One of the results of research conducted by (Wicaksono, Sparrow, & Bergeijk, 2018) stated that 7.45% of women were not interested in entering vocational schools, but differed from men, with interest in entering public schools by 46.8%. Even, (Sung, Cheng, and Hsueh (2016) from the results of their junior high school research on understanding the profile of jobs using the SCIA test showed that 44.6% of students had a low profile of various types of work, 65.2% of men had a lower understanding in comprehending the occupational profiles of interest, but women accounted for 22.5%. It is in contrast

to the results of research conducted by Liu, Peng, Mao, and Wong (2016) in their findings of career interests and maturity, which showed a relatively small relationship in terms of age, gender, and personality. It is caused by factors of the individual living environment, lack of motivation, and parental expectations.

Furthermore, the results of research conducted by (Argyropoulou et al., 2007; Arifin & Ristadi, 2017; Lestari & Pardimin, 2019; Rohman, 2015), stated that students who had the wrong direction or did not know the chosen majors affected the lack of self-motivation to learn, did not have confidence in the achievements that could be achieved, could not work in accordance with their educational background, or even unemployed after graduation. It indeed can be interpreted that the mismatch of majors in vocational schools could affect the level of individual career maturity that determined the future goals of the students themselves. Sadeghi, Baghban, Bahrami, Ahmadi, and Creed (2011) emphasized that individuals who have a more mature level of career maturity have a degree of certainty in developing a career and have self-efficacy in decision making.

3. Method

3.1 Research participants

The psychological test participants came from students majoring in Pharmacy and Industrial Engineering in one private vocational school, Surakarta, Indonesia. The process of identifying research subjects involved schools and had the permission of students and schools. The total number of class X (ten) students majoring in Pharmacy was 69 students, with the majority of female students totaling 59 students (86%) and male students of 10 students (14%). The total number of class X students majoring in Industrial Chemistry was 14 students, with the majority of female students totaling nine students (64%) and male students of 5 students (36%).

3.2 Data collection

The collection of research data used psychological tests that were administered classically. The test was carried out in one day with a duration of about three hours. The implementation of the psychological test for the whole subject was divided into three classes. Each class had a tester, two observers, and an administrative officer. Psychological testing instruments used included the Intelligence test (A2), aptitude tests (A1, A3, and A5), as well as an inventory of interests with RMIB.

The SPM or A2 test is an Indonesian name, while the original name is Standard Progressive Matrices (SPM). A2 Test is (Standard Progressive Matrices). This test was employed to measure adult intelligence by looking at the relationship between parts of the picture and developing a systematic mindset.

The comprehension test (A1) is the Indonesian version of a sub-test of the Flanagan Aptitude Classification Tests (FACT). Test A1 has the original of NMA Judgment and Comprehension. Judgment and Comprehension is a sub-test of FACT. This test measured the ability to read with understanding and logical reasoning and used it in making decisions by capturing the meaning of a practical situation.

The reasoning test (A3) and the numeracy test (A5) are Indonesian versions of the Differential Aptitude Tests (DAT) group. The A3 test, which has the original name of the abstract reasoning test, measured the ability to understand the logical relationship of abstract figures or the principles of "non-verbal design". The A5 test, the original name of Numerical ability, measured the thinking ability with numbers and mastery of numerical relationships.

Rothwell-Miller Interest Blank (RMIB) is an inventory of interests that can be used to guide career or educational possibilities. This test was first compiled by Rottwell in 1947 with nine occupational categories and was revised by Kennet Miller in 1958 into 12 categories.

3.3 Data analysis

Data were analyzed using central tendency analysis. All test results were scored by the research assistant. The scoring process followed the guidelines of each of the psychological test kits. Then, the test result norms were matched based on the standard norms of each test. In the final stage, the scores of each test kit were then interpreted by a psychologist to get an overview of students' interests and aptitudes.

4. Results

The results of this study were grouped into four categories, including the results of students' psychology in pharmacy majors, the work interest profile of students majoring in pharmacy, the results of the psychological test of students majoring in industrial chemistry, and the work interest profile of students majoring in industrial chemistry.

4.1 The results of psychological test of students majoring in pharmacy

Based on the results of intelligence tests, it showed that 85% of students had intelligence at an average level, 9% had a below average intelligence level, and 6% in the above average category. This condition means that the majority of students would be able to understand and handle the problems faced as other individuals in general. Only 9% of students needed some time to understand the problem, and no student had difficulty in understanding the problem or experienced obstacles in thinking. Intelligence at an average level means that students were generally able to follow the learning process at school, but needed to have good study habits to be able to repeat the material to achieve higher achievement. Students with a below average intelligence category needed more time to capture the material being taught and needed to repeat the material more frequently to be able to achieve good results.

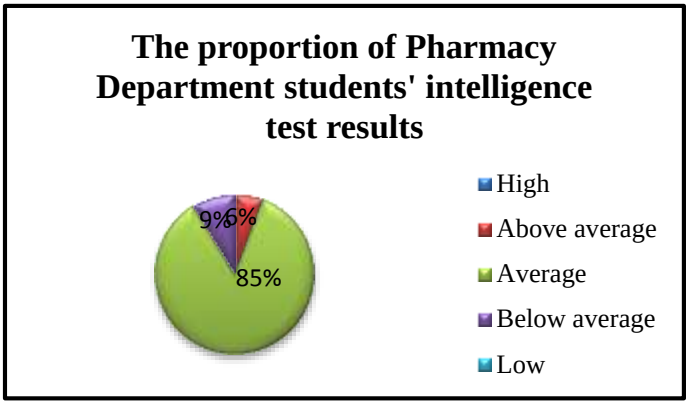

Figure 1. The proportion of Pharmacy Department Students' intelligence test results.

Test results of comprehension test indicate that the majority of students had a level of understanding that was classified as average, which was 49% of students. 29% of students had a below average understanding, and 22% of students had a fairly high level of understanding. Under these conditions, it means that in general, students in the Pharmacy major were quite able to understand the problems presented verbally and think logically to language problems. Test of understanding measured reading skills by understanding and logical reasoning and used them in making decisions by capturing the meaning of a practical situation.

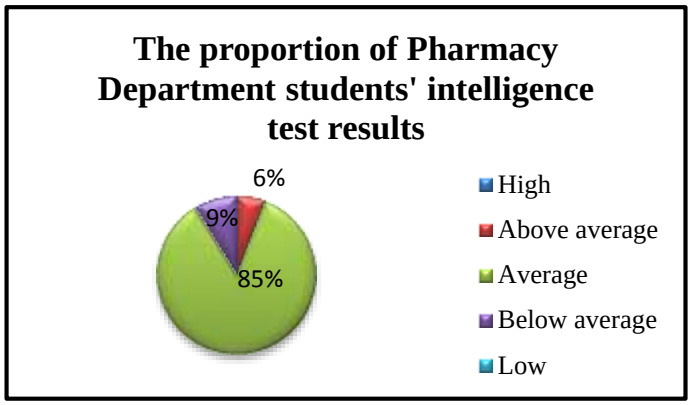

Figure 2. The proportion of students' comprehension test results of the Pharmacy Department.

Reasoning test results showed that students had the most reasoning ability at low and somewhat low levels (65%), and 35% were at medium and above average levels. Whereas, there were no students in the high category. The reasoning test revealed students' special abilities in doing logical thinking, especially those that are abstract. It measured the ability to understand the existence of a logical relationship from abstract figures or the principles of "non-verbal design". The ability of reasoning guided students to be able to think logically and systematically based on common sense.

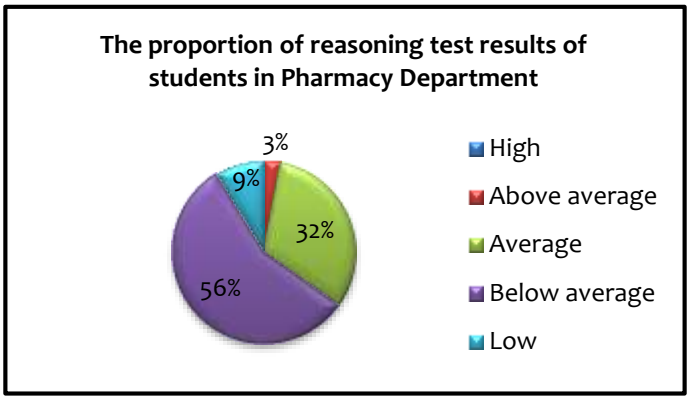

Figure 3. The proportion of reasoning test results of students in Pharmacy Department.

The analysis showed that 54% of students had the ability to count in the moderate or average category, 42% were below average, and 4% were above average. These conditions indicate that almost 2/3 of students had enough ability to think with numbers, and could understand numerical relationships (arithmetic operations problems). Students with a numeracy ability category of below average would have difficulty doing it, so it required more time to be able to solve a problem.

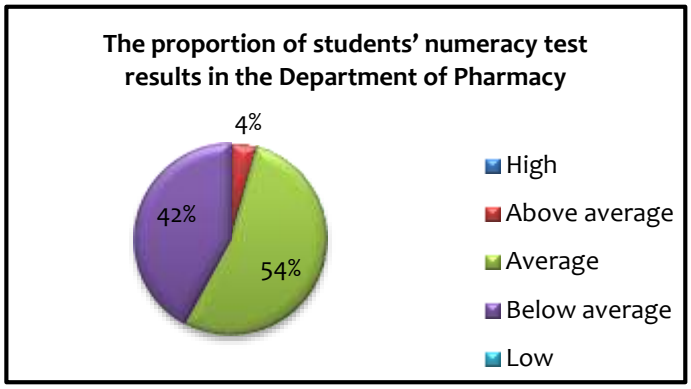

Figure 4. The proportion of students' numeracy test results in the Department of Pharmacy.

4.2 Profile of student interest in the Pharmacy department

The results of an analysis of interest inventory revealed that 78% or the majority of students already had a consistent interest in the types of work in accordance with the majors taken at Vocational High School, medical, social service, and scientific. It also means that students had a good understanding of the types of work chosen that were in accordance with their educational background or expertise package. The pharmacy department taken was a field of work related to the medical, scientific, and social service fields. Other fields that were also of interest but that were less relevant to pharmacy majors were the aesthetic, literary, and computational fields.

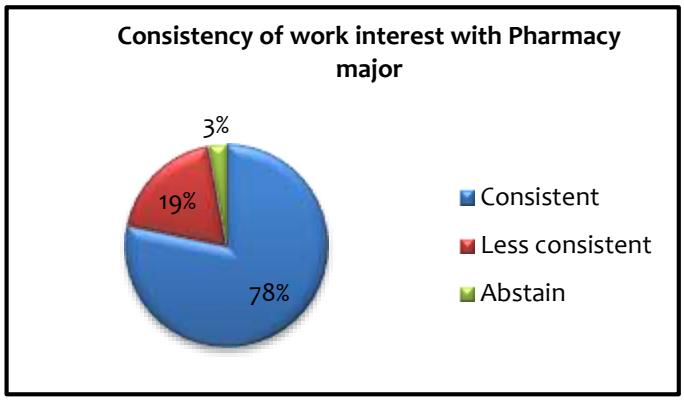

Figure 5. Consistency of work interest with Pharmacy major.

Based on the diagram, it is known that almost all students liked or wanted to do jobs that were in accordance with their major in vocational, which was the Pharmacy major. Variations in the work as the first choice and wanted to be done by students after they graduated included pharmacists, assistant pharmacists, doctors, and health experts. It indicates that the Pharmacy major took by students currently supported or positively influenced students' choices in choosing the work they wanted to do.

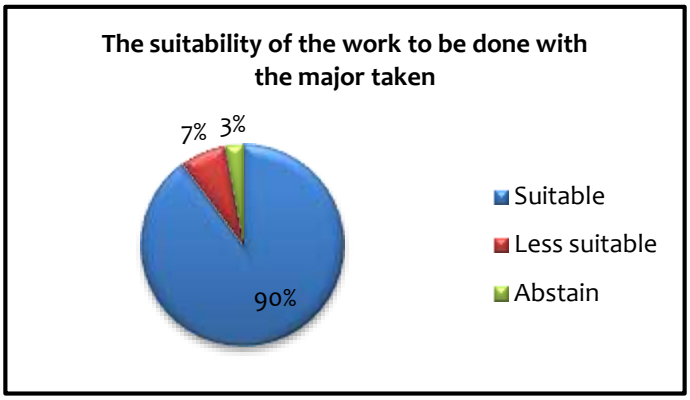

Figure 6. The suitability of the work to be done with the major taken.

4.3 The results of psychological test of students majoring in industrial chemistry

The diagram shows that 64% of students had enough or average intelligence, and 36% had a below average level of intelligence. There were no students who had the intelligence category of High, Somewhat High, or Low. This condition means that the majority of students would be able to understand and handle the problems faced as well as other individuals in general. Meanwhile, 36% of students needed a little time to understand the problem, and no student had difficulty understanding the problem or experienced obstacles in thinking. Intelligence at an average level means that students were generally able to follow the learning process at school, but needed to have good study habits by repeating the material to achieve higher achievement. Students with a below average intelligence category needed more time to capture the material being taught and needed to repeat the material more frequently to be able to achieve good results.

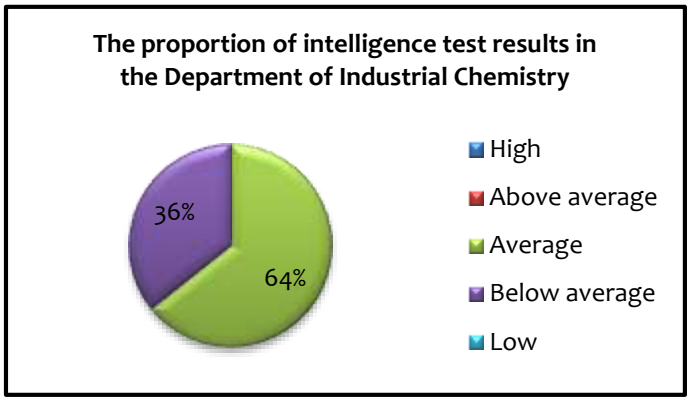

Figure 7. The proportion of intelligence test results in the Department of Industrial Chemistry.

Test results of understanding showed that 50% of students had a level of understanding that was classified as moderate, which was a number of seven students. Six students (43%) had a below average understanding, and one student (7%) had a above average level of understanding. With these conditions, it means that the conditions of understanding of students in the Pharmacy major were balanced between students who were quite capable and less able to understand the problems presented verbally and think logically to language problems. comprehension tests measured reading skills by understanding and logical reasoning and used them in making decisions by capturing the meaning of a practical situation. Students, whose ability to understand was below average, instead had difficulty when facing problems presented verbally.

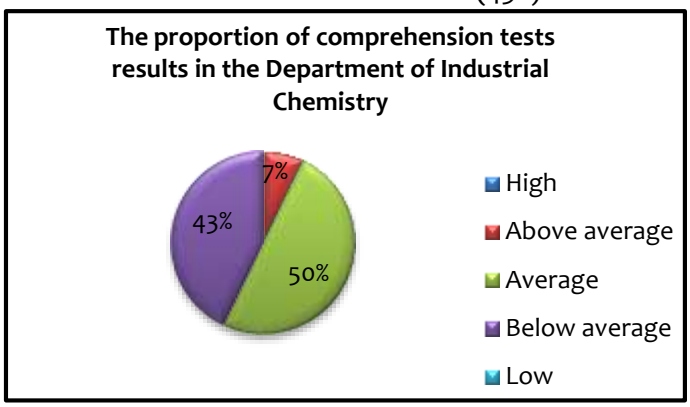

Figure 8. The proportion of the results of comprehension tests in the Department of Industrial Chemistry.

The diagram shows that students had the most reasoning ability at low and somewhat low levels (9 students), and five students were at medium and above average levels. Whereas, there were no students in the high or low category. The reasoning test revealed students' special abilities in doing logical thinking, especially those that are abstract. Reasoning tests measured the ability to understand the existence of logical relationships from abstract figures or the principles of "non-verbal design". The ability of reasoning guided students to be able to think logically and systematically based on common sense, thus helping them to make the right decision.

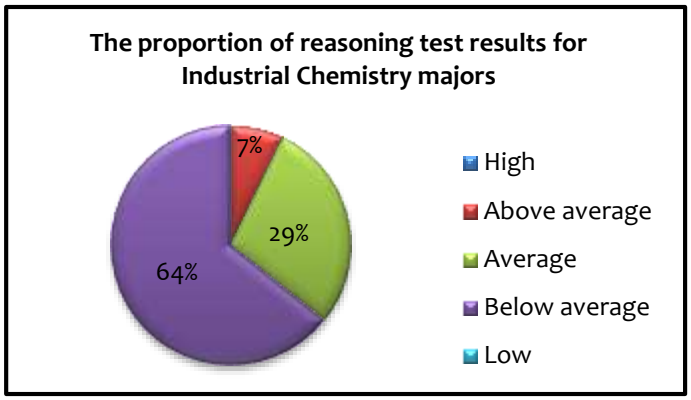

Figure 9. The proportion of reasoning test results for Industrial Chemistry majors.

The results of the analysis showed that students' numeracy skills only existed in two categories, namely in the moderate category or an average of 57% of students and the below average category as much as 43%. These conditions indicate that almost 2/3 of students had enough ability to think with numbers, and could understand numerical relationships (arithmetic operations problems). Students with a numeracy ability category that was below average would have difficulty doing it, so it required more time to be able to solve a calculation problem or one that demanded practical reasoning.

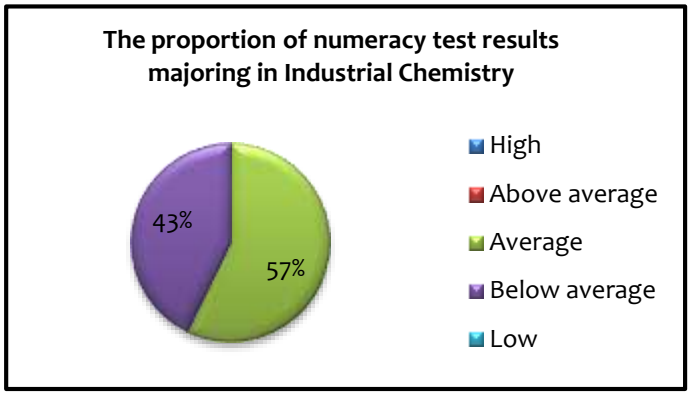

Figure 10. The proportion of numeracy test results majoring in Industrial Chemistry.

4.4 Profile of student interest in industrial Chemistry

The results of an analysis of the interest inventory revealed that 86% or the majority of students already had a consistent interest in the types of work that were appropriate to the major taken at Vocational High School. It also means that students had a good understanding of the types of work chosen that were in accordance with their educational background or expertise package.

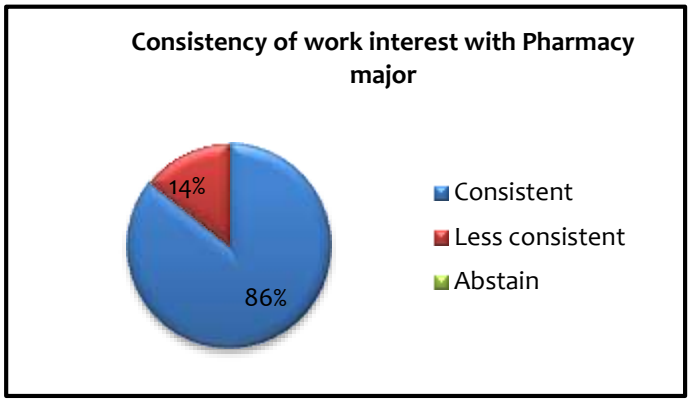

Figure 11. Consistency of work interest with Pharmacy major.

Based on the diagram, it is known that all students liked or wanted to do jobs that were in line with their major at Vocational High School, namely the Department of Industrial Chemistry. Work variations that were the first choice and wanted to be done by students after they graduated included the Industrial Chemistry Engineer, Industrial Chemistry Teacher, staff of Quality Control, head of the laboratory, laboratory assistant, and scientist. It indicates that the Department of Industrial Chemistry pursued by students currently supported or positively influenced students' choices in choosing the work they wanted to do.

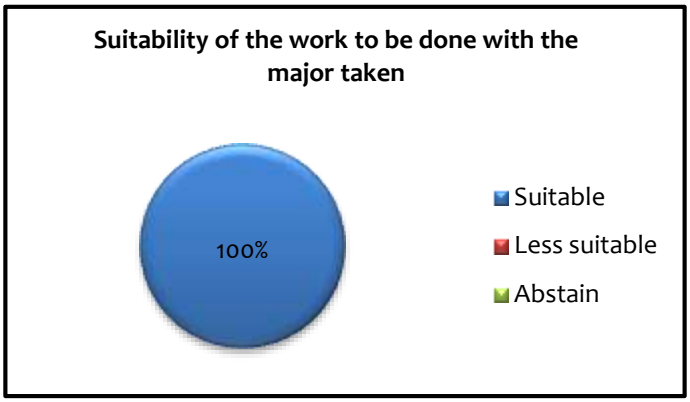

Figure 12. Suitability of the work to be done with the major taken.

5. Discussion

5.1 The proportion of ability test results

Table 1.

Comparison of proportions of ability test results.

Type of Test	Pharmacy					Chemical Industry				
	R	AR	C	AT	T	R	AR	C	AT	T
Intelligence Test		9%	85%	6%			36%	54%		
Comprehension test		29%	49%	22%			43%	50%	7%	
Reasoning Test	9%	57%	32%	3%			64%	29%	7%	
Numeracy Test		42%	54%	4%			43%	57%		

Potential abilities (intelligence and aptitude) in Pharmacy major students were higher than students majoring in Industrial Chemistry. The more prominent aptitude possessed by students in both majors was comprehension, where the majority of students had enough category (average). Furthermore, for numerical ability, the number of students had a below average category and was relatively balanced. Meanwhile, in reasoning aptitude, the majority of students had below average abilities. The discrepancy of students' aptitude with the chosen majors was also found in the results of other studies (Candiasa, Natajaya, & Widiartini, 2018), which showed that 32% of students had aptitudes that did not match the chosen majors. Previous research (Widodo, 2018) showed different results related to students' reasoning abilities in the pharmacy department, the majority of which were in the moderate category, amounting to 73.81%. As for the ability to count, it was with a percentage of 84.22% in the high category.

In the results of this study, the low level of reasoning possessed by students had an indirect effect on completing tasks, such as analyzing, managing, providing explanations, and making conclusions. This discrepancy could cause students' academic problems or even related to the selection of work to be occupied when they graduated. It is in accordance with previous studies (Basaria & Saraswati, 2019; Daulay, 2014; Jaya, Anwar, & Hermawan, 2017; Mitchell, Ostby, Mara, Cohen, Chou, & Green, 2019; Sung, Tien, & Cheng, 2012; Whitfield, Feller, & Wood, 2009; Wibowo, Subarkah, & Santoso, 2018), which showed the importance of compatibility between aptitude and chosen majors. In this case, aptitude plays a role in determining student academic success, planning for the future, determining task assignments, determining life planning, and future careers. The results of research conducted by Murakapi, Gembong, and Susanti (2018) of students majoring in multimedia engineering that measure the level of understanding, counting, and logic of students through story problems found three results, namely high, medium, and low. Students who had high intelligence could do assignments with systematic and precise arithmetic strategies; in the category of moderate, solving problems using formulas and methods that were not appropriate, even low categories students were unable to solve problems because they did not understand what was being asked and forgot how to in solving the problem.

5.2 The proportion of Interest Inventory Results

Table 2.

Comparison of interest inventory results.

Type of Test	Pharmacy			Chemical Industry		
	Less suitable	Suitable	Abstain	Less suitable	Suitable	Abstain
Job Type Consistency	19%	78%	3%	14%	86%	0%
Suitability of Interest	7%	90%	3%	0%	100%	0%

Student interest in the chosen majors, both from the Pharmacy and Chemical Industry majors, the majority were consistent. However, if the two were compared, students who chose the Department of Industrial Chemistry had a higher interest in consistency than students from the Pharmacy major. Individuals in choosing jobs were according to their preferred interests and avoiding jobs that were not desirable (Navarro, Flores, & Worthington, 2007; Pabler & Hell, 2012; Tracey & Hopkins, 2001). Nevertheless, there were still some students who had a mismatch of interests, even though the numbers were small. It could be caused by several things, such as self-potential, peers, family, school environment, neighborhood, lack of motivation, and existing job opportunities (Hayurika & Arief, 2015; Liu, Peng, Mao, and Wong, 2016).

The consistency of this interest becomes essential for students in undergoing the learning process at the Vocational School so that they become interested and motivated to learn more about the material presented by the teacher, practice the concepts that have been learned, to achieve the targeted competencies. Interest also helps individuals to be motivated in learning, display maximum work performance, and find satisfaction in an area of work or education (Akmal, Arlinkasari, & Kumalasari 2017; Rohman & Darmawan, 2013; Rounds & Su, 2014; Wibowo, Subarkah, & Santoso, 2018; Widiyanti, 2014).

5.3 Major is chosen based on students' interests rather than their aptitudes

Appropriate aptitudes and interests are needed as material for students' consideration in determining majors in schools so that students can be optimal in their learning and career planning processes (Asmara & Haryanto, 2015; Iddekinge, Putka, & Campbell, 2010; Rohman & Darmawan, 2013). One of the results of research conducted by Pyari, Mishra, and Dua (2016) using the DAT test in the selection of mathematics majors as a career choice showed that students already knew their abilities, interests, and aptitudes.

However, it is different from the results of this study, which emphasized that most subjects prioritized interest in choosing majors in Vocational High School compared to considering the aptitude they had. It can cause students to take courses that are not in accordance with their potential or are often referred to as "wrong majors". Some previous studies also found similar results. The results of Ermayanti's research (2009) showed that as many as 356 students out of a total of 368 students were included in the wrong category, while 12 students were suitable in choosing majors. The results of other studies Candiasa, Natajaya, dan Widiartini (2018) showed that 68% of students had a discrepancy with the chosen program.

The reason for choosing majors is not necessarily due to the suitability of aptitude and interests but also several other things. It might be the cause of some subjects in this study who are not right in choosing majors. Athanasou (2009) found that in general, most ordinary people will not consider their abilities, interests, and aptitudes, and tend to choose a trend that they do not necessarily like. Candiasa, Natajaya, and Widiartini (2018) stated that from the data of subjects who had a discrepancy in the chosen majors, 58% of them chose the program because they followed friends, advice from parents, and others, and 26% chose it because it was easy to find work. (Akmal, Arlinkasari, & Kumalasari 2017; Asmara & Haryanto, 2015; Septian, 2011) added that the placement of majors in schools was based on final exam scores, report cards, physical conditions, recommendations of Guidance and Counseling teachers, and their wishes in that department. Wati, Riza, and Sugandi (2019) also showed data where students in choosing majors, 86% of them were influenced by parents because, after graduation, it was easy to get a job, and 52% were influenced by peers.

The suitability between the aptitudes and interests of students with the majors or expertise packages taken will greatly determine the success of these students in undergoing the learning process. Aptitudes and interests of students play an essential role in achieving success in the department or package of expertise chosen. Thus, by knowing the aptitudes and interests of prospective students, it can help and facilitate the school in determining the right direction for students (Asmara & Haryanto, 2015; Rohman & Darmawan, 2013). Iddekinge, Putka, and Campbell (2011) add that people who have aptitudes and interests in accordance with their package of expertise will (a) be able to adjust to the environment, (b) be more satisfied with their environment, (c) able to have a good performance, (d) and able to survive in this environment compared to people who do not have the appropriate interests and aptitudes.

On the other hand, the mismatch of aptitudes and interests can lead to a number of student academic problems at school. The results of research conducted by Argyropoulou, Dimakakou, and Besevegis (2007) also showed that the results of students who felt less clear about their interests made them doubt related to their ability to obtain high grades in the chosen department. Some other problems also occur, such as lack of motivation to learn, do not have confidence in the achievements that can be achieved, cannot work in accordance with their educational background, or even unemployed after graduation (Argyropoulou, Dimakakou, & Besevegis, 2007; Arifin & Ristadi, 2017; Lestari & Pardimin, 2019; Rohman, 2015). Research conducted by (Arifin & Ristadi, 2017; Lestari & Pardimin, 2019) explains that the high unemployment rate of Vocational High School graduates is due to the mismatch of skills and knowledge students have. Even more than that, the problems experienced by these students can also have an impact on teachers' counseling guidance because they have to deal with obstacles experienced by students (Amoah, Kwofie, and Kwofie, 2015).

6. Conclusion

Based on the aptitude profile of the interests possessed by students of a private Vocational High School in Surakarta, Indonesia, it can be concluded that in choosing a major at Vocational High School, students based their interests more than their aptitudes. The result of this study can be used as an evaluation material and input for policymakers to establish student admission procedures with a more comprehensive method. So those talented students who have a strong interest in raw material input are obtained, then follow the learning process at vocational schools, and graduate with competencies and skills following the needs of the world of work.

Regarding the Intelligence and aptitude (comprehension, reasoning, and arithmetic), students, who were the majority in the category of enough and below average, needed strategy with appropriate learning methods and habits. The program that needs to be prepared by the school is to optimize this high interest as an encouragement for students to be actively involved in learning, accompanied by learning methods that are more practical, giving gradual and simultaneous assignments, and learning evaluation are done more frequently.

Practical learning methods, such as those implemented in vocational schools, were suitable enough to help students understand the material by practicing it. Regular assignments were also needed to make it easier for students to apply material that has been previously obtained. Conditions that are not too prominent intelligence need to be accompanied by routine and regular learning habits so that students have the opportunity to repeat the material that has been delivered in class.

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