

AN OPEN LEARNER MODEL USED BY TEACHERS TO MONITOR SPEED READING LEARNERS

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ABSTRACT

The benefits of Open Learner Model for learners have been widely demonstrated: supporting learning and metacognition, facilitating self-monitoring and planning, improving self-assessment skills... In this paper, we investigate the benefits of using an OLM for teachers. We present Hizligo, a speed reading application and the LEA's Box OLM, a competency-based OLM intended for both teachers and learners. They have been linked in order build in learner models composed of 50 competencies relative to speed reading that the level is calculated based on the outcomes of activities performed in Hizligo. 10 teachers have been using the OLM in order to monitor their class in the context of a 12 day intensive course using the speed reading application Hizligo and involving 87 students. The OLM have been regularly used by teachers, using different visualisations, mainly in the aim to identify the strengths and weakness of both their class and their individual students. Teachers found the OLM easy to use and to understand and helpful for their teaching.

CCS Concepts

• **Human-centered computing** → **Human computer interaction (HCI)**; user model, user studies
→ **Visualization**; Visual analytics; Visualization systems and tools • **Applied Computing** → **Education**;
Interactive learning environments.

KEYWORDS

Open learner model, learning analytics, teaching analytics.

1 INTRODUCTION

An Open Learner Model (OLM) is a learner model that is accessible to a user, in an understandable way [2]. The aims to make the model accessible to learners are to support learning and cognition, and to facilitate self-monitoring and planning [4]. OLMs can also be useful as well for other stakeholders of learning, like teachers and parents, in order to help them help learners and facilitate learners monitoring [8; 10]. Access the learner model can help teachers to identify learners' strengths and difficulties and to plan and adapt their teaching [11]. Thus, several OLM are intended for both teachers and learners (e.g. [12;7]), some OLMs offer different visualisations for learners and teachers (e.g. [5]), especially in the cases where the learners are children (e.g. [6]). However, in these OLMs the model cannot be built from data coming from an external data source, with a competency-based approach.

In this paper, we investigate the benefits for teachers to use a competency-based OLM, in the context of a speed reading course. First, we introduce Hizligo, a speed reading application and the LEA's Box OLM, a competency-based OLM intended for both teachers and learners. Then, we present how the OLM have been used in the context of a 12 day intensive course with Hizligo, involving 10 teachers and 87 students.

2 HIZLIGO SPEED READING APPLICATION

Hızlıgo (www.hizligo.com) is an online application intended to help learners to improve their speed reading competencies during a 12 day intensive course. Hızlıgo provides learners with 20 types of activities (see Fig. 2), like ‘letter counting’ where the learner has to count the number of occurrence of a character in a character cloud and ‘picture text’ where the learner has to recognise a picture briefly shown. Several measures can be used to calculate the scores of an activity, like the proportion of good answers, the number of answers and the speed to answers. Hızlıgo recommends a sequence of activities for every day of the course, but the learners can also access the activities independently. Using Hızlıgo, learners and teachers can visualise statistics regarding the completion rate of the course and the activity scores (see Fig. 2), however, it do not provided information with a competency-based approach.

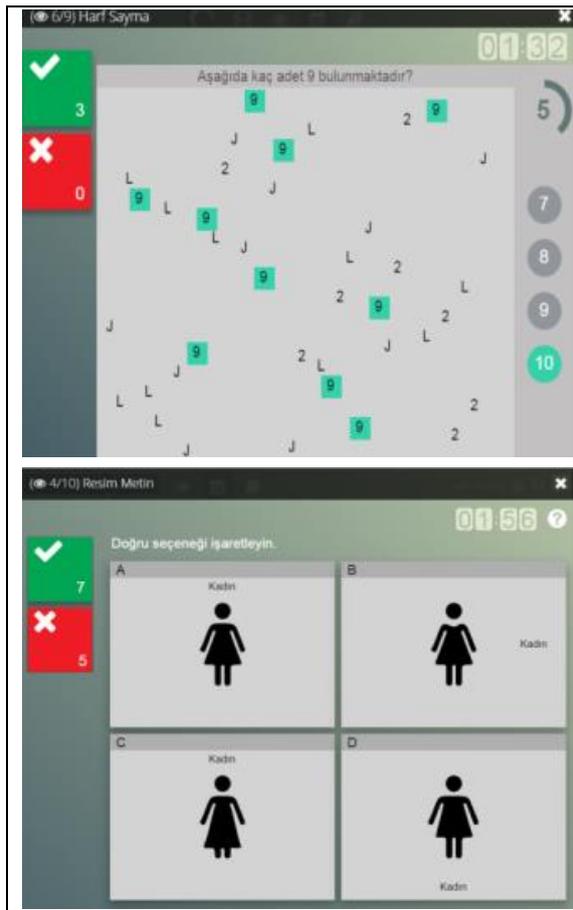


Fig. 1. Hızlıgo: letter counting and picture text activities.



Fig. 2. Hızlıgo: statistics.

3 LEA'S BOX PERSUADABLE OPEN LEARNER MODEL

The LEA's BOX OLM is a competency-based open learner model that provides teachers and learners with 12 visualisations [3], from the most simple like skill meters (Fig. 4) to more complex multidimensional visualisations like across time (Fig. 5) and heatmap (Fig. 6). They can be used to visualise different information: groups' overall level, students' overall level, the level of one or several students or groups for each competency in the model, and the data coming from activities or information sources.

In the simple example of Fig. 3, the teacher monitors 4 students coming from 2 groups. In the 'Groups/Students' part of the interface, we notice that the average level of group 9/A is a little stronger than group 9/A. The empty skill meters means that the OLM has no evidence of the level of this student, i.e. the student has not yet performed any activities linked to the OLM. In the 'Competencies' part of the interface', we see the average level of the students for the competency 'Focusing' and its 4 sub-competencies. In the 'activities' part of the interface, we notice that in average, the students had better scores from the activity 'Letter counting' than from 'Picture Text' and 'Word hunt'. Using the filters (see left part of Fig. 3), it is possible to visualise a sub-set of the information available in the OLM. For instance, the teacher can use the filters to see only the information relative to one student in order to identify his/her weakest and strongest competencies [4].

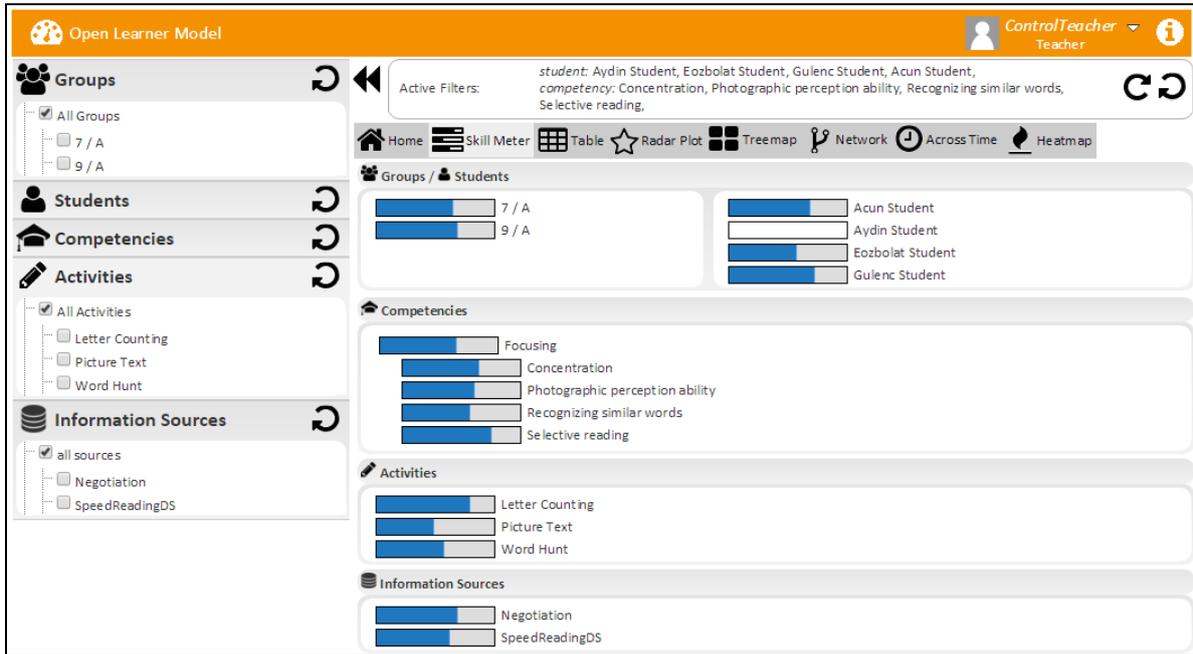


Fig. 3. LEA's Box OLM: teacher interface

Very Weak	Weak	OK	Strong	Very Strong	
		●			Improving Eye Muscles
			●		Flexibility
●					Seeing a wider area
			●		Focusing
				●	Concentration
	●				Photographic perception ability
	●				Recognizing similar words
				●	Selective reading

Fig. 4. Visualisation of the competencies using Table.

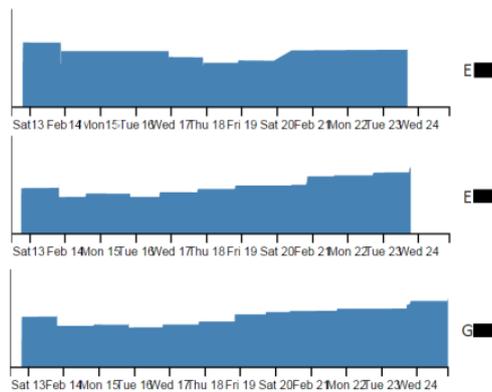


Fig. 5. Visualisation of the evolution of the students' models across time.

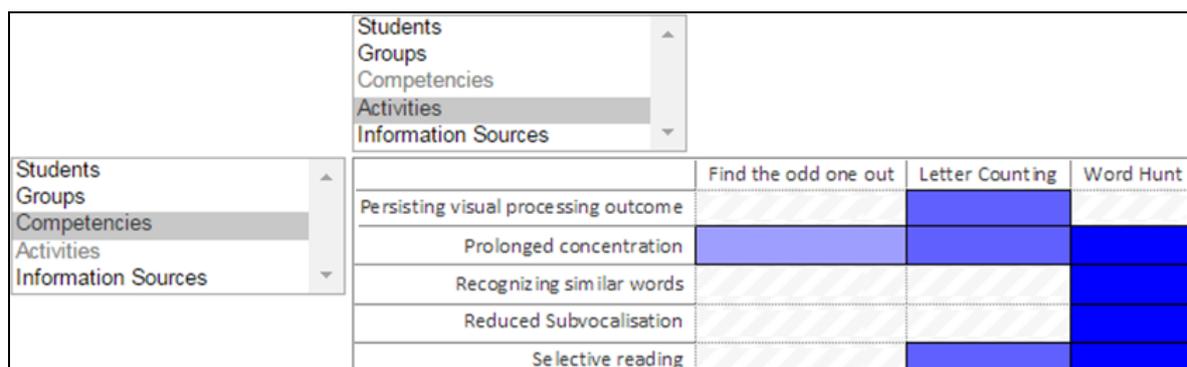


Fig. 6. LEA's Box OLM heatmap visualisation: link between activities (horizontally) and competencies (vertical). The darker is a case, the stronger are the evidence coming from the corresponding activity for the corresponding competency.

4 EVALUATION

In the context of a 12 day intensive speed reading course in Turkey, 87 secondary-school students from grade 7 to 11 have been using Hızlıgo. They have been encouraged to use Hızlıgo daily, on the base of 30 minutes per day.

Teachers have defined in the LEA's Box OLM 50 competencies and sub-competencies related to the speed reading and divided into 5 area (improving eye muscles, seeing rapidly, focusing, reading and reading and understanding), that have then been linked to the activities provided by Hızlıgo. Every time a learner performs an activity in Hızlıgo, the outcome, using several measures, is sent to the OLM as a piece of evidence for each competencies linked to this activity.

In order to monitor their students' engagement in the course and the evolution of their competencies, their 10 teachers had the possibility to use the LEA's Box OLM. Students also had the possibility to use the OLM for self-monitoring. In this section, we focus on how the OLM has been used by teachers.

4.1 Participants, Materials and Methods

The 10 teachers came from a same school in Turkey, 1 teacher had a class of grade 7, 4 teachers had a class of grade 9, 4 teachers had a class of grade 10 and 1 teacher had a class of grade 11. At the beginning of the course, students and teachers have been introduced to Hızlıgo and the LEA's Box OLM. All usages have been logged. At the end of

the course, a questionnaire has been send to teachers about the OLM.

4.2 Results

The 87 students have performed an average of 61,76 activities in Hızlıgo (median=33, minimum=1, maximum=275). The usages of the OLM by the teachers are presented in Table 1. The 10 teachers have been using the OLM in an average 7,9 times during the course; a session of use of the OLM lasted in average 17 minutes. All teachers have been using several visualisations, 3 in average, but only two visualisations have been very regularly used: the across time (used in 86% of the OLM sessions) and skill meters visualisations (used in 56% of the OLM sessions). Teachers frequently used the filters, mainly to monitor a given students, in 33% of the OLM sessions.

Table 1. Use of the OLM by teachers.

	Average	Median	Range
Session of use of the OLM	7.9	5	2 - 29
Time per session (in min)	17	12	3 - 104
Number of visualisations used	3	2	1 - 10

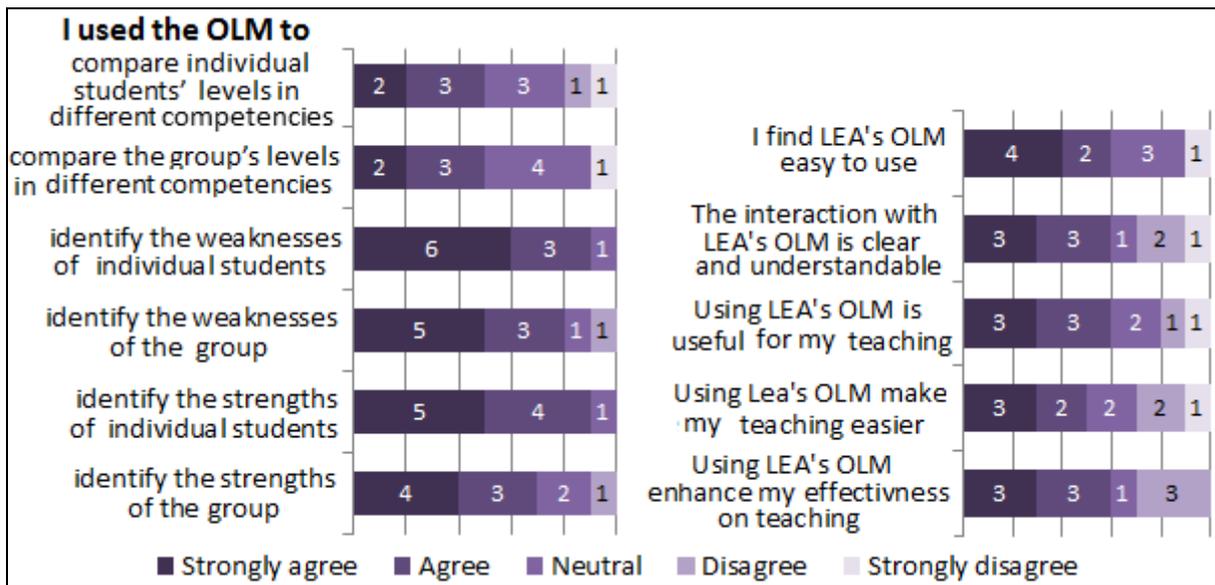


Fig. 7. Reasons to use the OLM, perceived ease of use and usefulness of LEA's OLM.

The teachers claimed several reasons to use the OLM (see left part of Fig. 7): 9 teachers used it to identify the weaknesses and strengths of individual students and of the group, 8 teachers used it to identify the weaknesses of the group and 7 teachers used it to identify the strengths of the group. 5 teachers also used the OLM to compare individual students' levels or the group's in different competencies. Most teachers found LEA's OLM easy to use and useful (see right part of Fig. 7): 6 teachers found it easy to use and found the interaction with the system clear and understandable, 5 teachers found it useful for their teaching and 6 teachers claimed that using LEA's OLM make their teaching easier and enhance their effectiveness. In their comments, teachers also claim an interest of in monitoring the students' engagement in the course and their regularity.

5 DISCUSSION AND CONCLUSION

Using the LEA's Box OLM, it has been possible to define a set of 50 competencies related to speed reading, and to link them to the activities provided by Hizlgo. Thus the learner models are built based on evidence coming from the scores to Hizlgo activities, using different measures. The OLM provided teachers with learning analytics that were not available in Hizlgo, in order to help them in their teaching. Although it was not the case in this first study, the LEA's Box OLM can gather information from different data sources, like several

online learning applications, teacher assessment and student self-assessment.

10 teachers have been using the LEA's Box OLM in order to monitor their class in the context of a 12 day intensive involving 87 secondary school students. The teachers have been using the OLM regularly during the course. They were particularly interested in using the across time visualisation in order to see the overall evolution of a student or a group, the evolution of the level of a competency and the evolution of the scores to an activity. Teachers were also interested in using the filters facility, in order to focus on one student or competency. Most of teachers found the LEA's Box OLM easy to use and to understand, and helpful for their teaching, notably to identify the strengths and weaknesses of their class as a group or of individual students.

These promising results show an Open Learner Model intended for teachers can be a powerful tool for teachers in order to help them in their teaching by providing relevant learning analytics in a suitable way. Teachers seem to be particularly interested in seeing an overview of their students' levels and their evolution across time, but there are also interested in focusing on one student or one competency.

6 ACKNOWLEDGMENTS

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