

# Chapter 70

## Increasing Learner Interaction in Large-Scale Lectures by Using a Mobile Learning Application

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### ABSTRACT

*Universities face increasing numbers of students leading to increasingly large lectures, and decreasing interaction and feedback, which are important factors for individual learning success and satisfaction. The use of IT can help in overcoming this challenge by increasing the interaction in large-scale lectures without massively increasing the workload of lecturers. This paper presents the design, use and evaluation of a mobile-learning application aiming to increase the interaction in large-scale lectures and the success of learners. For designing the application, the authors follow a design science research approach. The authors rely on insights from interaction theory as well as requirements gathered from lecturers and students in a focus group workshop. With the implementation, large-scale lecture related limitations can be overcome and the results help lecturers to face the according challenges. The results emphasize the potential of IT for university teaching and provide transferable insights for practical use in other learning scenarios.*

### INTRODUCTION

Universities in many western countries face increasing numbers of students. As a result, growing numbers of learners in lectures and an unfavorable lecturer-to-students-ratio of up to 80 students per lecturer is a common situation. These large-scale lectures are characterized by high anonymity and suffer from a lack of interaction - not only among learners themselves but also among learners and lecturers. More-

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over collaborative learning is not feasible in traditional large-scale lectures, where learners are single learners (Lehmann and Leimeister, 2015). The results of this decreasing interaction are often deficient learning outcomes and unsatisfied learners. For example, comprehension questions regarding the lecture as well as discussions on specific topics are not feasible, as they are impractical. This development is alarming, since fundamental elements of learning success include the opportunity to ask questions and the possibility of sharing one's opinions concerning the subject matter (Picciano, 2002). Additionally, interaction and feedback are regarded as significant predictors in terms of the learning success (A. Moore et al., 1996) and positively influence the long-term satisfaction of learners (Alonso et al., 2009; Hardless et al., 2005). It is true that by being actively engaged in the learning-teaching process, learners will get a deeper comprehension of the subject matter (Evans and Gibbons, 2007). But bringing interaction in a large-scale-lecture is a widespread problem (Lehmann et al., 2015).

A promising possibility to increase the interaction without massively increasing the workload of lecturers is the use of IT. Several researchers have investigated the possibility of mobile technologies to improve the classroom situation (Ratto et al., 2003). With the aid of IT and mobile devices, interactive data can be transferred between students and lecturers in real-time, which provides potential for improving the interaction in lectures (Dyson et al., 2009; Wortmann et al., 2014), for intervening in the learning-teaching process and enriching traditional courses. The application of IT supported learning and teaching has increased recently in education (Johnson et al., 2012). The use of mobile devices is widespread. They are flexible in use, easy to use and allow synchronous and asynchronous communication (Lehmann et al., 2012). The current state of research shows that existing learning applications do consider only single types of interaction but not all three types of interaction, which are proposed by Moore (1989) and no learning application exists which consider interaction completely.

The goal of the present research is to develop a mobile-learning application to increase interaction in large-scale lectures. Particularly, by using the mobile-learning application, learners should interact more with the learning content, the lecturer, and among each other. Hence, all three interaction types proposed by Moore (1989) are addressed.

Therefore, this paper aims to examine the following research questions (RQ):

- RQ 1:** How should the mobile-learning application be designed to increase interaction in the learning-teaching process of a large-scale lecture?
- RQ 2:** Is the mobile-learning application perceived as helpful in terms of quality, usefulness and satisfaction?
- RQ 3:** How does the frequency of use of the mobile-learning application affect the interaction among the students in a university large-scale lecture?

In order to answer the research questions, the chapter is structured as follows. The second part of the chapter presents the research methodology. Afterwards the related work part on mobile-learning applications is described. Then, the authors rely on insights from theory of interaction in order to gather theoretical requirements and they conduct a focus group workshop to gather practical requirements. Accordingly, the sixth part describes the design and development of the mobile-learning application. Section 7 presents the results as answers to the second and third research questions, before section 8 discusses the relevant results. Finally, the chapter closes with a conclusion, the implications, as well as limitations and an outlook on future research.

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