SmallEducator

Martijn Thörig

Version: 0.12

Table 1 Change log

Date	Version	Author	Description
20/10/2018	0.1	Martijn	Setup of document and first requirements.
22/10/2018	0.11	Martijn	1.1 Worked on Vision The SmallEducator comes from a need to be able to let students learn by themselves and to keep content up-to-date against minimum cost in a Flipping the Classroom environment (SmallEducator can also be used in a different educational process then Flipping). This is especially important for the part-time students at the University of applied science of Amsterdam, HvA. The SmallEducator is a tool for student, mentor and teacher. The students use it to get an introduction to theory or practical content. The student's mentor will be informed if particular criteria are met. The teacher uses SmallEducator for monitoring the progress and participation of the student during a course and can act based on the progress and participation of the student. 1.1.1 Context In this section the current situation will be described and the

			weaknesses of the current working situation are pointed out. Students at the HvA will be either doing their students as full-time of part-time students. The same curriculum is given to both types of students. There is a difference how the much face-time (lectures on site or lab sessions) the students receive. Part-timers only have 2 hours per week of face-time, where full-time students have 4 or more hours per week of face-time. This prompt a few challenges for the teachers at the hvA. One of these challenges is how time is divided between giving a lecture and lab sessions. The current situation for the higher years if to receive only 2 to 3 weeks of lectures and the last 4 to 5 weeks of feedback/lab sessions. This results in a lot of work for the students to finish the lab assignment at the end of the course. The current situation makes monitoring the progress of the students and the process of learning also hard. Lab assignments can be cut up in weekly assignments. VLO and

			Moodle can register when students submit assignments. This is already being applied. So, the progressing can be measured during face-time, if there is time to do this at all. The learning process of the students isn't monitored at all. Without asking how, how long and when students do their homework, there aren't other ways to measure students learning activities. The possibility to differentiate between learning styles or to give face-time more meaning is hard because of the time constraints. Still, for the full-time students this should be possible. The distance between student and lecture depends on the type of student and teacher. Discord is being used by some teachers and students. This doesn't solve problems for all students. Students can experience Discord not as a save place to ask questions. Discord and tools like Discord make it hard to distillate which questions already been ask. Students can always email teachers. Part-time students will email the teacher with

			questions. This results in a FAQ history within the different email boxes of the teachers. Of course, the teachers can compile their own FAQ from all sources. ### 1.1.2 Alternatives There are a few alternatives for SmallEducator. In this section the pros and cons of the alternatives will be discussed. #### *1.1.2.1 Video* The alternative for SmallEducator is an online movie and an assignment that must be handed in before the next workshop - or lab session. SmallEducator can be one or the other or both. An online movie must have a player and should be hosted online. Depending on the player, the movie can or cannot be viewed offline. The client of SmallEducator can be used offline. That makes SmallEducator different from the alternative of a movie. The biggest difference is the ease the SmallEducator content can be changed, specially if there are not recordings or voice-overs are used. The good thing about a video is how well the students can skip to different parts of the video.

			Example: the course 'Learning Angular'. Great content, but out-of-date. The bootstrap is based on an older version. Points: if voice-overs and/or videos of a person are used, to this only for the parts that don't changes for the upcoming years. Videos and voice-overs do make the content more personal. Students must be able to skip to different parts in the SmallEducator client. *1.1.2.2 Powerpoint* Another alternative is the Powerpoint presentation. The content of both can be changed very easily and both can be viewed offline. Still the Powerpoint doesn't prompt questions and the distance between teacher and student is bigger then the distance when SmallEducator is used. Students can ask questions at any time using the client during a viewing without leaving the client. The content of the SmallEducator can be enriched with questions. Another difference is the statistics pulled from the client of SmallEducator into the teacher's part of SmallEducator. These statistics are used to

			analyze the learning behavior of the students. Points: do give introductions about content to the students, so the students can view it when the student feel like it. Doing this without obligation and monitoring will make applying flipping the classroom harder. ### 1.1.3 Inspiration There are different sources of inspiration for making SmallEducator. These will be discussed in the following sections. #### *1.1.3.1 Nintendo Labo* Nintendo Labo is a big the inspiration for SmallEducator. All Nintendo Labo sets come with an instruction for building the cardboard toys. This interaction is really simple and fun. After building the toys there are videos on the working of each toy. The last step is to create other toys based on the new knowledge. The first two steps can be performed by kids from the age of 10 years old. Creating new toys depends on the creativity of the child, but price winning toys were created by young adults. After step 1 there is choice to play around with the toys

			in a sandbox or minigames. Educators can learn a lot from Nintendo Labo: How to communicate, when to communicate and what is communicated. *1.1.3.2 Learning Angular* This is a really good online course about Angular. The examples are clear and the creator knows his strongpoints and weaknesses. Still, the content is based on an older version of Angular and Bootstrap. So, this course has the weaknesses pointed out in 2.1.2.1 Video. Student client, Teachers' backend en Future improvements.
25/10/2018	0.12	Martijn	Add vision.
28/10/2018	0.13	Martijn	Worked on the vision and How to use SmallEducator

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2 Introduction

This document is your starting point for the case study of Architecture and Design. Your assignment is to create a back end and improve the given client in 3 sprints. There is also an extra document about flipping the class room. Please also read this document together with this one.

The client, the Unit project, can be downloaded from https://gitlab.fdmci.hva.nl/thomj/smalleducator/ Don't commit to this repo or break this repo. If you break this or your repo during AaD, you will have to fix it yourself. If you don't know how Git works, please read the following online book: https://git-scm.com/book/en/v2

Good luck and make the best software you can!

3 What is SmallEducator

This chapter will introduce the vision and the different parts of SmallEducator. First the vision will be given, then the client for the students will be discussed then the teachers' part. There is also an administrator client. This part will not be discussed here.

3.1 Vision

The SmallEducator comes from a need to be able to let students learn by themselves and to keep content up-to-date against minimum cost in a Flipping the Classroom environment (SmallEducator can also be used in a different educational process then Flipping). This is especially important for the part-time students at the University of applied science of Amsterdam, HvA.

The SmallEducator is a tool for student, mentor and teacher. The students use it to get an introduction to theory or practical content. The student's mentor will be informed if particular criteria are met. The teacher uses SmallEducator for monitoring the progress and participation of the student during a course and can act based on the progress and participation of the student.

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One of these challenges is how time is divided between giving a lecture and lab sessions. The current situation for the higher years if to receive only 2 to 3 weeks of lectures and the last 4 to 5 weeks of feedback/lab sessions. This results in a lot of work for the students to finish the lab assignment at the end of the course.

The current situation makes monitoring the progress of the students and the process of learning also hard. Lab assignments can be cut up in weekly assignments. VLO and Moodle can register when students submit assignments. This is already being applied. So, the progressing can be measured during face-time, if there is time to do this at all. The learning process of the students isn't monitored at all. Without asking how, how long and when students do their homework, there aren't other ways to measure students learning activities.

The possibility to differentiate between learning styles or to give face-time more meaning is hard because of the time constraints. Still, for the full-time students this should be possible.

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There are a few alternatives for SmallEducator. In this section the pros and cons of the alternatives will be discussed.

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The good thing about a video is how well the students can skip to different parts of the video.

Example: the course 'Learning Angular'. Great content, but out-of-date. The bootstrap is based on an older version.

Points: if voice-overs and/or videos of a person are used, to this only for the parts that don't changes for the upcoming years. Videos and voice-overs do make the content more personal. Students must be able to skip to different parts in the SmallEducator client.

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Another alternative is the Powerpoint presentation. The content of both can be changed very easily and both can be viewed offline. Still the Powerpoint doesn't prompt questions and the distance between teacher and student is bigger then the distance when SmallEducator is used. Students can ask questions at any time using the client during a viewing without leaving the client. The content of the SmallEducator can be enriched with questions. Another difference is the statistics pulled from the client of SmallEducator into the teacher's part of SmallEducator. These statistics are used to analyze the learning behavior of the students.

Points: do give introductions about content to the students, so the students can view it when the student feel like it. Doing this without obligation and monitoring will make applying flipping the classroom harder.

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3.1.3.1 Nintendo Labo

Nintendo Labo[1] is a big the inspiration for SmallEducator. All Nintendo Labo sets come with an instruction for building the cardboard toys. This interaction is really simple and fun. After building the toys there are videos on the working of each toy. The last step is to create other toys based on the new knowledge. The first two steps can be performed by kids from the age of 10 years old. Creating new toys depends on the creativity of the child, but price winning toys were created by young adults. After step 1 there is choice to play around with the toys in a sandbox or minigames.

Educators can learn a lot from Nintendo Labo: How to communicate, when to communicate and what is communicated.

3.1.3.2 Learning Angular

This is a really good online course about Angular. The examples are clear and the creator knows his strongpoints and weaknesses. Still, the content is based on an older version of Angular and Bootstrap. So, this course has the weaknesses pointed out in 2.1.2.1 Video.

[1] Labo.nintendo.com

3.2 Student client

The student part of the SmallEducator is a client which will run on PC, Mac, Web and mobile (web and mobile are nice to haves). The client should not be a hurdle to take, but easy to use. This section will only describe the first version of the client.

The student logins with codes which are send to the students by SmallEducator after the teacher registered the student. The codes are 10-digit numbers. The lesson is shown after the code is used and verified by the system. A lesson is like an interactive presentation. The information is shown, question can be asked during the presentation. The student can also send questions to the teacher during the presentation.

The first version of the client holds all assets for the content. So, nothing needs to be downloaded and the client isn't depended on resources shared on the internet. The client is depended on an internet connection. The client with the lesson must be distributed via another support system of the school or university.

3.3 Teachers' backend

The first version of teachers' backend is divided into 3 parts. Each part will be discussed in the following sections.

The teachers' backend is secured with a combination of username and password, or token, but always with a Google Authenticator step.

3.3.1 Course management

To manage each course that uses SmallEducator the teacher can create a new course or remove an old course in the course management part. The course management is also for register students to a course. A teacher has to register students to courses. The mentors of a student can also be registered.

The GUI should be like Moodle. If you know Moodle, then setting up a course for SmallEducator will be very familiar.

If the course is set up, the students can get their codes for the clients per lesson. The teacher must explicitly send these codes to the students.

3.3.2 Course lessons

Each course is split up into lessons, these are linked to the clients of the course. Per lesson the teacher will see how the students performed. Performance is split up per student by the following values:

1. Activity (when the student's client was active)
2. Given answers (with the indication if an answer is correct, and if it is a debatable question the option to give feedback)

3.3.3 Questions section

During each week or session students can send questions about the content of the course/lesson. These questions will be displayed in this section of the teacher backend. The teacher can also answer the questions from this section.

3.4 Future improvements

Here is a list of all future improvements:

1. Assets loading from the web by the client
    a. assets are downloaded from the backend
    b. assets are caches by the client
2. Custom playlist per week/session can be loaded by the client
3. Playlist builder for the teacher backend
4. Mobile version of the client
5. Web version of the client
6. LDAP log-in for teachers' backend in combination with Google Authenticator
7. Let students make enriched content presentations for the SmallEducator as an assignment.

4 How to use SmallEducator

SmallEducator is a tool for students, mentors of students and teachers in a flipping the classroom approach. This chapter will go into detail about the learning environment SmallEducator is used in and how the users use SmallEducator.

4.1 Flipping the classroom

This section will not go into details about what the flipped classroom model is, but rather what the weaknesses[2][3] are of the model. Understanding the weaknesses of the model will help with applying SmallEducator to counter these weaknesses here it can. SmallEducator is not the silver bullet for all problems.

4.1.1 Manage students' expectations

Most students are used to a teacher-centered approach. SmallEducator will not solve a wrong management of expectations of students about the model used for the course. This is a problem that must be tackled by the teachers.

4.1.2 Manage students' engagement outside the class

If the students are not using SmallEducator during their outside activities, then the teacher and mentor can be notified. For example:

during week 2 the students must view an introduction to a topic, and during this introduction a few questions must be answered by the students. If the students don't view this introduction, then no answered are submitted. SmallEducator will record if the students engage with SmallEducator and all answers are also recorded.

After the deadline for viewing the introduction, the teacher and mentor can react according to the engagement of students.

4.1.3 Manage class participation of students

The input from SmallEducator generated by the students' engagement outside the class should be considered when preparing the class session by the teacher. The class sessions should suite the needs of the students. So, if the preparation of the students is little to nothing that means the teacher should handle these students different during class then when students do prepare as excepted.

4.1.4 Manage distance during instruction

The instruction takes place outside the classroom, but during the instruction the students will have questions about the content. SmallEducator will also give the students the options to send questions to the teachers during the instruction.

How and when the questions are handled is up to the teachers.

4.2 Student

Student

Invloed op tempo van het afspelen. Skippen van delen en wanneer.

[2] https://www.rug.nl/e-learning/projecten/flipped-classroom/pro_s-and-cons
[3] https://www.onderwijsvanmorgen.nl/flipping-the-classroom-6-voor-en-nadelen/

4.3 Teacher

SAMR

TPACK

Animoto