

**EXAM PLANNER: A MOBILE APPLICATION FOR
MOTIVATING STUDENTS TO STUDY FOR EXAMS**



YİĞİT DİKER

MAY 2017

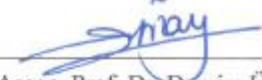
**IZMIR UNIVERSITY OF ECONOMICS
THE GRADUATE SCHOOL OF NATURAL AND
APPLIED SCIENCES**

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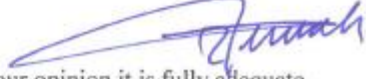
MAY 2017

Approval of the Graduate School of School of Natural and Applied Sciences


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I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Computer Engineering.

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This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Computer Engineering.



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ABSTRACT

EXAM PLANNER: A MOBILE APPLICATION FOR MOTIVATING STUDENTS TO STUDY FOR EXAMS

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M. Sc. Computer Engineering

Graduate School of Natural and Applied Sciences

Supervisor: Asst. Prof. Dr. Gazihan Alankuş

May 2017

Creating a study schedule during an exam period and subsequently following that schedule is quite difficult for many undergraduate students. Some students have a difficulty in creating a study plan because exam periods are very stressful and intense. In addition, some have difficulty in following a schedule even if they have created the schedule themselves. Furthermore, some students lack friends and goals to encourage them to follow their study schedules. We iteratively designed and developed a mobile application for undergraduate students to plan for their exam periods and to motivate them to follow their plans. In this application, we collect information such as study habits of students and use them to create course study schedules for students who have difficulties in creating study schedules during their stressful and intensive exam periods. We encourage them to work using motivation enhancing notifications that helps them focus on the study schedule. Interviews with students during the application development process, and the effects of application and student feedbacks after the application becomes a product that will guide us.

Keywords: Mobile Application, scheduling, exam planning, undergraduate students' study habits.

ÖZ

EXAM PLANNER: ÖĞRENCİLERİ SINAVLARA ÇALIŞMAYA MOTİVE EDEN BİR MOBİL UYGULAMA

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Mayıs 2017

Sınav dönemlerini planlamak ve planladıkları programa uyarak çalışmak birçok lisans öğrencisinin problemidir. Sınav dönemleri çok stresli ve yoğun olduğu için kimi öğrenci program oluşturmakta güçlük çeker. Kimisi de programı oluştursa bile bu programa sadık kalmakta zorlanmaktadır. Hatta sadece onları çalışmaya teşvik edecek kişiler veya hedefler olmaması bile bazen programlarını yerine getirememelerine neden olmaktadır. Biz lisans öğrencilerine sınav dönemlerini planlamaları ve planlarına sadık kalarak çalışmalarını sürdürmeleri için bir mobil uygulama geliştiriyoruz. Bu uygulamada stresli ve yoğun sınav dönemlerinde program oluşturmakta zorluk çeken öğrencilere bize verdikleri ders çalışma alışkanlıkları bilgileri ile ders çalışma programları oluşturuyoruz. Oluşturulan programlara sadık kalmaları için motivasyon artırıcı hatırlatmalar ile onları çalışmaya teşvik ediyoruz. Uygulamanın yapım aşaması için öğrencilerle yapılan görüşmeler, ürün haline geldikten sonraki öğrenciler üzerindeki etkisi ve öğrencilerin uygulamaya bakış açıları öğrencilerden gelen veriler ile değerlendirilmektedir.

Anahtar Kelimeler: Mobil uygulama, zamanlama, sınav planlama, lisans öğrencilerinin çalışma alışkanlıkları.

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Contents

ABSTRACT	iii
ÖZ	iv
Acknowledgments	v
Contents	vi
Chapter 1: Introduction	1
Chapter 2: Related Work	3
Chapter 3: Preliminary Study	6
3.1. Study and Participants	6
3.2. Method	7
3.3. Interviews	8
3.3.1. Make Users Promise to Follow the Given Study Schedule at Start. 10	
3.3.2. Track Users and Motivate Them to Keep Their Promises Continuously	11
3.3.3 The Application Should Be User Friendly	12
Chapter 4: Design	13
4.1. Storyboard	13
4.2. Paper Prototype	24
Chapter 5: Algorithm and Implementation	38
5.1. Algorithm	38
5.1.1. The Algorithm Definitions and Rules	39
5.2. The Algorithm for Creating the Schedule	41
5.2.1. The Algorithm Example	42
5.2.2. Executing and Maintaining the Schedule	44
5.3. The Application's Screens	46
Chapter 6: Experiments and Statistical Analyses	54
6.1. Experiments	54
6.2. Statistical Analyses	64
6.3. Other Observations	69
Chapter 7: Discussion and Conclusion	72
7.1. Discussion	72
7.2. Conclusion	73

7.3. Future Work.....	75
Chapter 8: Bibliography.....	76
Appendix-A: Interviews	79



Chapter 1

Introduction

During midterm or final period of the taken courses, students at undergraduate level have varied in their study habits. Observations and interviews indicate that a large fraction of students tend to make a study schedule for their upcoming exams, and they try to follow this studying plan. The study schedule is generally created through mostly subjective criteria such as difficulty of exams, interest in courses, and students' goal for their courses, all of which will be explained later in detail. After the study schedule is created by means of such factors, the study schedule is generally drawn on a notepad or saved in a digital platform such as Google Calendar, Google's, MS Word or Excel style applications. However, the mentioned applications or drawing a study schedule on a notepad has some deficiencies. First of all, they are not helpful in the preparation of the study schedule. In addition, they are not very effective in reminding users so that users need to check the applications occasionally. Although there are many remainder applications, they mostly lack of flexibility. Finally, they do not motivate students to follow their study schedule. Simply existing applications only work in storage and partly to remind users of their study schedule. In Human Computer Interaction field, it is observed that there is a need for an application or a product to overcome the mentioned shortcomings. Mona Haraty et al. presented in their research that users get help from various devices to make a plan [11]. Ryoko Fukuzawa et al. presented in their research that the time management and the coordination loss are the major factors for uncompleted or non-started tasks, and users might need help for time management [14].

In this study, we aimed to develop an application that helps undergraduate students to prepare a study schedule for their upcoming calendar events and make them to follow the study schedule daily, optimize, as well as maximize their habit of study. For this purpose, 18 undergraduate students were interviewed in a semi-

structured way in both verbal and written formats, and their study habits are also observed. By the observations, we inferred that an application must be developed under three headings, which consisted of many facts; such as to provide a study schedule that user would promise to follow it, to check users and motivate them to keep their promises continuously, and lastly it should be a user-friendly application. These headings will be discussed in detail in next sections of this paper. We have developed a storyboard that meets the headings and we partly have tested it on users. After storyboards are thoroughly being tested on users, we will develop paper prototype and test it on users. After storyboard and paper prototype test periods, we will develop the application and test it on real users whom we interviewed. Eventually, we will indicate the efficiency of the application on users, the users' satisfaction, the deficits of the application, the possible future works in detail.

Chapter 2

Related Work

In this section, we described some of the existing tools and methodologies about both time and task management. These topics can be associated with PTM (Personal Task Management). A number of personal task/time management approaches such as Stephen Covey's "The Seven Habits of Highly Effective People" [1], David Allen's "Getting Things Done" (GTD) [2], and Mark Foster's "Do It Tomorrow and Other Secrets of Time Management" [3] have provided people with strategies to manage their time and tasks. These three books are important for PTM but have no technological support for people. Besides these books, there are many applications on online market for personal task management. Some of these applications are as follows; *OmniFocus (Focus GTD for Android)* [4], *Remember the Milk* [5], *Zendone* [6], *do.it* [7], *Nirvana* [8], *Google Calendar* [10], and *Google Keep* [10]. Generally, study schedules, which are created by the priorities of users at certain dates and applications, provide users with the ease of reviewing their tasks. Furthermore, they remind users of the works to be made with automatic notifications. There are many other PTM applications apart from those in Google Play Store. Each user downloads and uses the appropriate application for him. Mona Haraty et al. provided design guidelines for personalised PTM tools that could serve different user types and behaviours [11]. Eugene Agichtein et al. presented the difficulty of managing a lot of tasks simultaneously in their research [12]. David M. Levy et al. indicated in their research that overcoming multiple task management is difficult for people [13]. As a result, with better technological support, people would be able to manage their time and tasks more effectively. In this regard, applications may be necessary for the users' task/time management. These applications can be developed in the direction of user suggestions with an algorithm.

Students may also want to plan their study schedule for their exams. They may assign some tasks to themselves. They can set a time when they will perform a task. Ryoko Fukuzawa et al. conducted a research studying the experience of the university students' task management [14]. They investigated the cases where whether students started or not started performing their tasks, as well as whether they completed or uncompleted their tasks. They found many directions on how university students could help fulfil multiple missions. However, they lacked technological support for students.

There are many apps on the Google Play Store for students to manage their exam periods. We conducted searches using key words such as “study timetable planner for exam” and “exam planner”. There are many features in these applications. *My Study Life – School Planner* has a tracking tool for student’s tasks, stores exams, manages his classes and has notification tool for users [15]. *TimeTune – Optimize Your Time* has a time management tool, which includes adding flexibility to his schedule planner, full customization for each notification independently, routine statistics to analyse, reminders and timers [16]. *Student Agenda* has a timetable, notification schedule for events while events can be organized by day, week or month, has a calendar, and management of marks [17]. *Timetable* has a light theme and dark theme options, as well as saves courses, tasks, and holidays. It also has an option for weekly cycle of setting events (two three or four), a notification tool for courses, and an alert for tomorrow’s tasks [18]. *Study Smart: Study Planner* has a session planning tool for daily school homework, a note taking tool, a reminder tool for assignments homework, and a reminder tool for assignments or exams [19]. *SQA My Exams* can create personal exam schedule and share it with students’ friends via e-mail [20]. *Studios* organises student’s study schedule, but students firstly have to create his schedule for his homework or exams. This app has a notification tool for current and next classes, backup and restore timetables to external or cloud storage, and enable students to export timetable as a png image [21]. *TimeTable++ Schedule* has a full calendar, homework notifications, notes notifications, exams and marks, device muting options during courses, cancellations, and free days while students can share their timetable with their friends and take pictures and record audio [22]. *myHomework Student Planner* has beauty, simplicity, and reliability features [23]. *Exam Planner*, which has the same name with our application, records exams and subsequently notifies them about these exam dates [24].

On the other hand, those existing applications do not create a plan based on the user's specific need. They only stick existing study schedule and reminds occasionally. Moreover, they do not provide necessary motivation for students to follow their study schedules. They have no algorithms to propose a studying schedule based on the students' particular needs. We can also argue that they do not behave like a friend and thus gives a student postive mood . They have not promised to comply with the study schedule which is created by the application. Finally, they have no video recordswhich can increase the likelihood of that the user will follow the schedule. Therefore, we aim to develop an application which does not have the observed shortcomings



Chapter 3

Preliminary Study

3.1. Study and Participants

We conducted a study that included 18 college students from different departments of three universities in Izmir: two state universities (Dokuz Eylül University and Ege University) and one Foundation University (İzmir University of Economics) in favour of variation of selection. In our study, we aimed to learn participants' habits and their approaches to create a study schedule. We did not aim for statistical representation for the sake of generalizability, but we did strive for general diversity, particularly around success, grade (from 1 to 4) and responsibility. Just as our sample consists of hardworking, responsible, and successful students, it also contains irresponsible, lazy, unsuccessful undergraduate participants. Furthermore, there were participants that made study schedules regularly and that made no-study schedules at all. Most of them prepared a 1-2 weeks study schedule for the following periods of their exams. Some of the participants can make weekly study schedules. There were participants that could study only one course in a day. In addition, there were students that could study more than one course a day. Some of the participants could efficiently study after going out, whereas some of them could study efficiently before going out, and some of them can study efficiently when they stay home during an entire day.

Participants' GPA and name of departments as were presented in *Table 3.1*. We took written consents from the participants who agreed to share their names. We protected the privacy of the participants who chose to stay anonymous.

Table 3.1 – Undergraduate Student

GPA	Students' Departments
0.00 – 1.99	Yavuz(Computer Science), İlder(Mathematics), Can(Mathematics), No-Name(Mathematics), Sercan(Mathematics), Uğur(Mathematics)
2.00 – 2.49	Neslişah(Software Engineering), Sinem(Computer Engineering), Zeynep(Computer Science), Melisa(Software Engineering), Gizem(Mathematics),
2.50 – 2.99	Melike(Mathematics), Gözde(Mathematics),Burak (Computer Engineering), Deniz(Computer Science)
3.00 – 4.00	Mert(Business), Ezgi(Mathematics), Duygu(Mathematics),

3.2. Method

The in-office interviews were conducted during March, April and May of 2015. The primary interviewer ran the interviews, while the secondary interviewer took notes on a notepad. All interviews were also audio recorded for backup and review purposes.

At first, the small number of participants were interviewed in the style of chat in order to learn whether they really needed an application for planning or not, and to determine the questions asked to obtain more efficient information about this topic. Based on the interviews and the observations, we prepared more efficient form that consisted of 10 questions that were asked in the interviews. The form and the question as follows;

- How do you utilize the period of time during the course and exam term?
- Which criteria are important for using your time in this period?
- Which criteria affects your study schedule?
- What are the reasons behind these effects?
- What do you care when you make schedules to study?

- Are you satisfied with your performance in exam periods? If not, what are your regrets? What are the reasons?
- Do you have any reason to prefer studying a course than other courses?
- How do you motivate yourself to study your courses?
- If someone wanted to motivate you to study your courses what would he do?
- What kind of help from other students (e.g. your friends) do you prefer? In which topic do you need help?

With this form, we interviewed 18 students in semi-structured way and we explored interesting points and students' patterns.

3.3. Interviews

We reached a number of findings from the interviews and we summarize them here. The detail of the interviews are given in *Appendix-A*.

As a result of the interviews, we found small differences between the dates when the students started to study for the exams. Participants usually start studying two weeks before the exam period. Especially Melike said she would never start working earlier than two weeks. Duygu and Ezgi begin to study two weeks before the exams. Mert starts to study one or two weeks before. Sercan, Yavuz, İlter and Gizem start to study a week or less before. In general, when we look at participants' grades, participants with high GPA to study for an average of two weeks for their exams. For this reason, we can say that it is an advantage for participants to start studying an average of two weeks before the exam term. If they start studying two weeks earlier, they are more likely to be successful. Thus, it is concluded that students should start studying their exams two weeks before the exam term.

According to our interviews, the majority of the participants use their exam dates to construct their study schedule. They study for the last exam at the beginning of their exam study period, and study for their first exam just before the exam week starts. This result will contribute to the study for developing the algorithm in the future. We also learnt that the participants wanted to study more for some classes. Mert and Yavuz study some of the courses that have the highest credits more than others. İlter, Sinem, Duygu and Melike study some of the courses that are more

difficult than other courses. Can and Mert do not spend much time in some courses during the examination period if they already studied the courses during the whole term. This means that participants have a different level of importance for each course. According to their courses' importance level, they can spend more or less time studying for a course. Therefore, participants should indicate the importance level of their courses in the application. In addition, some participants can study more than one course in a day. Participants should indicate the number of courses per day in the application.

Participants agree, while making a study schedule, that they should create study schedule with care. They need to make a realistic study schedule to keep their promises so that they can keep up with the study schedules. For this reason, they said that the application needed to be capable of definitely understanding the participant's need. Burak said that he studied more efficiently when he came home from outside so he prefers an application with appropriate reminders. Sinem stated that the application should help her remember the exam dates because she might forget them. Melike said that if the application created realistic study schedules for her, she would be able to promise to comply with the study schedule. In general, participants stated that if they could not make a realistic study schedule, they would have difficulty to comply with their study schedules in the future. This means that the study schedule needs to be prepared realistically before promising to follow it. Before the study schedule is prepared, the application needs to know the participant well. If the participant has a realistic study schedule that he really can follow, he can promise to comply.

Most participants said that they sometimes needed to delay their study schedules which were created by themselves. Because of some unexpected reasons, it may be necessary to postpone studying to another day. Therefore, the study schedule that is created by the application must definitely have the option of postpone. Melike, Neslishah and Zeynep said that the study schedule should be able to postpone a course to another day. They said that they sometimes could not study because of some unexpected circumstances. Burak said that the study schedule should be dynamic. Sinem said that she sometimes did not feel ready to study in a certain day, therefore she might want to study another day. Therefore, the application needs to be flexible for the participants. If participants do not want to study for a

variety of reasons despite their willingness, they should be able to postpone it to a further day.

The most important argument was found as a friend call that would support the participants during their exam periods. They said that someone (e.g. friend) had to give them various reminders as a notification during the study period. They said that when they lost their motivations, they should be provided with the quotes that would raise their motivations as a friend. Can, No Name and Neslişah said that they stopped studying for their exams in the progress of time. They said that they had regrets after their exams. According to them, if somebody could remember them to study in their exam periods, they would have not stop studying. When Deniz's and Uğur's motivations' decrease, they are motivated by remembering the money that their families have spent for them. Neslişah and Sinem motivate themselves by dreaming of their holiday plans. Ezgi motivates herself by making future plans. Duygu raises her motivation by reading the quotes of pacemakers. They said that these properties were very useful to make the application increase their motivations. Therefore, the application should control the participants and provide them with morale when they lose their motivation. The application should treat them like a friend. If they do not comply with their study schedule, the application should warn them, if they complies with the study schedule, the application should reward them.

In conclusion, we produced a sequence of results in order to produce a successful and user friendly application, which would make users promise to follow the given study schedule at start, check users, and motivate them to keep their promises continuously.

3.3.1. Make Users Promise to Follow the Given Study Schedule at Start

Throughout the interviews, participants feel more responsible when they promise to comply with a study schedule. They try to keep their promises. We presumed that getting the user to promise verbally in order to follow the given study schedule in the beginning might be more effective in persuading the user to actually follow the study schedule later. However, before they promise, they need to believe that they have made a realistic study schedule. Also, if an application is going to do this, it needs to know the habits of the participants. They said they could promise to

follow the study schedule of the application which knows their habits and uses them to create a realistic study schedule. We identified that study schedules which were feasible and respected the users' conditions may help users follow the schedule.

Realistic Study Schedules: We need to offer realistic study schedules to users, in order to take their promises from the beginning because users follow a realistic study schedule and they cannot exceed their study limit in a day as we observed.

User Recognition: In order to present a **realistic study schedule** in the first place, asking a few simple questions (e.g. How many hours can you study a day? What time or under what circumstances are you more efficient or motivated? Can you study your favourite courses weekly?) can be useful. The study schedule which has been presented by this information may be more realistic. While using application, behaviours of the users in a time will give more information about them.

3.3.2. Track Users and Motivate Them to Keep Their Promises Continuously

Participants want the application to remind them about the study schedule like a roommate. The reminders like "You said you were going to study this course today" or "You were way behind a few days the study schedule, you made a promise, did not you?" would be appropriate, they said. Besides, they said that their roommates motivated them and helped them to study based on their reminders. For this reason, the application should make some reminders daily and weekly, like a friend does. The application should motivate them by showing the quotes and the image of the important person or reminding them their promises when participants are not complying with their study schedule. Also, they can say to the application like "Today I'm too busy so I'm going to study another time" as the same way they reply to their roommates. Therefore, participants can postpone their study schedule in the application.

Flexible Study Schedules: Although users promise to follow the given study schedule at the beginning, they may not keep their words every time due to various reasons. In this case, the application has to be flexible in order to secure the promise. When users of the application cannot study by any reasons, the application should

postpone the study schedule to other time. Therefore, the application helps users to keep their promise.

Quotes: Providing the quotes from prominent people, in particular certain times in a day can motivate the user. These quotes can change according to the user's work rate situation, or what is important for the users such as family summer holidays.

Notifications: When there is no much time left to study for exams, it is observed that the students' motivation to study the upcoming course increases. Therefore, in order to make users keep their promises, it is useful to give them warning when the exam date is coming up. Moreover, how users comply with the study schedules they promised can periodically, and users remind their responsibility to both the study schedule and themselves. Some levels can be determined for it (i.e. hard working, laziness, etc.). At the end of the day, the application can give notifications about what the users' level of loyalty to their promises is; "Congratulations, your current level is hardworking, keep it!" or "your current situation is lazy, you make us sad! Please keep your word and study for your own good!"

3.3.3 The Application Should Be User Friendly

They said that the application should be easy to learn with all its features. They do not want to lose their time learning how to use an application since they already have a limited time for their exams. The application should be as simple and user-friendly as possible. Once the app is installed, there must be an application that can help him during their exam periods. It must act like a friend. The application that is capable of responding quickly to the incoming questions without asking participants to enter any data and to respond any other questions than the certain ones.

All other features are useless if the product cannot be used by people. Using heuristic approach for the applications we should create a user friendly application.

Chapter 4

Design

4.1. Storyboard

Using the results of our interviews and information about the participants, we collected the findings such that; “making users promise to follow the given study schedule at start”, “tracking users and motivate them to keep their promises continuously”, and “the application should be user friendly and consisted of many criteria and observations”. By using these findings, we will try to find out how a user practise the application that we plan to create. In this regard, we created a storyboard that was simply consisted of all possible work flow.

First, a user needs to study schedule for the upcoming period of their exams, and finds out that there is an application for this planner (symbolized as star). When the user starts the application, the planner asks a few questions to have an idea about the user, as well as his both habits and exam schedule. Then, the application presents a study schedule and asks if the user promises to follow the study schedule. If not, the user can change the study schedule under some conditions, and he can submit afterwards.

After these starting proposals, the application make users motivated to keep their words with quotes, notifications or feedbacks. In a daily routine, every morning, the application asks the user when he is ready to study and when the given time comes. Besides, it reminds him that he already have promised to study at this hour. The user can keep his word or postpone the daily routine. At the end of the exam period, the application gives a progress of the user's study, and get feedback from him.

The physical storyboards are shown below by the drawings in the computer for the purpose of clarity. The storyboards and story lines are demonstrated in *Image 4.1* and *Image 4.2*.

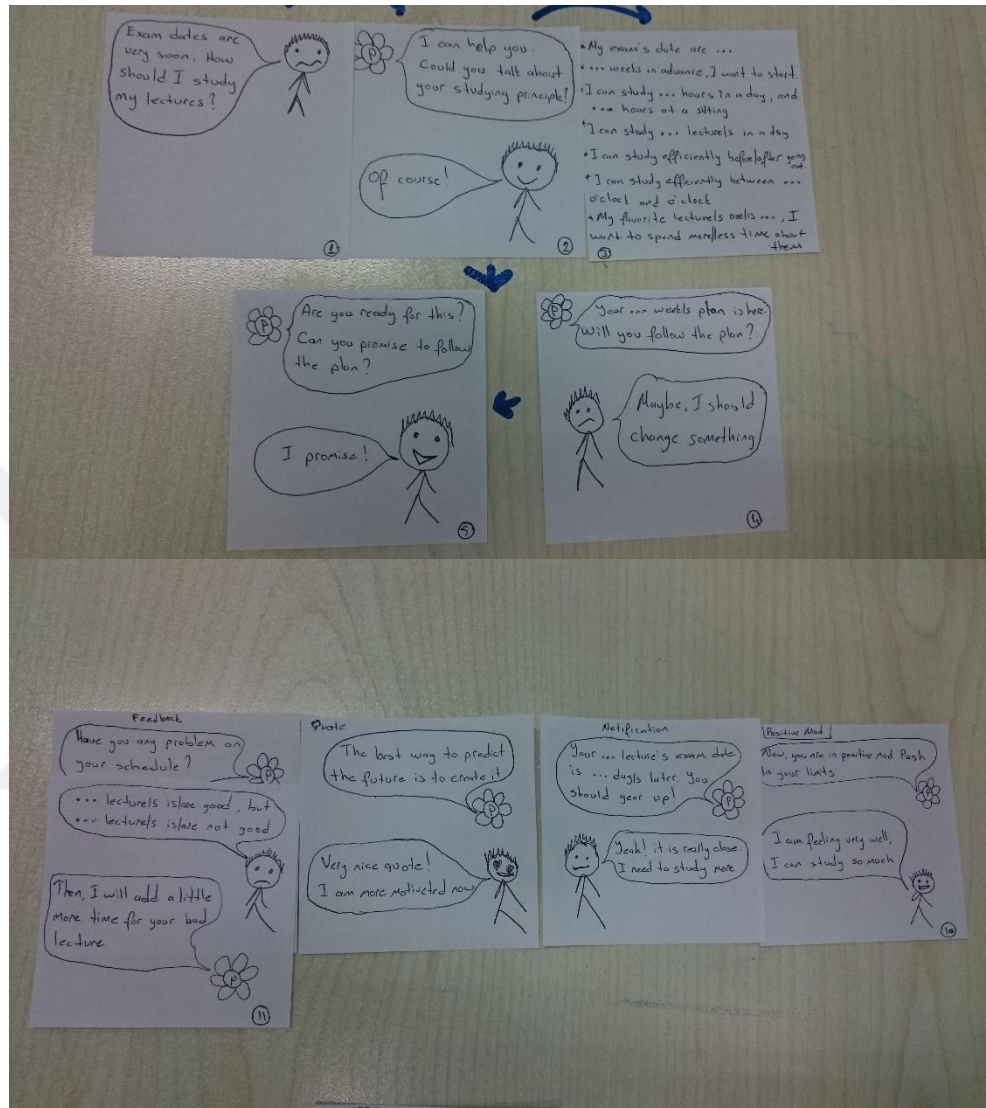


Image 4.1 – Storyboards on paper, part 1

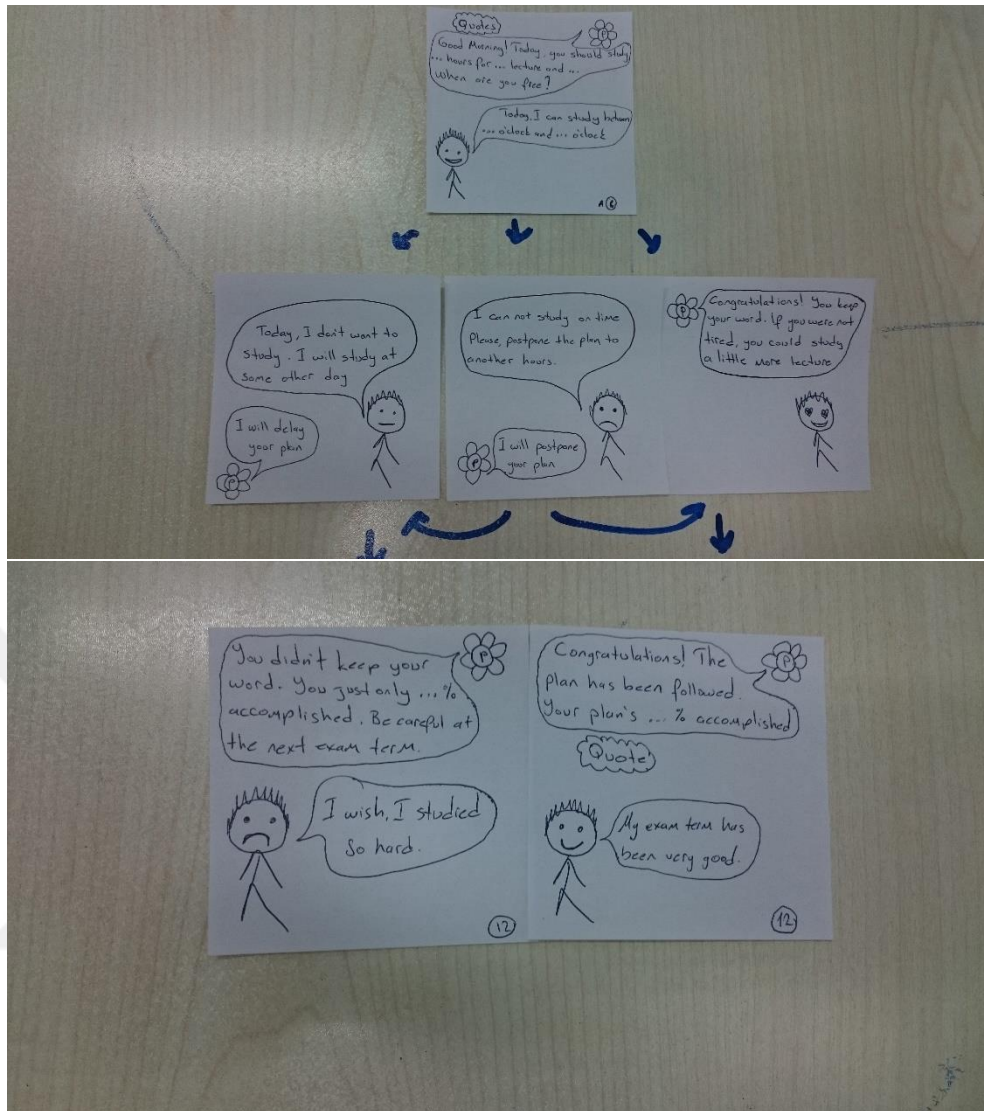


Image 4.2- Storyboards on paper, part two

A student is stressful due to his upcoming exams, as indicated in *Image 4.3*. He has difficulties in deciding how to create a study schedule.

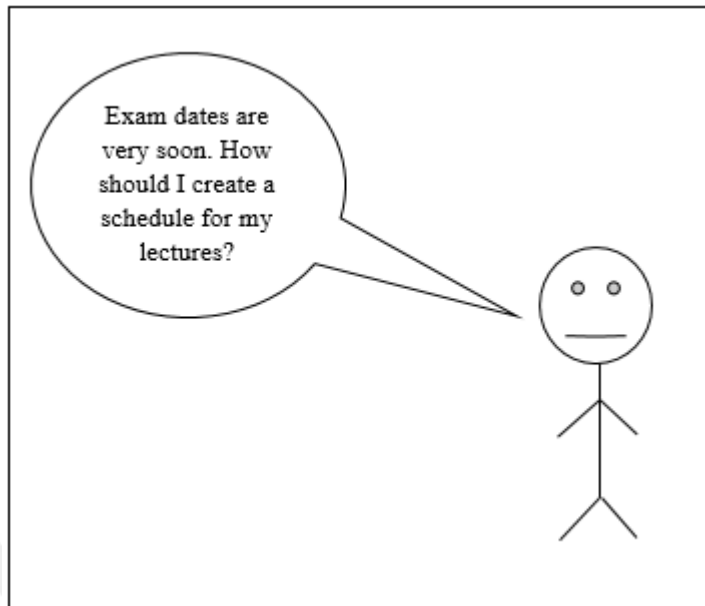


Image 4.3 - Storyboard

On the other hand, the exam planner helps him create a study schedule for him in *Image 4.4*, and thus makes the student more confident.

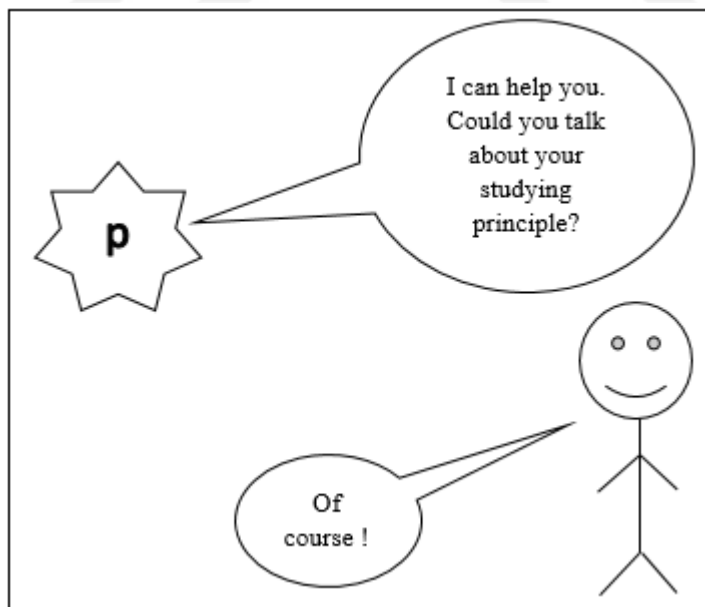


Image 4.4 - Storyboard

In *Image 4.5* below, He is giving information about his studying habits to Exam Planner as

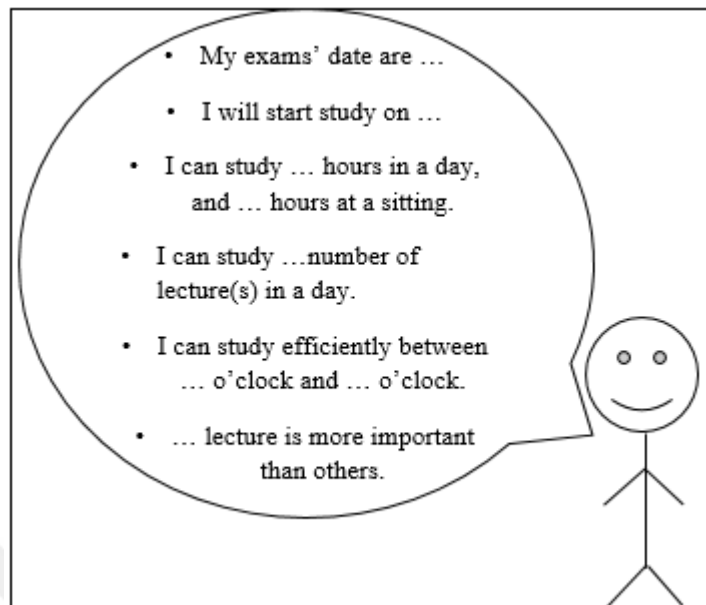


Image 4.5 - Storyboard

Exam Planner creates a study schedule considering the specific student habits in *Image 4.6*. Then, he checks the study schedule that has been created by Exam Planner.

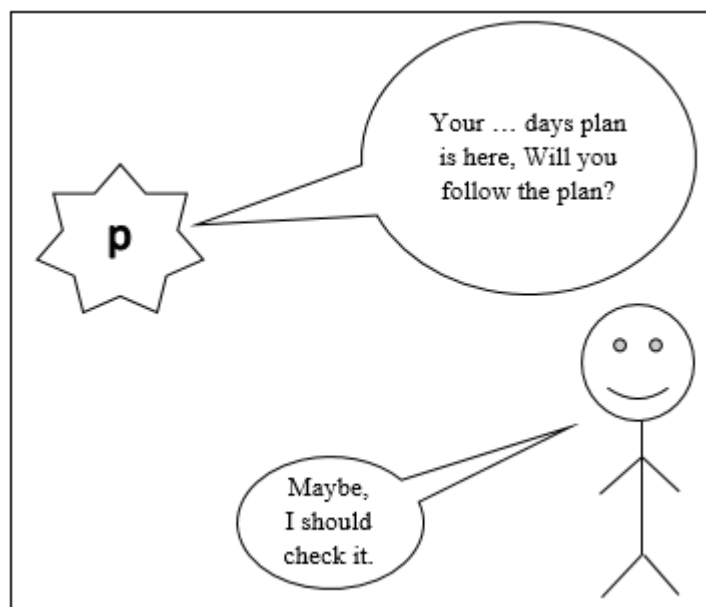


Image 4.6 - Storyboard

Exam Planner asks a question about whether he will follow the study schedule or not, as illustrated in *Image 4.7*. He promises and then he saves a video about his promise to the memory of Exam Planner. Moreover, he uploads a photo and quote about his future plan or important person to him. Then, the app reminds the user when the study time comes.

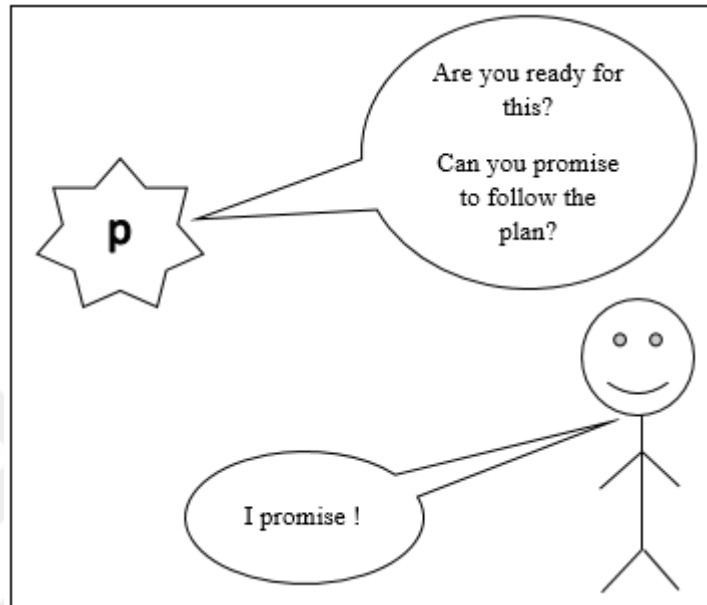


Image 4.7 - Storyboard

Exam Planner reminds the user about the times that he will certainly study (*Image 4.8*). Accordingly, he responds to the Exam Planner's notification.

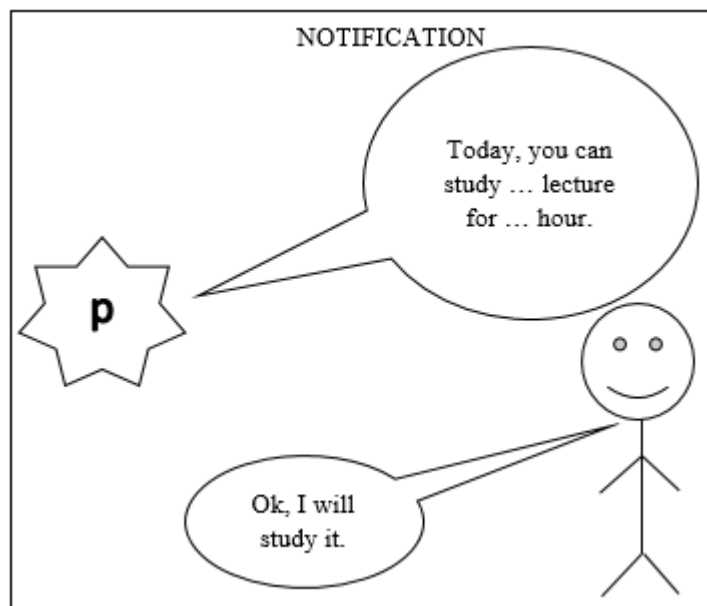


Image 4.8 - Storyboard

Exam Planner asks a question about whether he has studied or not in *Image 4.9*, and provides our application with an answer.

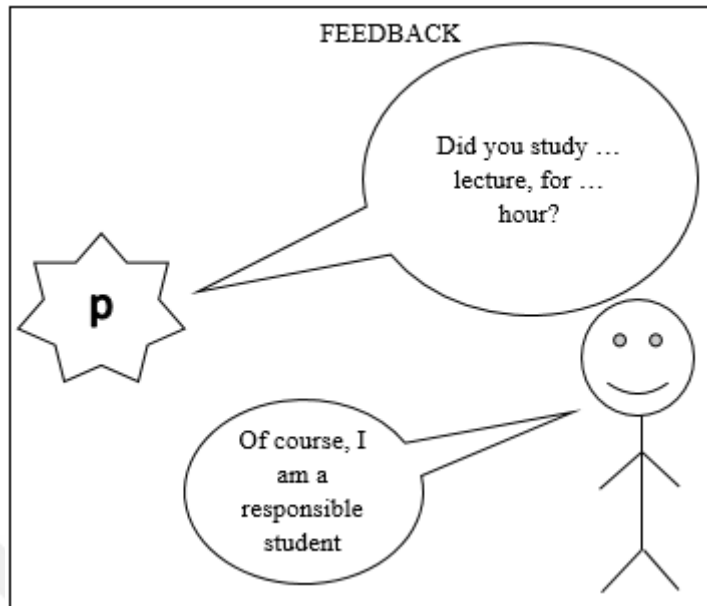


Image 4.9 - Storyboard

Exam Planner reminds the timeline that he can study more effectively, as shown *Image 4.10*.

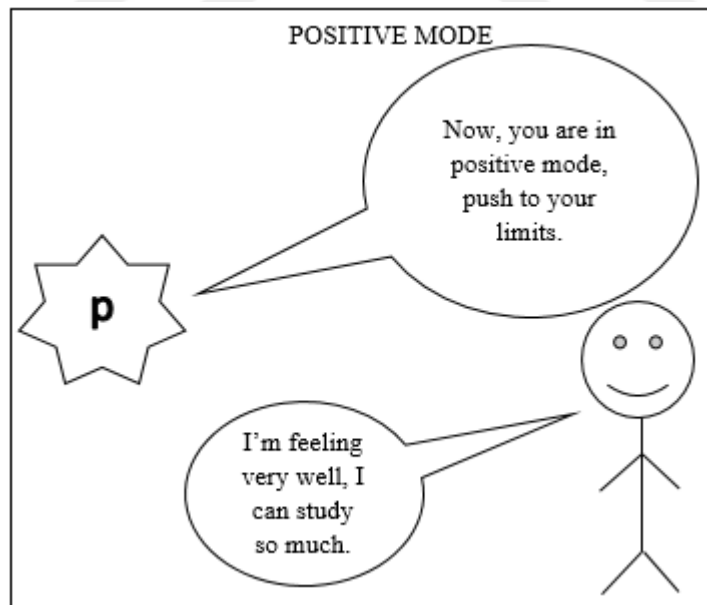


Image 4.10 - Storyboard

Exam Planner reminds the motivation quote in case of necessary situations in *Image 4.11* below.

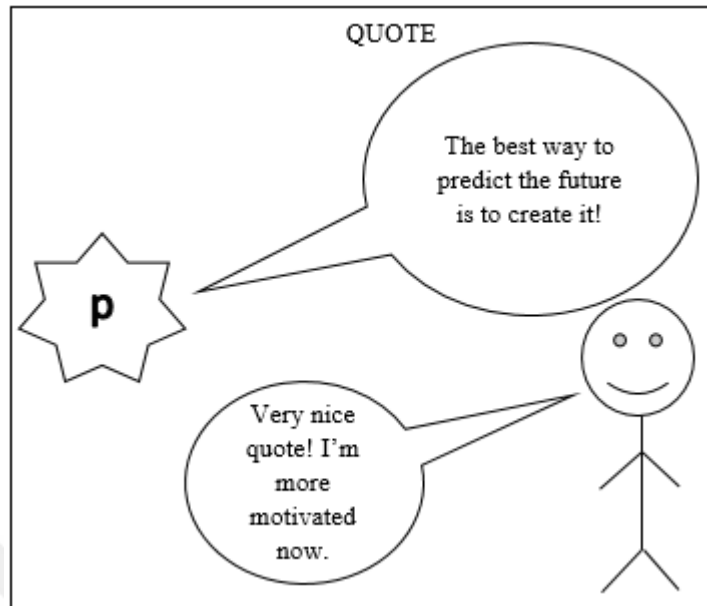


Image 4.11 - Storyboard

Exam Planner sends daily study schedule notifications. He responds to the notifications concerning a daily situation, as indicated *Image 4.12*, *Image 4.13* and *Image 4.14*.

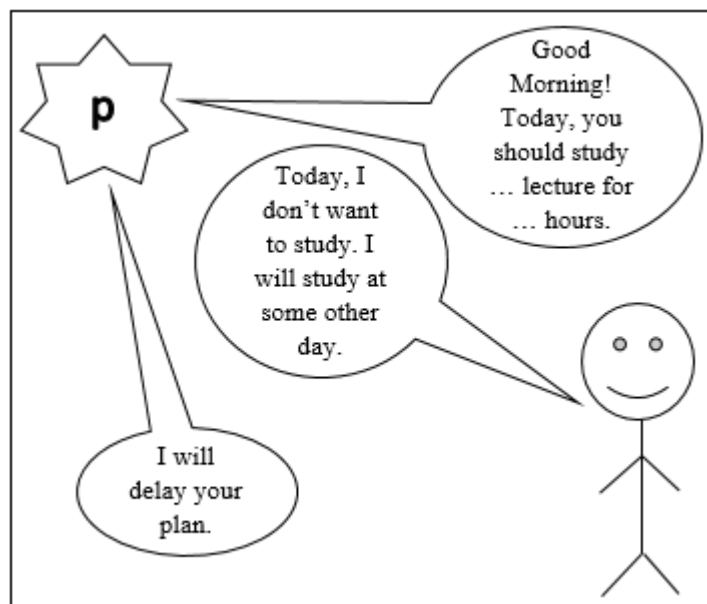


Image 4.12 - Storyboard

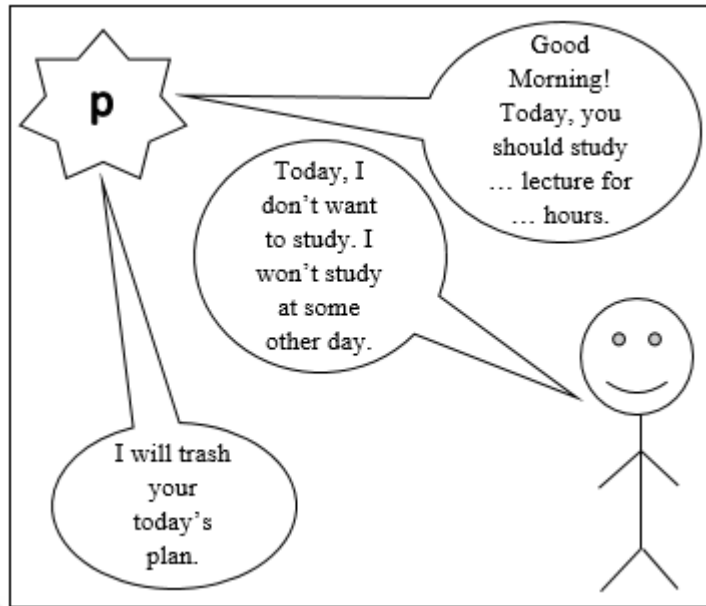


Image 4.13 - Storyboard

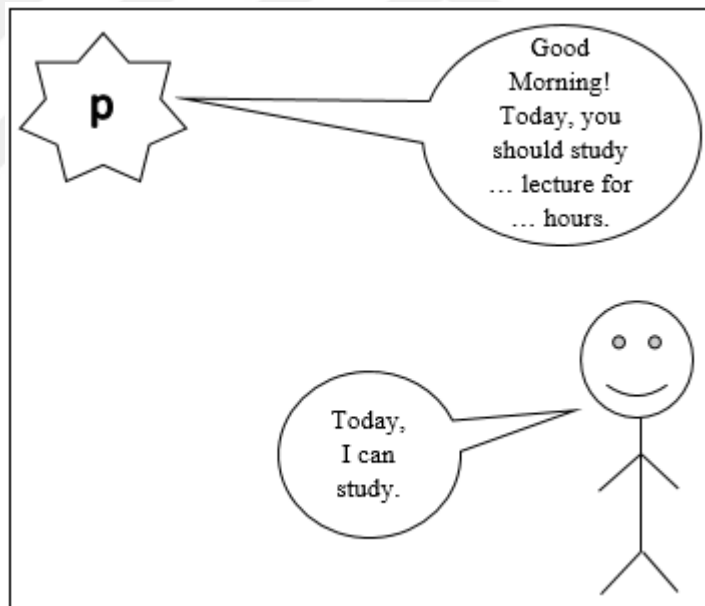


Image 4.14 - Storyboard

He gives feedback in *Image 4.14*, *Image 4.15* and *Image 4.16*.

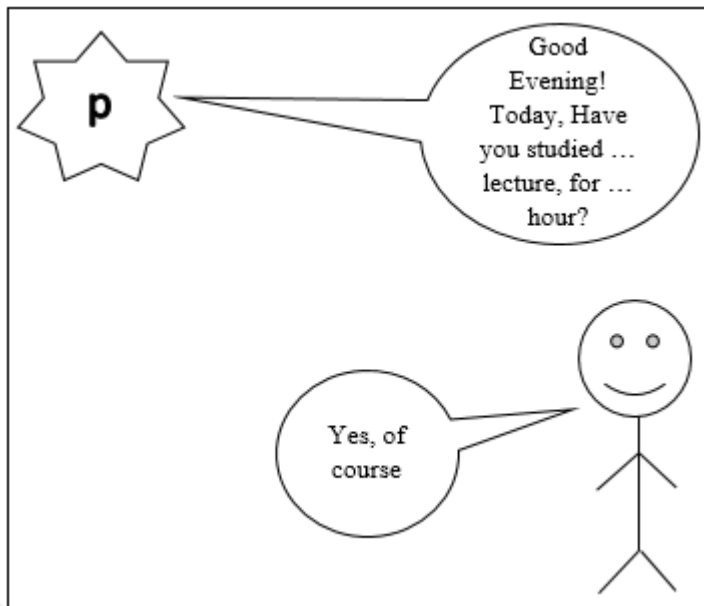


Image 4.15 - Storyboard

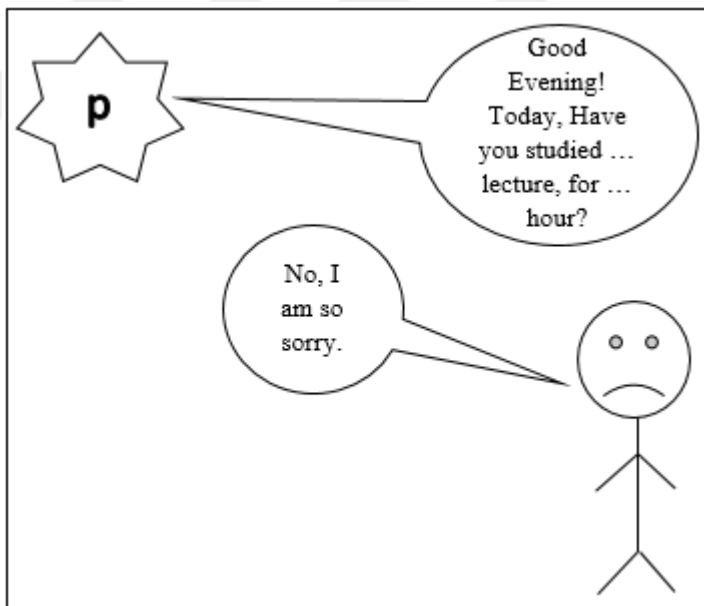


Image 4.16 - Storyboard

General evaluation is shown at the final part of the mobile application (Image 4.17 and Image 4.18).

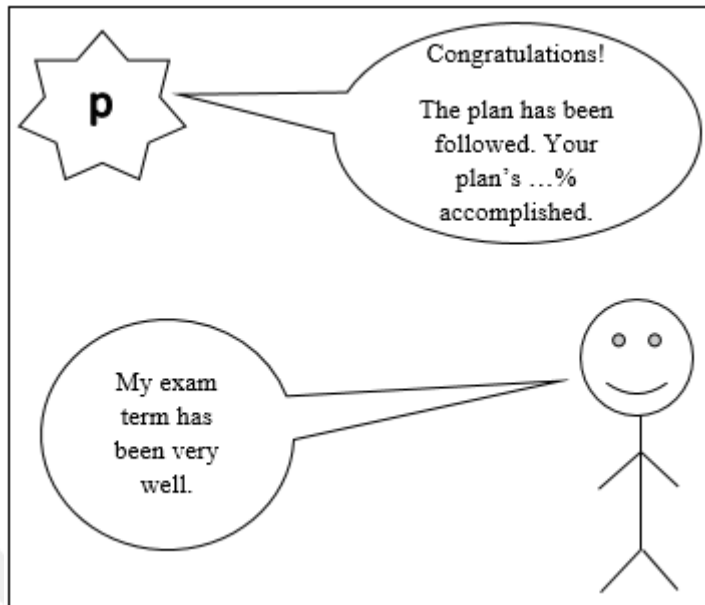


Image 4.17 - Storyboard

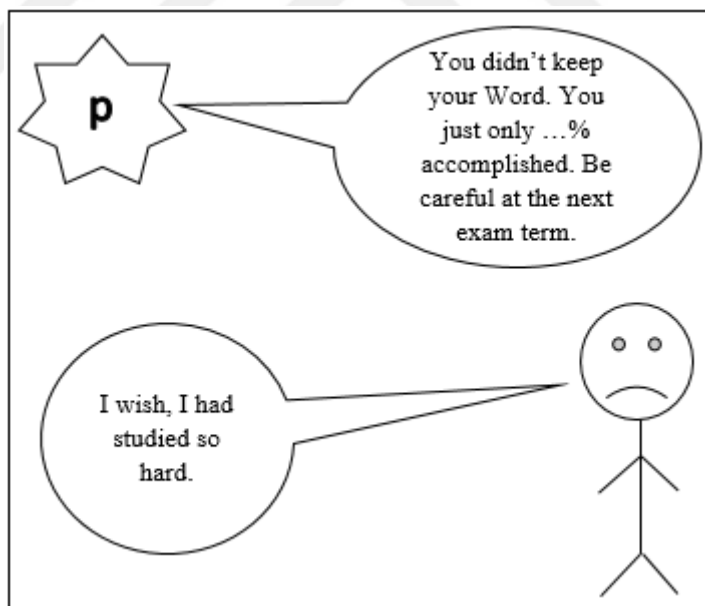


Image 4.18 - Storyboard

The storyboards indicated the features of our application. We had meetings with the participants to verify the idea of the users regarding to our storyboards. Thus, we aimed to develop a user friendly application.

The storyboards were shown to the participants. We noticed that there were some missing features after conducting the interviews with the participants. The question “How much time does a participant want to spend to study a course?” is very crucial from the point of the participants’ view. The participants provide the application with an answer to this question. Regarding this situation, after gathering the information about both the courses and the dates of their exams, the importance levels of their exams should be entered into the application by the participants. On the application, a participant must specify the time to go out and the time to come home. For this reason, there should be an information entry page about it. Furthermore, quotes should not have a certain standard. These quotes should be entered in a way that the participant can motivate himself in line with his needs. One of the important things to be aware of when creating the study schedule is to determine the time intervals in which the participant is not available to study. The participant may have activities that need to be done routinely during the exam studying period. For example, the participant may have some hobbies such as doing sport, or the participant may have a teaching role at a school some days. These issues must be considered and therefore entered into the app by the participant before the study schedule is created. In this way, the average hours in a day that they can study becomes clear. As continuation, we will create our paper prototypes based on the storyboards.

4.2. Paper Prototype

We, following that the storyboards were created, decided how to make the high level workflow with those storyboards. Then, we prepared the application screens as paper prototypes in order to start to create the appropriate screens. Our goal is to test them with the participants to make the screens better. The paper prototype firstly asks the name of the participant to approach him in a friendly manner. Then, exam date, hour and importance level of the exams are asked by the paper prototype. Particularly, the importance level of the exam is significant for the study schedule that will be created. It determines how much time the participant

should devote to a course. Then, the participant is asked about the time when he wants to start studying on their exams. In our research, it was found that students preferred to start studying for their exams at least two weeks before the exam term. This information is given to the participant for recommendation. After the date on which he wants to start studying is selected, the participant is asked to determine when they are busy during this period. The availability of the participant during these days are checked. Thus, the hours required to study in a day are calculated. In order to be able to create the study schedule, the user learns about which courses as well as how much time for each of those courses he should study during a day. Finally, the study schedule is created with data that is taken from the participants in *Figure 4.1*.

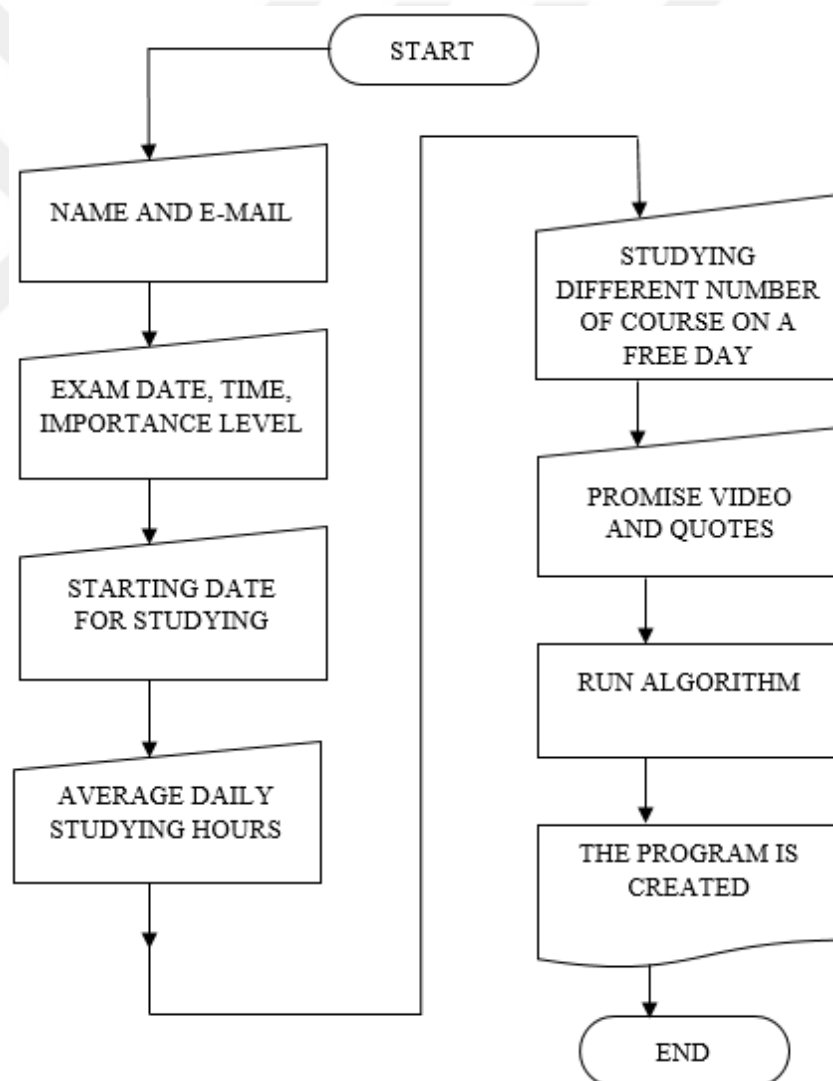


Figure 4.1 - Student Information Flowchart

According to our interview results, the application should be able to warn the participants when necessary, like a friend. For this reason, the application should learn the situations in which the participant can study more efficiently. The learnt situations are reminded as these situations motivate participants to study more willingly. In addition, the participants are asked to make some promises while setting up the application. The reason for this is that the participants are tracked whether they comply with the study schedule or not by the application. If the application figures out that the participant has not done well so far, it reminds the participant's own words and encourages him to work again. Hence, a picture and a message are sent to the participants about either the people they love or holiday plans. Along with this, he is required to make a promise to comply with the study schedule and records it with a video. The considerations in the storyboard design process are also noted here, as follows: making users promise to follow the given study schedule at the beginning, as well as checking users and motivate them to keep their promises continuously and being user friendly.

When starting the study schedule, the participant is asked his name and then study schedule gets acquainted with him. Through this, it learns his name and uses his name in the notifications. In addition, his e-mail is also recorded in the system to inform the participant about the developments related to the application, as we show in *Image 4.19* and *Image 4.20*.



Image 4.19 - Paper Prototype

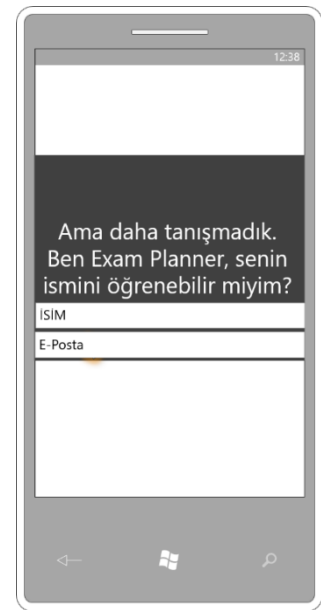


Image 4.20 - Paper Prototype

The application wants to learn about the participant's exams, and then he enters his exam info in sequence, as indicated in *Image 4.21* and *Image 4.22*, respectively.



Image 4.21 - Paper Prototype

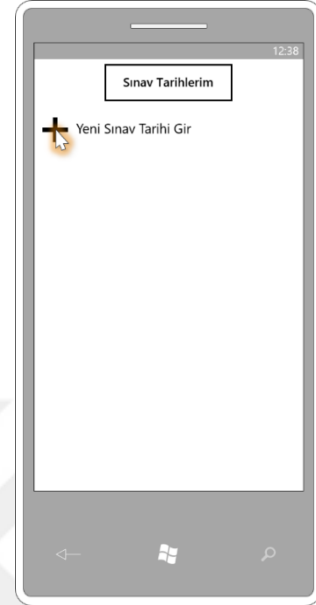


Image 4.22 - Paper Prototype

The name, the date, the time, and the importance of the exam that the participant enters into the application are very important for the study schedules and notifications. With the degree of importance, the application learns which course should be studied more by the participant (*Image 4.24* and *Image 4.23*).

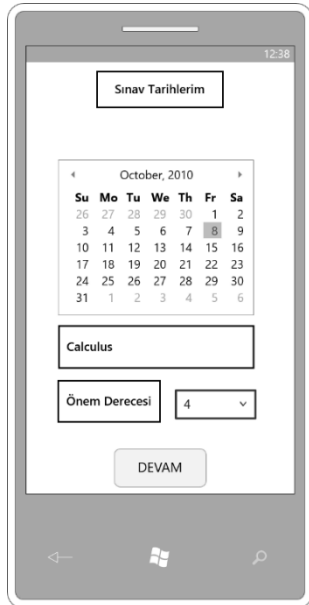


Image 4.24 - Paper Prototype

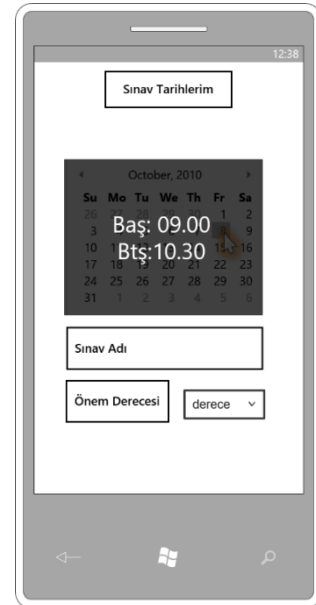


Image 4.23 - Paper Prototype

After the exams as well as the importance level of each exam are determined, the participant is asked at what time he wants to start studying. Thus, the application learns when it should help the participant, as we demonstrate in *Image 4.25* and *Image 4.26*.

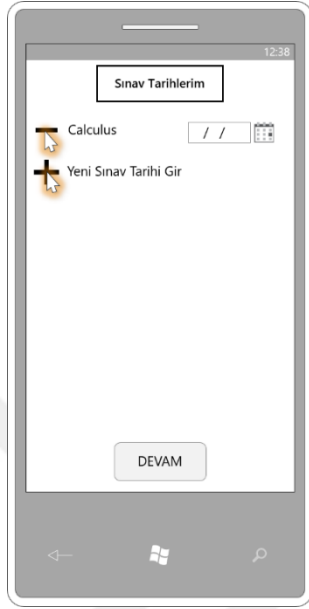


Image 4.25 - Paper Prototype

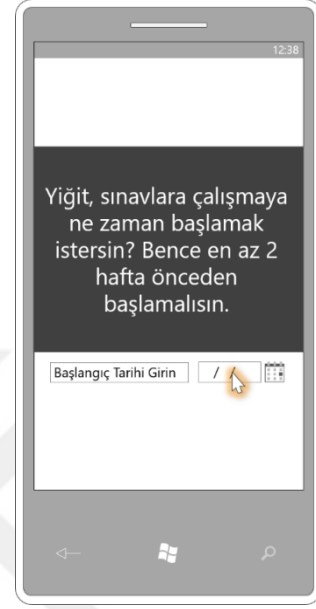


Image 4.26 - Paper Prototype

The participant selects the time intervals that he is busy in *Image 4.27* and *Image 4.28* below.



Image 4.27 - Paper Prototype



Image 4.28 - Paper Prototype

Information about the participant's daily study habits is requested in *Image 4.29* and *Image 4.30*.



Image 4.29 - Paper Prototype

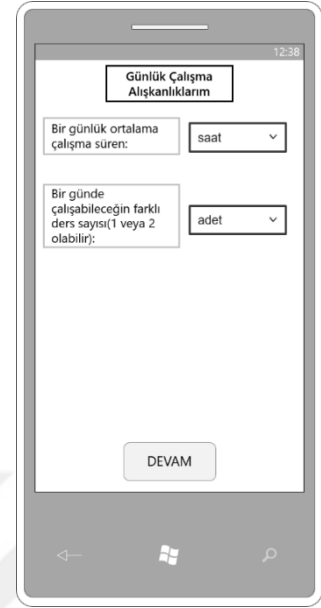


Image 4.30 - Paper Prototype

The application learns the situations in which the participant can work more efficiently in *Image 4.31* and *Image 4.32*.

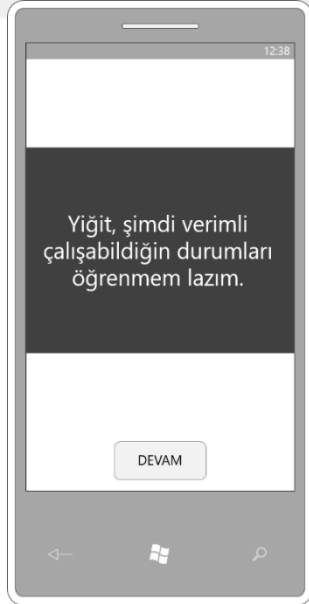


Image 4.31 - Paper Prototype

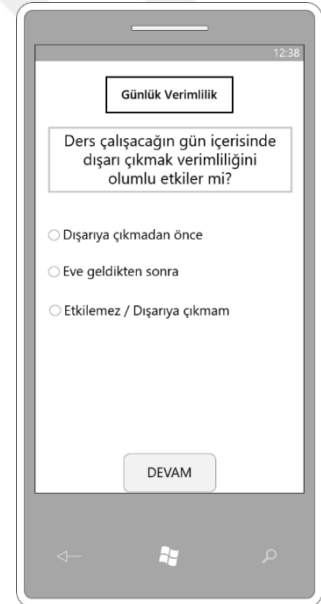


Image 4.32 - Paper Prototype

It is learnt when the participant studies more efficiently in *Image 4.33* and *Image 4.34*.



Image 4.34 - Paper Prototype

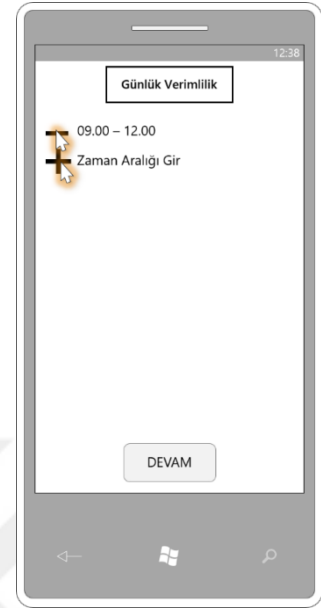


Image 4.33 - Paper Prototype

When the participant loses his motivation, a quote and a picture is sent to encourage him again, as shown *Image 4.35* and *Image 4.36*.

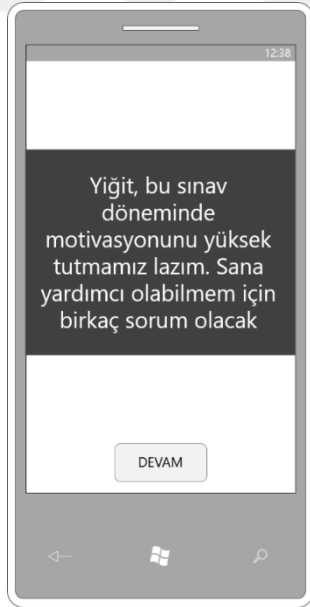


Image 4.36 - Paper Prototype

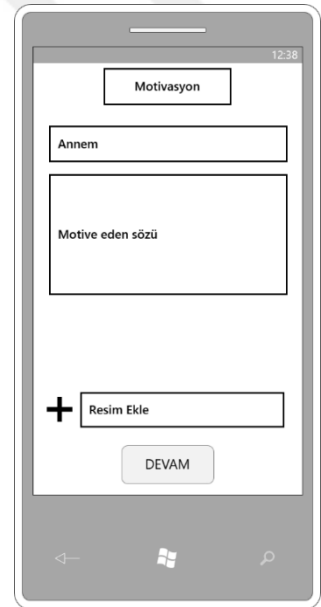


Image 4.35 - Paper Prototype

Created general study schedule is shown to the user in *Image 4.37* and *Image 4.38*.

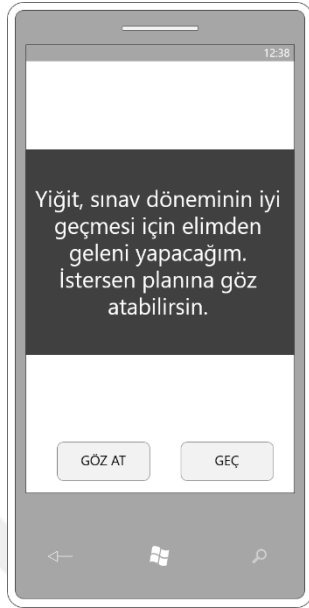


Image 4.38 - Paper Prototype

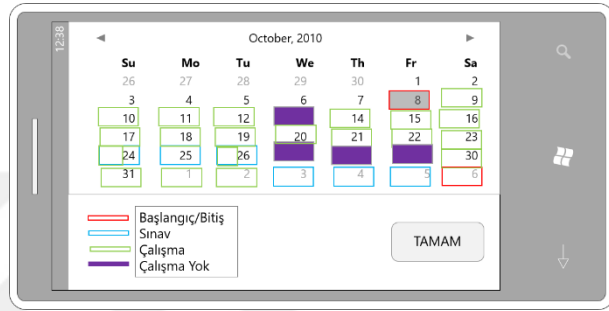


Image 4.37 - Paper Prototype

The participant promises to the application and records a related video to comply with the created study schedule in *Image 4.40* and *Image 4.39*.



Image 4.40 - Paper Prototype



Image 4.39 - Paper Prototype

An example of how to shoot a video is shown in *Image 4.41* and *Image 4.42*.



Image 4.42 - Paper Prototype

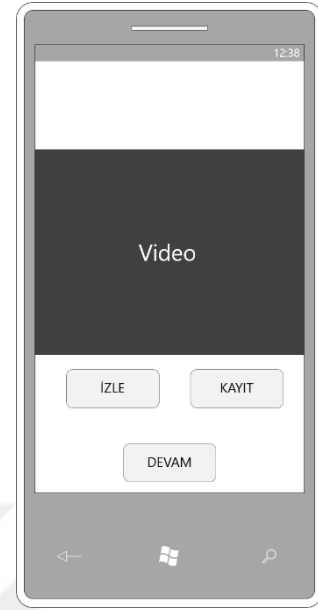


Image 4.41 - Paper Prototype

All necessary information was obtained for the exam period. Therefore, when the time comes, the application sends necessary notifications (*Image 4.43* and *Image 4.44*).



Image 4.44 - Paper Prototype

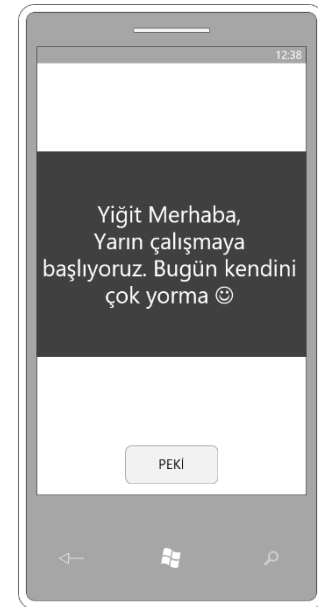


Image 4.43 - Paper Prototype

Image 4.45, Image 4.46, Image 4.47, and Image 4.48 below shows the general daily notifications.

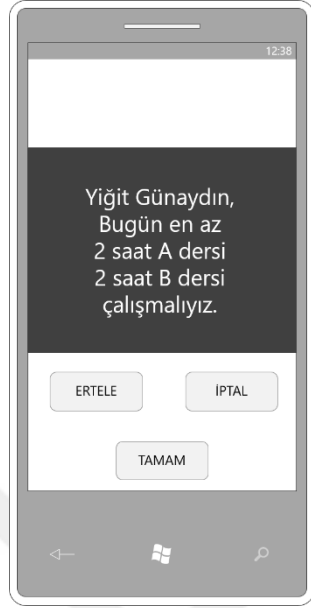


Image 4.45 - Paper Prototype

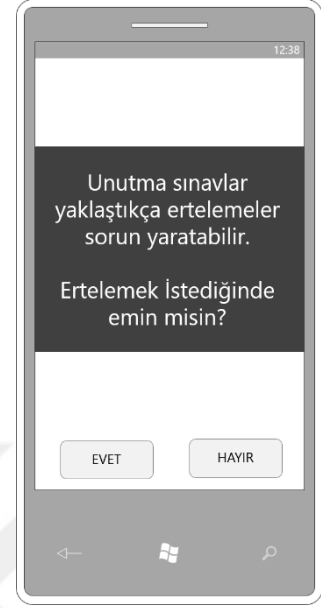


Image 4.46 - Paper Prototype

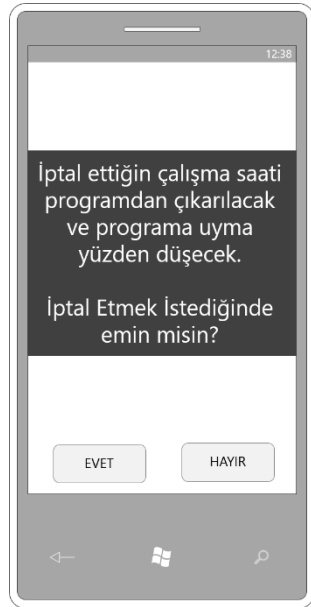


Image 4.47 - Paper Prototype



Image 4.48 - Paper Prototype

Notifications for certain periods are demonstrated in *Image 4.49*, *Image 4.50*, *Image 4.51*, and *Image 4.52*.



Image 4.49 - Paper Prototype



Image 4.50 - Paper Prototype



Image 4.51 - Paper Prototype

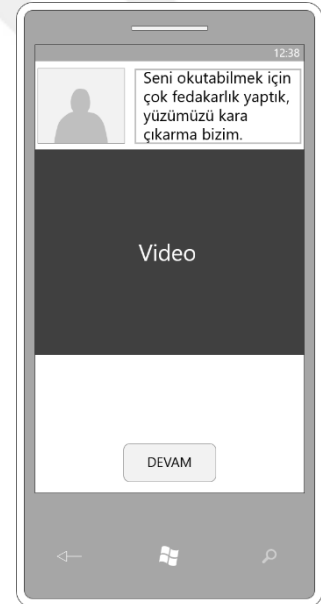


Image 4.52 - Paper Prototype

The screen where the participant will enter information about his situation is shown in *Image 4.53* and *Image 4.54*.



Image 4.53 - Paper Prototype



Image 4.54 - Paper Prototype

Notifications that will be sent to the participant according to the status of going outside are indicated in *Image 4.55* and *Image 4.56*.

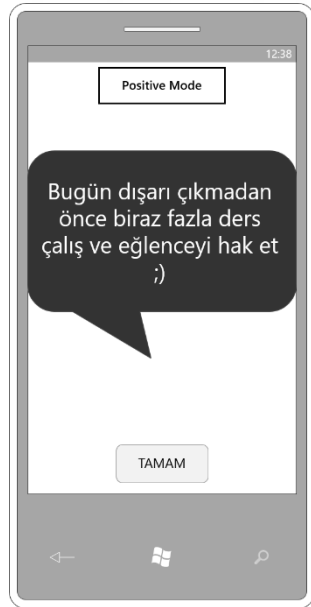


Image 4.55 - Paper Prototype

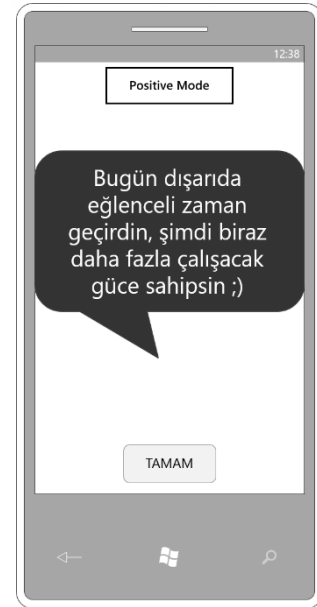


Image 4.56 - Paper Prototype

Exam notification and general application screens are presented in *Image 4.57* and *Image 4.58*.

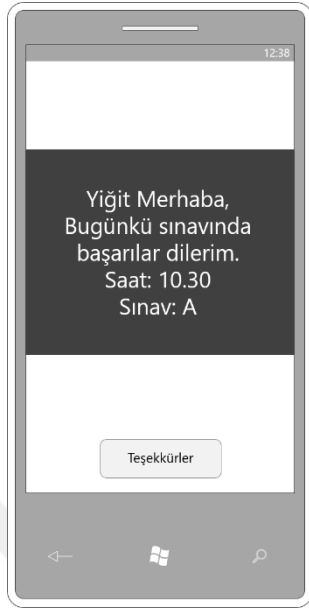


Image 4.57 - Paper Prototype

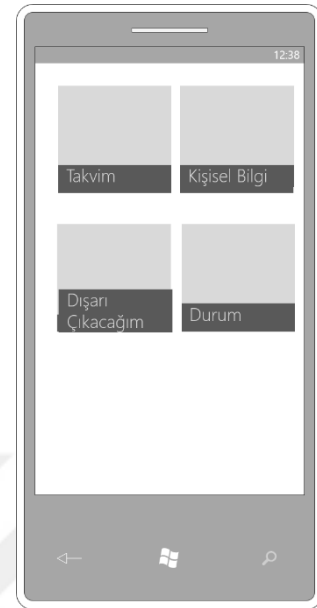


Image 4.58 - Paper Prototype

We made a usability test with these paper prototypes. While we were changing paper like a computer, the participants used the paper prototype using their pens like they use the real application. In this way, the participants behaved as if they were using the real application.

We again noticed some missing features when the participants used the paper prototypes. Participants thought that the application's notifications would be useful if they were pre-determined. However, the participants wanted to see how much they would comply with their study schedule instantly rather than waiting certain days. We asked them how many weeks ago they would like to start studying for their exams. They said that selecting the day rather than the week to start studying might be more effective. Besides, they mentioned that when they postpone their studying course, it is better to get a notification indicating the distressing consequences of that postponement. The notifications about complying with the study schedule were appreciated by participants. The application provides a good feedback for above a certain rate and an immediately bad comment for below a definite rate. However, the participants wanted the app to have a three-stage notification. Thus, the application will make a harsher warning if the participant's average working rate is too low. If the participant's average working rate is a bit better, a softer warning will be given

to the user. They also said that a certain limit of studying must be imposed when postponing a day. The application will be created by the storyboard and these feedbacks.



Chapter 5

Algorithm and Implementation

5.1. Algorithm

Our algorithm was developed with the finding from previous steps of the study. This algorithm constituted the study schedule considering the study habits of the participants.

The participants enter their exam dates into the algorithm. Moreover, the algorithm provides an option that enables the participants to select how many days before the exam period they want to study. If this option is not selected by the participant, the default date is chosen as 2 weeks before the exam period. Then, the participants enter the dates on which he is not available to study during that period

In order for the study schedule to be created, the information about the participant's study habits is obtained. People or plans are indicated by the participants that motivate them in order to keep their motivations high.

Finally, the participants are asked to promise to comply with this study schedule recording with an at least five-second duration a video. These motivations and promises are remembered by the application during the study period. The algorithm is created with these information and the rules that we demonstrate.

The application leads the participants with notifications. The planned studying days as well as the exam dates are reminded via the entered time interval which is defined by the participants, as shown in *Figure 5.1*. In addition, in certain days (every 3 days), participants are informed about how well the study schedule has been successful.

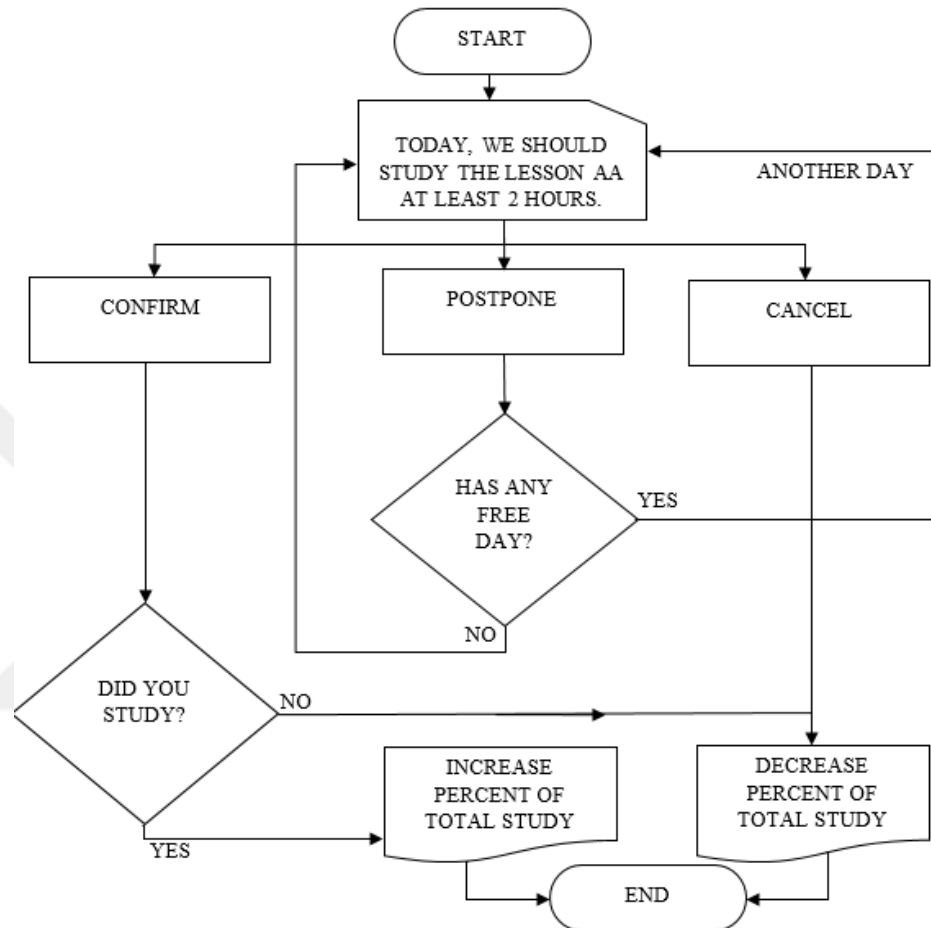


Figure 5.1- Notification Flowchart

5.1.1. The Algorithm Definitions and Rules

In order for the algorithm to create a study schedule, we needed to introduce some definitions and some rules. Six definitions and three rules were set according to the previous findings. These definitions and rules were used to create a useful study schedule with the data from the participants. Each definition had the corresponding calculation using the data that was used. The definitions and the rules are defined below.

Definition 1: Users are required to define the importance level of a course on a scale ranging from 1 to 5. The value of these importance level is directly proportional to the amount of time that will be reserved for each course. A Course's importance level is called **IL**. Summation of the importance levels is called **SIL**.

$$SIL = \sum_{i=1}^n IL_i, \text{ where each } IL \text{ is an importance level of a course.}$$

Definition 2: Users are required to define daily studying hours (**DSH**) and count of daily studying courses (**DSC**).

Definition 3: The user may have 3 types of daily study periods (**DSP**) according to the intensity of the day: (1) an entire day available for studying, (2) a half-day available for studying or (3) a day unavailable for studying.

$$DSP = DSH, \quad \text{for a day available}$$

$$DSP = \frac{DSH}{2}, \quad \text{for at least half a day available}$$

$$DSP = 0, \quad \text{for a day unavailable}$$

Definition 4: Summation of daily study periods is called total hours (**TH**).

$$TH = \sum_{i=1}^n DSP_i, \text{ where } n \text{ is a count of studying day.}$$

Definition 5: The time required to study for an importance level of course is calculated by dividing **TH** by **SIL**. This is called unit time for hours per **IL**.

$$IL = \frac{TH}{SIL}$$

Definition 6: The time required to study for a course is calculated by multiplying **UT** with **IL** of the course. This is called required total hour (**RTH**) for a course during the exam period.

$$RTH = IL \cdot UT$$

Rule 1: The courses are assigned in the reverse order of the exam dates with following case. We assume that the order of exam dates is A B (A is the first exam). The rule just runs in the beginning of the assignment.

- i- If a day is empty immediately before the exam date, just study for that exam.
- ii- If the upcoming exams are in consecutive days, the study plan is created as reverse order of the exams. For instance, if there are three consecutive exams namely A, B, C, the study schedule is designed to study C, B, A, respectively.
- iii- If half day is available, another half day is assigned to the first available day.

Rule 2: Between the dates of two exams, only the courses are studied in that range. For example, we assume that the order of the exams in terms of their holding dates is A B C D E (A is the first exam).

- i- Only the fifth exam can be studied between the fifth exam (E) and the fourth exam (D).
- ii- The fifth (E) and the fourth (D) exams can be studied between the fourth (D) exam and the third (C) exam.
- iii- The fifth, the fourth and the third (E, D, C) exams can be studied between the third (C) and second (B) exams.
- iv- The fifth, the fourth and the third and the second (E, D, C, B) exams can be studied between the second (B) and first (A) exams.
- v- All exams can be studied before the first (A) exam.

Rule 3: Select two exams which have the most remainder total study hours among others. The assignment is made considering the number of courses that will study maximum per day. If the participant can study a maximum of 2 courses, half of the daily studying hours is devoted to the first exam and the other half for the second exam.

5.2. The Algorithm for Creating the Schedule

Once all the rules were defined, the algorithm was created. It was a rule based algorithm. The information obtained from the rules was defined in a certain order. At this point, the flow of the algorithm was established.

Step 1: Enter all exam dates and *IL*.

Step 2: Enter *DSH*, *DSC*, and the starting date.

Step 3: Enter a busy interval from the studying period.

Step 4: Calculate *SIL* (by Definition 1) and *TH* (by Definition 4).

Step 5: Calculate *UT* (by Definition 5).

Step 6: Foreach courses, calculate *RTH* (by Definition 6).

Step 7: Foreach courses, assign a day that is previous course exam day with *DSC* by Rule 1. Then, the course's *RTH* is reduced by *DSH*.

Step 8: Select the last free day from the studying period.

Step 9: if the day is in the exam week

Step 10: Run Rule 2 and Rule 3 using *DSC*.

Step 11: if there is an exam with $RTH > DSH$, swap this course with the previous course by checking Rule 2.

Step 12: Assign a course which has bigger *RTH* to the day. The course's *RTH* is reduced by *DSH*. Move next day and goto Step 9.

Step 13: else if select last free day from studying period.

Step 14: if any free day exists and any course has *RTH*

Step 15: Run Rule 2, Rule 3 using *DSC*.

Step 16: if one of the courses with $RTH < 1$ exists, swap with the previous course.

Step 17: Assign a course which has bigger *RTH* for that day. The course's *RTH* is reduced by *DSH* and goto Step 13.

Step 18: else Finish.

5.2.1. The Algorithm Example

We have an example set for the defined application's algorithm. We assume that the order of the exam dates is A B C D E (A is the first exam). Course A's *IL* is

5, Course B's *IL* is 3, Course C's *IL* is 5, Course D's *IL* is 3, Course E's *IL* is 5. *DSH* is 4 and *DSL* is 2.

We have the study schedule which includes the exams dates, full available days (4 studying hours), half available days (2 studying hours) or unavailable days (0 studying hour), as given in *Table 5.1*.

Table 5.1 – Algorithm Example

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
<i>W1</i>	4 hours	2 hours	2 hours	0 hour	2 hours	4 hours	0 hour
<i>W2</i>	4 hours	2 hours	2 hours	0 hour	2 hours	4 hours	4 hours
<i>W3</i>	<i>Exam A</i>	<i>Exam B</i>	4 hours	4 hours	<i>Exam C</i>	4 hours	4 hours
<i>W4</i>	4 hours	<i>Exam D</i>	4 hours	4 hours	<i>Exam E</i>	-	-

TIL is calculated by *Definition 1*.

$$TC = 5 + 3 + 5 + 3 + 5 = 21$$

TH is calculated by *Definition 2* and *Definition 5*.

$$TH = 60$$

UT is calculated by *Definition 3*.

$$UT = \frac{60}{21} \cong 2.86$$

All RTHs are calculated by *Definition 4*.

$$RTH_A = 5 \times 2.86 \cong 14$$

$$RTH_B = 3 \times 2.86 \cong 9$$

$$RTH_C = 5 \times 2.86 \cong 14$$

$$RTH_D = 3 \times 2.86 \cong 9$$

$$RTH_E = 5 \times 2.86 \cong 14$$

When we run the algorithm after the calculations, a study schedule was created like in *Table 5.2*. In the table “A(2)” notation which means that course A should be studied for at least 2 hours.

Table 5.2 – Algorithm Result

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
W1	D(2)B(2)	B(2)	A(2)	-	B(2)	A(2)C(2)	-
W2	A(2)C(2)	A(2)	C(2)	-	A(2)	B(4)	A(4)
W3	<i>Exam A</i>	<i>Exam B</i>	C(4)	C(4)	<i>Exam C</i>	E(4)	E(2)D(2)
W4	D(4)	<i>Exam D</i>	E(4)	E(4)	<i>Exam E</i>	-	-

5.2.2. Executing and Maintaining the Schedule

There are some features when creating a study schedule with the algorithm. The features which contain execute and maintain processes are called Note. These Notes are necessary for participants to use the application more efficiently. When the algorithm is implemented, these Notes must also be considered.

Note 1: Users can postpone their courses that will be studied according to their busyness. Half of the studying time of the course which is postponed is added to the first studying day for this course. The other half is added to the next studying day for the course. If only one studying day is left for this course, all studying hours added to that day. If there is no studying day, no postponement can be done.

Note 2: It will be reminded that in case of going out or coming home, the participant may do extra study.

Note 3: We suppose three parts of a day as morning, afternoon and evening. If none of the pieces is full or a piece is full (morning, afternoon or evening), it is planned to be able to study the full day for the participant. If two pieces are full (morning and afternoon, or morning and evening, or afternoon and evening), half of the day will be planned as if the course can be studied for the participant. If all the parts are full, no plan will be made.

Note 4: Notifications of studying are sent based on the user's active study course hours. These notifications should not be sent to the user too late. Therefore, some precautions have been taken. The first notification for studying is submitted to the participant 10 minutes before the study hour if the participant sets as before 12:00. Otherwise, the application reminds him at 11:50.

Note 5: The notifications of feedback are sent according to the end of the user's active study course hours. These notifications should not be sent to the user too early. Therefore, some precautions have been taken. The last notification for studying is

sent to the participant 10 minutes after the study hour if the participant sets after 22:00. If not, the application shows the notification at 21:50.

Note 6: No assignment is given in any exam days. The participant can study if he wants. In an exam day, there will be only a notification 2 hours before the exam, such that "I hope I can be successful in the exam".

Note 7: The application will ask for an authentication by an e-mail. This e-mail address can be used to reach the participant as well. In addition, when the participant creates the study schedule, a summary of the study schedule will be submitted to participant via an e-mail in the same way.

Note 8: At the end of the study schedule, a mandatory survey will be conducted. The questionnaire will be sent to each participant the day after the last exam.

Note 9: A notification of the study schedule is sent every three days. It is displayed 10 minutes before the first active studying hour on that day. If there are no active studying hours, it is shown at 11.50.

Note 10: The postponement can be done when daily studying hour is less than up to two times of the planned hours by the participant. After that, the application gives a notification such that "Not enough time to make a postponement." and it asks whether he wants to cancel the course or not.

Note 11: If the postponement ratio is higher than 40%, the app notifies the user, in every 3 days, such as "Below 60% of the plan compliance rate, I have to remind you of your promises." Then, the video which is saved by the participant is shown.

Note 12: If the postponement proportion is greater than 25%, the app notifies the user, in every 3 days, such as "Below 75% of the plan compliance rate, we need to raise the motivation." Then, the image and the quotes, all of which are saved by the participant, are shown.

Note 13: If the postponement proportion is lower than 25%, the app notifies the user, in every 3 days, such as "Above 75% of the plan compliance rate, if you continue like this, you will be very happy at the end." Then, the image and the quotes, saved by the participant, are shown.

5.3. The Application's Screens

The implementation part is determined by the algorithm and the rules. The designed screens that are presented below. When starting the application, it has 22 steps for setting. It gives some information about following screens and the participant enters some information about his studying habits.

Firstly, the application gives general information in a friendly attitude in *Image 5.1*. Then, it asks the participant's exam date whether it is known or not, as shown in *Image 5.2* - Screen.

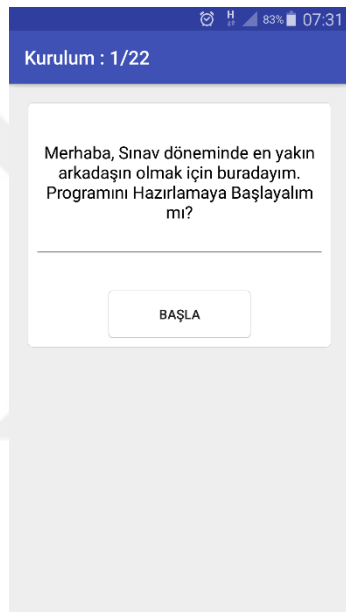


Image 5.1 - Screen



Image 5.2 - Screen

The Application asks the participant's name and email address for future connections in *Image 5.3*. Then, it gives general information in a friendly manner in *Image 5.4*.

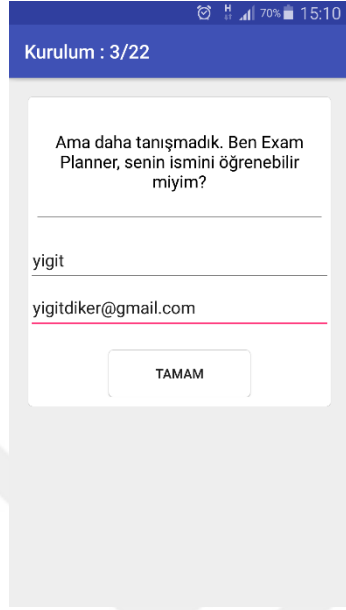


Image 5.3 - Screen

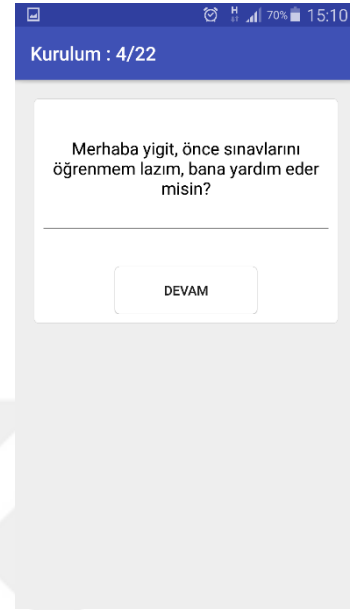


Image 5.4 - Screen

The participant enters his exam information and importance levels about this exam (*Image 5.5*) and he can show all exams on one screen (*Image 5.6*).

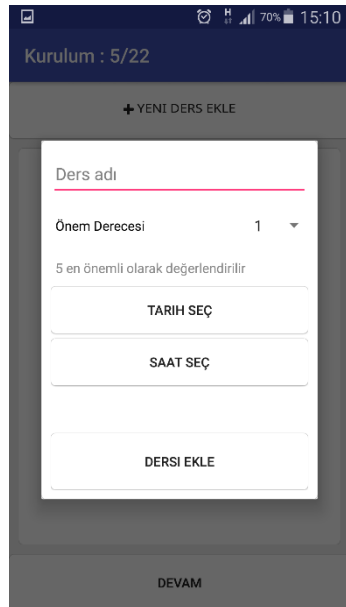


Image 5.5 - Screen

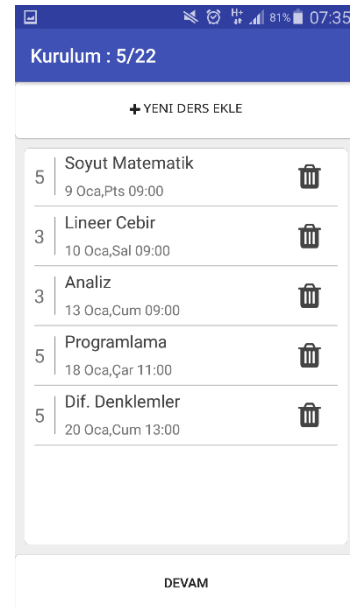


Image 5.6 - Screen

The application asks “When do you want to start studying? I think you should start at least two weeks before your exams.” (*Image 5.8*). After that, the participant selects the interval in which he will be busy during this period, as indicated in *Image 5.7*.

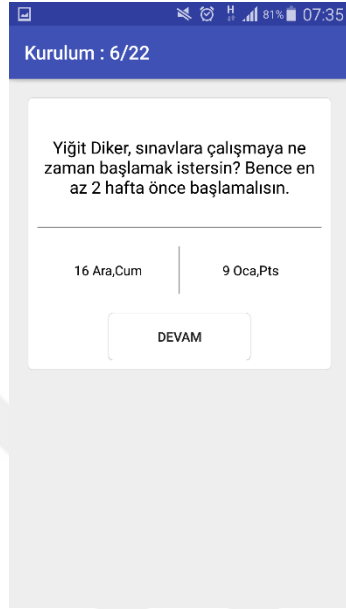


Image 5.8 - Screen



Image 5.7 - Screen

The application gives general information in a friendly attitude in *Image 5.9*. The participant enters his studying habits, as demonstrated in *Image 5.10*.

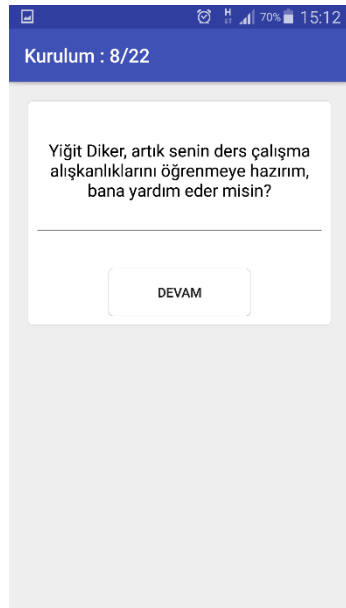


Image 5.9 - Screen

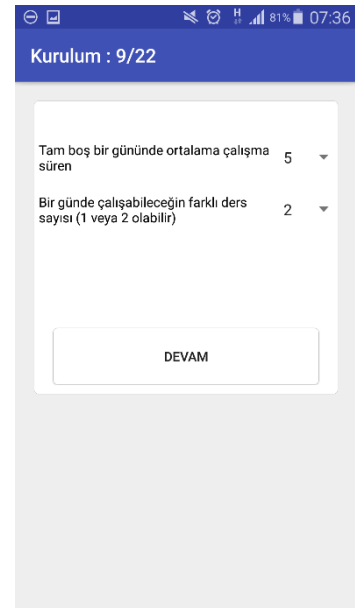


Image 5.10 - Screen

The application gives general information in a friendly attitude in *Image 5.12*. The participant chooses the situation where he can study efficiently. *Image 5.11* below shows that the participant can choose his efficient studying hours either before going out or after coming home.

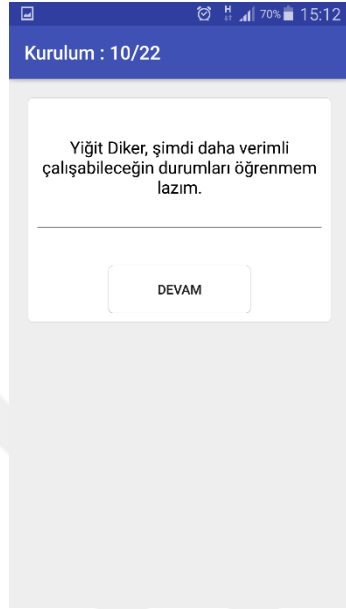


Image 5.12 - Screen

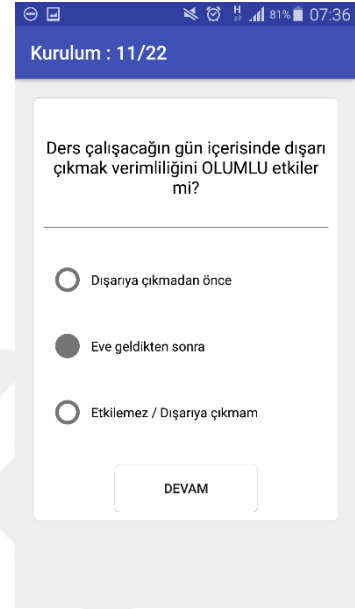


Image 5.11 - Screen

The application gives general information in a friendly behaviour in *Image 5.13*. The participant also chooses the interval in which he can study efficiently, as illustrated in *Image 5.14*.

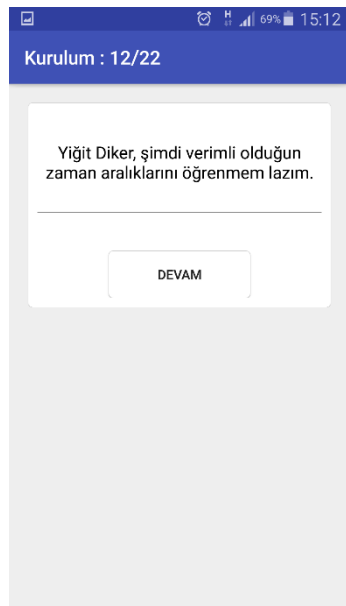


Image 5.13 - Screen

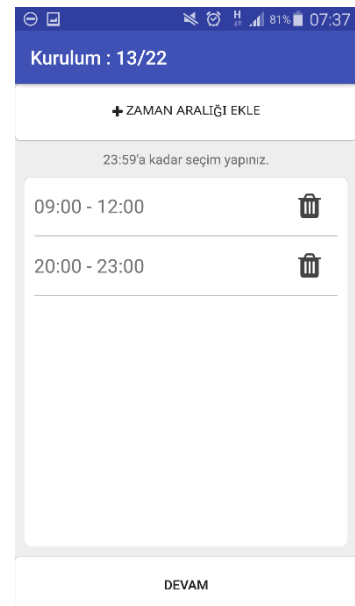


Image 5.14 - Screen

The application provides general information in a friendly attitude (*Image 5.15*). The participant enters a quote and an image which represents an important person to him or a holiday plan for himself, as shown in *Image 5.16*.

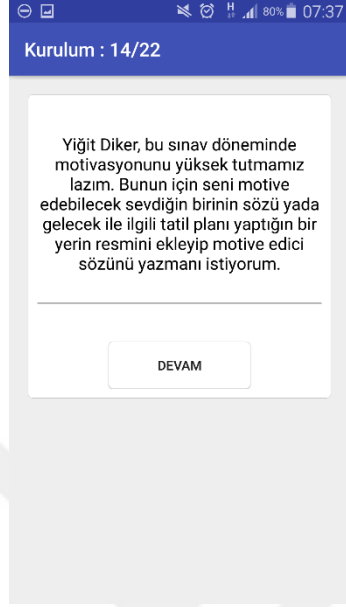


Image 5.15 - Screen

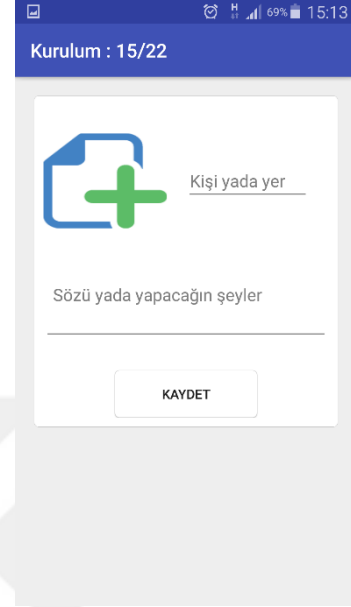


Image 5.16 - Screen

The application gives general information and shows a preview general study schedule in *Image 5.17* and *Image 5.18*.

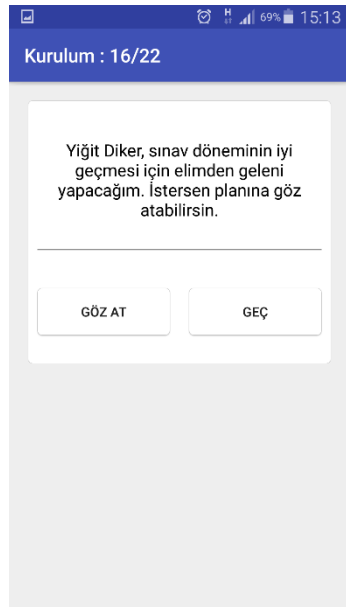


Image 5.17 - Screen

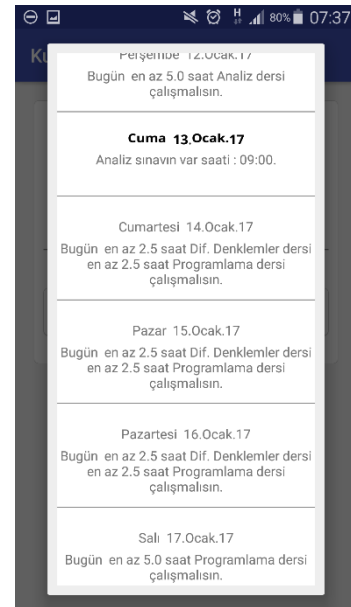


Image 5.18 - Screen

The application gives information about the following steps in *Image 5.19* and *Image 5.20*.

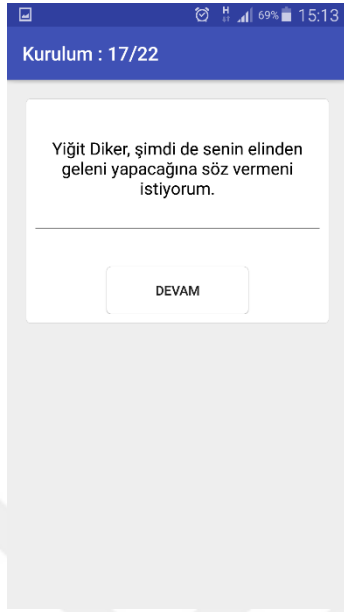


Image 5.19 - Screen

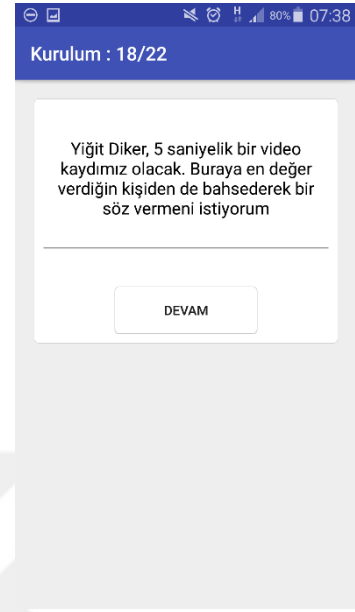


Image 5.20 - Screen

The application gives information about the structure of the video that helps the participant motivate to study, as demonstrated in *Image 5.21*. He promises to comply with this study schedule with a video that lasts at least 5 seconds (*Image 5.22*).

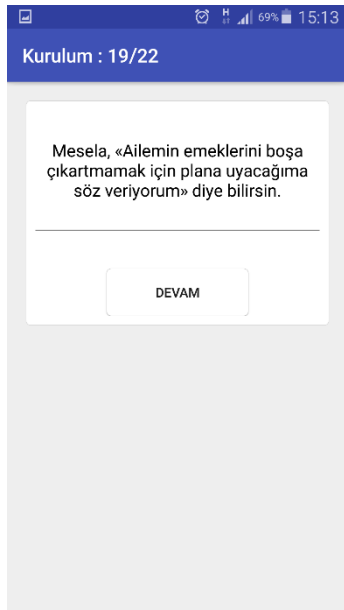


Image 5.21 - Screen

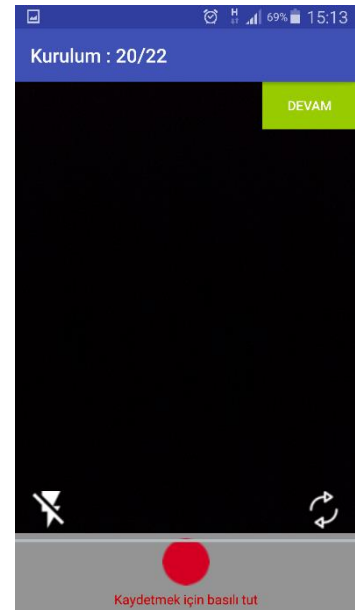


Image 5.22 - Screen

The participant can watch the video again (*Image 5.23*), and the application gives information about the following days in *Image 5.24*.

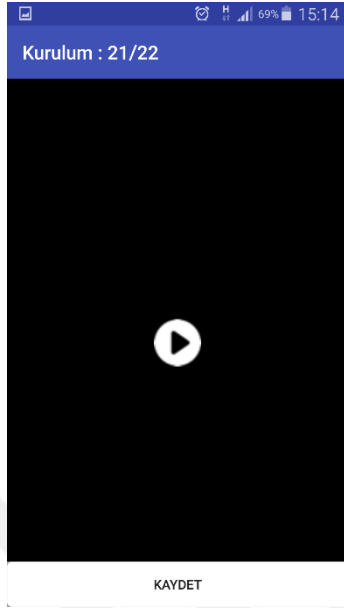


Image 5.23 - Screen

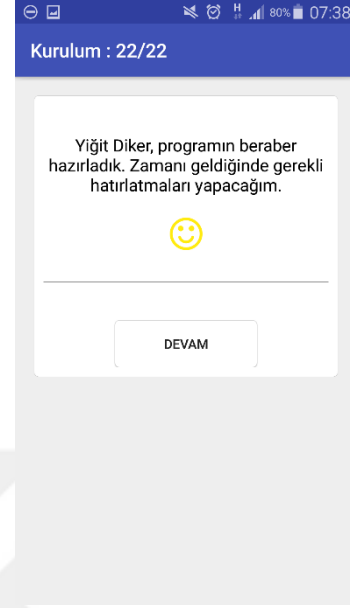


Image 5.24 - Screen

The application's general screen has a calendar, a personal information status, a button which indicates whether the user goes out or returns home during that day, and a pending notification button (*Image 5.25*). The notification screen is shown in *Image 5.26*.

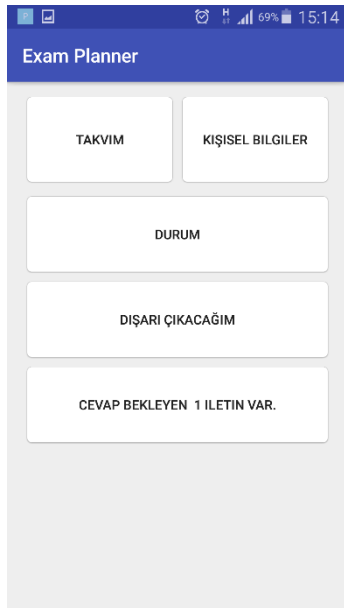


Image 5.25 - Screen

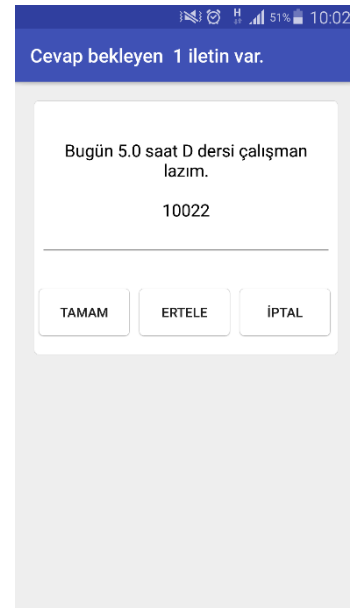


Image 5.26 - Screen

The notification screen is presented in *Image 5.27*. Finally, the general exams' screen which also shows the percentage of studying is demonstrated in *Image 5.28*.

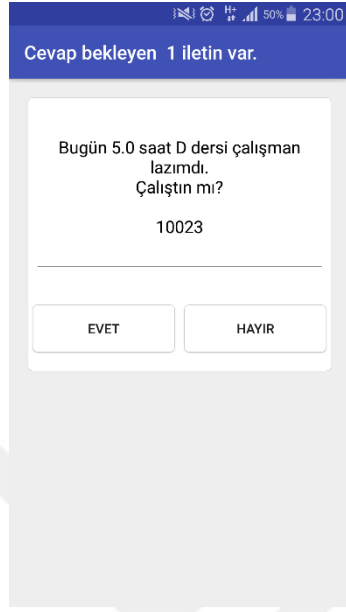


Image 5.27 - Screen

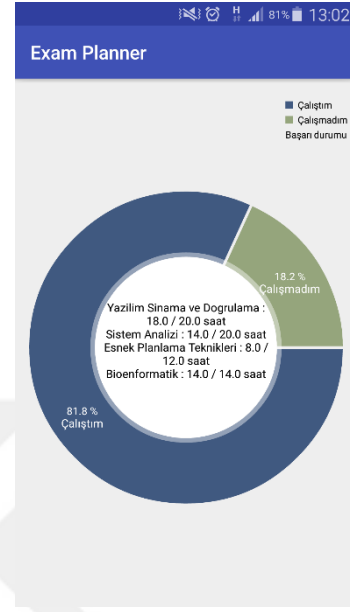


Image 5.28 - Screen

To summarize, we presented the preparation processes to develop our application. The participants were asked necessary questions in order to learn their study habits. Additionally, it is learnt what they do to keep their motivations high. Furthermore, it is learnt what they need to be more productive in their studying periods. Thus, a study schedule was created according to the obtained information. The study schedule was shown to the participants and they controlled all parts of the schedule. Then, they approved the study plan.

Chapter 6

Experiments and Statistical Analyses

The participants from Dokuz Eylül University, İzmir University of Economics, Ege University, and İzmir Institute of Technology have downloaded Exam Planner. The participants used Exam Planner for their final exams. They were followed for approximately one month. There were interviews with 37 people who were actively using Exam Planner. In this chapter, we examine their experiments and their feedbacks. We took written consent from the participants who agreed to share their names. We protected the privacy of participants who chose to stay anonymous.

6.1. Experiments

The Exam Planner application was developed for Android based devices. Exam Planner was uploaded to Google Play Market. The participants were followed through the developed web service. We followed that the application was whether actively used or not by participants. The days on which they were studying, the days on which they postponed their study schedule, and the days on which they cancelled their study schedule were recorded with the web service. The participants used the application during their final exam period. The participants' exam periods lasted two weeks. The participants started studying two weeks before the exams on average. In other words, they planned four weeks using Exam Planner. The data of the participants was obtained with an interface developed in ReactJS. With this user interface, the participants were tracked daily. During certain periods, the participants were asked by e-mail whether they had experienced a problem with their app or not. In this way, we prevented any interruptions to use the application so that the

participants were able to use it continuously. In case of problems, the problem was solved by releasing an immediate update. We carried out a questionnaire to collect all data to create the application. We tried to obtain a general idea about the application. Participants were asked 4 open questions and 11 multiple choice questions. Some questions required points between 1 and 5, where 1 is poor, 2 is fair, 3 is good, 4 is very good and 5 is excellent. The questions are as follows:

Question 1: Have you used Exam Planner until the last exam?

Question 2: What is your complying rate in Exam Planner Status?

Question 3: Did Exam Planner help you during the exam studying period? Can you describe the process with negative and positive aspects?

Question 4: What were the weaknesses of Exam Planner (technical and theoretical)?

Question 5: What were the strengths of Exam Planner (technical and theoretical)?

Question 6: What can be added to the Exam Planner in order to keep the motivation of the user high and make it more useful?

Question 7: Do you need an application such as Exam Planner during an exam studying period (5 is excellent)?

Question 8: How many points do you give for the Exam Planner's usability (5 is excellent)?

Question 9: How helpful were the reminders of the studying time (5 is excellent)?

Question 10: How helpful were the reminders of the exam dates (5 is excellent)?

Question 11: How beneficial was the "promise of video" that came up in your study schedule compliance rates to encourage you to study again (5 is excellent)?

Question 12: How useful was the "promise of your loved one" or "holiday plan" notification to encourage you to study again (5 is excellent)?

Question 13: How useful was Exam Planner to study for your exams (5 is excellent)?

Question 14: Do you want to use Exam Planner again in your next exam period (5 is excellent)?

Question 15: Would you recommend Exam Planner to your friends (5 is excellent)?

Answers of multiple choice questions are depicted in the pie charts. We asked participants whether they used Exam Planner until the last exam. They answered the questionnaire as 29 participants stated “yes” while 8 participants said “no” (*Figure 6.1*).

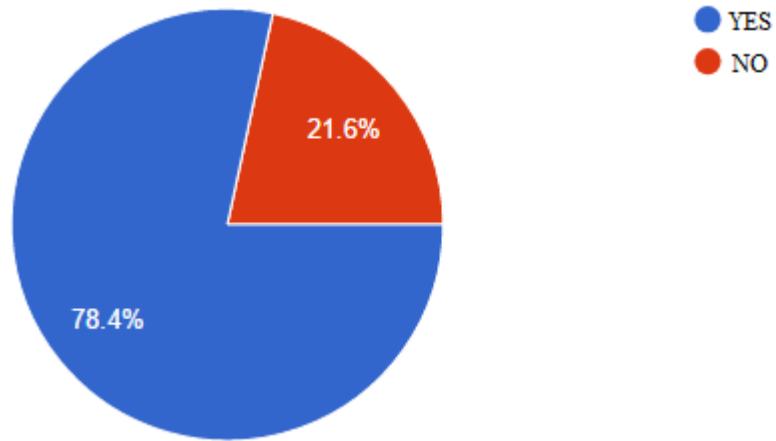


Figure 6.1 – Chart: Answers for Question 1

We asked participants what their complying rates are in Exam Planner Status. 13 participants stated 100-90%, 6 participants stated 89-80%, 8 participants stated 79-70%, 6 participants stated 69-60%, 2 participants stated 59-50% and 2 participants stated lower than 40%, as shown in *Figure 6.2*.

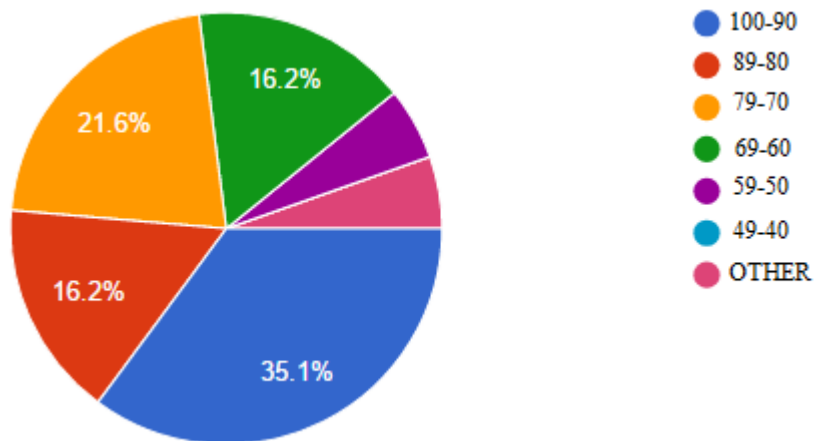


Figure 6.2 - Chart: Answers for Question 2

We asked if they needed an application such as Exam Planner during an exam studying period (5 is excellent). 18 participants stated 5, 13 participants stated 4, 4 participants stated 3, 1 participant stated 2 and 1 participant stated 1, as demonstrated in *Figure 6.3*.

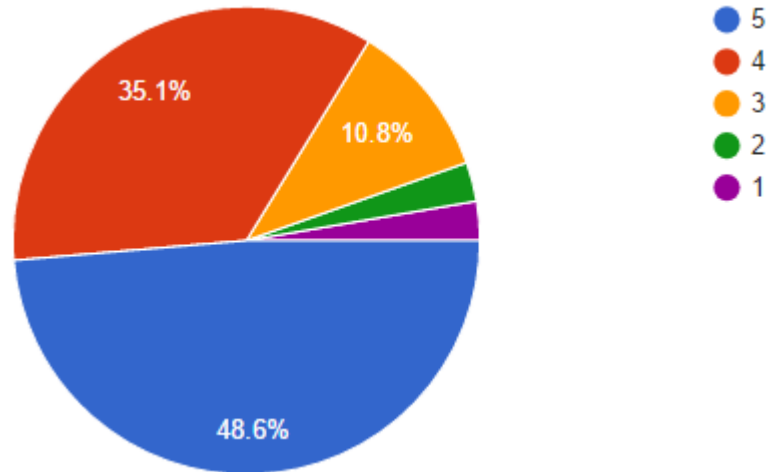


Figure 6.3 - Chart: Answers for Question 7

We asked how many points you give for Exam Planner's usability (5 is excellent). 15 participants stated 5, 16 participants stated 4, 4 participants stated 3 and 2 participants stated, as indicated in *Figure 6.4*.

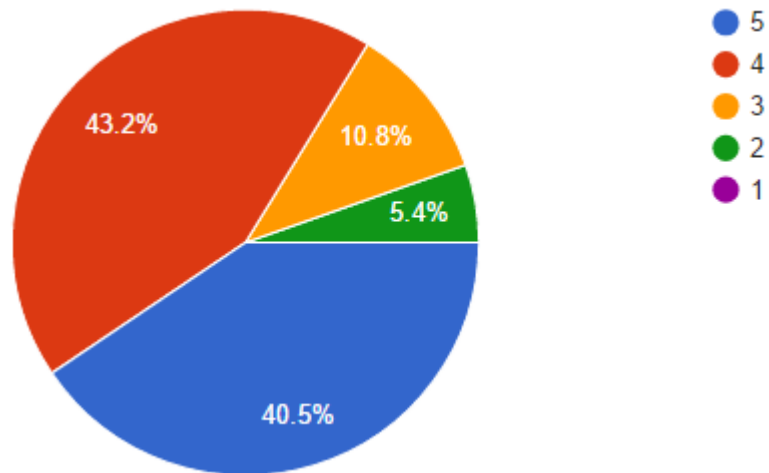


Figure 6.4 - Chart: Answers for Question 8

We asked how helpful the reminders of the studying time were (5 is excellent). 7 participants stated 5, 11 participants stated 4, 13 participants stated 3, 2 participants stated 2 and 4 participants stated 1 (Figure 6.5).

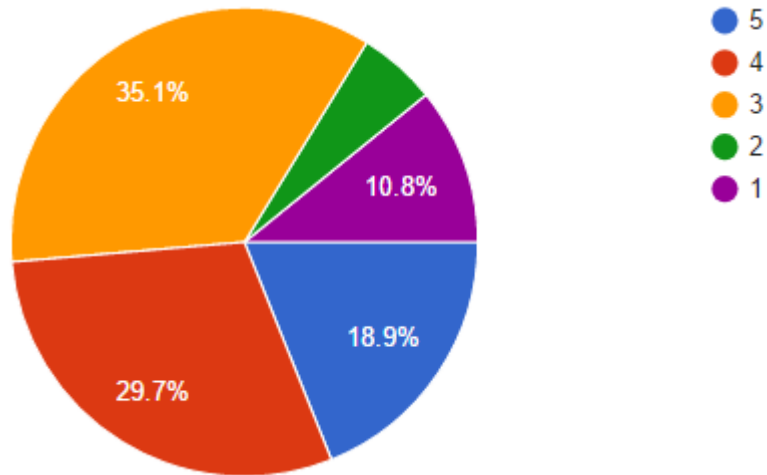


Figure 6.5 - Chart: Answers for Question 9

We asked how helpful the reminders of the exam dates were (5 is excellent). 13 participants stated 5, 8 participants stated 4, 10 participants stated 3, 3 participants stated 2, and 3 participants stated 1 (Figure 6.6).

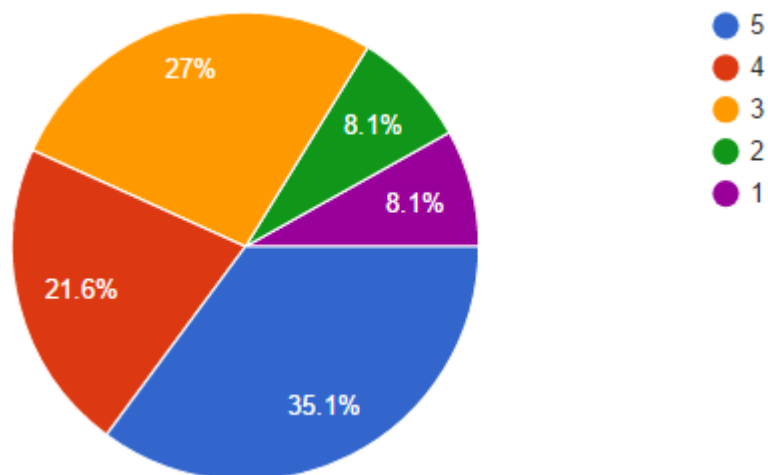


Figure 6.6 - Chart: Answers for Question 10

We asked how beneficial the "promise of video" that came up in your study schedule was to encourage you to study again (5 is excellent). 12 participants stated 5, 5 participants stated 4, 11 participants stated 3, 6 participants stated 2 and 3 participants stated 1 (Figure 6.7).

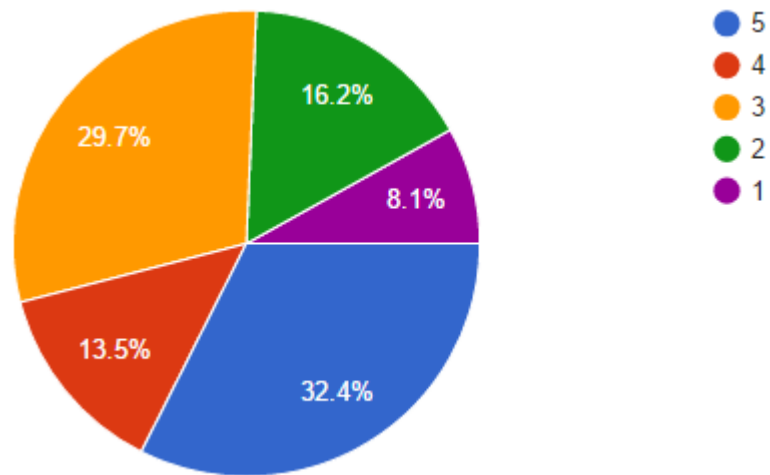


Figure 6.7 - Chart: Answers for Question 11

We asked how useful the "promise of your loved one" or "holiday plan" notification was to encourage you to study again (5 is excellent). 16 participants stated 5, 8 participants stated 4, 7 participants stated 3, 4 participants stated 2 and 2 participants stated 1 (Figure 6.8).

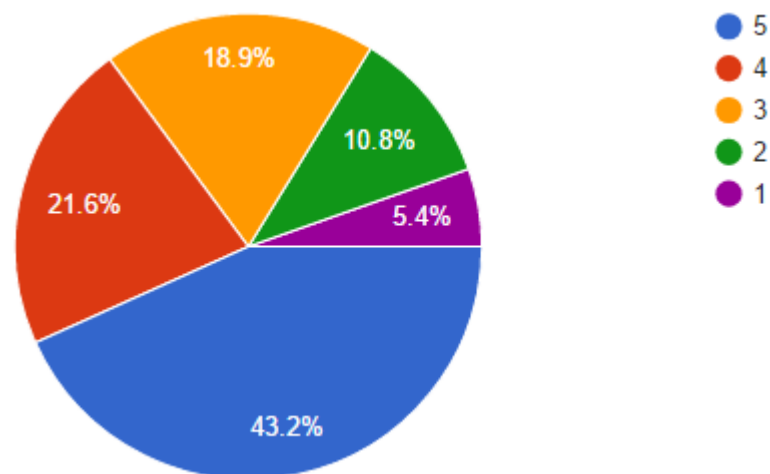


Figure 6.8 - Chart: Answers for Question 12

We asked how useful Exam Planner was in studying on exams (5 is excellent). 11 participants stated 5, 13 participants stated 4, 11 participants stated 3, 1 participant stated 2, and 1 participant stated 1 (Figure 6.9).

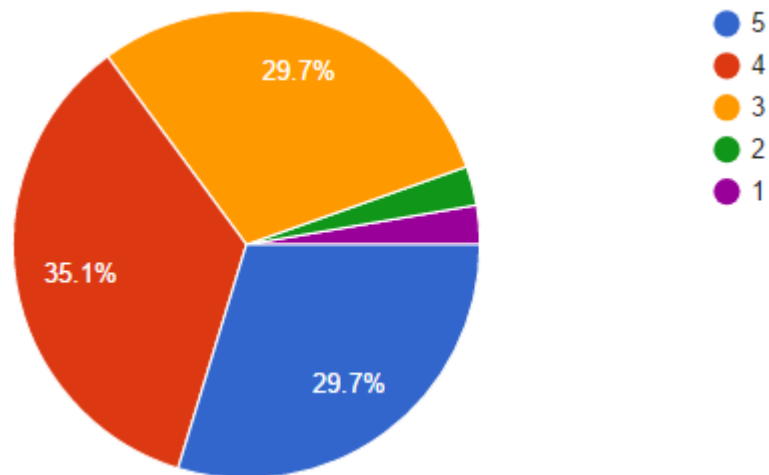


Figure 6.9 - Chart: Answers for Question 13

We asked if they want to use Exam Planner again in the next exam period (5 is excellent). 16 participants stated 5, 12 participants stated 4, 7 participants stated 3 and 2 participants stated 1 (Figure 6.10).

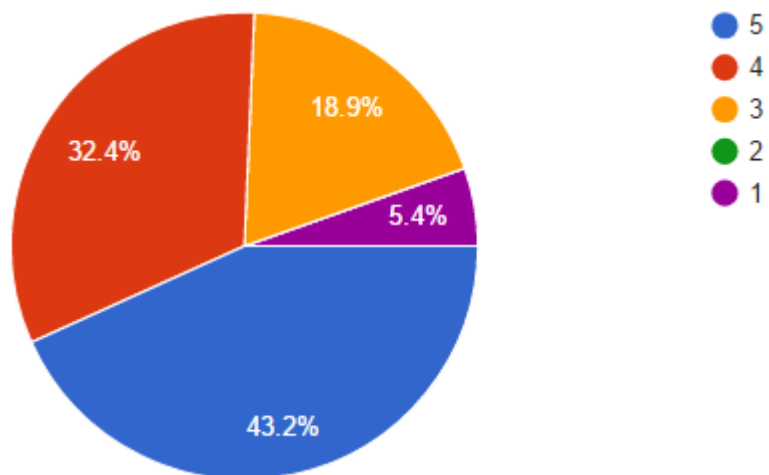


Figure 6.10 - Chart: Answers for Question 14

We asked whether they recommend Exam Planner to their friends (5 is excellent). 24 participants stated 5, 4 participants stated 4, 5 participants stated 3, 2 participants stated 2 and 2 participants stated 1, as shown in *Figure 6.11*.

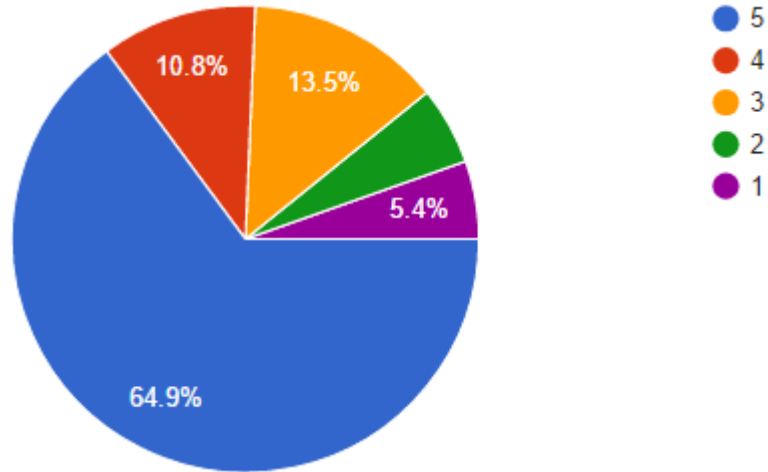


Figure 6.11 - Chart: Answers for Question 15

In Question 3, we asked the participants whether Exam Planner was helpful during the exam studying period or not. Another question was “Can you describe the process with negative and positive aspects?” In general, the participants said that the application was helpful to them. Some participants commented as; Neriman said that Exam Planner was a nice assistant and she studied her exams with the app more programmatically. Hakan said that Exam Planner's notifications and quotes caused him to feel self-blame and encouraged him to study. Büşra said that Exam Planner was very useful in terms of planning and she felt the responsibility of studying at the scheduled times during the day. Eyüp said that he did not study systematically on exam studying period. However, he studied regularly throughout his exam period based on Exam Planner. Yunus Emre said that the video notification and the photo notification motivated him, when he was becoming demoralised during the exam period and he studied more efficiently with Exam Planner. Kadir said that he tried to increase the percentage of compliance with the application. In this way, he felt like playing games and he studied systematically on his exams. Sevgi said that there was a study schedule in her mind, Exam Planner organised it and reminded her to study with the notifications. Şule said that course distributions with the Exam Planner's calendar were very relieving for her. She was motivated because she knew which course she was going to study on which day. Aylin said that when she took a break

from the studying, she saw the video that she had previously recorded and she got motivated and started studying again. Merve said that when her desire for the study was reduced, reminders encouraged her to study again. After studying a course, she was happy to approve it on the study schedule and she studied more efficiently. Rumeysa said that she usually could not make a study schedule for the exam periods and that Exam Planner solved this problem. She said that it was nice to have someone who prepared a study schedule for her. Saadet said that when she prepared a study schedule, she could not make such a detailed study schedule for each course. She usually could not have enough time for the last exam, and Exam Planner solves this problem. Making constant reminders and giving motivational messages when she was bored, it enhanced her desire to study. Gamze said that she was very nervous during the exams and she did not know what to do. It was nice to have someone who prepared a study schedule and a reminder for her. Ece said that she did not have to make study schedules and that Exam Planner did this for her. At the end of the day, when she was performing her duties and when she told Exam Planner, her exam anxiety decreased. Cansu said that she usually could not decide what to study for. Exam Planner did this for her, she liked this feature the most. Betül and Burak said that the course distribution was not suitable for them, and that they studied for other classes during those hours. They completed their study hours so they studied systematically.

In Question 4, we asked the participants about the weaknesses of Exam Planner (technical and theoretical). Some of the participants needed to open the app to see the notifications since they could not get the notifications automatically. Some participants said that automatic notifications would be a great convenience. The notification module should be compatible with every device. Erkin and Hayrettin said the application's interface should be more appealing. Neriman, Merve and Emin said that they must have the ability to edit the created study schedule. Eyüp said that he should be able to login the app with Google or Facebook. Osman said that the study schedule should be shared via e-mail. Şule and Emine said that Exam Planner should be able to give convenience of studying three or more different courses in one day. Sevgi said that she would like to choose the date and the time to postpone the course. Ayben said that a new course could be added to the study schedule afterwards. Mert said that he was spending too much time studying some of his courses. Instead of these courses, he should be able to put courses that require him

to study more. Ece wanted to see how many courses she could work on a day by adding a feature like a chronometer.

In Question 5, we asked the participants about the strengths of Exam Planner (technical and theoretical). Participants generally found the project idea very creative. For instance, Öznur said that the notifications were very useful for her to get motivated when her general studying rate decreased. Burak said that the prepared study schedule could be followed and being able to follow the studying process was a positive feature. Hakan said that the application's algorithm was giving sensible results. Umut said that the application affected him positively because it showed the ratio of working / not working for a course and made reminders. Büşra said that the created study schedule was almost the same study schedule she had in her mind. Osman said that the application was simple and easy to use. Leyla said that they always wanted to study a course but they could not study, they used to wait for someone to ask them to start. Exam Planner was exactly it. Yunus Emre said that he was a person who liked to study on a schedule. In this regard, Exam Planner has guided him. Seeing the words of the person he loved was very nice during the middle of the exam week. He remembered the promise he gave with the video he shot, again. His study efficiency increased. Kadir said that there were days he did not want to study, but he studied just for giving a feedback to the application. Sevgi said that her courses were put in order via Exam Planner. Emine said that at the end of the day, feedbacks and self-control were reflected exams positively. Merve said that Exam Planner was not restricted by the studying time within a certain range, they choose, so it provided a great comfort. Rumeysa said that Exam Planner was not only a study schedule but also the application that every age group could use, like an agenda.

In Question 6, we asked the participants what can be added to the Exam Planner in order to keep the motivation of the user high and make the application more useful. Büşra said that the installation part of the application was too long. Umut said that their mobile phone's screen must have an active icon that stayed constantly on the phone. This icon would be helpful for that they could see the studying percentage and the course(s) they studied in that day. Eyüp said that a different target could be added for each course. Osman said some games could be added to the application. Gonca said that the application must have some questions to remind her why she was studying. Şule said that the video and the picture provided by the participants could also be seen on the application's main screen. Saadet said

that there could be a table showing the results of the exams that were passed with a good grade. Gamze said that the application could ask how her exam was, and if the exam was bad, it could send a notification that would increase her motivation. In addition, some participants reiterated their comments regarding the Exam Planner's weaknesses.

In general, the stated experiences of the participants above were obtained from the survey results. Although generally positive comments were received, it also revealed that there were some missing and necessary points.

6.2. Statistical Analyses

In this section, the statistical interpretation of these experiences and inference are examined. A sample of 37 students were asked about the application. We aimed to find out whether the features of the application we offered to students were met positively.

Encouraging and Successful Algorithm: We analysed the answers to *Question 3* which was an open-ended question. It was determined that the words "encouraging", "help" and "successful algorithm" in the answers were present. The answers that positively mentioned these words were coded as 1, the answers that negatively mentioned these words were coded as 0, and the answers that did not mention these words were coded as -1. One-variable χ^2 analysis was conducted in order to see whether the application had an encouraging and successful algorithm. The results showed that there was a significant difference between the observed and the expected frequencies, ($\chi^2 (2, N= 37) = 51.95, p < .01$). We conclude that the answers to the question are not equally positive or negative. Majority of the students preferred positive answer (33 participants) rather than negative answer (2 participants). 2 participants did not make a comment positively or negatively.

Notifications Encouraging: We analysed the answers to *Question 5* which was an open-ended question. It was determined that the word "notifications encouraging" in the answers were present. The answers that positively mentioned these words were coded as 1, the answers that negatively mentioned these words were coded as 0, and the answers that did not mention these words were coded as -1. One-variable χ^2 analysis was conducted in order to see whether the notifications encouraged to the

participants. Results showed that there was a significant difference between the observed and expected frequencies, ($\chi^2 (2, N= 37) = 20.97, p < .01$). We could conclude that the answers to the question were not equally positive or negative. Majority of students preferred positive answer (25 participants) rather than negative answer (3 participants). 9 participants did not comment positively or negatively.

Meaningful Quotes: Motivational words entered by the practitioners were examined. Some participants entered meaningful quotes, but others entered random characters. The quotes that are meaningful were coded as 1, the quotes that are meaningless were coded as 0, and the quotes that were undecided were coded as -1. One-variable χ^2 analysis was conducted in order to see whether the participants use meaningful quotes. Results showed that there was a significant difference between the observed and the expected frequencies, ($\chi^2 (2, N= 37) = 42.54, p < .01$). We could conclude that the answers to the question were not equally positive or negative. Majority of the students preferred positive answer (31 participants) rather than negative answer (2 participants). 4 participants did not comment positively or negatively.

Necessary for the Students: We analysed answers to *Question 7* in which participants gave an answer on a scale ranging from 1 to 5 about necessary for the students. The answers that positively mentioned these words were coded as 1 for 5 or 4, the answers that negatively mentioned these words were coded as 0 for 2 or 1 and the answers that did not mention these words were coded as -1 for 3. One-variable χ^2 analysis was conducted in order to see whether such an application is necessary for the students. Results showed that there was a significant difference between the observed and the expected frequencies, ($\chi^2 (2, N= 37) = 42.54, p < .01$). We could conclude that the answers of question were not equally positive and negative. Majority of students preferred positive answer (31 participants) rather than negative answer (2 participants). 4 participants did not comment positively or negatively.

Usability of the Application: We analysed the answers to *Question 8*. The participants gave an answer on a scale ranging from 1 to 5 about usability of the application. The answers that positively mentioned these words were coded as 1 for 5 or 4, the answers that negatively mentioned these words were coded as 0 for 2 or 1, and the answers that did not mention these words were coded as -1 for 3. One-variable χ^2 analysis was conducted in order to see whether usability of the

application. Results showed that there was a significant difference between the observed and expected frequencies, ($\chi^2 (2, N= 37) = 42.54, p < .01$). We could conclude that answers to the question were not equally positive or negative. Majority of the students preferred positive answer (31 participants) rather than negative answer (2 participants). 2 participants did not comment positively or negatively.

Studying Time Notifications: We analysed the answers to *Question 9*. Regarding the answers, the participants gave an answer on a scale ranging from 1 to 5 about studying time notifications. The answers that positively mentioned these words were coded as 1 for 5 or 4, the answers that negatively mentioned these words were coded as 0 for 2 or 1, and the answers that did not mention these words were coded as -1 for 3. One-variable χ^2 analysis was conducted in order to see whether the notifications of course studying time are useful. The results showed that there was a significant difference between the observed and expected frequencies, ($\chi^2 (2, N= 37) = 6.87, p < .05$). We could conclude that the answers to the question were not equally positive or negative. Majority of the students preferred positive answer (19 participants) rather than negative answer (6 participants). 12 participants did not comment positively or negatively.

Exam Date Notifications: We analysed the answers to *Question 10* in which the participants gave an answer on a scale ranging from 1 to 5 about exam date notifications. The answers that positively mentioned these words were coded as 1 for 5 or 4, the answers that negatively mentioned these words were coded as 0 for 2 or 1 and the answers that did not mention these words were coded as -1 for 3. One-variable χ^2 analysis was conducted in order to see whether the notifications of exam date are useful. The results showed that there was a significant difference between the observed and expected frequencies, ($\chi^2 (2, N= 37) = 9.78, p < .01$). We could conclude that answers to the question were not equally positive or negative. Majority of the students preferred positive answer (21 participants) rather than negative answer (6 participants). 10 participants did not comment positively or negatively.

Seeing the Image and Quotes of the Favourite Person: We analysed the answers to *Question 12* in which participants gave an answer on a scale ranging from 1 to 5 about seeing the image and the quotes of their favourite person. The answers that positively mentioned these words were coded as 1 for 5 or 4, the answers that negatively mentioned these words were coded as 0 for 2 or 1, and the answers that did not mention these words were coded as -1 for 3. One-variable χ^2 analysis was

conducted in order to see whether the image as well as the quotes increase the motivation. The results showed that there was a significant difference between the observed and expected frequencies, ($\chi^2 (2, N= 37) = 16.60, p < .01$). We could conclude that the answers to the question were not equally positive or negative. Majority of the students preferred positive answer (24 participants) rather than negative answer (6 participants). 7 participants did not comment positively or negatively.

Usefulness of the Application: We analysed the answers to *Question 13* in which the participants gave an answer on a scale ranging from 1 to 5 about usefulness of the application. The answers that positively mentioned these words were coded as 1 for 5 or 4, the answers that negatively mentioned these words were coded as 0 for 2 or 1 and the answers that did not mention these words were coded as -1 for 3. One-variable χ^2 analysis was conducted in order to see whether the application is useful. The results showed that there was a significant difference between the observed and expected frequencies, ($\chi^2 (2, N= 37) = 19.84, p < .01$). We could conclude that the answers to the question were not equally positive or negative. Majority of the students preferred positive answer (24 participants) rather than negative answer (2 participants). 11 participants did not comment positively or negatively.

Willingness to Use the Application Again: We analysed the answers to *Question 14* in which the participants gave an answer on a scale ranging from 1 to 5 about willingness to use the application. The answers that positively mentioned these words were coded as 1 for 5 or 4, the answers that negatively mentioned these words were coded as 0 for 2 or 1, and the answers that did not mention these words were coded as -1 for 3. One-variable χ^2 analysis was conducted in order to see whether the participants would like to use the application again. The results showed that there was a significant difference between the observed and expected frequencies, ($\chi^2 (2, N= 37) = 30.87, p < .01$). We could conclude that the answers to the question were not equally positive or negative. Majority of the students preferred positive answer (28 participants) rather than negative answer (2 participants). 7 participants did not comment positively or negatively.

Suggesting the Application to Friends: We analysed the answers to *Question 15* in which the participants gave an answer on a scale ranging from 1 to 5 about whether they would recommend their friends to use the application. The answers that positively mentioned these words were coded as 1 for 5 or 4, the answers that

negatively mentioned these words were coded as 0 for 2 or 1, and the answers that did not mention these words were coded as -1 for 3. One-variable χ^2 analysis was conducted in order to see whether the participants would like to suggest the application to their friends. The results showed that there was a significant difference between the observed and expected frequencies, ($\chi^2 (2, N= 37) = 29.89, p < .01$). We could conclude that the answers to the question were not equally positive or negative. Majority of the students preferred positive answer (28 participants) rather than negative answer (4 participants). 5 participants did not comment positively or negatively.

Studying Rate: We asked the participants about the percentage of the study schedule they successfully followed in *Question 2*. They choose one of the ranges that are 100-90(%), 89-80(%), 79-70(%), 69-60(%), 59-50(%), 49-40(%) or, others. The answers were assigned 1 for above 70%, and 0 for others. One-variable χ^2 analysis was conducted in order to see whether the studying rate of the participants was over 70%. The results showed that there was a significant difference between the observed and expected frequencies, ($\chi^2 (2, N= 37) = 7.81, p < .05$). Majority of the students had studying rate which was over 70% (27 participants). 10 participants' study rate was under 70 %.

Using the Application until the Last Exam Date: We analysed the answers to *Question 1* where the participants gave 'YES' or 'NO' about using the application until the last exam date. The answers were assigned 1 for 'YES', 0 for 'NO'. One-variable χ^2 analysis was conducted in order to see whether the participants used the application until the last exam date. The results showed that there was a significant difference between the observed and expected frequencies, ($\chi^2 (1, N= 37) = 11.92, p < .01$). We could conclude that the answers to the question were not equally positive or negative. Majority of the students preferred positive answer (29 participants) rather than negative answer (8 participants).

The feedbacks of the participants has been analysed with Chi-Square Test. Statistically, it has been observed that these feedbacks were significant. The results of our analysis showed that the application had an encouraging and successful algorithm. To summarize, we observed that;

- The application's notifications encouraged the participants.

- The participants used meaningful quotes for notification, and the participants agreed about the usability of the application.
- The notifications of studying time were useful and the notifications of exam date were also useful.
- The motivation of the participants increased when seeing the image and the quotes of the participant's favourite person.
- Basically, the participants said that the application was useful and they would like to use the application again.
- The participants would like to recommend their friends to use the application, through indicating that the application was necessary for the students.
- The studying rate of the most of participants was found over 70%, and they used the application until the last exam date.

6.3. Other Observations

We performed some tests on the data, but the results of the tests were not statistically significant. This may be because of the small number of the participants. However, according to our subjective observations, they seem relevant. We will discuss about our observations here.

The participants who used the application until the last exam had generally over 70% of a studying percentage. They said that the application was necessary. They said that they wanted to use the application again. They entered meaningful motivational quotes. They indicated that the application had an encouraging and successful algorithm. We can interpret that these participants used the application more consciously during the period of studying.

Participants, who had a studying rate of over 70%, said that they would recommend the app to their friends. They mentioned that the application was necessary and they used the application actively. Moreover, they said that the application could be useful for students and it had an encouraging and successful algorithm. It could be interpreted that these participants found the application successful and suggest it to their friends.

Participants, who said the application was necessary and used the application actively, said that they wanted to use the application again. They said that the

application might be useful for students. They said that the video that included their promises was motivation enhancing when they saw with notifications. They entered meaningful motivational quotes. They said that the application had an encouraging and successful algorithm. Therefore, these participants said that the app raised their motivations, and therefore wanted to use it again.

The participants, who said that the app might be necessary for students, said that they wanted to use the application again. They said that the application might be useful for students. They said that their motivation increased when they saw their favourite person's photo and his quote with notifications. They found the exam time notifications useful. They said that the application was successful regarding its usability. They entered meaningful motivational quotes. Hence, these participants found the application's notifications useful.

The participants, who said that they would recommend the app to their friends, said that they wanted to use the application again. They said that the application might be useful for students. They said that the video that included their promised was motivation enhancing when they saw with notifications. They entered meaningful motivational quotes. They said that the application had an encouraging and successful algorithm. One can interpret that the application useful for students according to these participants.

Participants, who wanted to use the application again, said that it might be useful for students. They said that their motivation increased when they saw their favourite person's photo and his quote with notifications. They found the exam time notifications useful. They said that the application was successful in terms of usability. They entered meaningful motivational quotes. They said that the application had an encouraging and successful algorithm. It could be interpreted that these participants made the best use of the application.

Participants, who thought the app was useful, said that their motivation increased when they saw their favourite person's photo and his quote with notifications. They said that the application was successful in terms of usability. They said that the application had an encouraging and successful algorithm. It could be interpreted that these participants were influenced by the usability and notifications of the application.

Participants, who said their motivation increased when they saw their favourite person's photo and his quote with notifications, said that the application was successful in terms of usability. They entered meaningful motivational quotes. They said that the application had an encouraging and successful algorithm. It could be interpreted that these motivated participants found the application more useful.

Participants, who thought the app was successful in terms of usability, said that they found the exam time notifications useful. They entered meaningful motivational quotes. It could be interpreted that the notifications of the application were related to its usability.



Chapter 7

Discussion and Conclusion

7.1. Discussion

We divided our study into two sections. The first section was a preparation for the application, and the second section was the use of the application. The first section of the study included interview, storyboard, paper prototype and implementation. This section was conducted based on 18 participants. These participants were the undergraduate students from Dokuz Eylül University, Ege University and İzmir University of Economics. The second section of the study included enabling the participants to use the application and to provide feedback. This section was conducted based on 37 participants. These participants were the undergraduate students from Dokuz Eylül University, Ege University, İzmir Institute of Technology and İzmir University of Economics.

Most of our participants reported that they need an application that supports them during exam periods. Thus, the students may regulate their study schedule by using the application. The application can increase their motivation by showing what they care about (for instance; their favourite person's photo and his quote). As a result of this, they can learn their total hours of studying in the application. In this way, they may decide whether they study enough for the exams. When they know that their study hours are enough, they take the exams peacefully and their morale tend to be high. When they know that their study hours are not enough, they know how many hours more they should study for the next exams.

Hardworking students is generally stressful about which course should they study on which day? The application can be minimize their stresses by creating a study schedule for them. Additionally, they see how much time they should spend

for the courses in their study schedule. By this means, they can motivate themselves by seeing their total time that they spend.

Creating a study schedule may be so difficult for lazy students and that's why they may not study. This study schedule can motivate students for their following courses. Additionally, students may be encouraged to study by notifications of the application. By this way, it is aimed to make students uneasy if they do not study for their courses.

Some of the students need to get positive energy from their parents or friends because exam periods are very stressful. In particular, students who live far away from their parents, may want to remember their parents to increase their motivation. Our application can satisfy these cases for the users.

Some of the students cannot motivate themselves to start studying. Besides, these students sometimes say that it is too late to start studying for this day, because at the end of the day, there may be no one who ask them whether they studied for that day. As a result of these, they feel responsible because the application asks whether they studied today. In this way, they would be more motivated to study.

7.2. Conclusion

Evaluations with the participants show that many students have already been preparing the exam period study schedules for themselves. These study schedules can be written on a piece of paper, or they can be created in an electronic environment. Once the students have prepared their study schedules, they are trying to follow the study schedules that are created by them. The research, that we conducted, showed that the participants needed a friend who would help them during their exam periods. This friend should be able to motivate them, make necessary notifications, and sometimes warn them. They would usually try to comply with the study schedules that were created by them until the end of the exam period.

We asked participants “if there was an application that supports you during your exam periods like a friend, what would it be like?”. They said that it should create a viable study schedule that was practicable and it should tend to remind their promises. The application should motivate the user when the user's motivation decreases. It should remind users about their daily courses and exams. The

application that was created in accordance with these requests was used by the participants. The most relevant features of the application are:

To promise and try to keep their promises: Participants feel themselves responsible for keeping their promises. For this reason, the application's notifications encourage them to study.

See the photo and quotes of the person, who is loved, when the motivation falls: Participants are looking for someone who will support them when their motivation falls. That's why the application increases their motivations by reminding them about what they care about.

To create a practical and logical study schedule for the user: Participants sometimes have difficulty in making a study schedule. The application helps them in this regard.

To be able to see the rates in order to check complying with the schedule: Participants may want to see their created study schedule so they can check whether they are behind the study schedule.

To be able to see the course study schedule that is created: Participants may want to know which course they will study on which day.

Course study reminders and user feedback: The app reminds the participants about the courses that they will work on during the day. At the end of the day, the participant tells whether he has worked by giving feedback. The application only gives the courses that need to be studied on that day and the time required for studying, and leaves the studying hours to the participant.

Exam reminders: It is observed that the notifications of the application (the date and time of the examination notifications) are useful.

User Interface that is easy and user-friendly: Participants are very busy during their exams. For this reason, they should not spend times to learn the application, it should have a user-friendly interface.

7.3. Future Work

The application met the requirements of the majority of the participants. In addition, some features have emerged for future studies. Future studies might be as follows;

Adding and editing exam dates: Exam dates can change for various reasons. Therefore, the user must be able to add the date of the new exam and change the old exam date.

Editing of the course hours: The participant can reduce or increase the studying time of some courses if he wishes. The application should be adapted when a participant feels like he has studied enough for a particular course.

To increase the motivation of the students whose exams are bad: The participant's exam might be bad, so that the application should increase his motivation to prepare him for other exams.

To show the user what will happen in case of passing the courses with high score via a score table: Participants want to see how their grades affect their GPA if they pass this examination period well. Thus, they think that their motivation will increase.

Option to share study schedules: Participants would like to share their study schedules with their friends. Some participants want to send them to their computers and print out.

Suggestions for the exam schedule that will be created by deducing from previous exams: The application may benefit from previous experience while making a proposal for a study schedule for an exam. An artificial intelligence can be developed for this purpose.

Chapter 8

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Appendix-A

Interviews

We aimed to learn participants' habits and their approaches to create a study schedule in our study. Thus, we interviewed with eighteen students. The summary of interviews are given in *Section 3.3*. The detail of interviews is presented in this chapter as follows.

Melike: She makes realistic study schedules. She starts to study 2 weeks earlier. She believes that this style of study schedule is realistic for her since she cannot study more than 2 weeks. Even if she is depressive, she abides by her study schedule. She told that if there would be a planner application that she could use, the application should understand her patterns and limits, should be mobile, and also she would be able to delay her study schedule. She spends more time to study for the courses that she is not good at than the other ones.

Mert: He cares about his courses' level. He makes study schedule 1 or 2 weeks earlier like Melike and some other undergraduate students. Also, he studies his favourite courses during the term like Deniz.

Yavuz: He cares about courses' credits. He makes his study schedule at last week of the exam period. He studies his favourite courses more. He is able to study different courses on the same day. He said that the application should understand him.

İlter: He makes weekly study schedule, this style of study schedule is rarely seen. He cares about courses' difficulty and exam dates. He told that the application should be mobile, should be simultaneous, and could be transmitted to other formats (i.e. Excel, Word etc.)

Can: We made face to face interview and survey with Can. We received very similar answers in both interviews. He spares his time for easy courses. He studies his

favourite courses during the term like Mert and Deniz. He knows that he will be unsuccessful when he cannot study. Therefore, he motivates himself with this bad scenario. He starts studying before 1 or 2 weeks. When his exam is bad, he says “I wish I had studied hard.”

Zeynep: She takes into account the exam dates while she is preparing a study schedule. She said that the application should provide flexible and deferrable study schedule.

Burak: He studies very little although his goals are high. His study habits are enough to reach his target. The reason can be either university’s courses are so easy or he is very clever. He said that the application should be dynamic (for example; if his quiz result is bad, the application will adjust final term according to this result). He can study eagerly after he comes back home. This situation can change from person to person.

Sinem: We made face to face interview and survey with Sinem. We received very similar answers in both interviews. She studies for her exams before the exam period because she said that she would have fresh knowledge and take an exam with this knowledge. She said that the application should remember her exam dates. She can study efficiently when her mood is positive. If she is not ready for studying her courses, she should be able to delay this study schedule. She motivates herself with the dream of summer holiday. She makes study schedules according to difficulty of her courses. Even if this course’s exam date is the last day of the term, she studies this course early or in the middle of the exam term.

Neslişah: We made face to face interview and survey with Neslişah. We received very similar answers in both interviews. When she creates a study schedule, she chooses courses depending on the exam dates. If a course is harder than the others, this situation can be an exception. She said that the application should say “You must study”. Maybe, the application can have quotes. Therefore, undergraduate students’ motivations can increase. She said that when she studies, her mood should be good. If her mood is bad, she can delay her study schedule. When she has a bad exam, she says “I wish, I had studied harder.” like Can. She is afraid of thinking of summer school. Therefore, she motivates herself with this bad scenario. She hates someone who says “You must study!!”

Melisa: We made face to face interview and survey with Melisa. We received very similar answers in both interviews. We did not find any important points. She supports the research in other general issues.

Deniz: His family spends money for him. He is motivated by this situation. The quotes which are about his family can encourage him to study.

Duygu: She studies difficult courses regularly. She does not study easy courses during the exam term. She starts to study her exams before 2 weeks. She makes realistic study schedules. If she does not follow her study schedule, she becomes demoralized. She gets motivated when her scores increase. She motivates herself with successful people's quotes.

Ezgi: She studies intensively before 2 weeks of her exam term, just as she continues studying with a standard study schedule which is weekly or monthly during the whole term. Her future study schedules and sometimes some pictures increase her motivation.

No Name: She does not make any study schedule because she does not follow her study schedules. She feels very sad if she does not follow her study schedules. She does not like studying. For this reason, the application should not say "You must study" and, should use smooth words. When her exam is bad, she says "I wish, I had studied harder."

Sercan: He starts to study one week before the exam and creates a study schedule according to his exam dates. He does not follow his study schedule because he works for a job and has a health problem.

Uğur: He does not have any standard study schedule. He motivates himself by talking with his mother.

Gizem: She starts to study before 1 or 2 days of her exam dates. If she does not like a course, she does not study for it, either. She studies her favourite courses and the others ones are not important for her. She wants to pass all the courses that she dislikes even their scores are 'DD'.

Gözde: She does not use her time usefully. She starts to study 1 or 2 days before the exam dates.