

Filling the learning analytics gap for high-stakes exams

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Abstract (#319)

Drawing on the education, information technology and analytics literature, we argue that a combination of e-exams and learning analytics could be a powerful tool in enhancing our understanding of student behaviour, strategies and performance in examinations. The rapid rise in the use of learning analytics has been highlighted by the work of Dawson and McWilliam (2008) and the recent report by Siemens, Dawson and Lynch (2013) that is based on the 'big data' available from a plethora of sources within the institution. The potential for insight by drawing in data from student information and learning management systems mean that a great deal can be learnt about the way students are engaging and performing on formative assessments during the semester. A wide range of digital learning activities are now available for formative assessment that includes digital patients (Newby et al. 2011), virtual microscopy (Kumar et al. 2009), simulated conversations (Nelson & Dawson 2014), virtual history excursions (Matthews & Agutter 2014), simulated practicums (Gregory, et al. 2013) and virtual immersive foreign language learning (Grant et al 2013) that can provide data for analysis. However, when it comes to the typical paper based exam there is very little in the way of data points that can contribute to such analysis. Further it is currently rare for students to receive comprehensive feedback on how they have performed in examinations beyond a 'pass or fail' and similarly very little analytics of the exam questions themselves is performed. E-exams offer a way 'fill the data gap' with respect to our knowledge of student performance and behaviour in high stakes assessments.

Conference Theme

The potential for learning analytics and computerised high stakes exams is currently an untapped resource in assessing, evidencing and evaluating graduate capabilities. The contemporary workplace and social sphere is characterised by the high availability of information and a sophisticated range of ICT tools. Contemporary ICT enhanced formative learning activity does provide a means approximate the 'real world' however we are still left with the problem of authentication. The paper-based, high stakes exam remains as the primary means by which universities can be confident that the work submitted belongs to student being assessed. However a paper-based medium no longer reflects the problem solving environment that graduates will encounter in professional practice. This results in a disconnect between the desired set of attributes graduates will be expected to hold and our ability to validate and assess their capabilities. Further, the use of learning analytics in higher education is increasing as a means for understanding student learning behaviour, progress, engagement and success (or otherwise) as well as a means to improving learning delivery. However, the paper-based exam represents a significant information gap with regard to the data required to complete a more comprehensive picture.

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The Learning Analytics Gap

Analytics from MOOCs, LMSs etc only tell you what happens when the student is in the LMS.

Mind the analytics gaps...



- In the exam room -> **e-Exams**
- In the class room -> RFID, tags, sound analysis, video analysis?
- In the field -> Mobile learning tools?
- Social, discussions, share -> Privacy?
- Information overload -> a data tsunami.
- Solutions? sometimes we don't know what we don't know
- > avoid technical solutions that lock out unknown futures...

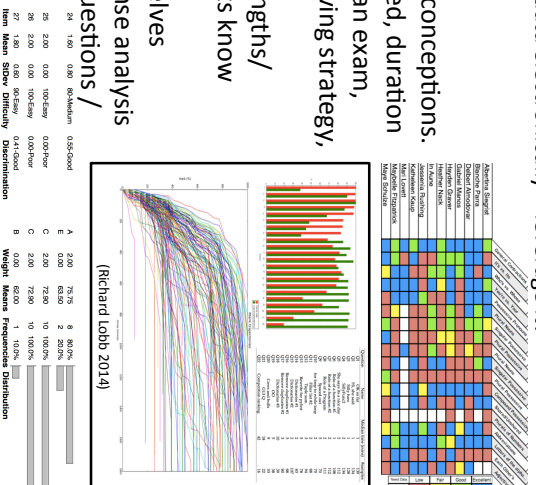


Gap Filler

How can e-Exams help fill the gap?

If using e-exams then we will be collecting data electronically – leverage it!

- What could we learn and do?
- Student/cohort performance on each exam question, concept to identify misconceptions.
- Student behaviour in exams: time, speed, duration answering questions, gaining marks in an exam, pauses, writing strategies, problem solving strategy, communication, decision points.
- More timely, useful feedback (e.g. strengths/weakness by topic area – helps students know where they need to improve.)
- Quality enhancement of exams themselves (selected response types) - item response analysis to identify weak / low discrimination questions / options.



Is this your exam space?



Applying Authentic Tools

- A comprehensive exam environment can enable authentic, complex, constructed assessment to test students against 'real world' problem sets.
- An ideal platform would mix:
 - An open range of 'tools of the trade' (word processor, spreadsheet, database, math, stats, graphics, multimedia, software dev, simulations, discipline tools).
 - Multiple computer marked question types.
 - System wide activity logging.
 - Open, restricted networks or stand-alone.
 - Known and controllable environment.
- Enabling a broad pedagogical landscape for the assessment of 21st Century capabilities.
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