A logbook for continuous self-assessment during 1 year in paediatric dentistry

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ABSTRACT. Aim The present study was designed to investigate whether a logbook helps undergraduate students to develop the ability to self-reflect and to increase their self-awareness. Methods A logbook was introduced to 54 dental students in their fourth year of education at the beginning of the paediatric dentistry course. The students filled in a questionnaire on learning styles at the start of the course and after 12 months. Results The results showed that at the end of the course significantly fewer students wished to be given detailed instructions to solve problems. Significantly more students felt able to expose both their weaknesses and strengths in clinical competence in the presence of their teachers. Students who reported a good knowledge of their own clinical skills found feedback from instructors more constructive compared with those who reported less good knowledge. Conclusion For a large group of students, the logbook stimulated self-reflection, learning from personal clinical experience, and an increase in knowledge about their weaknesses and strengths in clinical competence.

KEYWORDS: Dental education, Portfolio-based learning, Reflection, Self-assessment, Study habits.

Introduction

To educate students to be critical towards knowledge, to be reflective about learning from their own experiences, and to take personal responsibility for life-long learning are important goals of dental education at the Karolinska Institute. The development of methods for use in undergraduate education that simplify the transition from a subordinate student into an independent professional with personal responsibility is a key element.

Portfolio-based learning is one method used to encourage such reflective learning. A professional development portfolio is a collection of material made by a professional that records details and reflections on key events and processes in their career [Hall, 1992]. Portfolios can be valuable educational tools as they are based on principles, suggested by Knowles [1970], that adults enter a learning context with a background of learning based on their own experiences. Several authors have also highlighted the importance of reflection that is based on a learner’s own experiences in this process [Schön, 1983; Kolb, 1984].

A portfolio may consist of different parts: descriptions of critical incidents or events with patients, a reflective journal or logbook, tutorials and learning plans, and exam preparation material [Snadden and Thomas, 1998; Challis, 1999]. In this present study, a logbook was developed consisting of a competency scale for self-assessment and forms for self-evaluation, reflection, and formulation of learning needs to be used during clinical work in paediatric dentistry.

The aim of this study was, therefore, to evaluate whether the use of a logbook during a 1 year course in paediatric dentistry stimulated students in self-reflection and self-assessment and whether the logbook had an impact on the students’ study skills.

Materials and methods

The logbook contained four different forms for documenting each clinical session. This material was developed in 1995 at the University of Dundee Dental School, United Kingdom, for the late phase clinical development program [Stirrups, 1997]. The logbook details are available on request from the senior author.

Self-evaluation of clinical session. The students completed this form immediately after patient treatment whilst still in the clinic. Patients treated during the clinical session and the different types of procedures carried out were recorded. Each student
then assessed his or her performance using a competency scale (Table 1) before discussing the clinical session with their teacher. Together teacher and student agreed on a competence level for the procedure. During this discussion the teacher also recorded feedback in the logbook. Every discussion took place privately to respect the student’s integrity.

Self-evaluation of clinical session, reflection. The students filled in this form after the clinical session when they had left the clinic. The form had no structure and was considered the students’ personal document but could be discussed with their teacher if each student wished. On this form, the students reflected on experiences from the clinical session, a kind of self-generated feedback. The students could identify problems that they experienced during the clinical session, how the problems were managed, what was learned, and to identify new learning goals.

Self-evaluation after patient treatment. The students used this form to evaluate a comprehensively treated patient. Overall treatment was then discussed with their teacher, including how treatment problems were managed and, most importantly, how the students planned to increase their competence.

Summary of clinical work. The students completed this form at mid-term and again at the end of the term. The form consisted of an overview of clinical procedures in paediatric dentistry. Only treatments that could be assessed with the competency scale during a clinical session were listed. The students recorded the number of treatments performed and the highest competence obtained. This form helps students to identify which types of treatments they need to improve in competence or in which areas they have not yet had experience.

Summary of clinical work, reflection. The students filled in this form at mid-term and again at the end of the term. They formulated their personal learning goals and how they were to be achieved. At the same time, the students decided when the goals should be reached and a learning contract was agreed upon.

Questionnaires. The logbook was evaluated with three sets of questionnaires. The questionnaires have been used to evaluate medical education at the Karolinska Institute [Lundberg et al., 2000]. The students completed a questionnaire on learning styles at the start of the course and after 12 months. A course evaluation was handed out after 12 months. The scales used in the questionnaires were marked 1-9. Students were guaranteed anonymity.

Study population. The logbook was introduced to 54 dental students in their fourth year of studies during a course in paediatric dentistry. Of the students 49% were male and 51% female, 36% of the students had an immigrant background mainly from Iran. The mean age of the students was 28±5 years. The course took place between January and December and comprised 30 lectures, 70 clinical sessions of 3 hours, auscultation with specialist paediatric dentists, assignments to child health centres, attendance on a paediatric hospital ward and assignments to present oral health information to school classes. The logbook was introduced to the students during a half-day seminar and then discussed individually three times during the year. A staff meeting discussing competence criteria and individual student’s performance preceded the meetings with the students.

The response rate to the questionnaires was 100% at the start of the course, 61% after 6 months and 100% after 12 months.

Statistical methods. The non-parametric methods, Kruskal-Wallis test and the rank correlation test were used. When correlations were calculated, corrections were made for lack of reliability in the questions. The reliability value +0.90 was used according to Rippey [1981].

Results

Learning style. The students were asked if, when reading a new text, for instance a chapter in a textbook or an article, they began by reading line by line and page by page until they had worked through the text. Forty-seven per cent did so to a high degree and 23% to a lesser extent at the beginning of the course. One year later, 43% did so to a high degree, but those who did so to a lesser extent had increased to 34% (Table 2).
Logbook. Fifty-four per cent of the students wanted to keep the logbook unchanged and 37% did not. Of the students who wanted to keep the logbook, 35% thought it helped them to reflect both directly after the clinical session and later, compared with the 4% who were opposed to keeping a logbook (p>0.001) (Table 3). Most
of the students, 79%, thought they could reflect without using the logbook. At the beginning and again at the end of the course, the students marked to what extent they felt comfortable with different kinds of instruction for tasks to be solved (Table 4). Students who wanted to keep the logbook as a formative tool for evaluation were significantly more comfortable with beginning with an overview of the material to be covered, with being given complex tasks to be solved, and with formulating their own learning goals (p<0.10).

Reflection. Twenty-one per cent of the students stated that the logbook stimulated them to reflect immediately after the clinical session; 11% said they were stimulated to reflect on the clinical activities later when they left the clinic. Of the students who wanted to keep the logbook, 35% were more stimulated to reflect, compared with 4% of those who opposed keeping a logbook (p>0.001) (Table 3).

Feedback. Only 4% of the students wanted to assess themselves in the clinical situation. To the question of whether the students preferred that somebody else assessed their clinical skills, the median value was 5 (scale 1-9), indicating that most students wanted a system where both student and teacher participated in the assessment after a discussion. Sixty-two per cent of the students did not find the feedback from teachers to be plentiful or rich, but most of the students found it useful and thought provoking.

When students were asked if their self-assessment of clinical competence differed from the assessment of the teachers, 34% of the students reported that their assessment was similar to that of the teachers, 59% that there were some differences in the assessment of the competency level in the beginning of the course, and 7% that there were often differences.

The students were also asked about feedback given in relation to four different procedures (Table 5). More than 90% of the students found the feedback to be constructive or partly constructive when given after these procedures. The logbook stimulated the teachers to give feedback on the management of patients and therapy planning, not only on technical procedures related to operative treatment.

Student’s ability to cope with uncertainty. Forty-seven per cent of the students did not feel comfortable in vague and ambiguous situations at the beginning of the course compared with 33% 1 year

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**Questions** | **Dislike** | **Prefer** | **Median** | **Significance**
---|---|---|---|---
I like to start with a comprehensive review of the course content and learning | 8% | 64% | 6 | p<0.10
Students who wanted to keep the logbook (n=29) | 17% | 52% | 7 |
Students who did not (n=20) | | | |
I like to receive detailed instructions for solving given tasks | 16% | 29% | 7 | p<0.10
Students who wanted to keep the logbook | 14% | 51% | 5 |
Students who did not | | | |
I like to receive complex tasks where you have to find your own solutions | 11% | 51% | 7 | p<0.10
Students who wanted to keep the logbook | 24% | 30% | 5 |
Students who did not | | | |
I like to formulate my own learning objectives | 20% | 34% | 5 | p<0.10
Students who wanted to keep the logbook | 29% | 21% | 4 |
Students who did not | | | |
I am able to influence the teaching of paediatric dentistry | No (1-3) | Yes (7-9) | | p<0.10
Students who wanted to keep the logbook | 30% | 32% | 5 |
Students who did not | 56% | 12% | 3 |

*Rank correlation test

**Table 4 - Logbook. Students’ preferences on various tasks to solve marked on a 9-point scale and examined in relation to the preference for logbook learning.*
The undergraduate program No Yes Median Significance*
stimulated me to: 1-3 7-9

Receive detailed instructions for solving given tasks
Uncomfortable in ambiguous situations 6% 53% 7 p<0.10
Comfortable in ambiguous situations 36% 18% 4

Delimit and formulate problems
Uncomfortable in ambiguous situations 12% 24% 6 p<0.05
Comfortable in ambiguous situations 0% 92% 8

Analyse relations between details and concepts
Uncomfortable in ambiguous situations 0% 30% 5 p<0.05
Comfortable in ambiguous situations 0% 91% 7

Handle emergency situations
Uncomfortable in ambiguous situations 46% 20% 4 p<0.10
Comfortable in ambiguous situations 18% 27% 6

Evaluate information in a critical way
Uncomfortable in ambiguous situations 38% 25% 6 p<0.10
Comfortable in ambiguous situations 18% 73% 9

*Rank correlation test

TABLE 6 - Ability to cope with vague and ambiguous situations. Comparisons of students’ views on the extent the undergraduate program stimulated them in aspects of learning and professional competence, marked on a 9-point scale. Comparison between students who did (19%) and who did not (33%) feel uncomfortable in vague or ambiguous situations at the end of the course in Paediatric Dentistry.

The undergraduate program stimulated me to:

Feedback has been given (frequency)
Almost never 8 28 6 4
Sometimes 43 39 45 37
Often 49 33 49 59

Feedback has been given (time)
Long after - 4 4 2
After a while 29 36 19 23
Immediately after 71 60 77 75

When feedback has been given it has been
Difficult to use 8 11 12 10
Partly constructive 37 38 33 33
Constructive 55 51 55 57

TABLE 5 - Feedback. Students’ evaluation of the feedback received from their teachers during the course in Paediatric Dentistry.
stimulated the students to be given detailed instructions to solve tasks (p<0.10), to delimit and formulate problems (p=0.05) and to analyse relations between details and concepts (p=0.05), we found significant differences between the students who felt comfortable in vague and ambiguous situations and the students who did not feel comfortable in those situations. The latter did not feel comfortable in vague and ambiguous situations and felt significantly less prepared to deal with emergency situations (p<0.10) and to value information in a critical way (p<0.10) compared with students who did.

Self-awareness. Students were asked to rate their self-awareness three times during the 1-year course. At the end of the course, a higher number of students reported a very good self-awareness. Students who considered themselves to have a good self-awareness felt they were better able to expose their strengths and weaknesses and to develop stress tolerance and communication skills (p<0.10) than those who experienced their self-awareness as average.

Discussion

Discussions on how learning styles affect a student’s ability to solve clinical problems had not been discussed previously in the group’s dental studies. The risk associated with reading a new text for the first time line by line and page by page is that this method could lead to a surface approach to learning. If a reader instead skims a new text first to find out what it is all about before grappling with the parts, learning tends to improve. One reason is that it is better to start with a general understanding of the context before going into details. Even though a student’s understanding is incomplete and vague, this method helps the reader to understand the importance of the task at hand [Ramsden, 1992].

Forty-one per cent of the students preferred detailed instructions for solving given tasks at the end of the course compared with 63% at the beginning of the course. One of the intentions with the logbook was to stimulate the students to become more independent; this development seems to be positive and perhaps a result of the use of the logbook. In a study of a problem-based curriculum [Brinchmann-Hansen et al., 1998], students at the end of their first clinical year responded to a questionnaire containing questions about the program as well as three questions about their study behaviours. In total, 94 significant relations were found that indicate that students who feel comfortable in ambiguous situations, who regard themselves as able to take initiative, and who dare to pose ‘stupid’ questions are more content with, for example, the problem-based learning sessions, the training of clinical skills, the degree they felt they were met with respect from the teachers, the teaching, and the final assessment. Twenty-three per cent of the students disliked formulating their own learning objectives at the end of the course compared with 38% at the beginning. This skill is very important as life-long learning is considered vital in professional medical life [Mann, 1994]. Another reason is the necessity for students to be able to state their own learning objectives in problem-based learning or similar teaching methods. It could be argued that this study behaviour is an integral part of diagnosing and life-long learning, and hence should be stimulated in undergraduate studies.

The logbook project was introduced in the fourth year of dental studies. Previously, the students had only been exposed to summative assessments. This late introduction may have prolonged the acceptance of a new assessment method. If the logbook is used as a formal or summative assessment tool, the book may have a negative impact on the material collected. General practice registrars were found to be more unlikely to collect incidents that had not gone well in a reflective journal [Chadwick and Mason, 1997; Stirrups, 1997]. Such incidents are a rich source of learning and give insight into the development of a young professional.

This problem may have been addressed in our study, as the teacher frequently observed the students in their clinical work and their level of competence was discussed and agreed upon.

Fifty-four per cent of the students thought it was a useful tool for assessment and wanted to keep it unchanged. They thought the logbook stimulated them in more structured reflections on their clinical experiences; it also gave an opportunity to discuss the management of patients, personal values, and attitudes with their teacher rather than just technical aspects of dentistry. This agrees with the findings of Chadwick and Mason [1997], who used a logbook approach in restorative dentistry and reported that the logbook gave a significantly more meaningful measure of performance; it improved students’ understanding and self-awareness.

Thomson and Boyle [1996] also reported that students quickly recognise both the significance of acquiring personal clinical exposure and that the responsibility for accurate logbook recording rests with them. Approximately 40% of the students did...
not want to keep the logbook. The reasons given were that feedback from different teachers was inconsistent, the students wanted others to judge them, they thought they could reflect themselves, it took too much time to fill it in, and last but not least, the logbook binder was too heavy to carry around!

Studies of practitioners have found that feedback is also important for practising professionals [Mann, 1994]. The logbook creates an opportunity for the teacher and the student to form a partnership and thereby opens a dialogue that can assist the student’s development. It also allows self-generated feedback with support from the teacher. Students often complain that their teachers have different opinions on diagnosis and treatment planning. Even though one of the foci of this project was on feedback, two-thirds of the students stated that the volume of feedback was insufficient. When given, though, it was useful and constructive. It might be concluded that the students’ need for feedback is difficult to satisfy.

After the course, two thirds of the students stated that they were comfortable in vague and ambiguous situations and able to reveal their strengths and weaknesses to teachers. This might be a development of the ongoing dialogue between students and teachers and of the logbook being used in a formative way, allowing the students’ reflections to be private. Whether they are to be shared with the teachers is a decision of the student alone. In a study of students’ views on factors important for learning [Lundberg et al., 2000] it was found that the teachers’ interest in students learning was a critical factor.

To ask students about their self-awareness is not without problems. During the course of this study, an increasing number of students stated that their self-awareness was excellent. This occurred because the students’ awareness of their own skills and competencies grew, partly because of what is expected from them during the course and partly because of the logbook. This is in agreement with Thomson and Boyle [1996].

**Conclusion**

The results of this study show that the use of a clinical logbook during a 1 year undergraduate course in paediatric dentistry may stimulate dental students to reflect on their learning from clinical experience. A logbook also trains students in self-assessment and provides a structure for discussion and feedback from teachers.

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