Keeping Students Occupied with the Course Contents After Leaving the Classroom

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ABSTRACT

Keeping students engaged with the course contents between classes is challenging. Although out-of-class activities are used to address this challenge, they have limited impacts on improving student's engagement outside the classroom because of the lack of real-time feedback and progress updates. For this reason, these types of activities are less appealing to the current generation of students who feel the pull of instant gratification more intensely. This paper presents a mobile learning system, named Dysgu, which enables students to work on their out-of-class activities, compare their progress with the rest of the class, and improve their self-efficacy. The goal of Dysgu is to better engage students with out-of-class activities and reduce procrastination in those activities. By using Dysgu, faculty can facilitate and monitor learning even after the students leave the classroom and intervene early when students fall behind their peers.

CCS CONCEPTS

• Social and professional topics ~ Computer science education

KEYWORDS

Mobile learning, Homework, Personalization, Learning path.

1 Introduction

It is widely acknowledged that [1] freshman students are not as prepared for college work as their predecessors. The lack of preparation is exacerbated by the lack of study outside the classroom. A possible reason for the lack of study outside the class is that students are working increasing hours on jobs. Working more hours inevitably leads to students spending less time studying outside the class, which has detrimental effects on student's learning. Therefore, it is critical to develop methods that

will ensure effective usage of the time that the students have for studying outside the classroom in such socio-economic situations.

Out-of-class activities are an integral part of a traditional face-to-face classroom. However, in recent years, such activities have been scrutinized [2] because of the lack of consideration for the individual learner's needs, learning styles, personal situations and aspirations, and motivation. Although online courses attempts to provide such personalization, the lack of interaction between faculty and students in a purely online environment makes it difficult to keep the students engaged outside the classroom. Therefore, a more blended approach where face-to-face teaching is supplemented with personalized and interactive activities outside the classroom has the potential to improve student learning and engagement. Dysgu [3] enables students to attempt out-of-class activities anytime and anywhere, allowing faculty to guide student's knowledge acquisition well after they leave the classroom. Dysgu enables faculty to create interactive out-of-class activities that are delivered in a structured way to facilitate greater student engagement, better practice of learned concepts, and improved student engagement outside the classroom.

2 Properties of Dysgu

Dysgu is designed as a cloud-based software where students use the mobile-based client and faculty uses the desktop-based off-line server to interact with the system. Dysgu is different than similar systems by its ability to provide instructional scaffolding using learning paths, its mode of interaction, support for different types of activities, use of mobile platform, enabling notification and personalization, and its ability to offer students ways to compare their own progress with the rest of the class in a real-time basis. Major properties of Dysgu are:

a. **Instructional scaffolding and learning path**: Dysgu organize exercises into learning paths (Figure 1). Exercises within a learning path have a different degree of difficulties which gradually increases to support instructional scaffolding. Moreover, some paths are used to practice, some to grade, and some to challenge the students.

b. **Interactive exercise**: Interactive exercise allow students to interact with a visual representation of the problem by selecting or touching different components of that visualization. An interactive activity is not tied to any single problem or exercise and it is auto-graded. It can be populated with any new problem. Therefore, faculty can utilize one such
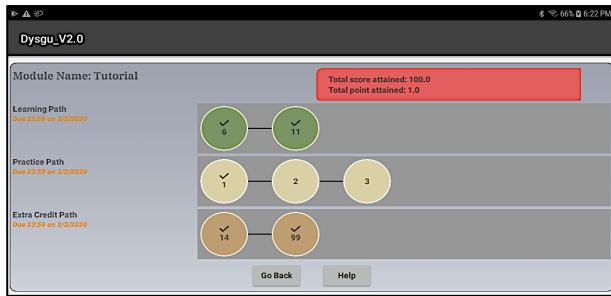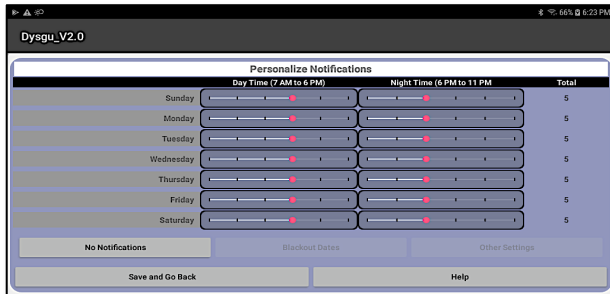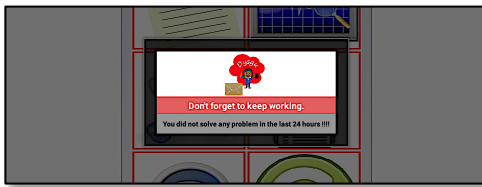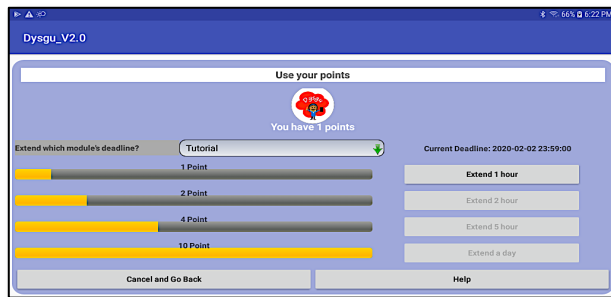
Figure 1. Learning paths in Dysgu.


(a)

(b)

(c)

Figure 2. Notification and personalization.

activity to test students with the same problem with different degree of difficulties. These activities can be developed by anyone and used with Dysgu following published APIs.

c. **Personalization and notification**: Depending on the student-set schedule (Figure 2(a)), Dysgu reminds (Figure 2(b)) the students of the out-of-class activities through encouraging, cautioning, or neutral notifications. Dysgu can recognize (depending on the privacy settings) the geophysical location of the student's device and provides customized and contextual alerts to the students. Students can also modify the deadline (Figure 2(c)) by using points, which they accrue by attempting extra credit problems.

d. **Progress update and self-comparison**: Dysgu provides aggregate and statistical information about peers without disclosing individual grades to follow federal privacy laws (Figure 3 (a)). Furthermore, it presents a progress indicator for a student in comparison to the rest of the class. As students continue solving problems, they earn badges depending on different criteria and they can see everyone else's and can compare their performance relative to the rest of the class (Figure 3(b)). By providing such information about peers the expectation is to promote a self-fulfilling prophecy.

e. **Easy to use**: Dysgu uses a workflow-based approach to give faculty an intuitive step-oriented process to use the software. A workflow comprises of a sequence of steps through which the faculty is guided to reduce the workload.
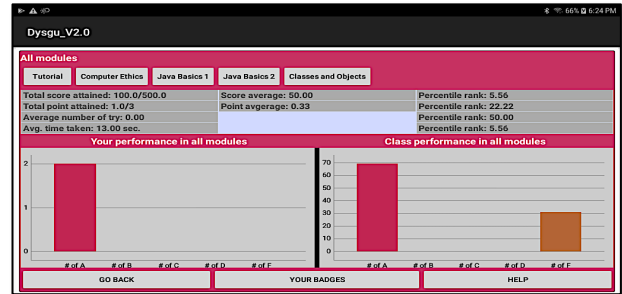
(a)
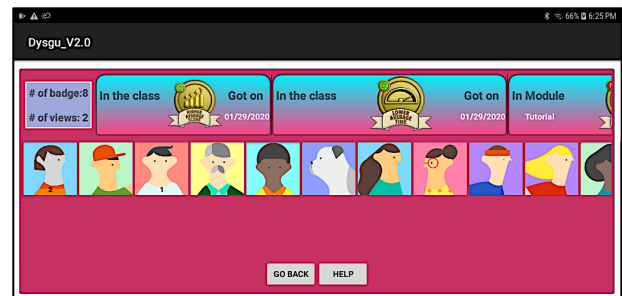
(b)

Figure 3. Progress and self-comparison.

3 Conclusions

This paper presents a new mobile-based out-of-class learning environment called Dysgu, which aims to increase student motivation and engagement by providing students with interactive exercise having instructional scaffolding and by allowing the students to self-reflect on their performance. Dysgu is being used in three separate classes in two different universities and intial data show that students like the experience and that they are more engaged in out-of-class activities.

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