

Helping Teachers to Help Students by Using an Open Learner Model

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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. 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.

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. [7, 12]), 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 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, an online speed reading application, involving 10 teachers and 87 students.

2 LEA’s Box 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. 1) to more complex multidimensional visualisations like across time (Fig. 2). 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.

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. 1. Visualisation of the competencies using Table.

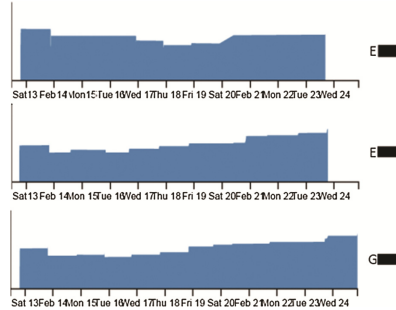


Fig. 2. Visualisation of the evolution of the students’ models across time.

3 Evaluation

Hızlıgo (www.hizligo.com) is an online application intended to help learners to improve their speed reading competencies using 20 types of activities. Using Hızlıgo, learners and teachers can visualise statistics regarding the completion rate of the course and the activity scores, however, it does not provided information with a competency-based approach.

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 min 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 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. 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 participants about the OLM. In this section, we focus on how the OLM has been used by teachers.

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 min. 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

In the final questionnaire, teachers claimed several reasons to use the OLM: 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: 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.

4 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 Hızlıgo. The OLM provided teachers with learning analytics that were not available in Hızlıgo, 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.

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References

1. Bull, S.: Negotiated learner Modelling to Maintain Today's Learner Models. *Research and Practice in Technology Enhanced Learning* (in press)
2. Bull, S., Kay, J.: Student models that invite the learner in: the SMILI() open learner modelling framework. *Int. J. Artif. Intell. Educ.* **17**, 89–120 (2007)
3. Bull, S., Ginon, B., Boscolo, C., Johnson, M.D.: Introduction of learning visualisations and metacognitive support in a persuadable open learner model. In: *Proceedings of Learning Analytics and Knowledge* (in press)
4. Bull, S., Kay, J.: Open learner models as drivers for metacognitive processes. In: Azevedo, R., Alevan, V. (eds.) *International Handbook of Metacognition and Learning Technologies*, vol. 28, pp. 349–365. Springer, New York (2013)
5. Bull, S., McEvoy, A.T., Reid, E.: Learner models to promote reflection in combined desktop PC/mobile intelligent learning environments. In: *Workshop on Learner Modelling for Reflection*, Sydney, pp. 199–208 (2003)
6. Bull, S., McKay, M.: An open learner model for children and teachers: inspecting knowledge level of individuals and peers. In: Lester, J.C., Vicari, R.M., Paraguaçu, F. (eds.) *ITS 2004. LNCS*, vol. 3220, pp. 646–655. Springer, Heidelberg (2004)
7. Ginon, B., Jean-Daubias, S.: *Models and tools to personalize activities on learners profiles*. Ed-Media, Portugal (2011)
8. Lee, S.J., Bull, S.: An open learner model to help parents help their children. *Technol. Instr. Cogn. Learn.* **6**(1), 29–51 (2008)
9. Siemens, G., Long, P.: Penetrating the fog: analytics in learning and education. *EDUCAUSE Rev.* **46**(5), 31–40 (2011)
10. Van Leeuwen, A.: Learning analytics to support teachers during synchronous CSCL: balancing between overview and overload. *J. Lear. Analytics* **2**(2), 138–162 (2015)
11. Vatrappu, R., Teplovs, C., Fujita, N., Bull, S.: Towards visual analytics for teachers' dynamic diagnostic pedagogical decision-making. In: *Proceedings of the 1st International Conference on Learning Analytics and Knowledge*, pp. 93–98. ACM (2011)
12. Zapata-Rivera, J.D., Greer, J.: Externalising learner modelling representations. In: *Proceedings of Workshop on External Representations of AIED: Multiple Forms and Multiple Roles*, pp. 71–76 (2001)