

The Contribution of Visual-spatial Intelligence towards the Drawing Capability of 11th Grader Teknik Gambar Bangunan (TGB) Students on Interior-exterior Subject in SMK-PU Negeri Bandung

Riskha Mardiana, Rr. Tjahyani Busono, Arif M. Fitri Permana

Universitas Pendidikan Indonesia
Bandung, Indonesia
riskhamardiana@upi.edu

Abstract—This research background is based on the gap among students regarding the capabilities to understand and visualize a certain shape and color of interior-exterior subject, seen by the visual-spatial intelligence of the students themselves. Visual-spatial intelligence and drawing ability research are focusing towards the 11th grader in Teknik Gambar Bangunan (TGB) of interior-exterior subject in SMK-PU Negeri Bandung. Thus research aimed to attain the data of: (1) Visual-spatial intelligence of 11th grader TGB SMK-PU Negeri Bandung; (2) The drawing ability of 11th grader TGB of Interior-Exterior subject in SMK-PU Negeri Bandung; and (3) The contribution of visual-spatial intelligence towards the drawing ability of TGB students on Interior-Exterior subject in SMK-PU Negeri Bandung. The theoretical framework or the research method used in this research is the descriptive correlation method with the quantitative approach. Sample technique of the research is saturation sampling. The sample of this research is about 67 TGB students of 11th grader in SMK-PU Negeri Bandung; and The collecting technique of the data is based on the data analysis test technique of product moment. The Result of the research shows that : (1) Visual-spatial intelligence of 11th grader TGB students in SMK-PU Negeri Bandung are majority under the average number with the percentage of 62,89%; (2) The drawing ability of 11th grader TGB students in SMK-PU Negeri Bandung are majority under the average standardized rate with the percentage of 59,70%; (3) There is a significant contribution between the linkage of visual-spatial intelligence towards the 11th grader TGB students in SMK-PU Negeri Bandung in interior-exterior subject. Those data occurred based on the calculation of 4,805 (t count) > 1,667 (t table) with the significance of 5%. Visual-spatial intelligence actually put efforts on giving the contribution with the amount of 25,72% towards the ability student's drawing and the data above is also supported by other factors.

Keywords—*visual-spatial intelligence; drawing ability; interior exterior*

I. INTRODUCTION

Formal education in Indonesia has many levels divided into several types, namely *SD* (Elementary School), *SMP* (Junior High School), *SMA* (Senior High School) / *SMK*. *SMK*

(Vocational High School) is one of the formal education that provides vocational education at the level of secondary education that leads students to have an expertise in one particular field. One of the *SMK Negeri* in Bandung is SMK-PU Negeri Bandung West Java Province.

Sekolah Menengah Kejuruan Pekerjaan Umum (SMK-PU) Negeri Bandung is located in Garut Street no. 10 city of Bandung, has 7 vocational major namely, *Teknik Kendaraan Ringan* (TKR), *Teknik Geomatika* (GEO), *Teknik Komputer dan Jaringan* (TKJ), *Teknik Pemesinan* (TPM), *Teknik Instalasi Listrik* (TITL), and *Teknik Gambar Bangunan* (TGB). The vision and mission from TGB Department is to equip the students with skills, knowledge and attitudes to be competent (1) Do the job as Drafter / Drawer in building construction, (2) Do the job as Drafter / Imagery in building implementation, (3) building construction work services independently / or an entrepreneurship in drawing studio.

The Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 70 Year 2013 on Basic Framework and Curriculum Structure of Vocational High School / Madrasah Aliyah Vocational, one of the subjects in the regulation spoken is Interior-Exterior. The core of this subject is to educate the students to create an interior and exterior design on a building [1].

The interior design itself is a design message with the intention to answer the needs of the wearer's living space [2]. The need for space for residential houses include living room, main room, kids room, kitchen, bathroom, family room, etc. In the Interior-exterior, learners are required to think a lot of pictures. According to Iskandar image thinking is a self-talk process of a designer, that is to communicating with a sketch or picture [2].

The syllabus SMK-PU Negeri Bandung has explained about the basic competencies that has to be owned by students. One of them is that the students are able to reason and present the division of space on the interior based on the function by considering the composition, harmony, and aesthetics. Based on direct observation of researchers, in practice some of the

students are still not capable in reasoning space ownership. From the results of student drawings, can be seen that there are also some students who are considered still lacking in indicators of ability.

Not all of the students have difficulty in pouring the work of interior drawing. There are also students who seem good in their drawing results. Students can also imagine the placement of objects, projection slices well. Thus there is a gap between the Basic Competition and the facts in the classroom. There is a difference in students' ability in drawing interior-exterior subjects. This is one of the reasons why the observer filed the title.

The differences of difficulty in terms of reasoning, imagining and pouring an object in the picture is one of the indicators of the presence of differences in visual-spatial intelligence among students. As Armstrong described, there are eight types of intelligence which among them is visual-spatial intelligence. Visual-spatial intelligence is the ability to understand the visual world accurately and make changes to that perception. According to him, visual-spatial intelligence involves sensitivity to the colors, lines, shapes, spaces and relationships that exist between these elements [3]. One of the indicator of an individual having high visual-spatial intelligence is that one is capable of seeing things from different perspectives and having a good imagination.

Referring to the explanation in the previous paragraph, that interior-exterior subjects tend to be dominated by visual-spatial intelligence. It can be interpreted where someone who has high visual-spatial intelligence has the ability to process patterns, lines, colors and shapes better than people who have low visual-spatial intelligence. Thus it can be understood that Interior-Exterior subjects are closely related to students' visual-spatial intelligence.

Based on the data above, the author wanted to find how much contribution of visual-spatial intelligence to the ability of drawing Interior-Exterior subjects. Therefore, the authors conduct research titled "The Contribution of Visual-Spatial Intelligence Towards the Drawing Capability of *Teknik Gambar Bangunan* (TGB) 11th Grader Students of Interior-Exterior Subject in SMK-PU Negeri.

The formulation of the problem in this research are: (1) How are the visibility-spatial intelligence of 11th grader TGB students in SMK-PU Negeri Bandung; (2) How are the 11th grader TGB students' drawing ability on Interior-Exterior subjects in SMK-PU Negeri Bandung? (3) How much contribution of students' visual-spatial intelligence to the drawing ability of TGB students on Interior-Exterior subjects in SMK-PU Negeri Bandung?

The purpose of this research is to know: (1) The visual-spatial intelligence of 11th grader TGB students in SMK-PU Negeri Bandung; (2) 11th grader TGB students' in SMK-PU Negeri Bandung abilities to draw; (3) The magnitude contribution of visual-spatial intelligence to the 11th grader TGB students' ability to draw.

Visual-spatial intelligence is part of the eight Dual Intelligence spoken by Howard Gardner. According to Gardner, visual-spatial intelligence is an intelligence that includes thinking in pictures as well as the ability to absorb, transform, and recreate various aspects of the visual-spatial world [4]. While visual-spatial intelligence according to Armstrong, the ability to understand the spatial visual world accurately and make changes to that perception [3].

"Spatial Intelligences features the potential to recognize and manipulate the patterns of wide space as well as the pattern of more convined area" Gardner stated in the description that space intelligence has the potential to recognize and manipulate spatial patterns and small spatial patterns [5].

This intelligence includes the ability to visualize and manipulate representing visual ideas as graphics, and orientate themselves appropriately in a space. People who have visual-spatial intelligence will tend to learn more easily through pictures, videos and props.

Thus can be interpreted that someone who has a great spatial visual intelligence can describe the visual form of an object and /or to orientate it precisely in a space. Whether in the form of sketches, mockups, and concept ideas. This include in the 2013 curriculum syllabus. In Interior-Exterior subjects; Analyze activity and facility needs in determining space on interior; Reasoning and presenting the division of space on the interior based on the function by considering the composition, harmony, and aesthetics. Can be concluded, that students are required to be able to analyze and present an interior design based on the function of space, user activity, and environmental conditions. The students who have great visual-spatial intelligence will get a greater chance to solve problems in Interior-Exterior subjects.

Putra et al. defines an ability as a state in a person who is fully earnest, efficient and successful in carrying out a job in order to produce something optimal [6]. An image is a language, just like a verbal language whose expression is through words, writings or cues [2]. The difference is only on the sensing, the expression and the rules. All of them are evidenced by the birth of the image as one of the main languages in various professions and societies (various disciplines: art, design, engineering, even social disciplines.

Purwanto mentions that there are factors that affect the ability to draw, one of them is the individual factor itself. The individual factors themselves has a visual-spatial intelligence on it [7].

Based on the problem that are under study, the research hypothesis can be described as:

- H0: There is no positive contribution between Visual-Spatial Intelligence to drawing ability of 11th grader TGB students on Interior-Exterior subject in SMK-PU Negeri Bandung.
- Ha: There is a significant positive contribution between Visual-Spatial Intelligence to drawing ability of 11th grader TGB students on Interior-Exterior subject in SMK-PU Negeri Bandung.

II. METHOD

The method used in this research is correlation descriptive method. The research was conducted in SMK-PU Negeri Bandung with the population and the samples are the 11th grader *Teknik Gambar Bangunan* (TGB) students on Interior-Exterior subject in SMK-PU Negeri Bandung. The sampling technique that used is a saturated sample.

The collecting data technique from this research is by using test. With visual-spatial intelligence instrument obtained from LBK UPI, meanwhile the drawing ability are using expert judgment validation. The analysis technique used is the tendency test of visual-spatial intelligence and drawing ability, correlation analysis with product moment, t-test, and determination analysis.

III. RESULT AND DISCUSSION

The result of this research is in the form of contribution of visual-spatial intelligence and students' drawing ability on interior-exterior subjects that test tendency, correlation analysis, t-test, and determination analysis.

A. Visual-Spatial Intelligence Test Result (the X Variable)

Based on the table above can be seen that the highest level of visual-spatial intelligence of the students is in the average category with 42 students of 62.89% percentage, followed by the under 13 students with the average of 19.4 percent. % Next the category above average as many as 12 students with a percentage of 17.9%. The data can be seen in the diagram below:

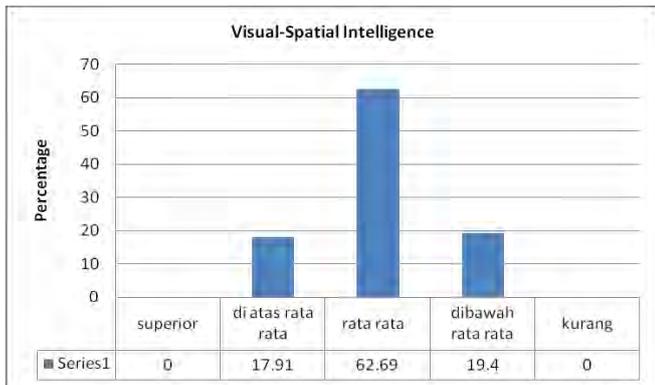


Fig. 1. Diagram of students' percentage of visual-spatial intelligence.

B. Drawing Ability Test Result (the Y Variable)

Based on the table above it is known that 36 students got a score below KKM with 59.70% percentage, and 31 students got score above KKM with 40.30% percentage The data can be seen in the diagram below:



Fig. 2. Diagram of students' drawing ability.

C. Correlation Analysis Results

Correlation analysis is used to find out the correlation of visual-spatial intelligence correlation to the drawing ability of 11th grader TGB students on Interior-Exterior subject in SMK-PU Negeri Bandung. This analysis uses the *product moment* formula. Therefore, can be obtained 0,512 correlations. The result consulted with the interpretation of coefficient correlation table, so the correlation of visual-spatial intelligence to medium correlation ability can be concluded.

D. T-Test Result

The significance test is performed to determine whether the correlation value is significant or not. Obtained t count of 4.805, while the value of t table obtained for the number of respondents 67 students with a significance level of 5% is 1.667. Thus 4.805 (t_{count}) > 1.667 (t_{table}), means that there is a significant contribution between visual-spatial intelligence to the ability of drawing. Therefore, H_a is acceptable.

E. Determination Analysis Result

Determination analysis is performed to know about the amount of contribution of spatial visual intelligence to students' drawing ability, so the percentage of contribution of visual-spatial intelligence to students' interior-exterior drawing ability can be showed. The formula used is as:

$$KD = r^2 \times 100\%$$

$$KD = 0,512^2 \times 100\%$$

$$KD = 26,18\%$$

r = correlation coefficient obtained from using *product moment*

Therefore, visual-spatial intelligence contributes 26.18% to the students' ability to draw, while the other is a contribution comes from other factors.

IV. CONCLUSION AND SUGGESTION

A. Conclusion

The conclusions obtained from this research are

- Visual-spatial intelligence of students of 11th grader TGB students in SMK-PU Negeri Bandung majority are on the average with 62,89% percentage.
- The majority of 11th grader TGB students on Interior-Exterior subject in SMK-PU Negeri Bandung ability to draw are still under KKM with presentation of 59,70%.
- There is a significant contribution between visual-spatial intelligence on the drawing ability of 11th grader TGB students on Interior-Exterior subject in SMK-PU Negeri Bandung. It is obtained from $4.805 (t_{count}) > 1.667 (t_{table})$ with 5% significance. Visual-spatial intelligence contributes 26.18% to the students' drawing ability, while the other is the contribution of other factors.

B. Suggestion

Based on the results of research and conclusions that have been discussed, the suggestions that can be submitted by researchers are as follows:

- For the school subject Teachers, have to know the condition of visual-spatial intelligence of their students. Therefore, it can help the teacher in determining the treatment to each student to increase the students' potential on interior-exterior subjects in accordance with the portion required to the students themselves.

- For the school, in order to improve the quality of graduates who become the school benchmarks, it is necessary to test intelligence on the selection test to entry the school so that we know the potential of the students and could provide the best course recommendations for students. At the end, the students will study well in accordance with the potential in themselves.

REFERENCES

- [1] Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 70 Tahun 2013 tentang Kerangka Dasar Struktur Kurikulum Sekolah Menengah Kejuruan/ Madrasan Aliyah Kejuruan
- [2] I. Iskandar, *Menggambar Desain Interior*. Bandung: Kiblat, 2010.
- [3] T. Armstrong, *Kecerdasan Multipel di dalam Kelas Edisi Ketiga*. Jakarta: PT Indeks, 2013.
- [4] Minsih, "Pengembangan Kecerdasan Majemuk pada Implementasi Kurikulum 2013," *Refleksi dan Realisasi Kurikulum 2013*, vol. 1, no. 1, pp. 278-285, 2013.
- [5] N.R. Ali, "Analisis Konsep Howard Gardner Tentang Kecerdasan Majemuk (Multiple Intellegences) dan Implikasinya Terhadap Pembelajaran yang Sesuai dengan Perkembangan Anak di TK Alam Alfa Kids Pati Tahun Ajaran 2014/2015. Skripsi Fakultas Ilmu Tarbiyah dan Keguruan Universitas Islam Negeri Walisongo Semarang," 2015, unpublished.
- [6] D.C. Putra, M. Mustam, and T. Yuniningsih, "Pengaruh Kemampuan Kerja dan Lingkungan Kerja Terhadap Kinerja Pegawai di Kecamatan Gayamsari Kota Semarang," *Jurusan Administrasi Publik Fakultas Ilmu Sosial dan Ilmu Politik Universitas Diponegoro*, 2012, unpublished.
- [7] N. Purwanto, *Psikologi Pendidikan*. Bandung : Remaja Rosdajarya, 2011.