The Influence of Creativity on Human Anatomy Learning Process. A Cross-Sectional Study on 2nd year Medical Students

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ABSTRACT

Medical literature seems encourage the use of drawing as an educational tool in human anatomy. However, incorporating drawing as human anatomy educational tool seems to be overlooked in medical schools' curricula. In a previous study conducted by the authors found that drawings are a useful tool in understanding general anatomy from dental students' perspective. Drawing papers were collected and immediately evaluated. Evaluation process was based on three indices; Similarity Index, Creativity Index, and Information Index. All these indices were given 3 scores based on the way student depicts the original figure. These criteria were agreed upon by the first and second authors. Seventy-two 2nd year medical students were included in this study. Forty-two students were females (59.2%), whereas 29 (40.8%) were males. The close pattern between similarity and creativeness indexes has been statistically confirmed. Kendall's tau_b Test showed a highly positive relationship between similarity and creativity indexes (*P*=0.000). Similarly, the relationship between creativity and information indexes was found to be highly significant relationship (*P*=0.000). in terms of gender, Chi-Square Test showed no significant relationship between gender in creativity score (*P*=0.157). Creative minds are better equipped to understand human body. They might have better ability to comprehend medical knowledge. This might be related to their learning ability, which might overcome educational challenges.

Keywords: Medical literature, human anatomy, Similarity Index, Creativity Index, Information Index

INTRODUCTION

Human anatomy is an essential subject in both medical and dental undergraduate studies. It provides knowledge foundation through which all dental and medical topics rely on. It is the gateway for medical students to understanding the realm of human body[1-3].

Educating human Anatomy through drawings, could be the best tool in its understanding[4,5]. This is why we do not find a human anatomy text clear from drawing, sketches, or real images of human cadaveric images.

Medical literature seems encourage the use of drawing as an educational tool in human anatomy[6-8]. However, incorporating drawing as human anatomy educational tool seems to be overlooked in medical schools' curricula. In a previous study conducted by the authors found that drawings are a useful tool in understanding general anatomy from dental students' perspective[9].

MATERIALS AND METHODS

The study was approved by the Ethical Committee in Ibn Sina University of Medical and Pharmaceutical Sciences. The study was conducted during the first semester on 2nd year medical students in Ibn Sina University. Students were examined by doing drawings of the orbital walls with pointing to certain anatomical part within these walls.

Drawing papers were collected and immediately evaluated. Evaluation process was based on three indices: Similarity Index, Creativity Index, and Information Index. All these indices were given 3 scores based on the way student depicts the original figure. These criteria were agreed upon by the two authors who have more than 15-year experience of medical education.

Similarity index refers to the closeness of the drawing to the original presented sketch or drawing in the anatomy textbook. It has 3 scores. Score 1 means that the drawing is exactly similar to the original, as if it has been copied and pasted. 2. Like the original with few missing details. 3. Similar to the original with essential details missing. As far as creativity index, 3 scores were considered. Score 1. The figure is very similar to the original with added creative elements. 2. The drawing is similar to the original with minor modifications. 3. Not similar but gives a hint on the original. Information index scores were as follows: 1. Exactly similar to the original figure with detailed information for each (colored) part, 2. Similar to the original with information to the important parts of the figure, 3. Similar to the figure with information to some parts within the Figure 1.

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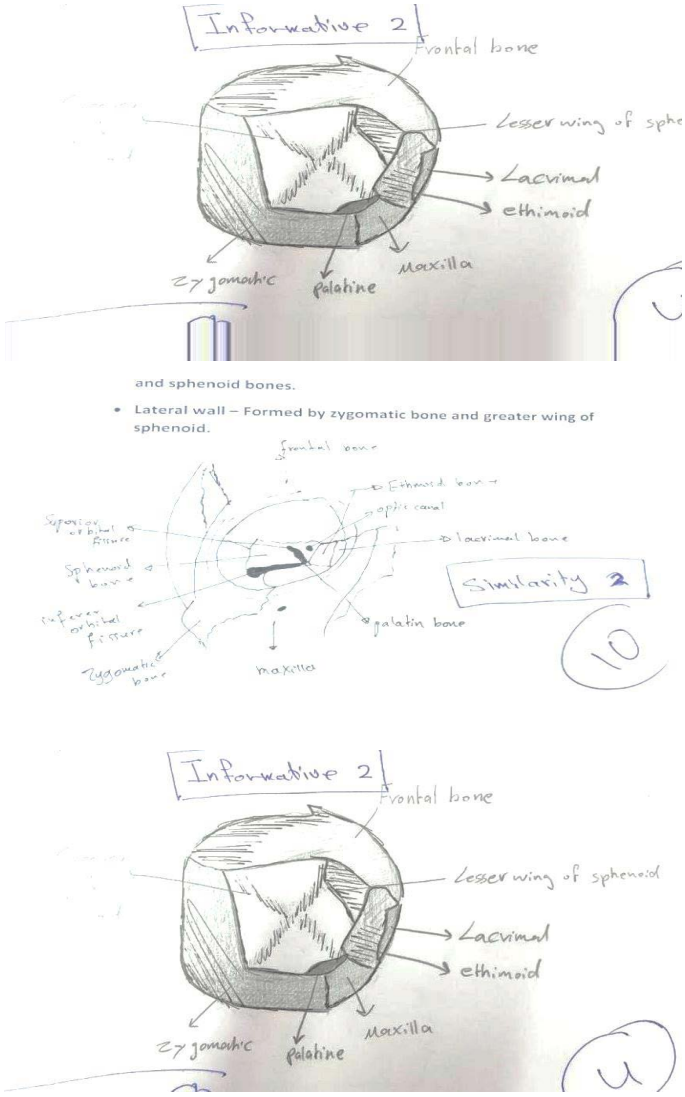
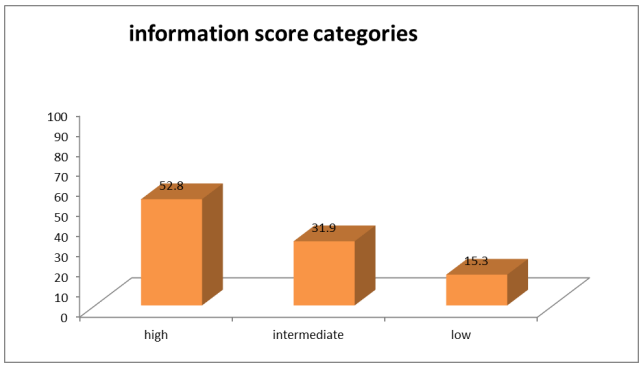


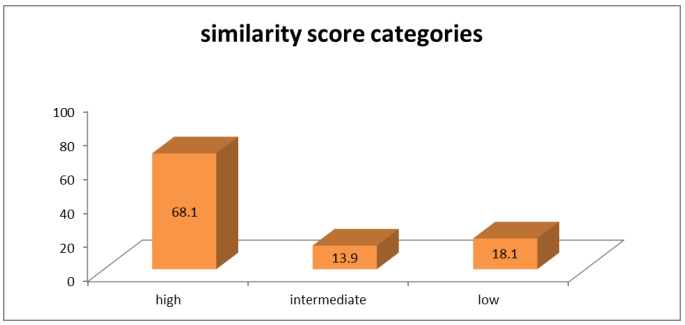
RESULTS

Figure 1. sample drawings with score 2 for creativity (upper left), similarity (upper right) and information (lower left)

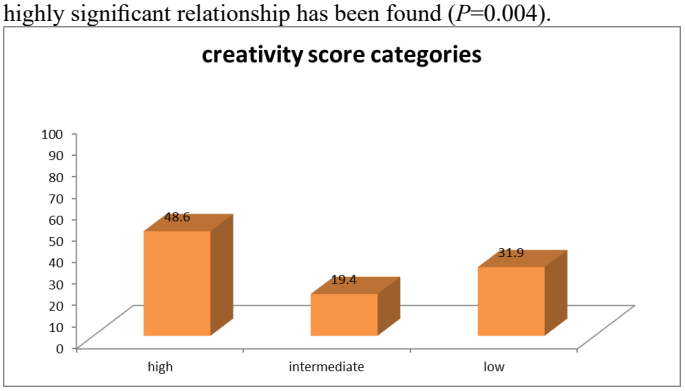
Seventy-two 2nd year medical students were included in this study. Forty-two students were females (59.2%), whereas 29 (40.8%) were males. The evaluation of information is shown in Figure 2.



As shown in Figure 1, high information score was the highest reported score. More than half of the students were given high information score. Around third of the medical students had the intermediate score in information evaluation. The least number was reported in the low score category. This reflects a relatively high level of information regarding the test topic. Chi-Square Test showed a significant relationship between gender and information score (*P*=0.024)



Similarly, high category score was the highest in the similarity category. Almost two-third of students were given a high score. However, unlike information score, intermediate category was reported the lowest number of students. Both intermediate and low score categories lie within the other one third area of responses. The similarity between information and similarity score has been statistically confirmed. A highly significant relationship has been found (*P*=0.004).



Creativity, in terms of score shows more similar pattern to similarity index. High score was reported in about half of the participants. Almost third of the students had low creativity score. The smallest score group was the intermediate with slightly lower degree compared to the low score. The close pattern between similarity and creativeness indexes has been statistically confirmed. Kendall's tau_b Test showed a highly positive relationship between similarity and creativity indexes (*P*=0.000). Similarly, the relationship between creativity and information indexes was found to be highly significant relationship (*P*=0.000). in terms of gender, Chi-Square Test showed no significant relationship between gender in creativity score (*P*=0.157).

DISCUSSION

This study data have shown that students with high creativity score enjoys higher ability to simulate the actual anatomical area. This ability to figure out the actual position of each anatomical structure and its relation to other structures enhances their diagnostic skills. Similarly, students with high similarity scores have higher information scores. This implies the obvious influence of imagination on information levels. It has been found that utilizing drawing in human anatomy education promote learning process through improvement of students' observational skills[10] through the dynamic of visualization and encourage creative atmosphere through creating wider learning environment[11-13]. It makes it easier for them to comprehend medical knowledge[9].

It acknowledged by the United Nations that sustainable development encourages multidisciplinary development path[14]. Inclusion of drawing as an educational tool will empower their visual memory and encourage them to explore and improve their creativity[15]. Encouraging medical students to use their creative skills will improve their resilience and problem-solving abilities[16,17]. Medical education is an ever-stressful environment[18-20]. This mandate that medical students need to have different skills, which could enable them to overcome this stressful educational challenge.

The resemblance between creativity element and similarity scores across categories reflects the higher influence of creativity on the similarity between the actual structure and the sketch provided by the student, which entails more accurate level of imagination toward the structure topic under question. It might also reflect the relationship between creativity and hand skills possessed by the students.

Obvious relationship between similarity and information indices supports the fact that anatomy is a visual science. Throughout history drawings were a major educational tool in human anatomy. This goes back to famous artistic figures such as Leonardo Da Vinci[21].

Our study further showed an important aspect of education. This is the influence of creativity on Endorsing students' creativity in their early medical education process will fuel their learning[17] and their engagement in the education process[16,22], increase their self-confidence, empowers their sense of achievement[23], and help them to overcome the burnout environment[24]. More importantly, it will embody their creativity within the learning process in the medical knowledge in general. There is an increase recognition for the role of artistic creativity in the development of coefficient healthcare professionals[23].

Important aspect of medical education. In fact, the study showed that creativity and medical knowledge seems to be inseparable. On the other hand, it shed the light on the importance of faculty choice for their prospect students. Encouraging creative minds to enroll in medical education might have a revolutionary impact on medicine.

CONCLUSION

Creative minds are better equipped to understand human body. They might have better ability to comprehend medical knowledge. This might be related to their learning ability, which might overcome educational challenges.

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Competing Interest: None

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