

Encouraging Online Student Reading with Social Visualization Support

Julio Guerra, Denis Parra, Peter Brusilovsky

School of Information Sciences
University of Pittsburgh
130 N Bellefield Ave, Pittsburgh, PA, 15260, USA
{jdg60,dap89,peterb}@pitt.edu

Abstract. In this paper, we describe ReadingCircle, a system designed to explore an alternative approach to encouraging reading among students. It is based on recent research on open student modeling, social comparison and social visualization. The idea of this approach is to develop social visualization of students' reading progress. The visualization will reveal such reading progress through several levels (from chapters to sections to pages) and allow students to visually compare their progress with both the class as a whole and individual peers.

Keywords. elearning, online reading, social visualization, social comparison, open student model

1 Introduction

Almost every college course requires students to complete weekly readings from course textbooks or other course materials, an effort critical to the students' success in the course. However, it is not easy for an instructor to determine whether or not the students have in fact completed the assigned readings. To combat this trend, instructors have to implement various approaches to encourage student reading and to ensure that reading assignments are completed. In smaller classes, these approaches could be both creative and efficient – such as group discussions. In larger classes, however, instructors find it difficult to assess the students' progress on the readings in an efficient way. Contemporary approaches such as randomly surveying students in class or administering pop-quizzes are neither creative nor efficient. Also, reading assignments produce no artifacts to grade by. As a result, the students frequently are not motivated to complete the reading assignments.

In this paper, we describe *ReadingCircle*, an alternative approach to encouraging student reading that is based on our recent research combining open student modeling, social comparison and social visualization [1]. The premise of this approach is to engage social visualization of student reading progress as a barometer of progress. The visualization exhibits progress on several levels (from chapters to sections to pages), and allows the students to visually compare their progress with both the class

as a whole and individual peers. We expect that social progress visualization will improve student awareness of readings left to do and class progress; the ultimate goal is to encourage students to do more readings. This paper presents our motivation for designing and creating this social reading application.

2 Related Work

Social Comparison. According to social comparison theory [7], people tend to compare their achievements and performance with others who are similar to them in some way. Earlier social comparison studies [11] demonstrated that students were inclined to select the more challenging tasks because of being exposed to social comparison conditions. Later studies showed that social comparison decreases social loafing and increases productivity by reinforcing good behavior through a graphical feedback tool [9]. A synthesis review of social comparison studies' summarized that applying social comparison in the classroom often leads to better student performance [8].

Social Visualization in E-Learning. The visual approach is a common technique to represent or organize data about multiple students in an informative way. For instance, social navigation, which is a set of methods for organizing users' explicit and implicit feedback to support information navigation [5], leverages the social phenomenon where people tend to follow the "footprints" of other people [2]. The educational value of social navigation have been confirmed in several studies [3, 6]

It is common to provide learners with the average values of the group model through social visualization in E-Learning; such as the average knowledge of the group on a given topic. Vassileva and Sun [10] investigated community visualization in online communities. They opined that social visualization increases social interaction among students, encourages competition, and offers students the opportunity to build trust in others and in the group. Bull & Britland [4] showed that releasing the models to their peers increases the discussion among students and encourages them to start working with learning content sooner.

In our prior work [1] we combined social visualization with open student modeling visualization to provide students with a holistic and easy-to-grasp view of their progress on answering java programming questions, and at the same time, allowing them to compare their progress with that of other students in the class. Our classroom studies demonstrated that the social visualization interface provided a remarkable increase in student work with problems. It also demonstrated that a circular design provides a better approach than a tree map to show progress over hierarchically structured content. This paper extends this work and presents a *social progress visualization interface to support online reading*. This interface takes advantage of some of the successful design ideas from our previous projects, and aims to work with a very different type of content. We expect that the new interface will provide clear guidance to the students to manage their reading process and to significantly increase their motivation to read.

3 The ReadingCircle Interface

The main challenge in our social reading interface design was to combine a simple social progress visualization of student progress over a flat list of topics (our past interface works with topics in Java) with a more complicated and hierarchical structure of student reading assignments. In addition, we wanted to employ the visualization not only as a social comparison tool, but also as a social navigation tool that provides orientation support and navigation support for a large body of assigned readings.

In light of these goals, the ReadingCircle system interface is divided into a social navigation component and a reading element as can be seen in Figure 1. The reading part on the right shows the current reading material and allows the student to make annotations and see annotations from peers. The social navigation component on the left aims to present visually the open student and peer models. The visualization of the student model (the top right part in Figure 1) is also the main content navigation control. We chose this circular shape approach because it requires less space to show the whole (hierarchical) content structure.



Figure 1. The ReadingCircle interface. The left part shows the student model (top) and peer models (bottom). The material is shown on the right side. A small portion of the user model is magnified at top center.

The circular shaped model presents the content structure of a course, organized clockwise, of 13 lectures. Each lecture consisted of one or more readings which can be chapters or sections from several books used in the course. Following the hierarchical structure of the reading (for example, a chapter has sections, and sections has subsections), the sector in the visualization corresponding to the reading is "opened" to reveal the fine-grained content. The top center rectangle in Figure 1 presents a closer view of the third lecture (lecture 3). By clicking in each sector, the student is presented with a menu of the related content displayed in the right side. The color of the sections indicates the progress on a scale ranging from red (not seen) to green (completed). The progress is computed by aggregating the evidence of the user reading each terminal subsection to upper level subsections, chapter and lectures. We track the individual page loads (i.e. the individual pages of each reading), and the

actions (clicks, annotations) of the user in the reader interface. The bottom part of the left side in Figure 1 presents 3 tabs: Peer Comparison, Self Comparison and Index Plain Text. The Peer Comparison tab shows thumbnail models of three peers. The models display only the lecture level. The Self-Comparison tab is similar and shows three previous models of the current student (over the past 3 weeks). We aim to explore the effect of self-comparison as we study peer comparison.

The social reading interface presented above is currently going through a classroom study in a large graduate class. Using log analysis and questionnaires, we hope to assess the impact of, and the student attitude towards, the tool.

4 References

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