A MOBILE APP TO SUPPORT STUDENTS IN THE “TRANSITION-IN” PHASE

Florian Johannsen  
University of Applied Sciences Schmalkalden, f.johannsen@hs-sm.de

Martin Knipp  
University of Bremen, martin.knipp@uni-bremen.de

Thomas Loy  
University of Bremen, thomas.loy@uni-bremen.de

Johannes Voshaar  
University of Bremen, jo_vo@uni-bremen.de

Jochen Zimmermann  
University of Bremen, jzimmermann@uni-bremen.de

Follow this and additional works at: https://aisel.aisnet.org/ecis2021_rip

Recommended Citation  
Johannsen, Florian; Knipp, Martin; Loy, Thomas; Voshaar, Johannes; and Zimmermann, Jochen, "A MOBILE APP TO SUPPORT STUDENTS IN THE "TRANSITION-IN" PHASE" (2021). ECIS 2021 Research-in-Progress Papers. 11.  
https://aisel.aisnet.org/ecis2021_rip/11

This material is brought to you by the ECIS 2021 Proceedings at AIS Electronic Library (AISeL). It has been accepted for inclusion in ECIS 2021 Research-in-Progress Papers by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.
A MOBILE APP TO SUPPORT STUDENTS IN THE “TRANSITION-IN” PHASE

Research in Progress

Johannsen, Florian, Hochschule Schmalkalden, Germany, f.johannsen@hs-sm.de
Knipp, Martin, University of Bremen, Germany, martin.knipp@uni-bremen.de
Loy, Thomas, University of Bremen, Germany, thomas.loy@uni-bremen.de
Voshaar, Johannes, University of Bremen, Germany, johannes.voshaar@uni-bremen.de
Zimmermann, Jochen, University of Bremen Germany, jzimmermann@uni-bremen.de

Abstract

Inadequate student experience, inefficient learning strategies or a lack of self-organization often lead to students’ premature dropout from higher education. With the increase in student numbers, student success is becoming a serious social issue. Most early terminations happen in the so-called “transition-in” phase of the student lifecycle, when students fail at developing a “student identity”. To sustain student success, universities need to develop instruments with a focus on freshmen, reinforcing learning and fostering retention. We present a digital solution with the potential to enhance student experience, improve learning strategies and help with self-organization. Universities can thus better contribute to the goal of a successful academic education by using technology to help students adjust to a more diverse student body. This paper describes our research on the development of a mobile application, adapted to the particular needs of business and economics students in the “transition-in” phase at a German university.

Keywords: design science, mobile application, student lifecycle, transition-in phase.

1 Introduction

Over the last 50 years, there has been a tremendous increase in students seeking higher education (Matheson, 2018). For instance, the number of university students in Germany almost approaches three million, reflecting an increase of about 50 percent in a span of 15 years. Higher education policies across the globe now need to primarily focus on the development of attributes, skills and knowledge that are required by the labor market to ensure global competitiveness, and accommodate for the sociocultural and academic background of students, which has become more diverse in most countries (Matheson, 2018). Empirical studies hint at a correlation between premature student dropout and their educational background (Neugebauer et al., 2019). In addition, inadequate student experience throughout their university studies or psychological factors – such as inefficient learning strategies, learning problems or a lack of self-organization – seem to play a decisive role (Blüthmann et al., 2011; Heinze, 2018; Neugebauer et al., 2019). We claim that there is a digital solution that can account for diverse student backgrounds, tackle their insufficient experiences as well as support individual learning and self-organizational strategies, thereby helping both students and universities achieve academic success. Within the student lifecycle of Lizzio (2011), who describes the transition from a prospective student to a commencing, continuing and finally graduating student, most premature departures happen in the so-called “transition-in” phase (Isleib et al., 2019; Neugebauer et al., 2019; Yorke, 2004). At that stage, students work at developing a “student identity” (Lizzio, 2011) and try to integrate into the student world.
To foster student retention at this early point, universities need to develop instruments with a focus on entering freshmen. These must enable better communication – especially between students and faculty (Schulmeister, 2007). The transition from the highly-structured school system into a university system that largely builds on self-organized research-based learning (cf. Huber et al., 2009) and asks for individuals’ self-responsibility obviously overburdens many freshmen. More concretely, many students seem to struggle with the organization of their individual study activities, balancing the time slots for attending courses, obtaining credits, and preparing or postprocessing lectures (Schulmeister, 2007). Digital technologies seem to be well suited to mitigate such challenges and need to be studied further (Bond et al., 2018; Schulmeister, 2007). Therefore, we pose the following research question:

What can a mobile application to support students’ experience, learning strategies or self-organization in the “transition-in” phase of the student lifecycle look like?

In this paper, we present a prototype of a mobile application that helps business and economics students at the University of Bremen cope with the challenges of the “transition-in” phase of their study program. More specifically, students are enabled to plan out their regular attendance of lectures, monitor individual learning progress or recall acquired knowledge by gamification elements (e.g., quizzes, etc.). Due to the widespread availability of smartphones within the population in general and among students in particular (Bond et al., 2018; Clayton and Murphy, 2016), we believe that a mobile application is a suitable instrument for this purpose. This makes use of the trend that the institutional acceptance of mobile applications for educational purposes is quickly expanding (Morris et al., 2016). It also reflects user interests, as German students express a greater demand for digital teaching and learning technologies than what is currently being supplied (Bond et al., 2018). Moreover, a mobile application is an adequate instrument to meet the challenges caused by the COVID-19 pandemic. A running version of a mobile application for business and economics students will be introduced as a technological solution to study-related challenges at the University of Bremen. We initially focus on this narrow target group because requirements can be specified more precisely for a homogeneous user group with which the authors are well acquainted. The app can, however, easily be adapted to the needs of other departments and universities, so our results will be beneficial to a broad audience.

The paper is structured as follows: In the next section, we present related work about mobile apps for educational purposes. Then, we introduce requirements for our prototype and subsequently describe its development. Finally, the results are discussed before we propose a pathway for further research.

2 Foundations & Related Work

Digitalization and particularly the use of mobile devices and applications in higher education is a vibrant field of research (Bond et al., 2018; Castek and Beach, 2013; Larkin, 2015; Sezer and Yilmaz, 2019). This holds especially true for the group of freshmen to create technological aids to reduce premature dropouts (e.g., Bermingham et al., 2016). Current studies reveal that freshmen often show a lack of self-organization (cf. Zehetmeier et al., 2014) and of social as well as academic integration (Isleib et al., 2019). Additionally, insecurity and inefficiency regarding learning and examination behaviors can be observed, a decisive reason for premature dropouts (Isleib et al., 2019). At the same time, self-efficacy and organization skills are seen as important psychosocial factors for the success of first-year students (cf. Krumrei-Mancuso et al., 2013). Taking this into account, developing a mobile solution to support the student experience, learning strategies and self-organization skills in the “transition-in” phase seems promising. A classification scheme for technologies to support student learning along the dimensions “personal vs. shared” usage and “portable vs. static” device was introduced in a NESTA FutureLab study (Naismith et al., 2004). In this context, much research was done regarding “learning management systems (LMS)” in the past, which can be best described “as web-based software platforms that provide an interactive online learning environment and automate the administration, organization, delivery, and reporting of educational content and learner outcomes” (Turnbull et al., 2019, p. 1). Thus, a LMS can be proprietary (e.g., WebCT of the University of Columbia) or open source (e.g., Moodle) in nature,
with the functionalities ranging from course management, gradebooks, communication tools or progress tracking capabilities among others (Alshorman and Bawaneh, 2018; Turnbull et al., 2019). The positive impact of LMS usage on students’ performance, with a special focus on freshmen, was shown in several studies recently (cf. Goosen and Van Heerden, 2018; Leontyeva, 2018; Msomi and Bansilal, 2018). Nonetheless, it is acknowledged that even the best-planned LMS does not help decrease student dropout rates if it is rejected by the new generation of “information consumers” (Turnbull et al., 2019, p. 1) – hence, the exploration of further technologies like cellphones for learning purposes is strongly suggested (Goosen and Van Heerden, 2018; Msomi and Bansilal, 2018).

Considering that higher education is increasingly becoming aware of the great availability of mobile phones among students – having become an integral part of their daily lives that helps establish and maintain social networks (Bermingham et al., 2016; Kobus et al., 2013) – we focus on mobile apps to support freshmen’s learning efforts in this research. In this respect, Castek and Beach (2013) introduce so-called “affordances” to mediate the relationship between students and their learning goals, which are supported by interaction apps and cloud storage, among others (Wai et al., 2018). A further line of research discusses mobile apps in education from a more technical perspective. Specifically, Clayton and Murphy (2016) examine peer learning and teaching capabilities of mobile apps, referring to a collaborative video design project. General propositions on how to purposefully integrate mobile apps to provide an infrastructure for educational content delivery are made by Khaddage et al. (2011). Vázquez-Cano (2014) presents the functionality of smartphones to support mobile distance learning. Pechenkina et al. (2017) show the positive effect of gamification in mobile apps to increase student engagement, retention and achievement. Finally, some authors discuss the role of mobile apps to support students with disabilities (cf. Ok et al., 2016; Stephenson and Limbrick, 2015). Mobile apps are also considered for specific disciplines or subject areas (e.g., Morris et al., 2016; Steel, 2012). As examples, Diliberto-Macaluso and Hughes (2016) provide evidence for the positive effect of mobile apps for achieving learning objectives in an introductory course in psychology, while Larkin (2015) performs a detailed evaluation of available apps that support building mathematical knowledge. In this paper, we focus on the development of a mobile app for business and economics freshmen at the University of Bremen. Initially, we surveyed the market of official mobile apps that were developed by other German higher education institutions. Thereby, we identified a vast amount of different applications (cf. Table 1 for some examples). While campus apps can be found on an international level as well (e.g., UC San Diego mobile app), we aim to keep the scope of the research manageable, considering the aspired target group.

Table 1. Sample of Links to Mobile Campus Apps in Germany

<table>
<thead>
<tr>
<th>Links to campus apps at German universities</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="https://www2.uni-augsburg.de/projekte/campus-app/">https://www2.uni-augsburg.de/projekte/campus-app/</a></td>
<td><a href="https://be-jo.net/2013/09/apps-der-tu-ilmenau/">https://be-jo.net/2013/09/apps-der-tu-ilmenau/</a></td>
</tr>
<tr>
<td><a href="https://www.uni-due.de/myude/">https://www.uni-due.de/myude/</a></td>
<td><a href="https://hskampus.de/">https://hskampus.de/</a> (Karlruhe)</td>
</tr>
<tr>
<td><a href="https://navigator.tu-dresden.de/mobile_apps">https://navigator.tu-dresden.de/mobile_apps</a></td>
<td><a href="https://tumcabe.in.tum.de/landing/">https://tumcabe.in.tum.de/landing/</a> (Munich)</td>
</tr>
<tr>
<td><a href="https://app.uni-frankfurt.de">https://app.uni-frankfurt.de</a></td>
<td><a href="https://www.uni-paderborn.de/studium/paul-info/paul-app/">https://www.uni-paderborn.de/studium/paul-info/paul-app/</a></td>
</tr>
<tr>
<td><a href="https://rz.uni-greifswald.de/dienste/allgemein/uniapp/">https://rz.uni-greifswald.de/dienste/allgemein/uniapp/</a></td>
<td><a href="https://zim.uni-wuppertal.de/dienste/campus-app.html">https://zim.uni-wuppertal.de/dienste/campus-app.html</a></td>
</tr>
<tr>
<td><a href="https://www.uni-hamburg.de/newsroom/presse/publikationen/apps.html">https://www.uni-hamburg.de/newsroom/presse/publikationen/apps.html</a></td>
<td>...</td>
</tr>
</tbody>
</table>

Following the classification scheme of Notari et al. (2016), it becomes clear that most of the other mobile campus applications are “learning and teaching support apps”, although their concrete purposes and functionalities vary widely. Nevertheless, almost all of them provide campus maps, an overview of cafeteria offerings, official timetables or event directories. Some (e.g., apps of the University of Arts Bremen, University of Hohenheim) provide rapid access to learning content and others even allow registering for exams (e.g., apps of the RWTH Aachen, University Duisburg-Essen). Communication functionalities do not seem to play a major role, as departments and students obviously defer to commercial apps like Facebook and Instagram to ensure effective information transfer. In addition to university apps, a variety of commercial apps help users organize their daily lives. These can schedule daily routines and tasks (e.g., “24me”, “Todoist”), structure brainstorming ideas (e.g., “MindNode”) or...
track fitness activities (e.g., “FitNotes”, “MyFitnessPal”), among others. Usually, these mobile apps are well-integrated into the lives of many young people (e.g., Goodyear et al., 2019). This contrasts with official “campus apps” that often provide content already readily available elsewhere. Hence, campus apps often run the risk of not being developed further when they lack student acceptance or interest (e.g., Potgieter, 2015). We therefore aim to provide a mobile app that supports freshmen academically during the “transition-in” stage of the student lifecycle and is easily and practically integrable into everyday student life, achieving long-term student acceptance. Hence, our app ought to combine the ideas of commercial “apps to organize daily routines” (e.g., “24me”, etc.) with university-related content and functionalities (e.g., timetables, define tasks and goals, etc.) along with gamification elements.

3 Methodology and Research Design
To achieve a working prototype of the mobile app, we conduct a Design Science Research (DSR) project (cf. Gregor and Hevner, 2013, Hevner et al., 2004) following the procedure of Peffers et al. (2007).

Figure 1. DSR Procedure by Peffers et al. (2007) Adapted for This Research

The problem statement has been formulated in the introduction (Step 1 – “Problem”). The second step (Step 2 – “Objectives of a Solution”), deals with the specification of requirements (e.g., Schilling, 2016) to arrive at a manageable set of design requirements for our initial prototype. The prototype is then designed and developed in Step 3 (“Design & Development”). In this respect, suitable frameworks for technically realizing the prototype also need to be selected. Next, a demonstration of the prototype takes place to obtain feedback (Step 4 – “Demonstration”). Considering Step 5 (“Evaluation”), we present the results of a SUMI (Software Usability Measurement Inventory) study (cf. Kirakowski and Corbett, 1993) with 37 participants that was performed to assess the app’s general usability from the perspective of faculty members and students. In the next step of the evaluation, the prototype will be subjected to a second and larger field study in order to generate additional insights regarding its usefulness and applicability (cf. Hevner et al., 2004). Subsequently, the app will be revised before a large-scale rollout across all undergraduate courses of the faculty can take place (Step 6 – “Communication”). The purpose of this current research is to contribute to the knowledge base (cf. Gregor and Hevner, 2013, Hevner et al., 2004) of using mobile apps to mitigate students’ challenges in the “transition-in” phase.

4 Objectives of a Solution (Step 2)
To achieve design requirements (cf. Gregor and Hevner, 2013, Hevner et al., 2004) in Step 2, we followed the suggestions of Schilling (2016) regarding the pre-conception of mobile apps and requirements engineering (cf. Rupp et al., 2009). Hence, (I) user stories, (II) market research, (III) user requirements (persona profiles) and (IV) user journeys are combined to create a feature list for the app (Schilling, 2016).

We first defined a fictional (I) user story of a business student that uses the app to practice their skills concerning the “Accounting and Accounts” course and tackle challenges within the “transition-in” phase. That way, the data processed by the app as well as its underlying logic became evident (Schilling, 2016). Second, as described (section 2), a (II) survey of the market of mobile apps designed by German higher education institutions was performed to identify common functionalities of campus apps. To identify specific (III) user requirements (preferences) on the app, we first surveyed second- and third-
year undergraduates who are still well familiar with the challenges they experienced at the beginning of their studies. More specifically, the survey comprised 54 students in four different courses administered by the authors of this study. 68% of the students were enrolled in the “Business Studies” program, 26% in “Information Systems and Management” and a further 6% in “Engineering and Management”. A central requirement on the selection of undergraduate courses to administer the survey was that the students should still be able to recollect the challenges they had when entering the university system. As such, this target group can describe how the problems might have been handled by coping strategies and which functionalities of an app would have been helpful. The students were given a paper-based questionnaire with a list of functionalities derived from existing apps (see Table 1). These functionalities were rated on a 5-point Likert scale concerning their importance for supporting a student in the “transition-in” phase. More importantly, the students were asked to note their individual ideas for additional functionalities they would perceive as helpful.

We found that the majority of students consider a timetable manager, which lets them arrange periods for individual study as well as includes automatic reminders for lectures or other relevant academic events (e.g., exam registration), as a decisive feature of the app. Furthermore, the ability to define and monitor learning goals would be highly appreciated. To achieve this goal, the app should provide options for testing knowledge and skills attained in lectures and tutorials. Generally, the timetable planning functionality is offered by many of the existing university or commercial apps. However, the ability to test one’s knowledge on specific subject-related matters is not central to these apps.

Table 2 sums up the design requirements. More detailed descriptions can be viewed at: https://tinyurl.com/y2uhpmnh. These requirements were chosen to be realized in an initial version of the app prototype. In fact, the university is already running an open source LMS. Although, this platform is

<table>
<thead>
<tr>
<th>Category</th>
<th>Design Requirement (DR)</th>
<th>Students’ experience</th>
<th>Learning strategies</th>
<th>Self-organization</th>
<th>Primary source of the DR</th>
<th>Student factors addressed by the DR</th>
<th>Primary source of the DR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course attendance/reminders</td>
<td>DR 1: Tracking and monitoring of course attendance</td>
<td>●</td>
<td>-</td>
<td>●</td>
<td>I, II, III(s, ft), IV(s)</td>
<td>Students’ experience</td>
<td>I, II, III(s, ft), IV(s)</td>
</tr>
<tr>
<td></td>
<td>DR 2: Pop-up messages with reminders of lectures and important academic events</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>I, II, III(s, ft), IV(s)</td>
<td>Students’ experience</td>
<td>I, II, III(s, ft), IV(s)</td>
</tr>
<tr>
<td>Support of study phases</td>
<td>DR 3: Provision of training and exam-oriented exercises for learning control and training purposes</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>I, II, III(s, ft), IV(s, ft)</td>
<td>Students’ experience</td>
<td>I, II, III(s, ft), IV(s)</td>
</tr>
<tr>
<td></td>
<td>DR 4: Performance tests via quizzes</td>
<td>-</td>
<td>●</td>
<td>●</td>
<td>I, II, III(s, ft), IV(s)</td>
<td>Students’ experience</td>
<td>I, II, III(s, ft), IV(s)</td>
</tr>
<tr>
<td></td>
<td>DR 5: Control of learning process and comparison with a peer group</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>I, II, III(s, ft), IV(s)</td>
<td>Students’ experience</td>
<td>I, II, III(s, ft), IV(s)</td>
</tr>
<tr>
<td>Technical requirements</td>
<td>DR 6: Design as a hybrid app</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>III(s, ft), IV(f)</td>
<td>Students’ experience</td>
<td>III(s, ft), IV(f)</td>
</tr>
<tr>
<td></td>
<td>DR 7: Separation between front-/back-end, with an easy management of the content in the back-end</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>III(s, ft), IV(f)</td>
<td>Students’ experience</td>
<td>III(s, ft), IV(f)</td>
</tr>
<tr>
<td></td>
<td>DR 8: Data transfer via HTTP and JSON</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>III(s, ft), IV(f)</td>
<td>Students’ experience</td>
<td>III(s, ft), IV(f)</td>
</tr>
</tbody>
</table>

Legend: ●: fully supported; ○: partly supported; -: little supported; I: user story; II: market research; III(s/ft): user requirement student/faculty member & teaching staff; IV(s/ft): user journey student/faculty member & teaching staff

Table 2. Requirements for the Mobile Application

A second user group concerns faculty members and teaching staff, whom we interviewed subsequently. The interviewees have long-term professional experience in the academic field and are the contact persons for student as well as teaching staff problems in their day-to-day life at the university. As a result, requirements on the management of content, the app’s design and usability emerged. We also complemented our findings by studies dealing with the challenges of first-year students and their base competencies when entering the university system (cf. Krumrei-Mancuso et al., 2013, Zehetmeier et al., 2014). Thereby, literature recognizes significant drawbacks in terms of self-organization or learning efficacy amongst others (cf. Krumrei-Mancuso et al., 2013, Zehetmeier et al., 2014) confirming the results received in our survey. Finally, (IV) user journeys for the aforementioned user groups were specified to identify potential usability problems when working with the app (cf. Schilling, 2016).

Table 2 sums up the design requirements. More detailed descriptions can be viewed at: https://tinyurl.com/y2uhpmnh. These requirements were chosen to be realized in an initial version of the app prototype. In fact, the university is already running an open source LMS. Although, this platform is implemented as an instrument for data storage to provide students with learning content via a central
and static system, it is not available as a mobile app and lacks most of the features mentioned in Table 2, thus rendering it unsuitable for supporting students in the “transition-in phase”. Also, we refrain from purchasing and adapting a commercial solution, because the source code and the further development should be kept within the faculty’s area of influence. Finally, the requirements could be realized by a custom-developed app, and any dependence on a third-party-supplier should be avoided.

5 Development & Demonstration (Steps 3 and 4)

The component diagram in Figure 2 gives an overview of the app’s architecture, which was developed as a hybrid app to enable its rollout for Android and iOS devices (Step 3). Thereby, the communication between the front- and back-end but also the internal communication within these components is enabled by the HTTP and JSON standards. The major task of the front-end is to receive user input (e.g., activate a button) and process this information to the back-end. The front-end was developed by help of the IONIC Framework (https://ionicframework.com/), which works based on Angular (https://angular.io/) (Green and Seshadri, 2013). In contrast, the back-end was realized via the Spring Framework (https://spring.io/) and the complementing Spring Boot solution (cf. Walls, 2016), which consists of the four components “controllers”, “services”, “model entities” and “repositories”. The functionalities provided by these components – i.e., the persistence of the data and their inquiry as well as the login logics – are realized by the Spring Boot packages “Web”, “Data JPA” and “Security”. Thus, the check of the login data is performed via the faculty’s LDAP (Lightweight Directory Access Protocol) server.

![General Architecture of the Mobile App](image)

Figure 2. General Architecture of the Mobile App

The demonstration (Step 4) comprised two acceptance tests of the prototype. The first acceptance test focused on the processing logic of the front- and back-end. Hence, the prototype was demonstrated to faculty management (i.e., the dean and dean of studies).

![Screenshots of the Application Prototype](image)

Figure 3. Screenshots of the Application Prototype

During the subsequent discussion, several requests regarding the front-end’s visual layout were documented. After a corresponding revision, a second acceptance test was performed with the dean, lecturers and selected teaching assistants of the faculty, who all interact regularly with students in the aforementioned phase. The audience agreed that all initial requirements were fulfilled to organize a comprehensive evaluation of the app in its current version. Figure 3 shows screenshots of the application. It displays a new course added to a student’s timetable (DR 1 and 2) and sample functionalities for this course derived from the design requirements that address different student factors (e.g., quizzes (DR 4), comparison with a peer group (DR 5), etc.).
First Evaluation (Step 5) – SUMI Usability Study

Generally, testing the quality of software is a wide research field and many metrics, standardized quality dimensions and frameworks have recently been developed (e.g., Dubey et al., 2012; Franke and Weise, 2011; ISO, 2011; Wang et al., 2012). To assess the usability of our prototype from the user perspective, a SUMI study (cf. Kirakowski and Corbett, 1993) was performed as a first step of a comprising evaluation (cf. Sonnenberg and Brocke, 2012). In this respect, usability refers to the “ease-of-use” of the software product and its applicability for the intended purpose (Bevan, 1995). The SUMI instrument was designed by the Human Factors Research Group (HFRG) (http://sumi.uxp.ie/) to evaluate user satisfaction with a software in terms of “efficiency”, “affect”, “helpfulness”, “control” and “learnability” (Kirakowski and Corbett, 1993). As a result, SUMI was validated on a Europe-wide basis (van Veenendaal, 1998) and is a widely recognized means to assess user satisfaction (Mansor et al., 2012).

The corresponding SUMI questionnaire consists of 50 items (e.g., “I feel in command of this software when I am using it”) and 3-point Likert scales are used for valuation (“agree”, “disagree” and “undecided”) (van Veenendaal, 1998). Furthermore, free text fields are offered to receive additional feedback and suggestions for improvement. The SUMI reference database suggests an average score of “50” for each dimension with a typical standard deviation of “10” and a maximum score of “73” (Arh and Blažič, 2008; van Veenendaal, 1998). In total, 18 business and economics students and 19 faculty members participated in our SUMI study (N = 37). In this respect, the students took the view of end-users, and the faculty members acted as lecturers or tutors providing learning materials and exercises via the app.

For the SUMI study, the participants were given access to the app and they could freely navigate through the prototype, test its functionalities and get an impression of the app’s capabilities in general. To receive the feedback from this first evaluation rather quickly and be able to improve the prototype in preparation for a larger and second field study, we allotted a test period of one day in our research computer lab at the university. Each participant then filled out the SUMI online form and the results were made available by the HFRG. Figure 4 shows a summary of the results for both groups (faculty members and students).

The global scale of our prototype was above the value of “50” (mean: 56.37 and 57.11) and hence, a positive perception by the student and faculty member group was observed. For the most part, no significant differences in the ratings became evident across both groups, despite the data range for particular dimensions (e.g., “control”). The functionalities of the app were judged to purposefully support students in the “transition-in” phase (dimension “efficiency” – mean: 59.11 and 57.56). Also, the visual design and GUI of the software were judged to be appealing on the whole (dimension “affect” – mean: 56.79 and 57.17), while the app was seen as rather self-explanatory (dimension “helpfulness” – mean: 55.56 and 55.68).
Johannsen et al. /Mobile App to Support Students

Twenty-Ninth European Conference on Information Systems (ECIS 2021), [Marrakesh, Morocco|A Virtual AIS Conference].

— mean: 55.42 and 54.89) and easy to control (dimension “control” — mean: 56.05 and 59.50). However, the study also provided beneficial feedback on how to revise and further develop the app. As an example, it was proposed to include “a performance assessment tool that indicates those topics one is already well acquainted with” from the students’ side. To sum up, the usability test provided encouraging results to foster a second field study in the upcoming semester.

7 Implications & Discussion

Student retention in the “transition-in” phase is a lively discussed topic. Our research and the ongoing development of our mobile app can positively contribute to the debate and produce desirable academic results. First, with the development and provision of a mobile app, we contribute to the discussion on how to purposefully integrate mobile apps into the student lifecycle with an attempt to provide a “hands-on” solution. Identifying students’ needs in the “transition-in” phase and deriving design requirements from them helps freshmen, in particular, to stay on course. Valuable insights are also generated for university management because our results may help in better assessing the role of mobile apps in student retention during one of the most stressful and problematic phases of their studies. Second, the gamification feature in our app is seen as a key factor concerning students’ motivation for app usage and acceptance. Therefore, the app may proactively help them overcome challenges in the “transition-in” phase via features that let them organize their day-to-day life at the university, keep track of important dates (e.g., push notifications) and motivate them to keep studying (e.g., peer group ranking) — all in a fun and useful fashion. To do so, university-related content is integrated with gamification elements that are commonly known from apps to support peoples’ daily lives (e.g., fitness apps, organizer apps, etc.) as these are highly accepted by the younger generation (cf. Martin et al., 2015). However, it should be mentioned that besides the motivating effect of gamification elements on students’ learning engagement (e.g., Kiryakova et al., 2014; Stott and Neustaedter, 2013), also negative effects have been discussed in literature (e.g., undesired behavior) (cf. Toda et al., 2017). Third, the app offers the possibility of learning independent of time and place, which is not only of particular relevance in times of the COVID-19 pandemic but also corresponds to the university’s claim to self-responsibility. In this respect, the app could enable students to self-determined learning and might close a gap that currently exists within the curriculum. Finally, due to its general architecture as well as its intuitive user and control interface, the app can be adapted to the needs of other departments and institutions.

Nevertheless, our research is also subject to limitations. The app is now developed for the use at a specific department of one university, and the mobile app’s generalizability to other schools and institutions has to be explored in greater detail. Students at other departments might face different challenges in their lifecycle and may have diverse expectations. We will examine the necessary adjustments more closely in future research. However, the close focus of this study helps us to precisely define design requirements for a specific target group and develop a prototype that matches these particular needs in a first iteration of our DSR project. Extensions and adjustments of the app based on students’ feedback will take place after having conducted further evaluations (second field study) and considering further quality dimensions of mobile apps in particular (e.g., Franke and Weise, 2011).

8 Outlook & Next Steps

This paper describes our ongoing research on the development of a mobile application, which is adapted to the particular needs of business and economics students in the “transition-in” phase at a German university. Thereby, we particularly focus on the challenges in the “transition-in” stage of the student lifecycle to derive design requirements. As next steps, we will conduct a more comprehensive evaluation with a larger group of students in the upcoming semester (including first-year students). More specifically, this beta test will take place in the “Accounting and Accounts” course that is mandatory for freshmen in business studies, economics and other related fields, such as engineering and management, covering about 500 students in total. After successful completion of this beta test phase and possible adjustments based on users’ feedback, it is our aim to release and effectively implement the mobile app into the full undergraduate curriculum at our faculty.
References


