

# Simultaneous anatomical sketching as learning by doing method of teaching human anatomy

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## ABSTRACT

**Objective:** Learning by lecture is a passive experience. Many innovative techniques have been presented to stimulate students to assume a more active attitude toward learning. In this study, simultaneous sketch drawing, as an interactive learning technique was applied to teach anatomy to the medical students. **Materials and Methods:** We reconstructed a fun interactive model of teaching anatomy as simultaneous anatomic sketching. To test the model's instruction effectiveness, we conducted a quasi-experimental study and then the students were asked to write their learning experiences in their portfolio, also their view was evaluated by a questionnaire. **Results:** The results of portfolio evaluation revealed that students believed that this method leads to deep learning and understanding anatomical subjects better. Evaluation of the students' views on this teaching approach was showed that, more than 80% of the students were agreed or completely agreed with this statement that leaning anatomy concepts are easier and the class is less boring with this method. More than 60% of the students were agreed or completely agreed to sketch anatomical figures with professor simultaneously. They also found the sketching make anatomy more attractive and it reduced the time for learning anatomy. These number of students were agree or completely agree that the method help them learning anatomical concept in anatomy laboratory. More than 80% of the students found the simultaneous sketching is a good method for learning anatomy overall. **Conclusion:** Sketch drawing, as an interactive learning technique, is an attractive for students to learn anatomy.

**Key words:** Active learning, anatomy, sketch, teaching

## INTRODUCTION

Anatomy is an essential component of medical curricula, although it is still at the heart of the philosophy of medicine.<sup>[1,2]</sup>

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Several learning and teaching approaches have been described to enhance students' understanding of anatomy, such as, lectures, small group learning and practical classes, computer multimedia, seminars, and videos.<sup>[3-5]</sup> Learning by lecture is a passive experience in which little processing occurs between the ear that hears and the finger that writes.<sup>[6]</sup> Whenever teaching strategy is a continuum from teacher center methods, such as lecture to some innovative and students-centered approaches.<sup>[7-9]</sup> The efforts have been made over recent years to promote the introduction of new techniques to stimulate students to assume a more active attitude toward learning.<sup>[10-12]</sup> Examples of different techniques are provided which are grouped into the categories of brainstorming, experiential learning, role-playing, competition and games, stimulus materials, brain-storming, and sub grouping. Anatomy as a discipline has firmly established its place in medical education. As the teaching of anatomy has developed, the value of the

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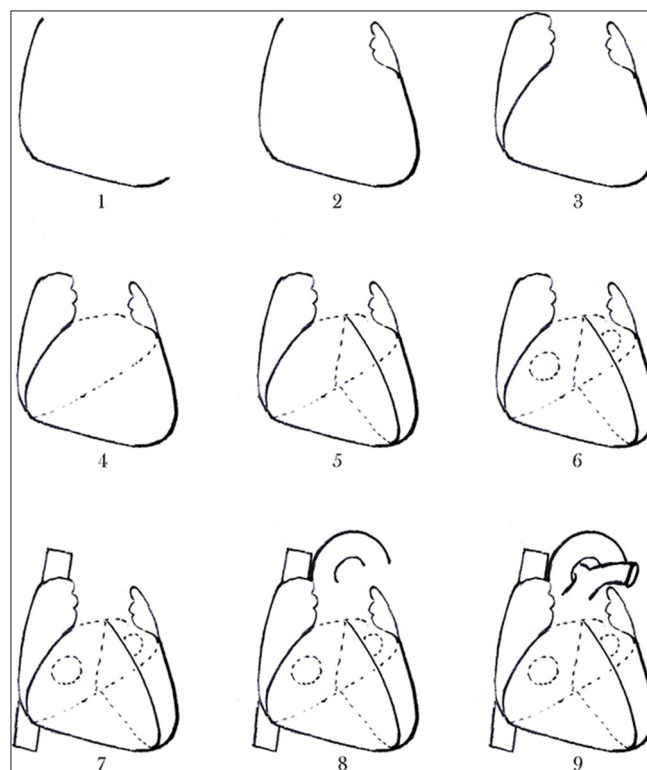
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deep learning approach has been shown to be superior to the 'surface learning approach.'<sup>[11-15]</sup> Interactive techniques in anatomy education in theory class has received little attention and a stronger disposition toward classic teaching techniques often exists among teachers.<sup>[7]</sup> Many successful innovative teaching techniques have been applied to improve anatomy courses by means of interactive learning. For example, Butler used learning packages within the lecture format. The other scientist such as Handfield-Jones *et al.*, used different innovative techniques such as role-playing, competition and games, stimulus materials, brain-storming, and sub grouping in medical teaching.<sup>[6]</sup> Another interesting method also used in teaching anatomy by Geuna *et al.* They outlined an interactive approach to teaching anatomy based on the use of "brainstorming."<sup>[7]</sup> Spontaneous storytelling in problem-based learning was a method used by Kieser *et al.*,<sup>[16]</sup> that enhanced clinical anatomy teaching in half of the third-year dentistry class. In recent years, computer-based learning received more attention. For example, Corton *et al.*,<sup>[17]</sup> showed that student satisfaction was highest with application of an interactive computer-based method in comparison with a conventional reading approach for learning pelvic anatomy. In recent years, Durosaro *et al.*,<sup>[18]</sup> showed that team-based learning approach emphasizing the use of knowledge-sharing computer portals maximizes opportunities for students to master their knowledge and improve cognitive skills to ensure clinical competency. Yip *et al.*,<sup>[10]</sup> also introduced a new interactive computer-based program designed for independent learning of anatomy. For deep learning in anatomy, one of the methods that was introduced into integrated clinical skills teaching sessions was body painting which included clinically important aspects of respiratory system, musculoskeletal system, and topics in regional anatomy including head and neck.<sup>[7]</sup> Because the study of anatomy concerned observation and drawings, the popularity of the anatomist was equal to the quality of his drawing talents, and one need not be an expert in Latin to take part.<sup>[1]</sup> Many famous artists studied anatomy, attended dissections, and published drawings for money, from Michelangelo to Rembrandt. This would suggest that prospection can fit very well into the structure of modern medical training on them and link what they are being taught to their own body. This may seem like a relatively obvious idea but to formally link it into teaching of anatomy should aid memory recall.<sup>[19]</sup> Learning by doing is one of the best known strategies in enhancing learning. In this study, the application of an interactive learning technique, we have named it simultaneous sketch drawing, to teach anatomy to the medical students is outlined, and the results of an evaluation study aimed at exploring the students' views on this teaching approach are reported.

## MATERIALS AND METHODS

We reconstructed a fun interactive model of teaching anatomy as simultaneous anatomic sketching. To test the model's instruction effectiveness, we conducted a quasi-experimental study. The study population consisted of all first year medical students at our University for 2011 ( $n = 57$ ). The duration

of undergraduate medical education in the Iranian medical education curriculum is 7 years. During the first five semesters of education, students take their basic science courses which include gross anatomy. The study was conducted at the end of the trunk anatomy course of the first-year medical curriculum organized by the Shiraz University of Medical Sciences, Iran, to evaluate the efficacy of simultaneous anatomical sketching in teaching and learning anatomy. Three anatomy teachers attended the class and the lectures were presented in 60 h. Simultaneous anatomic sketching was presented in 20 h. The remainder hours the lectures were presented by other colleague in form of traditional lecturing and use of anatomical slides show. A total of 57 students attended the course. Simple sketches were drawn on an overhead projector and the students were asked to draw simultaneously. An example of teaching of heart anatomy is presented in Figure 1. Anatomical points were explained and added to the sketches. At the end of the anatomy course, the students were asked to write their learning experiences in their portfolio, this portfolio was a flexible learner-centered portfolio format. The students' views regarding the simultaneous anatomical sketching sessions were evaluated by means of a questionnaire that included questions about their interest in each session and their thoughts about the usefulness of each session for learning anatomy. Validity of the questionnaire was determined by a panel of experts and the reliability was determined after a pilot study ( $r = 0.86$ ). After



**Figure 1:** The steps for drawing a sketch of human heart. (1) Right and inferior borders were drawn. (2) Left border and auricle were added. (3) Right atrium and auricle were drawn. (4) Coronary sulcus as a dotted line was added. (5) Interventricular septum (and sulcus) was sketched. (6) Atrioventricular orifice as two-dotted circle was added. Superior and inferior vena cava, aorta and pulmonary arteries were added in the steps 7, 8, and 9, respectively

collecting data, the results of questionnaires were determined by a statistical software. The results of portfolio assessment were analyzed by reading all of them and emerging important themes.

## RESULTS

Fifty-seven students completed the questionnaire. The details on students' responses are presented in Table 1.

More than 80% of the students agreed or completely agreed with this statement that leaning anatomy concepts are easier with this method. They preferred to attend in these anatomical classes and found that the class is less boring and remaindering anatomical concept is easier. These numbers of students also found the sketching is a good method for learning anatomy overall.

More than 60% of the students agreed or completely agreed to sketch anatomical figures with the professor simultaneously and found the method help them to learn anatomical concept in the class. These also found the sketching make anatomy more attractive and reduce the time for learning anatomy. These number of students agreed or completely agreed that the method help them learning anatomical concept in anatomy laboratory Several themes about deep learning and attractive class were identified in the writings of students in portfolios. Feelings of a good teaching culture and attractive educational environment were common.

## DISCUSSION AND CONCLUSION

The result of this study revealed that the student's satisfaction with simultaneous anatomical sketching sessions was higher than traditional methods. Many successful innovative teaching techniques have been applied to improve anatomy courses by means of interactive learning. For example Butler used learning packages within the lecture format. The other scientist such as Handfield-Jones *et al.*,<sup>[3]</sup> used different innovative techniques

such as role-playing, competition and games, stimulus materials, brain-storming, and subgrouping in medical teaching. Another interesting method also used in teaching anatomy by Geuna *et al.* They outlined an interactive approach to teaching anatomy based on the use of "brainstorming."<sup>[4]</sup> Spontaneous storytelling in problem-based learning was a method used by Kieser *et al.*,<sup>[6]</sup> that enhanced clinical anatomy teaching in half of the third-year dentistry class. In recent years, computer-based learning received more attention. For example, Corton *et al.*,<sup>[5]</sup> showed that student satisfaction was highest with application of an interactive computer-based method in comparison with a conventional reading approach for learning pelvic anatomy. In recent years, Durosaro *et al.*,<sup>[18]</sup> 2008 showed that team-based learning approach emphasizing the use of knowledge-sharing computer portals maximizes opportunities for students to master their knowledge and improve cognitive skills to ensure clinical competency. Yip *et al.*,<sup>[10]</sup> also introduced a new interactive computer-based program designed for independent learning of anatomy. We used painting in anatomy teaching and there is another use of painting in learning anatomy that by McMenamin,<sup>[7]</sup> who introduced body painting by nontoxic paints, into integrated clinical skills teaching sessions which included clinically important aspects of respiratory system, musculoskeletal system, and topics in regional anatomy including head and neck. Our experience indicates that the technique of simultaneous anatomical sketching could is an effective way to induce learning to anatomy students in an active way. Simultaneous anatomical sketching is a method that encourages the students to participate actively in the learning process, resulting in enjoyment for both students and teachers.

The use of interactive and creative techniques, such as simultaneous anatomical sketching, in anatomy courses, facilitates the application of similar learning methods in the following academic years by the students themselves, because students will have already learned and experienced the active learning method. For example, we encouraged the students to use this method in learning neurology, radiology, and the other courses that the method is applicable, which not only help

**Table 1: Evaluation of sketching simultaneously with professor for learning anatomy in 57 respondents, Shiraz University of Medical Sciences, Iran, 2010**

	Strongly agree	Agree	Neither	Disagree	Strongly disagree
Leaning anatomy concepts are easier when you sketching simultaneously with professor	38.5	49.1	1.7	8.7	1.7
I prefer to attend in the anatomical class which is presented with this method	29.8	56.1	0.0	14.0	0.0
Attending in the class which is presented with sketching simultaneously with professor is less boring	22.8	61.4	3.5	7.0	5.2
I prefer to sketch anatomical figures with professor simultaneously	19.2	45.6	5.2	26.3	3.5
Sketching simultaneously with professor help me to reminder anatomical concept later	28.0	54.3	1.7	12.2	0.0
Sketching simultaneously with professor help me to learn anatomical concept in the class	24.5	54.3	1.7	17.5	1.7
Sketching simultaneously with professor make more attraction to anatomy	21.0	40.3	14.0	19.2	5.2
Sketching simultaneously with professor help me in learning anatomical concept in anatomy laboratory	17.5	49.1	7.0	15.7	5.2
Sketching simultaneously with professor reduce the time for learning anatomy	15.7	47.3	8.7	21.0	7.0
Overall, I found sketching simultaneously with professor a good method for learning anatomy	22.8	61.4	3.5	10.5	1.7

educators better understand the cognitive factors underlying student poor performance in medical school but also may shed light on the instructional tactics or interventions that are needed to optimize adaptive student self-reflection and self-regulation. Advantages of the method include increasing teacher and learner enthusiasm, improving participation. The use of this technique requires time, planning, a commitment to the teaching process, and a belief that the resulting learning will be both more enjoyable and productive. The teacher must practice the sketching and simple drawing before his/her classes. It should be noted that simple and schematic figure should be selected and every steps of sketching should be accomplished with anatomical explanation. In addition, some studies state that the majority of teachers have a preference to apply more than one teaching method in their instruction.<sup>[20-22]</sup> The pedagogical feasible model method and staff development activities can help teachers to improve their instructional skills.<sup>[23-25]</sup> However, it seems needed to revise the curriculum, modify educational objectives, and establish new courses.<sup>[26,27]</sup>

The method can be applied for teaching of all anatomic subjects and it seems there is no limitation.

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