

The role of assignments in lab activity test results in Histology

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Abstract

Background: In the first module of the newly adopted problem based approach where the hours for lab activity were greatly reduced showed that students were not serious about lab activity. Therefore, the test results for Histology lab activity were disappointing. We designed assignments for students to complete during the lab activity and tested whether the results could be improved.

Objective: To determine whether assignments caused better test results

Methods: This Quasi-experimental study was conducted at the Department of Histology Faculty of Medicine, University of Indonesia (FMUI). FMUI International class students enrolled in the module of Cell and Genetics in the years 2006 and 2007 were included. Intervention (year 2007 only): assignments that will be scored by instructors. Outcome measures were assignment and lab-activity test scores. T test was used to compare the means of lab-activity test scores of group 2006 and 2007, and the Pearson correlation between assignment and test scores of the group 2007 was examined.

Results and conclusion: The lab-activity test results of group 2007 (mean: 93.72, SD: 16.67) were significantly higher ($p= 0.000$) compared those of group 2006 (mean: 54.83, SD: 29.79). However, there was only a weak correlation between assignment and test scores ($R: 0.202$. $p= 0.189$). Assignments may contribute slightly to the significantly higher test results of the group 2007. However, other factors such as the students' external and intrinsic factors that were not assessed in this study may also play a significant role.

Keywords: assignment scores, problem based learning

Introduction

Due to accumulating information in medicine, problem based learning has become a trend and adapted as a teaching and learning method at the Faculty of Medicine University of Indonesia (FMUI) (Pawitan, 2006). In our teaching where problem based learning is extensively used, the first biomedical module of Cell and Genetics was first implemented in 2006. In the module, the Department of Histology is involved in conducting laboratory activities to establish the students' knowledge about the cells of the four basic tissues during 9 hours of laboratory activity in three sessions, while in the previous curriculum it was conducted over 18 hours divided into 6 sessions.

Our experience of the first module of Cell and Genetics showed that students were not serious in doing their laboratory activities and did not use the limited time well and efficiently. The test result for histology laboratory activity was therefore disappointing. To achieve a better test result, in 2007 we applied a new strategy, i.e. giving the students assignments to be completed during their lab activity, which will be scored. The aim of this study is to determine whether assignments caused better test results.

Methods

This quasi experimental study was conducted in the Department of Histology, Faculty of Medicine, University of Indonesia, through February, 2006 to April, 2007.

Inclusion criteria: FMUI International class students enrolled in the module of Cell and Genetics in 2006 and 2007. The sample was divided in to two groups, group 2006 (control

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group) and group 2007 (intervention group). Exclusion criteria: Students attending less than three laboratory activities, or students who did not submit a complete assignment (applied only on group 2007), or did not do the lab activity test.

Procedure: Both groups were exposed to 3 hours of interactive lectures in Histology, and nine hours of Histology laboratory activity divided in three sessions. Each session was preceded by a 45-60 minute introductory lecture presenting slides of microscopic appearances of cells in various tissues. Slide presentations were by the same lecturer, and students were instructed to look for certain cells/structures/tissues. All students then

received a manual and learned the specimens under the microscope on their own, attended by a tutor (instructor). A tutor attended a group of 9-10 students, and helped the students when they had difficulties in recognizing or searching for a cell, structure or tissue.

Group 2006 (control group)

Students in group 2006 received a complete (undivided) manual and 3 boxes containing 37 specimens for each group of 9-10 students (the specimens are listed in Table 1). The same boxes were used in all three sessions. The students were asked to draw the cells/structures/tissues that they saw under the microscope for their own benefit. The drawings were not collected and not scored.

Table 1: The list of specimens for lab activity for group 2006 and 2007

No	Name of specimens	Group	Group
Lab activity I			
1	Labium oris – HE staining	2006	
2	Lingua – filiform and fungiform papillae - HE staining	2006	2007
3	Lingua-valate papilla - HE staining	2006	2007
4	Lingua-foliate papilla - HE staining	2006	
5	Tooth – root- ground specimen - unstained	2006	2007
6	Embryo- development of tooth – early stage - HE staining	2006	
7	Embryo- development of tooth – late stage - HE staining	2006	2007
8	Development of tooth – sheath of Hertwig - HE staining	2006	
9	Palatine tonsil - HE staining	2006	
10	Esophagus – middle third– cross section - HE staining	2006	
11	Esophagus –middle third – longitudinal section - HE staining	2006	
12	Esophagus-cardia (longitudinal section) - HE staining	2006	2007
Lab activity II			
13	Cardia - HE staining	2006	
14	Fundus - HE staining	2006	2007
15	Pylorus - HE staining	2006	
16	Pylorus-duodenum - HE staining	2006	2007
17	Duodenum – cross section - HE staining	2006	
18	Jejunum – cross section - HE staining	2006	
19	Jejunum - longitudinal section - HE staining	2006	
20	Ileum – cross section - HE staining	2006	2007
21	Ileum – longitudinal section - HE staining	2006	
22	Colon – cross section - HE staining	2006	2007
23	Colon – longitudinal section - HE staining	2006	
24	Rectum – cross section - HE staining	2006	
25	Recto-anal junction - HE staining	2006	2007
26	Appendix – cross section - HE staining	2006	
Lab activity III			
27	Parotid gland - HE staining	2006	
28	Submandibular gland - HE staining	2006	2007*
29	Sublingual gland - HE staining	2006	2007*
30	Liver – homo - HE staining	2006	2007**
31	Liver-sus - HE staining	2006	2007
32	Liver – silver staining	2006	
33	Liver supravital staining	2006	2007**
34	Liver- gall bladder	2006	
35	Gall bladder	2006	2007
36	Pancreas - HE staining	2006	2007
37	Pancreas – Mason trichrome staining	2006	

, **= the boxes contained one of the two specimens with * and *

Group 2007 (intervention group)

Students in group 2007 received a complete manual divided into 3 parts, each part for 1 activity and different boxes of specimens for different activities. The boxes contained five specimens/box (Table 1), and 3 boxes were used by a group of 9-10 students. Assignments were given to students in the intervention group, i.e. they were asked to draw certain cells/structures/tissues observed under the microscope. The items to be drawn were determined by the lecturer. Students were told that the drawings would be scored by tutors, and the scoring method was told. Data collected were attendance, scores of laboratory activity drawing (=assignment score) from the intervention group, and laboratory activity test results of both groups.

Analysis of data

Data analysis was by SPSS version 10.0. Laboratory activity test results in group 2006 and 2007 were tabulated and checked for the normality and homogeneity. The means of histology laboratory activity tests of both groups were compared using independent-samples T test. Further, Pearson correlation between the assignment scores and the lab activity test results of the intervention group was examined.

Results

Group 2006 (control) consisted of 52 students and group 2007 (intervention) consisted of 47 students. All students did the lab activity test, but three students from the intervention group were excluded due to incomplete lab activity attendance (1 student) and incomplete submission of assignments (2 students). Both groups showed a normal distribution, and the variances were homogenous. Independent-samples T test showed that the histology laboratory activity test results of the treatment group (mean: 93.72, SD: 16.67) were significantly higher compared to the control group (mean: 54.83, SD: 29.79). There was only a weak correlation between assignment scores and test results (R: 0.202, p= 0.189).

Discussion

In the new problem based modules used in FMUI, much time is spent in student centered discussion (Azer, 2001; Oon, 2003; Wee, 2004). The disadvantage is reduced time for lab activity to establish student's knowledge, as happened in most of our new modules.

Problem based learning aims to direct students towards self directed learning and to make students more enthusiastic and motivated (David *et al.*, 2003). Therefore, it was not irrational to expect that students would replace the reduced time of lab activity with self learning. However, results of the lab activity test in the first module of Cell and Genetics (the first biomedical module in the new curriculum) were not as expected, although overall test results were acceptable.

Our study showed that laboratory activity test results of the intervention group were significantly higher compared to the control group. The learning materials in lab activity of the year 2006 were not selected as in the year 2007. Therefore, the students in the year 2007 were more focused on the very important specimens, while the students of the year 2006 were not. This fact is the limitation of this study, as the 2 groups were not quite the same in terms of the learning material. Test results are determined by many factors including teaching-learning and evaluation methods, students' intrinsic factors, environment, etc. In this study the emphasis was only on teaching-learning and evaluation. Therefore other factors may contribute to the high difference between the treatment and control groups in this study.

Conclusion

The specific assignments contributed to significantly higher Histological test results of the intervention group. However, other external and intrinsic factors that were not assessed may play a significant role.

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