

Mobile Support for Ad Hoc Learning Communities

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Abstract. The creation of user-generated content is an approach which is used to activate learners. This paper presents an approach supporting mobile collaborative use of user-generated e-flashcards within small ad-hoc learning communities. The application of this approach to support cooperative work and workplace learning is discussed too.

Keywords: mobile learning, collaborative learning, e-flashcards, learning communities, workplace learning

1 Introduction

The approach of e-flashcards is mainly related to work on active learning and feedback. Regarding the topic of active learning, such approaches are widely accepted that are based on constructivism and emphasize that active learning deals with own production and discussion of (learning) content [1]. The use of e-flashcards within large university courses was evaluated in [2, 3]. A study of use and acceptance of e-flashcards showed a high positive level of user acceptance according to the user feedback and active learning [3]. But this user acceptance was not reflected in the actual use of e-flashcards during the examination preparation phase. In this phase, learners meet other learners occasionally forming small ad hoc learning communities. Thus, the research question arises how to provide mobile support for small ad hoc learning communities during exam preparation. To gain additional benefit of the offline interaction in the learning process, a mobile learning application should support mobile collaborative learning, especially creation and ad hoc exchange of user-generated content. Therefore, this paper presents an approach to support mobile collaborative learning with e-flashcards within small ad hoc learning communities meeting these requirements.

2 E-Flashcards in University Settings

2.1 Pedagogical Scenario

The e-flashcard approach is based on small content snippets in the sense of Micro-learning (see [4]) and is suitable for learning of facts. Each e-flashcard consists of a question and the related answer page, which can be accessed by a web-based client or a mobile application, so that learning becomes possible anytime and anyplace. The mobile application for ad-hoc collaborative learning picks up the scenario of questioning each other using paper-based flashcards within the co-located ad hoc learning community. For this collaborative task, a Bluetooth-Connection between the mobile devices of the learners is established. One learner, the questioner, requests the answer to the question on his e-flashcard from the other learners. The questioner sees the answer side of the e-flashcard on the mobile device, whereas the question side of the same e-flashcard is presented to the other learners of the learning community (see figure 1). The answers of the other learners are compared with the answer on the flashcard and discussed between the learners. The questioner can send the solution or parts of it, for example a correct match in a fill-in-the-gap question, to the mobile devices of the other learners. If during this communication process new questions arise, a new e-flashcard will be created and sorted into the flashcard-deck. Furthermore, an ad-hoc exchange of e-flashcards between the mobile devices of the learners is possible by using the Bluetooth-Connection or utilizing NFC-tags.

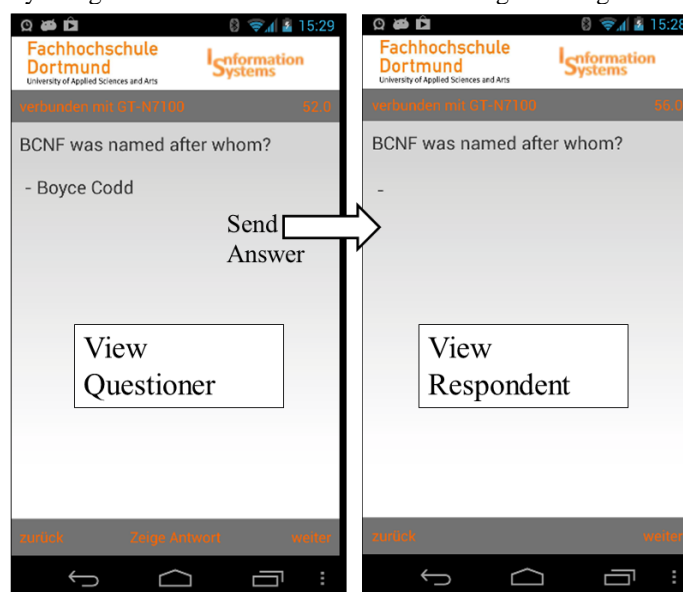


Fig. 1. Screenshot of the mobile application

2.2 System Architecture

Figure 2 shows the rough architecture of the e-flashcard system. The web server application supports the use and the creation of e-flashcards and maintains the e-flashcard pool. To enable a user-friendly, offline mobile learning with the e-flashcards, a native Android application was developed [5]. The learner subscribes lessons to determine the e-flashcards to be used on the mobile device. These subscribed e-flashcards are replicated in a SQLite database [6] on the mobile device. To support additional ad-hoc collaborative learning with e-flashcards, this server-client architecture was enhanced with a P2P-network between the mobile clients.

Because an internet access of the mobile phones of the learners in ad-hoc collaboration settings could not be taken for granted, the Bluetooth protocol was used to establish the ad-hoc P2P-network. Zhang et al. [7] showed for example, that various mobile devices could be connected by Bluetooth to provide an ad-hoc 1:n communication channel between teacher and course members for feedback and learning progress monitoring.

To ease this connection process for the learners, NFC-capable devices are connected by touching the devices utilizing the NFC protocol (named Android “Beam” [5]) to transmit the Bluetooth-Connection data (port, MAC-address). This is applicable for the Android operating system 4.0 and above, whereas all other mobile devices still have to undergo the Bluetooth pairing process. On the mobile device ad-hoc created e-flashcards are stored in the SQLite database and can be stored on NFC tags additionally. When the connection to the e-flashcard server is (re)established, these ad-hoc created e-flashcards can be uploaded to the e-flashcard-pool.

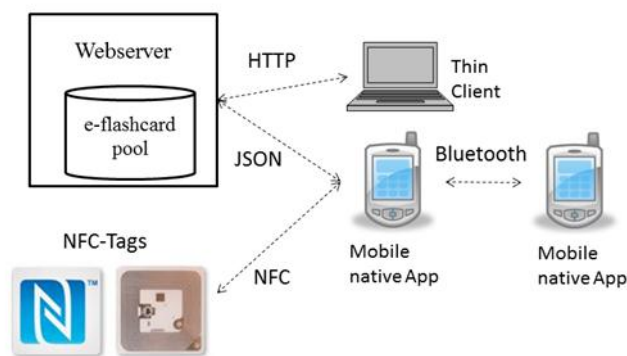


Fig 2. Architecture overview

2.3 First Experiences and future work

A case-study was carried out in a classroom setting at a vocational school for commerce in February 2013. The test group consisted of 16 students (14 male, 2 female), who were preparing for the A-level examination in the subject business economics. At first the test group created 44 e-flashcards and worked with the mobile cooperative

application in small peer groups of 2 or 3 learners. In the follow-up interview the learners indicated their acceptance to work together by means of the mobile application.

In order to increase motivation and fun of the users future work addresses the idea to add gamification-elements to e-flashcards platform (e.g. a competitive card game) to investigate whether this is a means to enhance the tool's use by the learners and to study cooperation within ad hoc learning communities.

3 Relevance for cooperative work and workplace learning

The approach of e-flashcards and its cooperative usage have the potential to support (collaborative) learning of facts even in companies. Therefore, various mobile e-flashcard applications are available, see for example [8, 9]. Due to the NFC and Bluetooth connection between the mobile devices the collaboration within these ad hoc learning communities collaboration is possible even if WiFi-connection is protected due to security reasons. From our point of view learning or internalization of facts is necessary even though knowledge platforms are widely used to store knowledge about facts. Internalized facts are especially necessary at workplaces handling time-critical situations, for example flight control, medical care or fire service. In these situations searching of facts in knowledge management situations is too time-intensive. As an example, Sonne et al. [10] reported on a question-based mobile learning application focusing privacy protection and data security developed for an airline.

E-flashcards could be used to enhance the internalization of facts and should be therefore integrated in work processes. Such opportunities occur whenever people come together to spend some time, have fun or meet for learning, for example during on-call duty or travel time. With this contribution we would like to brainstorm possible further tool's use cases and start a discussion about these and more potentials of the e-flashcards-approach for CSCW.

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