THE UNIVERSITY of EDINBURGH

Learning Analytics to Support Large Courses

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Distance Learning at Scale

- MicroMasters with EdX
- Building, testing and proving the University and its partners' capability and capacity to plan, create and execute online learning at scale without compromising quality.
- Deliver:
  - new pedagogy
  - underpinning innovative technologies
  - new University processes
  - an "at scale" partner relationship
  - new course creation with the capabilities to scale production

Pedagogical Principles of DLAS

- providing for visible, and visibly engaged, teachers who are experts in their fields
- providing flexibility for integration with an appropriate system of automated tutor support which also integrates human tutor intervention
- providing capacity for regular and substantive feedback on students' work across different media
- helping students to feel like they are members of a learning community, a sense of belonging within their department, programme, and the University of Edinburgh different media

There needs to be capacity for using AI and automated systems for a host of functions for meaningful scaling. This is critical to expanding the courses without sacrificing quality'– (Bayne & Gallagher 2018)

The analytics challenge

- Lack of production ready systems
- Predictive\retention modelling prevalent
- Lack of historical data for Distance Learning at Scale Programmes
- MOOC platforms understand the requirement however offer basic reporting tools
- Where is learning analytics useful @ scale?
- Will it align with the pedagogical principles of DLAS?
- Meaningful and useful to teachers and students

The Proposal

- Analytics be used to facilitate the delivery of personalised feedback to all learners

- OnTask
  - Developed @ University of Sydney for blended learning in large cohorts
  - Open source web application
  - Does not require large scale infrastructure
  - Used by UBC, Texas Arlington and by multiple Australian Institutions

What is OnTask?

- Strongly aligned with pedagogical design
- Provides personalised actionable *coaching* feedback via email
  - Configurable workflows with set criteria
- Rules and feedback generated are managed by teachers
  - Algorithmic transparency
  - Machines do “heavy lifting”

*"Examples of feedback **OnTask** could facilitate includes directing them to specific chapters or worked examples in their textbook, suggesting additional reading or resources, enrolling them in required workshops or laboratory tutorials, suggesting the most effective study techniques for the tasks in the course, directing them to university support services, etc. **OnTask** aims to assist instructors to support all students in a course regardless of their performance by providing relevant, personalised suggestions."*

student dashboard

7 principles of good ~~feedback~~ practice

- Helps clarify what good performance is
- Facilitates the development of self-assessment (reflection) in learning
- Delivers high quality information to students about their learning
- Encourages teacher and peer dialogue around learning
- Encourages positive motivational beliefs and self-esteem
- Provides opportunities to close the gap between current and desired performance
- Provides information to teachers that can be used to help shape the teaching

Nicol, D. J., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. Studies in higher education, 31(2), 199-218.

LS1 - Feature Selection 2	A01 - Dimensionality reduction	Acquisition	Read	00:50	Video - slides & narration	Singular Value Decomposition
		Acquisition	Watch a video	00:20	Reading text	Singular Value Decomposition
		Investigation	Discover - Applications of SVD in Real-Life	01:00	Project activity	Look at applications of SVD
		Discussion	Sharing research on SVD applications	00:45	Discussion	Post in forum and discuss
	A02 - The Netflix Prize	Investigation	Review - Netflix Prize Paper	01:00	Project activity	Learners to review paper
		Discussion	Share - Opinion on recommendation	00:50	Discussion	Share recommendations with other learners
			Total learning sequence time:	**04:45**		
LS2 - Principle Component Analysis	A01 - Principle component analysis	Acquisition	Read	00:50	Reading text	Principle Components Analysis
		Acquisition	Watch a video	00:20	Video - slides & narration	Principle Components Analysis
		Acquisition	Reading	00:50	Reading text	Code for PCA
	A02 - Coding PCA	Production	Create - PCA Analysis & Compare with Correlation	01:00	Activity: coding	Analysis and comparison activity - coding activity.
		Practice	Multiple choice questions	00:40	Activity: multiple choice	Learner will select from a list of components they needed to consider from this production activity and list the priority order.
		Discussion	Discuss - Can you recreate your PCA with correlation?	00:45	Discussion	Discussion among learners
	A03 - Knowledge check evaluation	Assessment	Summative assessment - weeks 1-3 content	01:00	Activity: multiple choice	Knowledge check
			Total learning sequence time:	**05:25**		

DEMO

What Next

- DLAS Pilot 2019/20
- On-Campus Pilot 19/20
- Evaluation
- OnTask is an Apereo Incubation Project
  - Apereo will allow it to grow via wider support structure