

Dental Students Evaluation of Two Learning Modalities in Oral Histology

¹Wajnaa Qassim, PhD and ²Faaiz Alhamdani, PhD

^{1, 2}Department of Clinical Sciences, College of Dentistry, Ibn Sina University of Medical and Pharmaceutical Sciences, Baghdad, Iraq

Corresponding Author: Faaiz Alhamdani

E. mail: faaiz68@gmail.com

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Abstract

Background In medical education, feedback plays an important role in the assessment of the effectiveness of the adopted methods. **Objectives** This study was conducted to evaluate two learning modalities followed in the achievement of an oral histology course. **Materials and Methods** Eighty-three second-year students in the college of dentistry in Ibn Sina University of medical and pharmaceutical sciences were assessed for their attendance and scores in oral histology followed two different programs, only seven of the total students' number could not poll for their preference through a questionnaire. **Results** The study showed no significant difference in students' scores of both educational modalities, while there is a highly significant relationship of scores to their attendance. **Conclusion** Students tend to prefer having both theoretical and practical sessions on the same day. However, students' final course scores seem unrelated to the educational modality. Further studies regarding the use of different educational sources and their influence need to be considered.

Keywords: Learning modalities; oral histology; students based evaluation; undergraduate dental students

Introduction

Learning is defined as both social and, somehow, indescribable complex individual processes (Kelly, 2002). The complexity of the process on the individual level might explain the reason for different theories in the learning style reported in the literature (Barbe et al, 1988; Gregorc, 2016; Kelly, 2002; Kolb, 2007), which are in continuous development. The benefit of these modalities has been assessed regarding students' abilities (Papadatou-Pastou et al, 2018; Pashler et al, 2008; Riechmann

and Grasha, 1974). Most of these theories are based on communication using different human senses (Coffield et al, 2004). However, the recent development of different learning modalities. Medical learning is no exception (Willingham et al, 2015). It depends on accumulative information, acquired knowledge, investigation, and experience, as medical professions have both theoretical and practical aspects. In this sense, medical learning requires the implementation of multiple learning modalities to suit a wide spectrum of students and

to match their different abilities (Lilienfield et al, 2010). This brought the attention among academic researchers toward the value of the different learning modalities. Determination and assessment of learning styles are still the subjects of controversy. Some researchers believe there is inadequate evaluation of learning styles, and the process needs a particular kind of studies (Pashler et al, 2008), others showed that it is difficult for the teacher to assess the learning style of their students accurately (Papadatou-Pastou et al, 2018). This might reflect the paucity of studies in this field, basic medical sciences learning outcomes in particular. One of these basic medical sciences is Oral Histology. It is an important basic preparatory module for dental students. It provides a better understanding of dental and oral structures both in health and disease conditions. This subject needs to be provided in theory and laboratory to provide mandatory knowledge of oral tissues (Avery and Chiego, 2006).

Aim of the Study

To assess students' evaluation for Oral Histology subject regarding two educational modalities. The first one when theoretical and practical sessions are provided on the same day. The second when the practical session is given a few days later.

Materials and Methods

Eighty-three second-year students, College of Dentistry in Ibn Sina University, agreed to participate in this study. The study was approved by the Scientific Committee of Ibn Sina University of Medical and Pharmaceutical Sciences in February 2019. All the participants were taught by the same lecturer and have the same teaching facilities during the study period. Of the total number of 83 approached students, 76 students completed a specifically designed questionnaire for the study by the end of the first semester; the remaining 7 stu-

dents were excluded. The students were requested to answer some questions in Arabic (native) Language (Appendix I). Students were informed to provide their responses anonymously to ensure credibility. The questions aim to compare students' evaluations regarding the two learning modalities. Students' marks, attendance, and credits regarding Oral Histology were analyzed and compared with their evaluations for both modalities. The first modality considered students who receive their practical session after theoretical module immediately. Hence, their information approach based on repetition, whereas the second modality when students attend the practical lab after theoretical lecture few days later. Thus, their refreshment is relying on memory and review. Statistical analysis was executed using SPSS 25. Chi-Square was used to examine the correlation between categorical data; analysis of variance (ANOVA) was used to compare the means within groups of different sizes (F-test). Pearson Correlation Analysis was used to test the relationship between interval variables. A p-value of less than 0.05 was considered the threshold for statically significant results.

Results

The study sample of 76 participants consists of 27 males and 49 females with an age range of 18-21 years (mean of 19.5 years). The male to female ratio was 1:2. The number of students according to their willingness to attend theoretical and practical sessions on the same day (modality -1) or few days apart (modality -2) and their response to each modality is shown in table 1.

Table (1): Sample distribution according to students' perception.

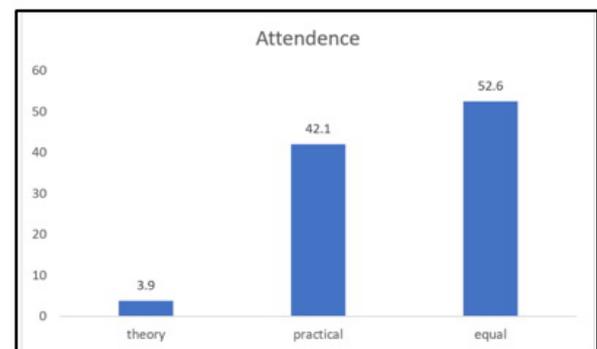
Learning in sequential style	Number of students	Positive response	Negative response
Student Accept	56	41	15
Student Reject	8	5	3
Total	64	46	18

The majority of students agree on their willingness to have theoretical and practical sessions on the same day. Also, most of the students stated the benefit of this educational approach, the other 12 students had no response were not listed in the table. Students' scores and attendance during the semester are distributed in a different manner in Table 2. Considering that only one group receives the course in (modality -1) and the other two groups in (modality -2). Chi-Square Test showed no significant relationship ($p > 0.05$) between the time interval of theoretical and practical sessions and the study behavior (study the lecture on the day where it was given or immediately before the exam). Students who were absent five hours or more during the semester are excluded from both groups. Considering the total hours in the semester is 45 hours that means students' absence may not exceed 9% of the total hours (Table 3). As figure 1 shows, half of the students attended both lectures and labs equally. The vast majority of the other half attends only oral histology labs leaving less than 5% attending the lectures alone. Chi-Square Test showed a highly significant relationship between the mode of attendance and the time gap of theoretical and practical sessions ($p < 0.01$). As demonstrated in Figure 2, about half of the students used the internet alone as a learning aid in their study. This is followed by private experts, who refer to family members, relatives, or friends who can provide additional useful information about different aspects of oral histology.

Both web-based learning aid and expert opinion were the information source for over 5% of students. The remaining aids, which include scientific materials provided by other academic institutes; both academic institutes and web; and all the available learning aides constituted about 6% of students. Chi-Square Test shows no statistical relationship between the use of additional learning resources and the time gap between theoretical and practical sessions, the study method, and the preference of attendance ($p > 0.05$). One-way ANOVA showed no statistical relationship between the study mode (behavior and students' scores. However, there was a significant relationship ($p = 0.02$) between the absence hours and the students' scores (Pearson Correlation). Interestingly, Figure 3 revealed that most of the students believed that the questionnaire was late, whereas a third of them thought that the timing for the questionnaire was suitable. Less than 3% of students find it early.

Table (2): Sample distribution according to students' score analysis.

Learning style	Number of students	Passed students	Failed students
Modality -1	28	26	2
Modality -2	55	51	4
Total	83	77	6

**Figure (1): Percentage of attendance for oral histology lectures and laboratory Sessions.**

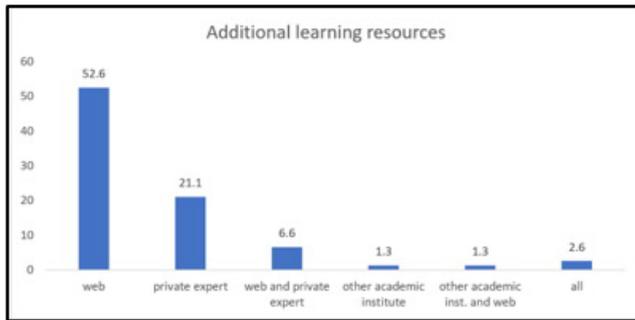


Figure (2): Additional learning resources for oral histology subject.

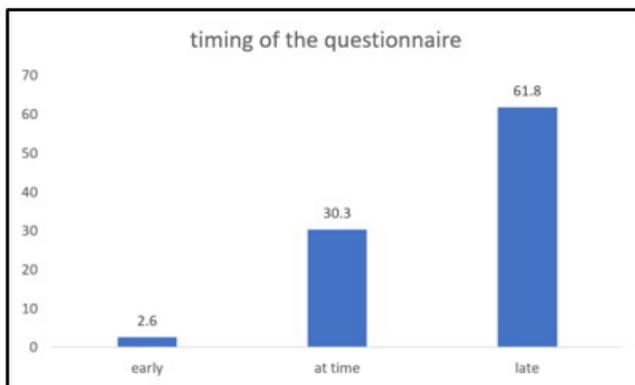


Figure (3): students' views on the timing of the questionnaire.

Table (3): Distribution of students according to their attendance.

Groups	Number of students	Attendant students	Absent students
Modality -1	28	25	3
Modality -2	55	47	8
Total	83	72	11

Discussion

Each medical subject needs specific learning modality to be approached (Vasquez and Prieto, 2009). In this study, a mix of teaching modalities including (power point slides, microscope slides, video clips, charts, and drawings) applied on a single subject in one class for the first semester depends on training materials in an authenticated syllabus. Oral histology was chosen in this study as it forms an impor-

tant basic science in dentistry and needs to consider different abilities, imagination, and especial conceptualization. Analysis of students' evaluation reveals that the majority of students preferred to receive both theoretical and practical sessions on the same day. This reflects the importance of the repetition element with different approaches for better fixation and reinforcement. Despite that students prefer having theoretical and practical sessions on the same day; this does not seem to influence the nature of additional learning resources. This might reflect the importance of other available educational resources. Considerable percentage of students benefit from different learning aids, especially the web might indicate the value of web available images for different oral histological material, which can provide an important learning alternative. Similarly, the learning modality does not seem to influence the students' scores. This, again, could be attributed to the influence of other educational resources and not only by the given educational modality. Hence, assessment method, alone, maybe insufficient to reflect students' level and feedback, it rather assesses the memorizing ability of students to the information received in a short period rather than learning ability, i.e. there is a shortage in the assessment of accumulative information, acquired knowledge, skill, and cognition. Having two learning patterns without a perceptible difference in students' outcomes may indicate that the level of knowledge acquired by students using academic educational modalities is not enough. It might, also, reflect the greater influence of other learning resources as learning aids. This could explain why students' evaluations and academic scores show no difference concerning their preferred approach for receiving information. It appears that learning style and the tendency toward specific learning styles are inconsistent between students.

This further indicates the psychological influence may play a role in this aspect (Pashler et al, 2008), as it forms with the individual's baseline on which the knowledge is built. Also, this ability, in turn, is determined by natural and acquired factors, natural factors like intelligence quotient (IQ), perceptions, memory while the acquired factors like attendance, refreshments, tests, life experiments, personal experience, and language. The use of more than educational resources, as shown in this study agrees with the fact that there is no conclusive evidence about which is better on students' performance outcomes. (Pashler et al, 2008; Vasquez and Prieto, 2009). There is agreement among psychologists on the fact that teaching should follow the identified learning style for each student (Pashler et al, 2008; Vasquez and Prieto, 2009). Learning style is changeable and depends on factors like circumstances, status, and purpose (Carnell and Lodge, 2001). Students included in this study had the freedom to choose their educational sources. It is not uncommon that each individual has a different learning style (Willingham et al, 2015). There is a conflicting opinion regarding this matter in the literature. Some argue that forcing students to change their learning style may not improve the study outcome. Others, on the other hand, believe the following students' preferences may reduce their potential learning skills. That is why new theories on education rely more on a combination of factors (Kolb, 2007). The fact that the majority of students found the questionnaire timing to be late might reflect the need to address the way oral histology material is provided for the students.

Conclusion

Students tend to prefer having both theoretical and practical sessions on the same day. However, students' final course scores seem unrelated to the educational modal-

ity. Further studies regarding the use of different educational sources and their influence need to be considered.

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