

Do Moodle analytics have a role to play in learning design, feedback and assessment?

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Abstract

The project's main aim is to investigate feedback for teaching and learning using analytics via Moodle. Moodle analytics allows institutions to accumulate information which can be used for analyzing students' behaviour within a virtual learning environment (Romero, Ventura, & García, 2008). This information can include records of computer operations in the form of logged data of students' activities. However, students' activities and their e-learning interactions may vary across an institution because of the different ways course spaces are designed between schools/departments. Through Moodle analytics, it would be possible to evaluate students' online behaviour and possibly to explore what this behaviour can tell us about how students learn online and to identify various departmental pedagogical disciplinary practices (Martín-Blas & Serrano-Fernández, 2009). The project focuses on the study of students' activities and its relationship with the design of course spaces in the areas of feedback and assessment and will build on the work of San Diego and McAndrew (2008). Through this project, we will explore the potential of Moodle analytics to provide feedback to tutors about learner activities in relation to the design, structure and content of a module, and also to provide feedback to students on how they use these resources. In order to achieve this, records of learning activities through Moodle analytics need to be translated into a display that teachers can interpret easily and that students can appreciate. Studies around learning activities with Moodle will be conducted across six departments on selected modules with large student numbers.

Keywords

Learning analytics, learning design, pedagogical practices, feedback and assessment

Background

The design of learning activities with Moodle can vary, as can its users, who may interact and engage with learning in various ways. Furthermore, in implementing learning technologies, such as Moodle, the proper use of a tool is not obvious from the design nor is the use entirely conventional, needing to be taught to the learner by the teacher or their peers (van der Veer, 2010). However, learning technologies can be designed to inform learners, in some ways, how they can use the technologies properly through analysing how they use it and also considering the culture of the learner (Daniels, 2010). Learners' use of technology can be captured through analytics. Analytics has emerged as a key driver for business transformation (Kiron et al., 2011) which has been appropriated into the educational space as academic analytics or learning analytics (Long & Siemens, 2011). As the field matures, different types of analytics operate in various educational contexts. Learning analytics, in particular, is now a rapidly growing area of research for technology enhanced learning (TEL) that distinguishes itself through a focus on providing value to the teaching and learning process (Ferguson, 2012). Many kinds of learning analytics are being explored around social Learning Analytics (Ferguson & Buckingham Shum, 2012); feedback and engagement (Trowler and Trowler, 2010); feedback and assessment (Deakin Crick, 2007; Prineas and Cini, 2011). So, it is important to explore how learning analytics can be exploited to provide an alternative assessment system through formative feedback and engagement and its relationship to the learners' context and learning design. This project will explore the potential of Moodle analytics to provide feedback to both the learners and the tutors about learner activities in relation to the design, structure and content of a module, and also to provide feedback to students on how they use these resources.

Sharing of analytics and feedback

The project is at its initial stage so we are taking the opportunity to do some exploratory work that would encourage discussions about our ideas regarding analytics through a workshop and a poster. The poster part will be an interactive format. The poster is designed with 'blank' sections. The idea is that in the spirit of open academic dialogue, we will benefit from sharing thoughts and ideas with the conference delegates. Delegates who come and listen to our poster presentation will be asked to share their thoughts and help populate the blank sections. The blank sections will consist of headings representing key information we would like to gather (for example: draw us an analytic, feedback useful to teachers, feedback useful to learners, and so on). We will provide some paper and drawing pens. Every now and then, we will analyse the contributions and the 'results' will be presented by reorganising the poster and displaying the results as analytics. By doing this, we hope that the poster will constantly capture dialogue with colleagues and will also attract delegates during breakouts. We will also use social media to gather more contributions through Twitter (hash tag #KEATSAnalytic, KEATS: King's e-learning and teaching service being an acronym of the College's Moodle environment). The workshop part of the presentation will start with a short presentation about the project. Then, the participants of the workshop will be asked to share their views about the question 'Do Moodle analytics have a role to play in learning design, feedback and assessment?' through the results gathered from the delegates' contributions in the poster.

Possible presentation and project outcomes

The outcomes of this presentation will be made available via the project website as a wiki where delegates of the conference can continue to contribute. Ultimately, we would like to be able to provide some insights to the question posed in the title: Do Moodle analytics have a role to play in learning design, feedback and assessment. If there is enough empirical evidence, to speculate what they learn, we will aim to do so. In either case, the investigation above will greatly help in giving a direction to and shaping the outcomes of the project and provide some useful insights to the academic community.

The outcomes above will greatly help in giving a direction to and shaping the outcomes of the project. Our original project planned outcomes are:

Feedback Display's requirements analysis from the data gathered from KCL students and tutor participants. An implemented Feedback Display selected on users' requirements.

Recommendations for further analytics that will be made available via the project website. Some design guidelines on designing course spaces from evaluating the analysis of the results.

Project methods

We believe that conducting the above data gathering and workshop will immensely help the success of the project in conducting that five phases and activities outlined below.

- 1 **Identification of Feedback Display.** As informed by the contributions from the conference (existing analytics) and using the data from (2) below, examples of Feedback Displays will be designed and will be made available to the students and teachers of the participating course spaces. Their opinions will be collected and a selected few will be interviewed.
- 2 **Student tracking and collection of logs.** The techniques proposed by San Diego and McAndrew will be employed in capturing learning interactions. These will include automatic recording and tracking of computer actions captured via Moodle (i.e. content visits, participation in activities, discussion forums and other activities that are not directly assessed as part of the student's educational progress).
- 3 **Implementation of Feedback Display.** The Feedback Display will be modified and refined after analysing students' and teachers' opinion from (1). The resulting Feedback Display will be implemented in order to investigate whether students will appreciate the functionality of the Feedback Display within KEATS.
- 4 **Evaluation of the usefulness of feedback to teachers and students.** The evaluation of the usefulness will be determined from the data gathered from analytics gained from implementation (3). A survey will be designed from this qualitative information. Then the survey will be given to all the students participating students in all the course spaces.

- 5 **Specifications of learning design guidelines from the project outcomes.** This phase is exploratory as it is highly likely that the project will come up with some ‘learning design’ specifications for course spaces development. ‘Learning design’, in this context, refers to an application of a pedagogical model around the different components of teaching and learning activities (e.g. objectives, methods, context, knowledge) on the levels describing the learning process (e.g. programme, course, module, unit) (San Diego et al., 2008)

Examples of existing feedback analytics and possible feedback display outcome

The following examples are some of the analytics and a learning analytic approach around engagement that we are considering in developing our Feedback Display. We will use this to stimulate discussion during the workshop and the poster presentation.

Engagement as a metric that supersedes previous linear metaphors encompassing the quantitative data of site visits, the qualitative data of surveys and performance, as well as the fuzzy data in between that represents social media. Haven and Vittel (2008) elaborate this as a developmental process through the four key stages of discovery, evaluation, use, and affinity.

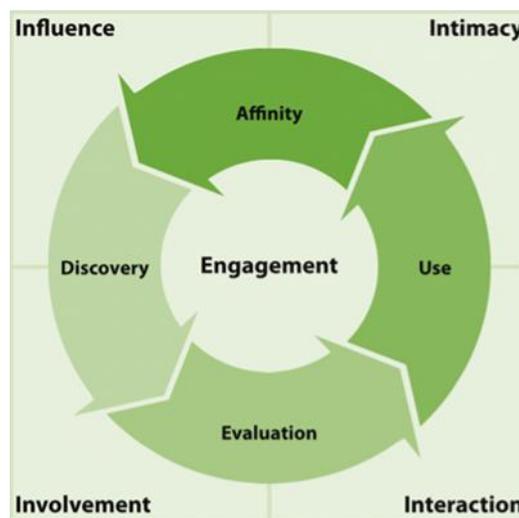


Figure 1: Engagement Model (Haven, 2007)

Involvement describes the presence of a learner within the institution and includes data such as physical or virtual visits. While this is not a key indicator in itself, these activities are critical to make connections with the other components and metrics.

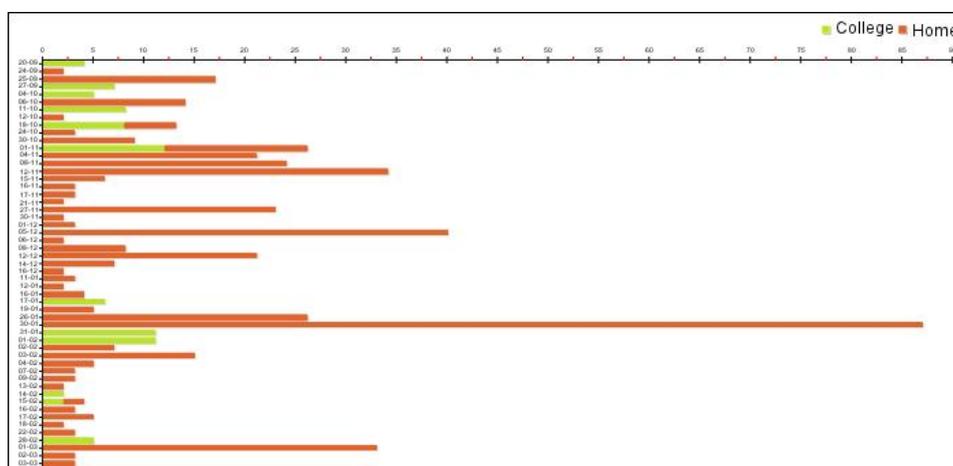


Figure 2: User logs over time

Interaction provides a depth of understanding that involvement does not where development is more dependent on meaningful experience of activity than the particulars of performance. Using a learning design framework, such as Conole’s (2007) task type taxonomy offers the opportunity to explore patterns of use where a higher level of interaction should allow the learner to experience a wider range of digital literacies.

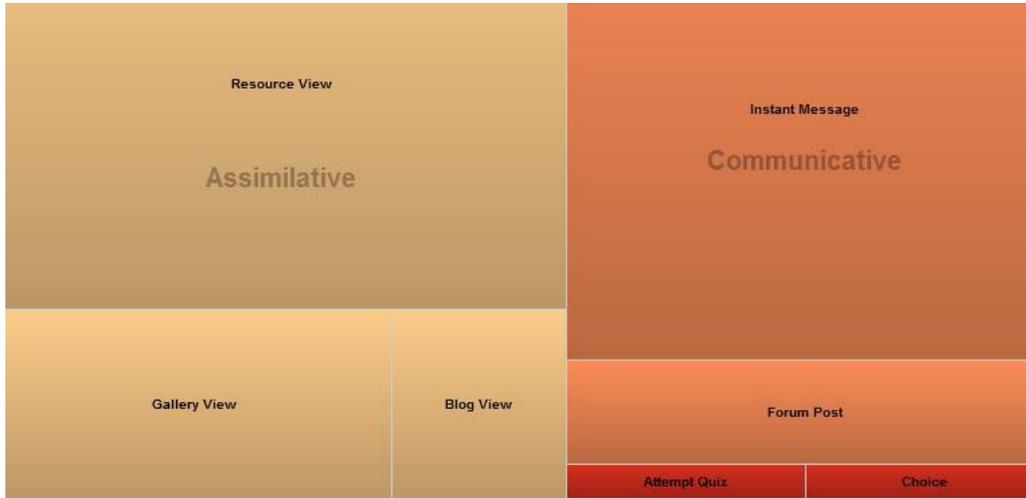


Figure 3: Activity types for a user based on task type taxonomy (Conole, 2007)

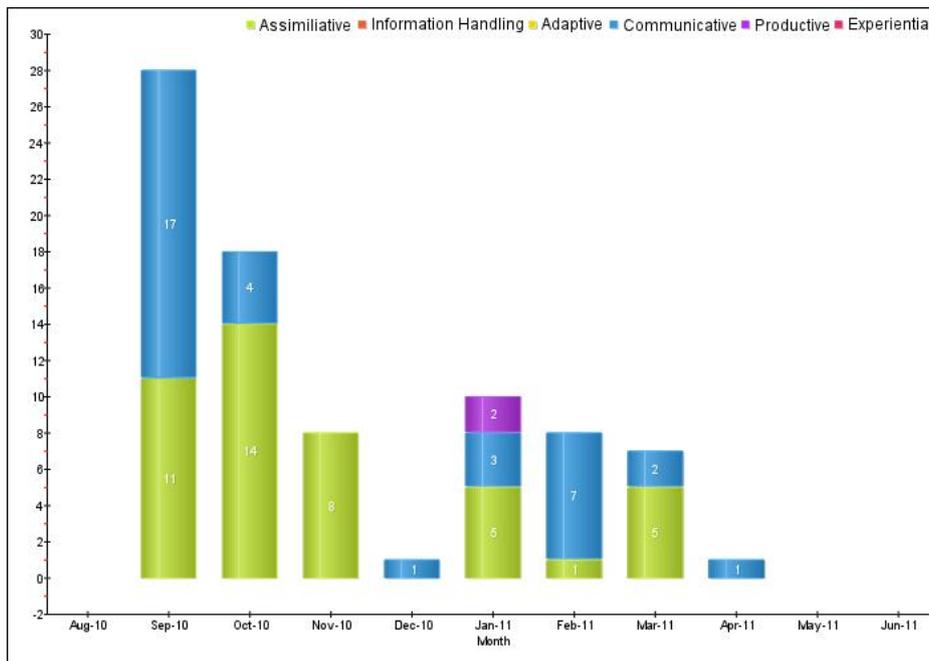


Figure 4: Task types over time

Another example emerges from Lave and Wenger’s (1991) community of practice approach which suggests learners must learn to talk, rather than learn from talk. Legitimate peripheral participation may be identified through learners who are actively engaged in passive tasks but perhaps not contributing as much as others. Understanding whether this represents peripheral participation or disengagement is a key aspect of interaction analysis.

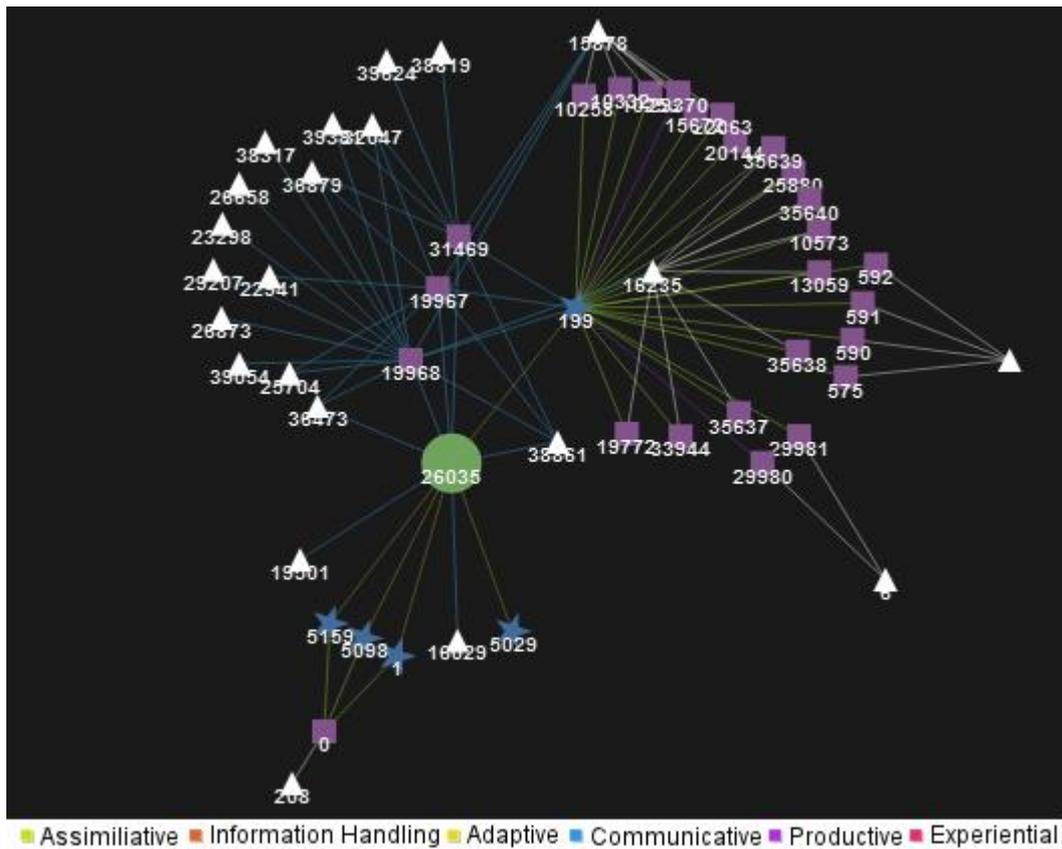


Figure 5: Connectivity map for a user

Intimacy goes beyond interaction to help understand sentiment and or affection. The most common way to collect this type of data is through interviews or surveys. Some examples with high validity include Dweck’s (1999) self-theory surveys to identify preferences towards learning or performance goals, the Motivated Strategies for Learning Questionnaire (MSLQ) as a way of understanding metacognitive learning strategies adopted (Pintrich & de Groot, 1990), and the Effective Lifelong Learning Inventory (ELLI) and the understanding of Learning Power (Deakin Crick, 2007).

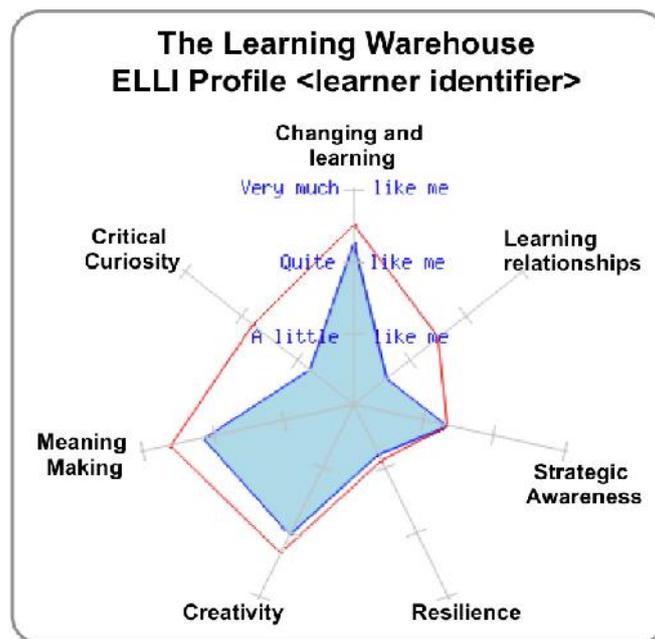


Figure 6: ELLI Profile (Buckingham Shum & Deakin Crick, 2012)

Influence extends beyond sentiment to determine the likelihood of the individual recommending a “brand” to others. Within the context of learning one may look to determine contributions to local culture through action as determined in the 4th quadrant of Harre’s (1983) participation pathway. Digital literacies concerned with distributed cognition, collective intelligence, networking, negotiation and visualisation should feature prominently in analysis of this component.

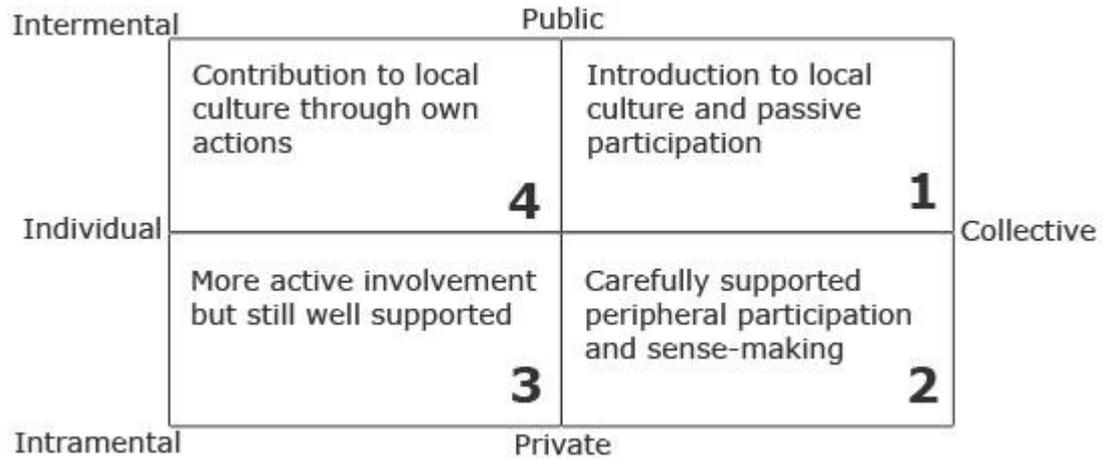


Figure 7: Harre’s participation pathway

Where patterns of use can be established it may be possible to replicate and enhance these models. In particular a coding across this site and other sites may empirically identify and establish patterns. Identifying possible factors would provide a necessary step in being to influence identified patterns. This type of visualisation tends to form a course or site dashboard .



Figure 8: Grouping patterns by Moodle course



Figure 9: Signals course dashboard (Arnold, 2010)

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