

Four principles for promoting learner agency within the design of learner dashboards (0352)

Liz Bennett¹, Sue Folley¹ ¹University of Huddersfield, United Kingdom

Introduction

Dashboards take data from a range of sources and present it in graphical form, so they provide students with feedback on their progress and engagement in learning activities such as attendance or clicks on the VLE or the number of library books borrowed. They may also provide students with predictions about their likely outcomes or give them a risk score alternatively they sometimes provide comparisons with others in the cohort or others who have similar trajectories. Their significance relates to their potential to affect students' self-esteem and hence their learning and is reflected in significant investment by many HEIs (Newland and Trueman 2017). The paper contrasts principles for the design of learner dashboards derived from the learning analytics literature with principles derived from a small scale study that examined students' perspectives.

Dashboards as technical tools

Bodily and Verbert's (2017) meta study found 93 papers that focussed on the design features of learner dashboards. From their analysis they proposed 9 categories of design principles which that they argue should guide the development of future learner dashboards. Table 1 identifies these 9 categories and the questions which they believe are important for dashboard developers to consider. These categories suggest that the literature view dashboards as technical tools in that they emphasise the function and features of the data and its visualisation (such as the ease of use of the dashboard, what types of data are used, how they appear). Indeed, dashboard development is typically owned by computer service departments (New Media Consortium, 2011, p. 28) and driven by a focus on the data, oriented around the possibilities of large datasets to reveal new information (Dyckhoff et al., 2013).

Question	Category
What is the intended goal of the system?	Goals
What visual techniques will best represent your data?	Visualisations
What types of data support your goal?	Information selection
What do students need?	Needs assessment
Is the system easy and intuitive to use?	Usability test
Why use the visual techniques you have chosen?	Visual Design
How do students perceive reporting the system?	Student Perceptions
What is the effect on student behaviour and achievement?	Actual Effects
How are students using the system?	Students' Use

Table 1 Questions to Guide Process of Creating a Student-facing Learning Analytics Reporting System (Bodily and Verbert 2017)

Dashboards as a tool for feedback

In contrast we consider dashboards using the literature on student feedback. We have previously used Sutton's (2012) 3 dimensions of feedback literacy, which uses a socio-cultural way of framing feedback as a literacy practice, to conceptualise students' use of dashboards (anon 2018). In this paper we apply a socio-cultural framing to illuminate the design principles based on our interpretation of data from a small scale study.

Our study used semi-structured interviews with 24 undergraduate students. The sample was final year undergraduate students within the School of Education at a single case study UK higher education institution. The study was sensitive in nature, given its focus on students' academic performance. BERA principles informed the study (2011). Participation was voluntary, and students' identity has been anonymised through the use of pseudonyms.

Four Principles

In this paper we propose 4 principles, derived from our analysis, which we argue are significant for shaping the design of learner dashboards. These four principles position students as active in the interpretation process and foreground the cultural and relational dimensions of learning thus our approach contrasts with the categories and questions identified by Bodily and Verbert (2017) which the dominate within the learning analytics literature.

Principle 1 Supports sense making

This principle relates to the dashboard's clarity and presentational features but it focuses on the student's interpretation of these features. Thus it relates to how the dashboard engages and is motivated to undertake this sense making activity. This principle is significant in that students have a wealth of knowledge about their studies to bring into the interpretation process. Hence the design principle reflects the importance of enabling the students to apply their contextual knowledge to the data presented:

Principle 2 Customisable by the student

The dashboard needs to provide students with a sense of agency, for example by enabling them to choose how they see their data displayed. For instance, some students wanted to compare themselves to others because they found it motivating, whilst others did not. We suggest that dashboards need to allow students to choose what and how they see their data.

Principle 3 Enables students to identify actionable insights

One of the main objectives of learner dashboards is that they should encourage students to act differently in ways that support positive learning. Typically, learner dashboards attempt to identify actionable insights, a frequent preoccupation of the human computer interaction field (Williamson 2017). Instead our principle emphasises the way that students work with the dashboard to help them turn their interpretations into action. We take a critical perspective to unpick the notion of actionable insights and foreground the way that these are support students' agency.

Principle 4 Supports educational alliances

Ajjawi and Boud (2017) suggest that the effectiveness of feedback will depend on the quality of the relationship between the student and the person giving the feedback, a term they call *educational alliance*. The notion has application to learner dashboards in that the value that students place on the dashboard will depend on factors such as trust in the data, being able to make sense of the displays, but also the way that they are supported in interpreting and action planning.

Some of the students conveyed the strong sense of relationship and working together with tutor evident and the possibility that the data affords to support this is perhaps the main factor that will influence the positive potential of dashboards on student retention, motivation and attainment:

References

- A.L.Dyckhoff, Lukarov, V., Muslim, A., Chatti, M. A., & Schroeder, U. (2013). *Supporting Action Research with Learning Analytics*. Paper presented at the LAK.
- Ajjawi, R., & Boud, D. (2017). Researching feedback dialogue: an interactional analysis approach. *Assessment & Evaluation in Higher Education*, 42(2), 252-265. doi:10.1080/02602938.2015.1102863
- Bodily, R., & Verbert, K. (2017). Review of Research on Student-Facing Learning Analytics Dashboards and Educational Recommender Systems. *IEEE Transactions on Learning Technologies*, 10(4), 405-418. doi:10.1109/TLT.2017.2740172
- British Educational Research Association. (2011). *Ethical Guidelines for Educational Research*. Nottingham: Bera.
- Newland, B., & Trueman, P. (2017). *Learning Analytics in UK HE 2017: A HeLF Survey Report*. Retrieved from https://helfuk.blogspot.co.uk/p/research_19.html
- New Media Consortium. (2011). *Horizon Report: 2011 Higher Education Edition*. Retrieved from <https://www.nmc.org/publication/nmc-horizon-report-2014-higher-education-edition/>
- Sutton, P. (2012). Conceptualizing feedback literacy: knowing, being, and acting. *Innovations in Education and Teaching International*, 49(1), 31-40. doi:10.1080/14703297.2012.647781
- Williamson, B. (2015). *Coding/ learning, software and digital data in education*. Retrieved from Stirling: <http://bit.ly/1NdHVbw>