Amsterdam University of Applied Sciences

HBO-ICT

StudyGotchi - Tamagotchi-like game-mechanics to motivate students during a programming course

1. Introduction

To learn a programming language, it is crucial to practice daily and get feedback. Earlier research has found that:

- A large share of students **do not finish their parctical assignments**. As a result, students receive no feedback on their practical assignments.
- A large share of students have a **low-class attendance.**
- Active participation is a **good predictor** for the final grade.

For this research, a StudyGotchi game-mechanics were developed inspired by the popular Tamagotchi game in the nineties to motivate the students to finish their assignments and attend their classes.

2. Theory

Games connect well to the interests and the world of the student. Motivation is defined according to the Self-Determination Theory. Three psychological needs: **Autonomy**, **Competence**, **Relatedness.** Gamification elements have effects on the psychological needs.
Tamagotchi-like game-mechanics motivate players to keep the avatar happy because the mechanics promote a sense of reality to the students.

2. Research questions

- What is the effect of the StudyGotchi on the online activities of students and their presence in the classroom?
- What is the effect of the StudyGotchi on the passing rate and obtained grades of the students participating in the Java programming course?
- What lessons can be learned from deploying the StudyGotchi app?

3. Design

- Randomized Controlled Trial.
- A/B testing two variants of the StudyGotchi app.
- Control group: A-version only 'presence in the classroom' registration function 180 students.
- Experimental group: B-version presence registration and game function
- 10 weeks Java programming course 194 students.

Figure 1 Research design of StudyGotchi app

3. Intervention

- A mobile game-based virtual lecturer.
- The student must keep the virtual teacher happy by attending lectures, making online quizzes and by completing assignments.
- Virtual teacher reacts when students work on the course assignments and attend the classroom.
- The game is linked to the schools Digital Learning Environment (Moodle).
- Students get weekly **push notifications** to engage them with the StudyGotchi app.

Figure 2 Happy and sad lecturer

Figure 3 Game score and push message

The StudyGotchi system consists of four parts:

1. Moodle LMS for the quizzes and practical assignment.
2. QR scanning for classroom presence.
3. Backend program where all the data is collected, the game score calculated, the message generated and pushed to the app.
4. The mobile app where the 'virtual lecturer' lives and the game score is depicted based on the game score received from the backend.
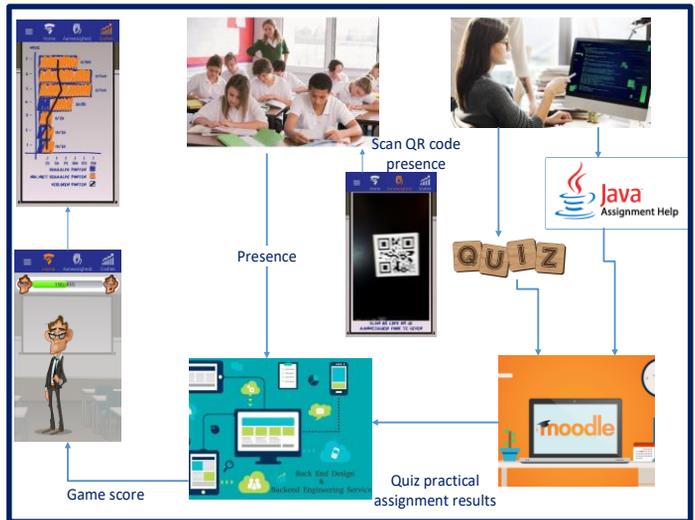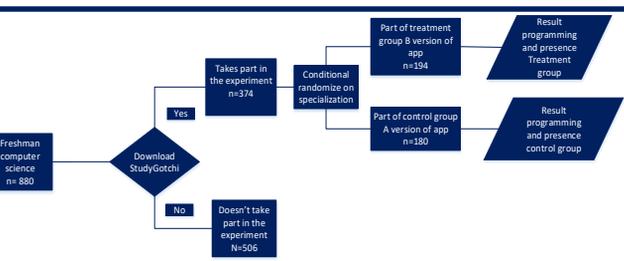

Figure 4 StudyGotchi system

5. Results

The results show:
- The online behaviour and outcomes of the students showed no significant difference between the control and the treatment group.

Why did the app not increase the motivation of the students?
- The fun factor of the game was not appreciated enough.
- The interactivity with the avatar and personal attachment towards the avatar were insufficient.
- For students it was unclear what the exact perceived usefulness of the app would be.
- No rewards were given in the app, hence the desired behavior was not evoked.

Jan Hellings: j.f.hellings@hva.nl Pieter Leek: p.d.leek@hva.nl; Bert Bredeweg: b.bredeweg@hva.nl