A Mobile App in the 1st Year Uni-Life: A Pilot Study

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The transition process that students undergo from high school to university, especially during the first year has a significant impact on their academic success. Higher education institutions try to cater for the needs of these students with a variety of initiatives. Although there are numerous resources made available in university websites, in most cases, they are underutilized. With the high adoption rate of smart phones among university students, mobile apps can be used to provide personalised support during the transition from high school to university. But, questions such as what is the truly relevant information that should be given to students, how should the information be delivered, and how should such a mobile application be designed remain unanswered. To explore these issues, we have developed a prototype mobile application called "myUniMate". We conducted a pilot study in which 13 first year engineering students used the app for 6 weeks during a normal semester. Both qualitative and quantitative data was gathered to analyse the usability and feasibility of the app and to identify the features that were more useful. The obtained results have provided clear guidelines for the evolution of the application.

Keywords: transition, mobile learning.

Introduction

Enhancing universal higher education provision is one of the goals for Australia in recent years (Gale and Parker 2014), and supporting students to have a smooth transition from high school to university is one of the aspects that require special attention to reach this goal (Briggs et al., 2012; Krause, 2001). Various research projects have been conducted to explore this transition process in order to support and encourage students entering higher education, (Richardson et al, 2012; Tinto, 1998; Wilcox, Winn, and Fyvie-Gauld, 2005). Results of previous studies indicate that the first year in university is one of the most important transitions in a student's life (Richardson et al. 2012). A high-quality academic experience, adequate academic support, social involvement and peer support are factors that contribute to a successful transition (Tinto 1998; Wilcox, Winn, and Fyvie-Gauld 2005).

Various approaches have been developed by researchers to support the students during the first year in university. Student peer coaches were adopted in Pitkethly & Prosser (2001), Pitkethly & Prosser (2001) and Huon & Sankey (2002) suggested that course coordinator should be assigned to work with small groups of new students particularly during the induction week. A "Transition to University" workshop was described by Peat et. al., (2000) and The University of Tasmania has deployed a "UniStart" program to nurture critical thinking and independent study skills in commencing students (Adam, Hartigan, & Brown, 2010). However, these interventions have two drawbacks. The first one is that they are not tailored to student's needs. They are initiatives offered to all the students, but it is difficult to estimate how many of them truly need them. The second drawback is that these approaches do not scale when the number of commencing students is large due to its resource-intensive nature.

With the advancements of mobile technology and the increasing adoption rate of mobile phones, these devices have become an integral part of people's lives. Specially designed mobile applications have been created to improve students' learning. For example, in Steel, C. (2012), mMobile apps were used to supportallow students learn to make better use of their time to learn languages (Steel, C. 2012).., while, Cheong et.al. (2012) created a framework designed based on collaborative learning theories to support collaborative learning within groups of students. Kinash et. al. (2012) also designed a study to analyse if mobile learning really "does the job" of supporting students' learning activities. However, not much research has been done. on the analysis using mobile applications to support first year university students in their transition.

FP:330

To evaluate the feasibility of using a mobile application in supporting university students we adopted a user centred design strategy. We designed and deployed an initial prototype of a mobile application, called "myUniMate". A user group of 13 first year engineering students from an Australian university used the application during a regular semester. Pre- and post- questionnaires were used to gather qualitative feedback from participants. Additionally, participant interactions with the mobile application were tracked and used as quantitative data. The analysis of data gathered in this study allowed us to evaluate the merit of the prototype as a mobile application to support student transition into university. The results helped us identify a set of requirements that need to be included in the application in order to be valued by the students. In the remainder of this paper we present our findings and answer the following research questions:

- What information should be given to first year university students?
- How should the information be delivered to first year university students?
- What are the mobile design guidelines that better support the transition of a first year university student?

The "Five Senses Model"

Lizzio (2006) proposed 5 areas of student needs that are relevant to their early success at university. The aim was to provide a framework that summarises ideas and practices that have been shown, either directly or indirectly, to enhance commencing students' satisfaction, engagement and persistence in higher education.
The five senses are:

- **Capability**. The university experience is usually quite different from what a commencing student has experienced in her previous studies. Better prepared students tend to have early academic success, and are usually more satisfied with their university experience and persistent with their studies.
- **Connectedness**. The university experience usually requires students to form new relationships with their peers or with university staff. Aside from relationships with other students, the identification or affiliation with their school or university is also important to become a successful student.
- **Purpose.** Motivation is more effective when it is intrinsic (Deci & Ryan, 1985, 2000). A student with an intrinsic purpose of learning is more likely to choose the right degree, understand the relevance of the courses, and know how to systematically develop strengths and talents.
- **Resourcefulness**. The ability to navigate the university system, get the help and information needed, and balance work and life, and the appropriate study commitment are all aspects that contribute to a successful university experience.
- **Academic culture**. Students with a successful university experience usually know the value of learning, what is required for the learning process, and what is important or valued in this new culture.

The details of our findings, the details of which are presented in a future section, are in agreement with this model.

The "myUniMate" Mobile Application

In this section we provide an overview of the application. The "myUniMate" mobile app was conceived as an aggregation of commonly acknowledged functionalities that are important to the experience of a university student such as a tightly integrated feedback loop. Android was chosen as the development platform due to the low cost of Android smartphones and relatively simpler deployment process. The mobile application was implemented asis a mobile client that communicates continuously with a server that handles data storages.

Design Considerations

The purpose of the study is to gather user feedback about the application, and solicit features that they would like to see included. "myUniMate" was designed in a "top-down" approach, in which functionalities were first drawn from similar studies by researchers in the project team and

implemented as a collection of clearly differentiated functional components. Each component provides information about one aspect of the student university experience. The first version of the application was designed with four components: Reminder, Mood & Health, Feedback, and Memo. All four components were implemented in their simplest form to let participants explore the desirable features and speed up the time to create an evolved version of the prototype. It follows a detailed description of each of the components.

Reminder Module

One of the most important aspects that first year university students need to understand is to manage multiple information sources by themselves. Apart from attending lectures, laboratories and tutorials, students may also work on part-time jobs or participate in other extracurricular activities. This variety of engagements can be an advantage, or a burden. There is a risk that the student feels overwhelmed by the tasks derived from these contexts. The "Reminder Component" was implemented to help students organize different tasks that they need to complete.
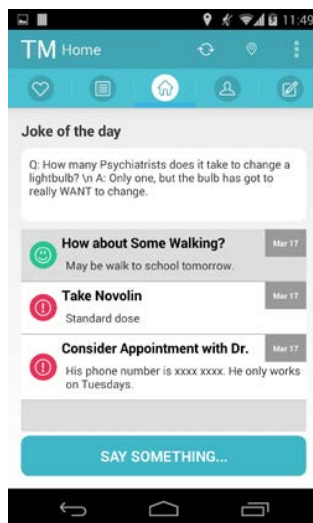

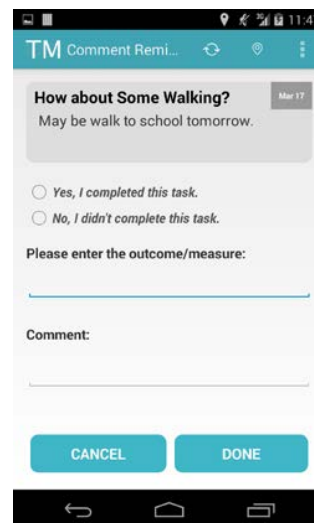Figure 1: The Reminder Component   Figure 2: Detail Screen

Figure 1 shows the appearance of this module. As it can be seen the screen shows a list of reminder items. Each item consists of a title, content, and a deadline for the task. On the left of each item, there is an icon indicating whether the task has been completed (green icon) or not (red icon). Each item is clickable, and if a user clicks on an item, she will be redirected to a screen similar to Figure 2. On this screen she can say whether the task has been completed and (optionally) make a comment.

Mood & Health Module

Self-perceived mood and health information has been shown by various researchers to be related to performance and wellbeing (Ryan & Deci, 2000, Huppert & So, 2013). And the support during the transition period should not only consider students' performance in completing academic tasks, but wellbeing should also be included as a goal of the transition support.

The measurement of students' mood and health was implemented as a set of progress bars (as shown in Figure 3) because they have a straightforward interpretation. The ranges of the three progress bars go from a low magnitude to a high magnitude, but the individual wording is different for each measure. The mood scale goes from "negative" to "positive", the energy scale from "low" to "high", and the health scale from "very bad" to "very good". Students report their current self-perceived mood and health by moving anchors along the progress bars and (optionally) making a comment about the values.

Feedback Module

An important aspect to support first year university students consists of suggesting alternatives to

their observed behaviour. Towards this end, self-reflection may be an effective way to foster these changes or reaffirm positive behaviour during their first year. The purpose of the feedback module is to allow students to reflect in their past performance and possibly adjust their behaviour based on what they have observed.
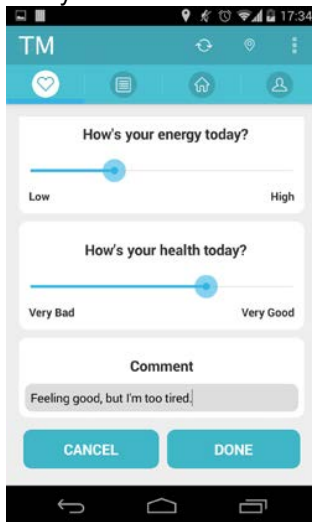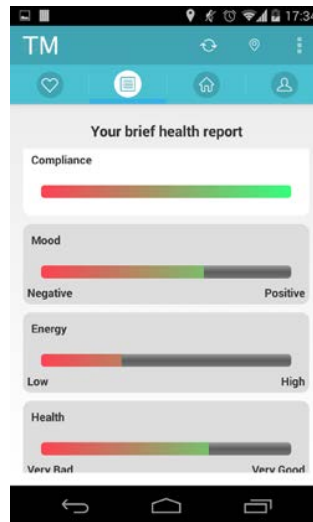

Figure 3: The Reminder Component

Figure 4: The Reminder Component

Figure 5: The Reminder Component

In Figure 4, the feedback component shows four measurements:

- Compliance: the completion rate of tasks listed in the reminder component
- Mood: the average of self-reported mood score
- Energy: the average of the self-reported energy score
- Health: the average of the self-reported health score.

Each component is shown in a progress bar ranging from red to green. When the score of the corresponding measure is low, the progress will be positioned at the red part (left side of the bar). If the score of the measure is high, the progress will be at the green part (the right side of the bar).

Memo Module

This component is a conventional memo functionality that contains the aggregation of all text-based records entered through myUniMate. An example of this module is shown in Figure 5.

Case Study: First Year Engineering Students

The mobile application described in the previous section was deployed in a 6-week pilot study to gather feedback on the current design and solicit new functionalities from real-world users. 13 (11 male and 2 female) first year university students participated in this study. The current version of the mobile application was used as an example to stimulate participants' imagination on thinking of novel functionalities. Interactions between participants and the mobile application were tracked and questionnaires were used to get feedback from participants.

Sample

To satisfy study goals, participants were required to be first-year undergraduate students using Android phones on a daily basis. We chose Android as the development platform because of the limitation of development skills of the project teamlow cost of Android mobile phones and its relatively easiersimpler deployment process. its Participants were recruited via email with a message that contained a brief description of the study and the participant requirements.

After getting the approval from the course coordinator, a recruiting email was sent to each of the students enrolled in the first-year engineering course. A total of twenty students replied to this email
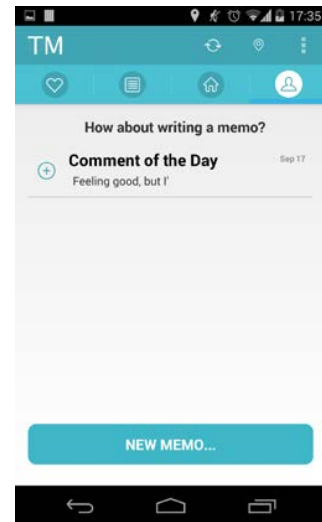
and expressed their interests in participating in this study. Fourteen of them ended up participating in the study and thirteen of them completed the entire study. Those who completed the study were compensated with a $20 gift card. Out of the 13 participants, 11 are male and 2 are female. All recruited participants were first-year undergraduate students in the Engineering Department of the university. All participants were regular Android smartphone users and had been using a smartphone for at least one year. Nine of the thirteen participants were raised in Australia, and the rest were international students.

Method

After recruiting all participants were required to attend a meeting (pre-questionnaire session) with the research team. Before the first questionnaire session, participants gave their consent and were informed that they can opt out at any time without affecting the relationship with the researchers or the university in which the study took place. All participants were required to use the mobile application for four weeks.

During the first questionnaire session that took place on the first day of week 1, the researchers gave each participant a demonstration of the application. After the demonstration, participants were required to complete a questionnaire containing questions collecting demographic information, their experience with mobile phones and mobile applications, and their university experience. Participants were also required to complete a second questionnaire in which participants reported their expected activities or tasks that they needed to complete in the next 4 weeks. After the first questionnaire session, instructions on using "myUniMate" and tasks that they were required to complete were given to each participant through the application, and all of them were asked to use "myUniMate" for the following four weeks. The second questionnaire session took place at the end of the fourth week in which participants were required to complete two additional questionnaires about their university experience and their opinion about the application. The third questionnaire session was at the end of the sixth week, and participants were required to complete the same two questionnaires used in the second questionnaire session.

Measurements

The data obtained in the study can be categorised into three categories: questionnaire answers about the overall university experience, questionnaire answers regarding the mobile application, and usage data gathered through "myUniMate". It follows a description of each of these data types:

Current university experience
The same sets of questions regarding participants' current university experience were asked in all 3 questionnaire sessions to see if there were changes in students' answers over the duration of the study. More specifically, the following questions were asked:

- Since this is your first year at uni, how do you feel right now?
- Are you confident? Why?

Additionally, the following questions were included to obtain information about awareness of the institution:

- How much do you know about university life?
- What would you like to know right now? Or what information do you think would be most valuable to you?

The learning aspect of their experience was captured with the following questions:

- Do you know how to excel in a course? Why?
- Do you think you are able to do well in a course? Why?
- How do you plan to study? Why?

Mobile application
Since the aim of this study was to gather feedback about "myUniMate" and seek design suggestions, we asked the participants if they had used mobile applications that were designed to support their

study and help them adapt to a new lifestyle before they had their hands-on experience with "myUniMate", and asked them what did they think of "myUniMate" after using it (questionnaire session 2 and 3). The questions used were:

- Have you used a mobile application that aims at supporting your study? If yes, was it helpful? Why?
- What features do you like best? Or what features do you think are most useful? Why?
- What suggestions would you like to give on the design and implementation of myUniMate?

Data from "myUniMate"
This data source included the information entered by each participant through the application and additional metadata such as clicking a button, navigating to a screen, and entering some text.

Study Results

The questionnaire answers were analysed by coding the answers line by line. Two coding analysis were done on the data. In the first coding analysis, we tried to fit the answers into the "Five Senses Model", if an answer does not fit in any of the 5 senses, it will be excluded from this part of the analysis. And for the second coding analysis we did not have a pre-defined coding scheme before the analysis. Instead, we identified themes from the data as we processed the answers. We used affinity diagrams (Foster, S. T., & Ganguly, K. K., 2007) to organise questionnaire answers in both coding analysis. Our major focus during the analysis was to find answers to the 3 research questions.

Fitting the "Five Sense Model"
- Capability. Participants generally have different capabilities, and when they were answering the questionnaires, most of them were comparing their high school experience with their current university experience.

    Capability 1 - "I'm enjoying it, much better then high school." (Participant 3 – questionnaire session 1)
    Capability 2 - "… I felt quite stressful due to the unexpected transition from high school to university such as having to be responsible for assessments and tutorial preparations. However, I feel much more confident [now] in terms of the course load and maintaining a social life at university." (Participant 10 – questionnaire session 3)

    No actual preparation for university was mentioned by participants. However, they did ask other people for information about what university life was like.

    Capability 3 - "Was told about it from siblings, family and friends." (Participant 4 – questionnaire session 1)
    Capability 4 - "I live on campus in a college environment where making social connections and seeking academic assistance is trivial, I have positive working relationships with staff and students at the university and I am a member of the IT society." (Participant 8 – questionnaire session 1)

- Connectedness. Interactions with others (peers, relatives, university staffs) were mentioned by several participants, and the interactions were not limited with persons that they meet within the university, they also seek help or information from relatives or friends.

    Connectedness 1 - "…, lecturers and tutors have taught students how to succeed in a course during orientation. I've also gained some experience in the first semester." (Participant 2 – questionnaire session 1)
    Connectedness 2 - "I feel that I know a fair amount - I feel settled and comfortable in my surroundings. Tips and advices from older students has [have] certainly helped." (Participant 8 – questionnaire session 1)
    Connectedness 3 - "Not much but I suppose some discussion with older and experienced peers would really help with adapting to university life" (Participant 10 – questionnaire session 2)

- Purpose. Some participants already knew what is important to them at the time of study, which could turn into a successful university experience.

  Purpose 1 - "I would like to know more information on career such as internship, graduate program and also tips on work-life balance." (Participant 2 – questionnaire session 1)
  Purpose 2 - "More information about unit elective choices, especially course content and what each course entails (in detail). More information about requirement for majors and enrolling in Honours, [and scholarship information]…" (Participant 8 – questionnaire session 1)
  Purpose 3 - "It's my first year in this uni. Everything is exciting. Study is a little bit hard, but I want to learn the stull [stuff], which can help in the future. I am interested in electrical engineering. So it's fine for me." (Participant 9 – questionnaire session 1)

- Resourcefulness. Universities have provided different types of information that are useful for students, however, not all students where the information is.

  Resourcefulness 1 - "The university provides a lot of help to students. There are plenty of resources the student can access, they can be very helpful." (Participant 2 – questionnaire session 1)
  Resourcefulness 2 - "I would like to know more about options later on, i.e., postgrad research/ honours, and what steps I should take as an undergrad student to progress into honours/postgrad. I would also like to know more about what is expected in each of my current courses, e.g., assessment, required amounts of effort/ studying to achieve maximum marks." (Participant 8 – questionnaire session 2)

- Academic Culture. Most of the participants understood what they need to do in order to succeed academically.

  Academic 1 - "Preparing my study notes at the end of each week as this will reduce my workload as finals approach." (Participant 5 – questionnaire session 1)
  Academic 2 - "Preview the lecture and tutorial, I can know what I can't understand, and I will focus on this during the class. Review the stuff after school. It can help me to enhance my knowledge. And I will know what I still don't understand. I find our or ask teachers." (Participant 7 – questionnaire session 1)
  Academic 3 - "I was very unconfident as I wasn't sure if I could pass." (Participant 13 – questionnaire session 1)

Features of first year university students and their needs

Students start first year from different "levels"
The first year experience may vary significantly from student to student. We have found a wide variety of perceptions of students about their first year experiences. Some students have prior information about the environment obtained from close relatives or friends. This gives them an edge over students who have no other reference about university. **Capability 3, 4** illustrate this point.

Some students expressed their general challenges when dealing with first year tasks, and there were participants specifically mention academic challenges (**Academic 3**):

  "I felt very lost and had trouble making friends." (Participant 1 – questionnaire session 1)
  "Personally, I felt quite confused due to this new transition." (Participant 5 – questionnaire session 1)

Apart from the above two categories of students, there are also students who were passionate about what they were doing at the university, as shown in **Purpose 3.**

Support should be provided from various angles
From the point of view of a first year student, university life is not only about study. We should not only focus on the learning aspect to support student in their transition. By analysing participants' answers to questions about their knowledge of university and learning, we found that although learning is the

main student concern, there are additional aspects that students would like to know, such as societies & events, information on courses, degrees, and postgraduate opportunities, career advices, time management & work-life balance etc. **Purpose 1** and **Purpose 2** are good examples of answers obtained about this aspect.

The "emotional level" of students changes over time
In this section, the three answers to the same questions are compared. Generally, most the students experience changes over time. Some students felt more confident when they had some successful experience at university, while some students understood more about what university is like.

> "I feel it's really stressed, as high-school life is a bit more relaxing, but uni life needs more time onfocusing [focusing] on study." (Participant 2 – questionnaire session 1)
> "Very stressful, but now I feel I'm doing better…" (Participant 2 – questionnaire session 2)
> "Everything seems to be better now, consider that I have found some ideas for studying and also enjoying my life, but coursework is still a bit stressed, which requires me put a lot effort into it.) (Participant 2 – questionnaire session 3)

One interesting point to note is that 8 of the participants used similar texts to answer the same question in the 2nd and 3rd questionnaire sessions, which probably meant that there were no significant changes during this period.

Students use different apps to get help

Apart from the institutional mobile application (developed/sponsored by the university), mobile applications for time and task management, navigation, and instant messaging were the most used by our participants. When asked the reasons for using these applications, participants mentioned the requirement to remember and get notified of certain tasks, travel to, from, and within the university, and contact friends.

Perception of the App

All participants agreed that "myUniMate" was useful, because of its reminder functionality and its ability to allow a user to record her mood and health. The reason for including the "Mood &Health" component into "myUniMate" was to introduce the concept of "wellbeing" and foster its improvement throughout the first year. However, not all students understood or appreciated this idea. One participant stated that he didn't know what it does while others felt that "it's an interesting concept, can see why something like this would be useful for students/universities."

Different valuation for components

Based on participants' answers to questions on "myUniMate", we found that the "Reminder" component, the "Mood & Health" component, and the "Feedback" component were consistently listed as the best features by all participants, and some participants thought the "Memo" component should be removed.
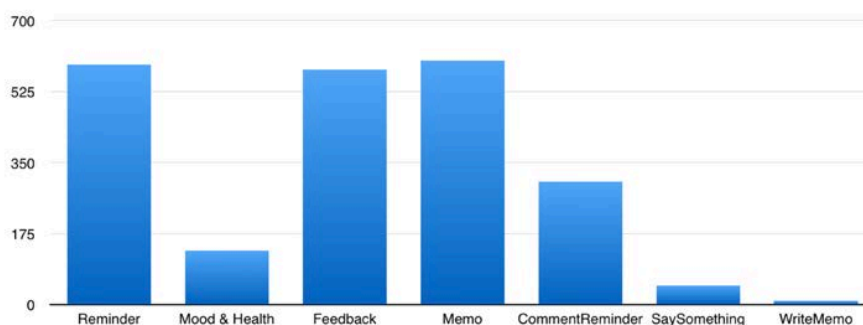

Figure 6: Screen Access

In Figure 3, the first 4 columns show the number of screen accesses of the 4 major modules of "myUniMate", and the last 3 columns show the number of times when participants were making comments on reminders, writing memos through the "SaySomething" button on the "Reminder" screen, and writing memos through the "Memo" screen. From Figure 3, we can see that the numbers of screen access of the "Reminder" component, "Feedback" component, and "Memo" component are significantly larger than that of the other screens, which suggests that those screens were heavily used by participants during the study. The high access rates of "Reminder" and "Feedback" are consistent with qualitative data, which means participants thought that the 2 component were useful and interesting and they used them more than the other screens. However, although participants would like to remove the "Memo" module, the module has the highest access rate. Though the "Mood & Health" component was not intensively used by participants, it is considered more interesting and useful by all participants (questionnaire answers).

The remaining three columns, labelled "CommentReminder", "SaySomething", and "WriteMemo" are all related to information input by participants. The total number of reminders setup were 398 and at the end of the study 114 of them were completed (completion rate 28.6%). The low completion rate is acceptable, because the reminder module was not designed to encourage users to interact with the application and make comment.

There is a significant difference between the "Memo" column and the "SaySomething" and "WriteMemo" columns, although participants frequently view the "Memo" screen, but they seldom write memos, and this might be the reason why participants considered the "Memo" module useless.

Design Guidelines

The app should include crucial aspects to students and be able to reflect student identity

Participants were using multiple mobile applications, and they would like to know information about different things that related to their lives, from how to get a good grade to career advice. Therefore, the design of transition-supporting applications should take into account multiple facets about students. Those facets should all be closely related to a student's life, and all those facets together should be unique for a specific student and able to reflect the stages of transition that students are on at a certain point. This can be accomplished by following the "5 Senses Model" (Lizzio, 2006), since it is an already established theory that identifies the key aspects to the successful transition of a first year student.

The core functionalities of the app should be close to students' everyday life

Although students felt that the application was useful, it was commented by participants as "not ready for daily use", as the current provided functionalities are limited and not appealing enough to enhance user engagement. Furthermore, in order for students to see the value of using this application, the functionalities should be directly linked to students' everyday lives or at least focus on the core aspects of their lives. For example, an on-campus navigation system would be useful for all commencing students as looking for lecture theatres and tutorial rooms are challenging tasks for new students.

Information delivered through the app should be personalised

As students usually come from different background and have different abilities, the information should be tailored to suit their use. For a student who knows programming, some research project choices could be offered, while for a student who barely pass her courses, more detailed instructions on grasping the course material should be provided instead.

As a student progresses though the transition, the amount of information of different aspects of her life should be adjusted as well. For example, at the beginning of the student's degree, more information delivered should be focused on what it is like to study in a university, and later as she gets familiar with how universities work, the focus of the app should be shifted to the learning, socialising, and other aspects that she concerns. Apart from that, wellbeing should always be taken into account when trying to support students.

Information delivered through the app should be based on the level or "stage" or transition of the student

With the passage of time, things change, so are students' feelings about their university experience. The major consequence of the change is the change of their needs, and as a result, the support delivered through the mobile application should be updated accordingly.

Limitation & Future Work

The major limitation of this pilot study is its small sample size. Due to the small sample size, we were unable to statistically analyse if "myUniMate" served its purpose: supporting first year students' transition to university. In the future, the next version of "myUniMate" could be designed and implemented based on the design guidelines proposed in the previous section. Longitudinal studies with larger sample sizes should be used to evaluate the effectivene ss of such applications. Collaboration with university-based transition-support programmes would also be a possibility for future work. Another limitation is that

Conclusion

To evaluate the feasibility of using a mobile application in supporting university students through their transition and solicit design requirements of such applications, an initial prototype of the mobile application was developed and deployed to thirteen first year engineering students from an Australian university during a normal semester. Through analysis of data gather in this study, we found that "myUniMate" is a good prototype as a mobile application for support student's transition to university. However, more requirements need to be fulfilled before this type of mobile application can be accepted by students. The "Five Senses Model" could be used as a model of information that should be provided to first year university students, and information provided should not be limited to learning related information. When delivering information to students, the information should be personalised in order to suit individual student's needs. What is more, when developing transition-supporting applications, the design guidelines presented in this paper could be considered.

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