



## The effect of logbook as a study guide in dentistry training

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### Abstract

**Introduction:** Although logbook is a useful tool in learning and assessment of the student, its use in the education of undergraduate dentistry students is not well-established. The present study was conducted to assess the effect of logbook as a study guide and an effective method for assessment of the students in the fixed prosthesis course.

**Methods:** This quasi-experimental study was performed in Shiraz Dental School. The subjects of this study consisted of 60 students categorized into two experimental and control groups. In the control group, the students underwent the current format of Fixed Prosthesis curriculum. In the experimental group, the intervention was carried out using the Logbook. Pre and post tests were done using MCQ. The instructors and students had to evaluate the students' daily activities. The data were analyzed using SPSS software. T-test, Paired T-test and Mann Whitney test were used for statistical analysis.

**Results:** The logbooks were effective in cognitive and psychomotor domain (knowledge and practice) of dental education and the mean difference between the two groups was significant ( $P < 0.01$ ). The use of logbook provided a more objective evaluation and led to further student satisfaction.

**Conclusion:** Logbook is a useful tool for teaching and learning as an interactive study guide and assessment tool. Using logbook in dentistry education necessitates more studies to be conducted in this regard and also the revision of dental curricula.

**Keywords:** Logbook, Study guide, Dentistry undergraduate Training

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### Introduction

The objective of the dental curriculum is to produce clinically competent dentists who are independent performers, capable and critical thinkers, and long-term learners (1). Students of dentistry experience different practical and clinical courses to become experienced as a dentist (2, 3). Many studies have identified what dental educators perceive as effective laboratory instructor qualities, which includes clear goals and expectations of practical courses (4, 5). What students learn during these courses often depends on available competent teacher, facilities, and their interest (6, 7). To optimize the students' learning during any phase of the program, the learning situation and guidelines could be structured. This could be done by guiding and orienting the students by a set of goals, objectives and directions, such as a logbook (8). In Iran, some experiences are reported

by universities on the effectiveness of logbook as assessment tools for evaluating medical students' experiences (9-11). A student logbook was introduced in Manchester University to monitor their students' progress and assess the efficacy of clinical instruction in oral and maxillofacial surgery. Findings reveal that logbook assessment also facilitates effective audit of the teaching staff, clinical sessions and overall course delivery. They recommended logbook as a versatile aid to clinical teaching practice (12). There are several roles for log- book, namely logbook as a study guide (with the structure of the study guide), logbook for documented learning process and logbook as an assessment tool or for program evaluation. However, studies of properly constructed logbooks can provide structure and focus on the experimented learning cycle (13). This study examines the effect of logbook as a study guide and an effective method for assessment of

students in fixed prosthesis courses in dental schools.

## Methods

This quasi-experimental study was performed in Shiraz dental school. The subjects of this study consisted of 60 students randomly categorized into two experimental and control groups. In the control group, the students underwent traditional teaching format of the fixed prosthesis curriculum (without any logbook). In the experimental group, the intervention was carried out using a logbook. After randomization procedure, the students in the experiment group were oriented for a short course with logbook. Three different approaches were used to assess the outcome of the study, i.e. logbook effectiveness

a) MCQ (Multiple Choice Question) test, b) DOPS (Direct Observation Procedural Skills) by checklist and c) self assessment.

Pre - and post-tests were done by using MCQ test. The MCQ test was developed with twenty questions and only one correct answer. The questions were categorized into two groups, five questions on general knowledge in fixed prosthesis and fifteen questions on most common practical applications in this course. All of the participants completed the MCQ test before any formal teaching in this course (the pre test). The MCQ test and Dopes were used for assessment of the students' performance at the end of the course. Moreover, also the students' performance for either logbook teaching or traditional method was done through self assessment. The content and face validity of MCQ were determined by experts and the concurrent validity of MCQ and DOPS by Pearson correlation coefficient. The Cronbach's Alpha Reliability coefficient of 0.90 over the three set of marks was very strong.

A student's log was developed which aimed at a study guide and also formative assessment tool, so the student's log in the study situation was learning activity of a student during his/her practical course of fixed prosthesis. In the log, a list of procedures of this course was provided. We asked the students to record their daily experience in the skill lab the first pages of the log contained an explanation of how to use the logbook and the instructors and students had to evaluate the students' daily activity.

The data were analyzed by SPSS software, using frequency distribution mean, standard deviations, and statistically analyzed with t-test and Paired t-test. Quantitative data were summarized as means, standard deviations and student t-test.  $P < 0.05$  was considered significant.

## Results

The students' mean age was 23 years (%30 female and %70 male). Comparison of the mean scores of the pre-and post-tests by paired t-test shows a significant

**Table 1.** Comparison of the Mean score in the case and control groups' MCQ exam

Control		Case	
Pretest	Post test	Pretest	Post test
2.5±0.64	6.37±0.53	2.8±0.87	5.33±1.2
Data are showed by mean±SD p<0.001			

difference in the study group ( $p < 0.001$ ) and also in the control group ( $p < 0.001$ ). The significant difference between the experimental and control groups' final exam (post test) by t-test reveals that teaching with logbook is more effective than traditional approach ( $p < 0.001$ ) (Table 1).

The significant difference between the experimental and control groups' final exam scores of the students (post test), using direct observation of tutors, reveals that teaching with logbook is more effective than traditional methods ( $p < 0.01$ ) (Table 2).

We designed a questionnaire to address the student's self assessment in achieving the goal and objective of the course. For the skills required in fixed prosthesis course, the questionnaire defined 10 items. Table (1) we used the following scale for marking – excellent (grade 4), good (grade 3), satisfactory (grade 2) and poor (grade 1).

The mean score for the perceived self-sufficiency in the control group was 29.6. In the case group, it was 31.37. The lowest mean score among the components of the course was given to Wax-up pattern and the highest score was give to finishing and polishing

The comparison of self ratings of the logbook's objective (Mann-Whitney test) revealed that there were significant differences between the experimental and control groups in some areas and students who did not receive the logbook had a lower rating in their self assessments in some areas (Table 3).

## Discussion

The finding of this study suggests that logbook plays an important role in attainment of the psychomotor and cognitive domain in fixed prostheses courses of dental curriculum. It shows that the students appreciate and accept and supervisors support the logbook and show a positive response to the new tools (14). This is compatible with the study in which the same result was obtained (9-11). On the other hand, some outcomes (objectives) were unaffected by logbook. However, education does not function as a

**Table 2.** Comparison of the Mean score in the case and control groups' Dops exam

Case	Control
Post test	Post test
16.86±2.76	15.81±3.11
Data are showed by mean±SD p<0.001	

**Table 3.** Mean score, standard deviation and p. value in both groups (case and control) of students' self assessments

Topic	Group	n	Mean Score	P
ªPFM preparation on anterior teeth	Case	30	3.12±0.65	0.04
	Control	25	2.43±0.38	
Preparation for fixed partial denture	Case	30	2.56±0.44	0.978
	Control	25	2.50±0.55	
Impression	Case	30	2.97±1.24	0.05
	Control	25	2.10±0.82	
Working cast	Case	30	2.92±0.67	0.191
	Control	25	2.49±0.23	
Die preparation and articulating	Case	30	3.10± 1.31	0.03
	Control	25	2.20± 0.92	
Wax-up pattern	Case	30	2.80± 0.63	0.04
	Control	25	2.10± 0.32	
Spruing and investing	Case	30	2.80± 0.55	0.549
	Control	25	3.10± 0.75	
Casting	Case	30	3.04± 0.43	0.679
	Control	25	2.83± 0.65	
Finishing & polishing	Case	30	3.60± 1.14	0.329
	Control	25	3.24± 0.89	
Proceeding application	Case	30	3.08± 0.88	0.74
	Control	25	3.20± 0.95	

ª PFM: porcelain fused to metal

single factor. Instead, it is very often accompanied by other factors such as contextual and socioeconomic ones (15). This creates a web of interrelated factors that influence educational outcomes that are not easily disentangled (16). This study also showed the positive effect of log as a study guide and participation of interested tutors in teaching and learning. Obligation and time spent by instructor in planned and structured study guide for guiding students in laboratory may be an important factor to enhance learning (4, 9, 17, 18). These findings support the idea that active learning and logbook guideline and reflection is the best way to improve the students' learning. There are several studies that emphasize the low reliability of logbook and portfolio, lack of evidence for validity of inferences from testing and ethical concerns about the use of patients (19-20).

Also, the use of logbook encourages cooperation between tutors and students by providing constructive feedback to prevent misunderstanding (21-23). We made an attempt to create reflection, so logbook assessments have a positive impact on learning environment because they document what the learner has done and ask the learner to reflect on what she/he has accomplished. In fact, our logbook was more than an accumulation of what the learner has done. It was similar to portfolio. Due to commentaries of students on logs, the log could develop new skills, new attitudes, and new concepts of thinking (24- 26).

## Conclusion

The results revealed that the students in the study group had more positive perceptions than those in the control group. It is concluded that students participating in this study were positive overall about

their learning experiences in laboratory and dental schools. The subjective data recorded on log by students and coordinators revealed that the log was useful as a study guide and also assessment tools because they have a clear understanding of the additional competence and knowledge that trainees should achieve on completion of each training program (2, 8, 26). As mentioned previously, a significant part of the dental curriculum consists of practical training that includes laboratory work. Thus, this finding validated the importance of having quality and capable dental technicians to assist the students in their learning process (2, 27, 28).

One of the limitations of this study was non-probability sampling in a single university, and single course might limit its generalization to different settings. However, the whole program was repeated in another field.

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