



@DrBartRienties

Professor of Learning Analytics



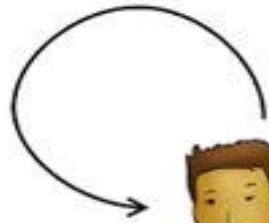
IMS GLOBAL
Learning Consortium
Better Learning From Better Learning Technology



Keynote presentation - Learning analytics and the effective use of assessments

30 November 2020

Reflection



Teacher

feedback on group performance
choose indicators

Monitoring Visualization-Dashboard



Learning Analytics:

e.g. time spent, areas of interest, usage of resources, participation rates, correlation with grades



Students

Change of teaching method?

receptive learning:
observe, read,
download ...

active learning:
participate, write,
collaborate ...



logging



The Open University



Leading global distance learning, delivering high-quality education to anyone, anywhere, anytime



Largest University in Europe

38% of part-time undergraduates taught by OU in UK

173,927 formal students



No formal entry requirements



33% enter with one A-level or less

55%

of students are 'disadvantaged'

66% ²⁵

of new undergraduates are 25+

60%

FTSE 100 have sponsored staff on OU courses in 2017/8

1 in 8

Open University students has a disability (23,630)



3 in 4

Students are already in work



1,300

employers use OU learning solutions to develop workforce



Predictive analytics to identify whether students are going to make the next assignment



• Predictions

Export Select columns

Student Information					Next TMA predictions Generated: 10/06/20 (today) Week: 19			Long term predictions Generated: 10/06/20 (14 days ago) Week: 13	
Student ID	Name	Tutor ID	Staff tutor ID	TMA	Submission	Risk of NS	Grade	Completion	Passing
A0000000	Freddy Hayes	98437902	81619251		N/A	N/A	N/A	71.80%	51.40%
A0000000	Helen Becher	91199169	88966057		N/A	N/A	N/A	81.90%	51.40%
A0000000	Arba Dick	20387629	52950221		N/A	N/A	N/A	95.100%	61.70%
A0000000	Kitty Ulrich	10128672	14282382		N/A	N/A	N/A	71.80%	41.50%
A0000000	Dimitrios Schage	36093026	12512371		N/A	N/A	N/A	81.90%	81.90%
A0000000	Hippolyte Aubertor	01139205	38197990		N/A	N/A	N/A	00.00%	00.00%
A0000000	Genevieve Hechurst	32010949	78222381		N/A	N/A	N/A	00.00%	00.00%
A0000000	Cornea Kerkula	83007947	67238119		N/A	N/A	N/A	95.100%	81.90%
A0000000	Dusty Schiller	59441600	73972985		N/A	N/A	N/A	51.40%	41.50%
A0000000	Gustafage Brinkke	68319368	53887702		N/A	N/A	N/A	00.00%	00.00%
A0000000	Emmy Williams	62828367	68151571		N/A	N/A	N/A	95.100%	95.100%
A0000000	Ernauld Grant	88191111	62828369		N/A	N/A	N/A	81.90%	71.80%
A0000000	Deven Rath	35511285	76504794		N/A	N/A	N/A	95.100%	95.100%
A0000000	Anthe Wehner	26793388	83039211		N/A	N/A	N/A	41.50%	21.20%
A0000000	Arlo Wilman	28941389	89102833		N/A	N/A	N/A	71.80%	71.80%
A0000000	Wilson Johns	26112760	25722985		N/A	N/A	N/A	41.50%	41.50%
A0000000	Ora Reynolds	69229281	42945229		N/A	N/A	N/A	95.100%	81.90%
A0000000	Karl Daniel	31454147	38294853		N/A	N/A	N/A	N/A	N/A
A0000000	Jasmine Pacey	22221072	79419016		N/A	N/A	N/A	95.100%	81.90%
A0000000	Clara Vinyager	61825515	62615209		N/A	N/A	N/A	81.90%	81.90%
A0000000	Katrina Cummings	59899889	25797103		N/A	N/A	N/A	51.40%	21.40%
A0000000	Nicole Gerlach	90178041	34388729		N/A	N/A	N/A	95.100%	95.100%
A0000000	Anabelle Pomeroy	78896074	68395714		N/A	N/A	N/A	95.100%	95.100%
A0000000	Jasmine Barnas	21212622	98321384		N/A	N/A	N/A	95.100%	81.90%
A0000000	Ely Johnston	53971752	93788891		N/A	N/A	N/A	95.100%	95.100%

Showing 1 to 25 of 1,315 entries

Previous 1 2 3 4 5 54 Next

Kuzilek, J., Hlosta, M., Herrmannova, D., Zdrahal, Z., & Wolff, A. (2015). OU Analyse: analysing at-risk students at The Open University LACE Learning Analytics Review (Vol. LAK15-1). Milton Keynes: Open University.

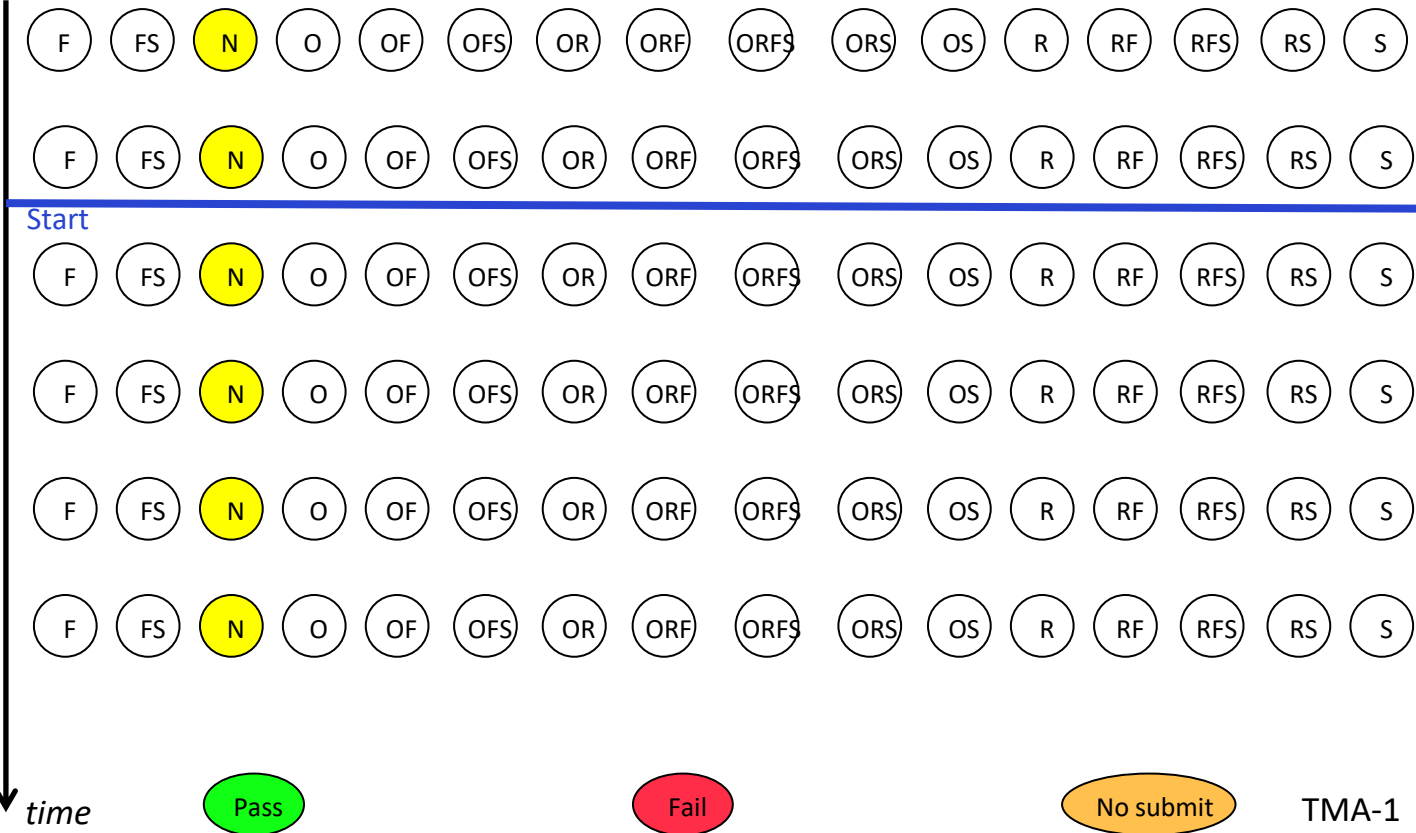
Kuzilek, J., Hlosta, M., & Zdrahal, Z. (2017). Open University Learning Analytics dataset. Scientific Data, 4, 170171. doi: 10.1038/sdata.2017.171

Wolff, A., Zdrahal, Z., Herrmannova, D., Kuzilek, J., & Hlosta, M. (2014). Developing predictive models for early detection of at-risk students on distance learning modules, Workshop: Machine Learning and Learning Analytics Paper presented at the Learning Analytics and Knowledge (2014), Indianapolis.

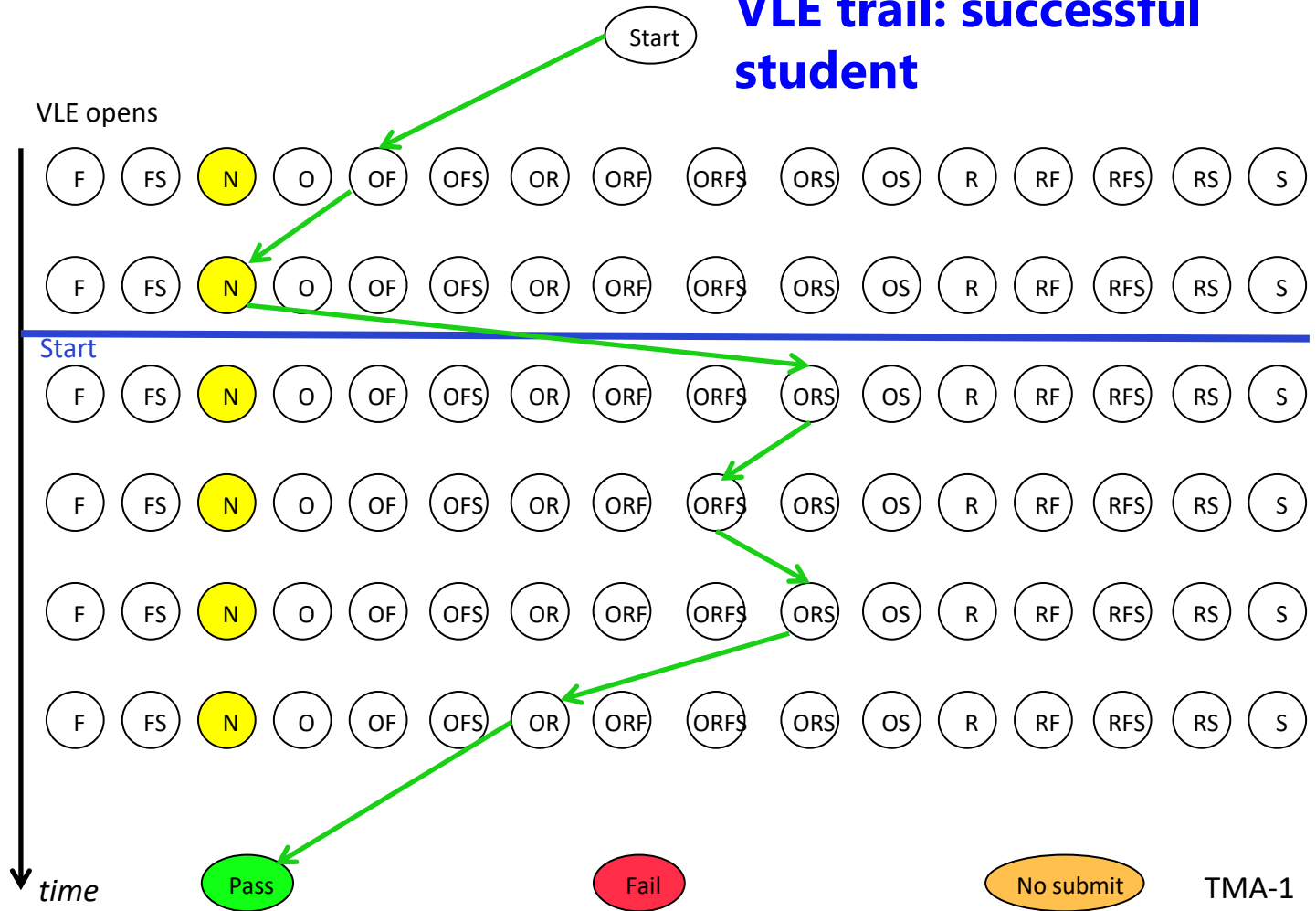
Start

Activity space

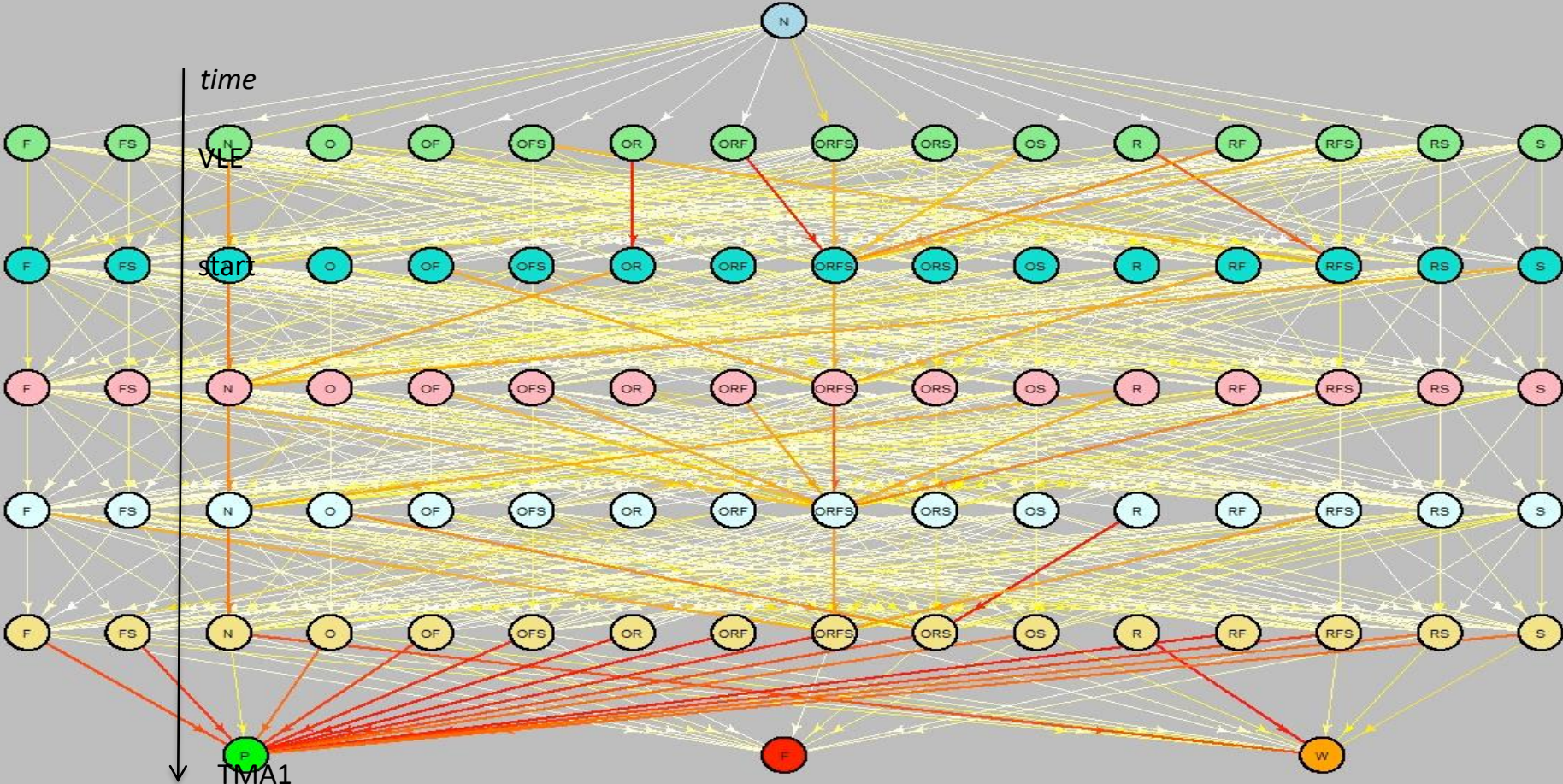
VLE opens



VLE trail: successful student



Probabilistic model: all students



OU Analyse demo

<http://analyse.kmi.open.ac.uk>

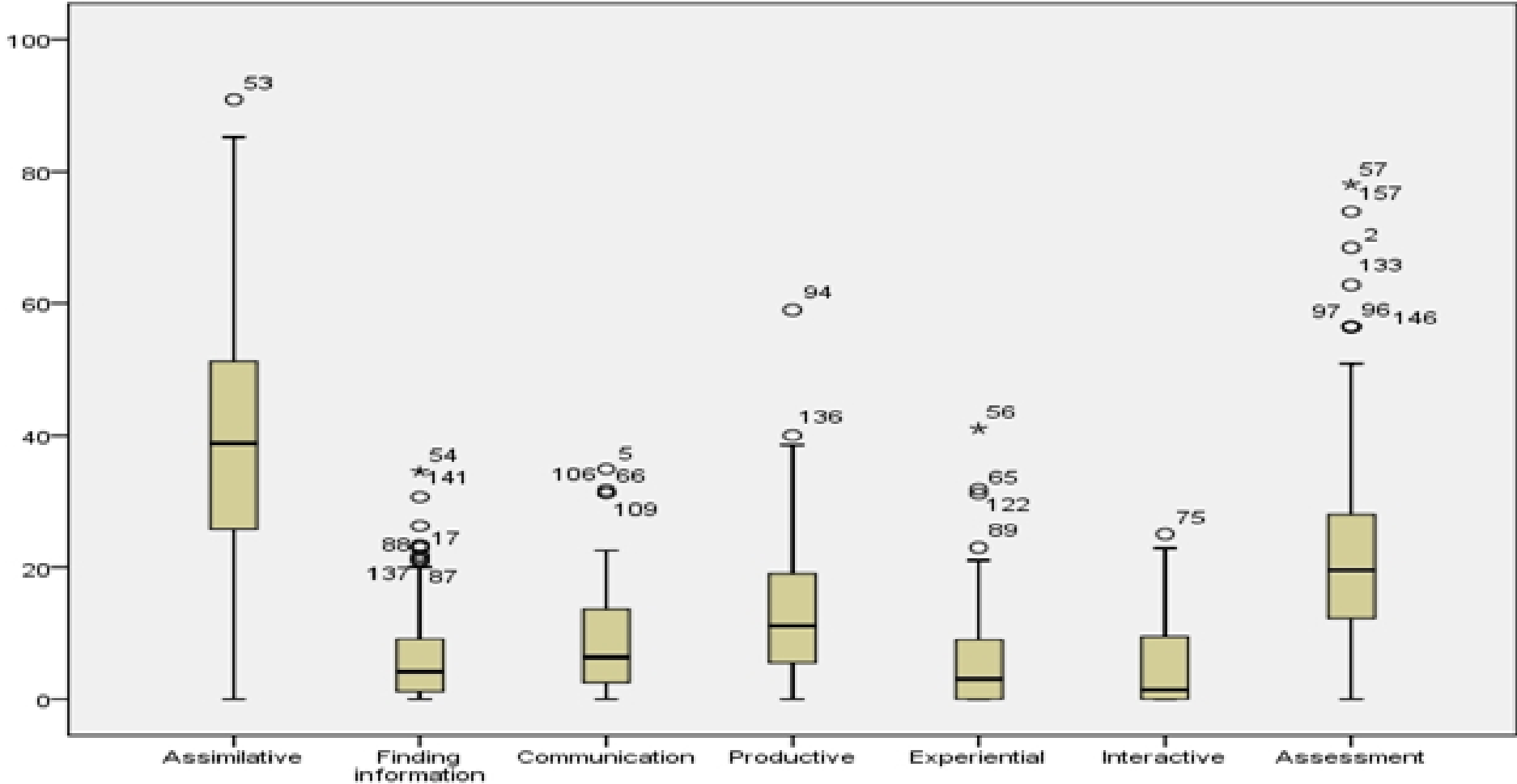


Open University Learning Design Initiative (OULDI)

	Assimilative	Finding and handling information	Communication	Productive	Experiential	Interactive/ Adaptive	Assessment
Type of activity	Attending to information	Searching for and processing information	Discussing module related content with at least one other person (student or tutor)	Actively constructing an artefact	Applying learning in a real-world setting	Applying learning in a simulated setting	All forms of assessment, whether continuous, end of module, or formative (assessment for learning)
Examples of activity	Read, Watch, Listen, Think about, Access, Observe, Review, Study	List, Analyse, Collate, Plot, Find, Discover, Access, Use, Gather, Order, Classify, Select, Assess, Manipulate	Communicate, Debate, Discuss, Argue, Share, Report, Collaborate, Present, Describe, Question	Create, Build, Make, Design, Construct, Contribute, Complete, Produce, Write, Draw, Refine, Compose, Synthesise, Remix	Practice, Apply, Mimic, Experience, Explore, Investigate, Perform, Engage	Explore, Experiment, Trial, Improve, Model, Simulate	Write, Present, Report, Demonstrate, Critique

Conole, G. (2012). *Designing for Learning in an Open World*. Dordrecht: Springer.

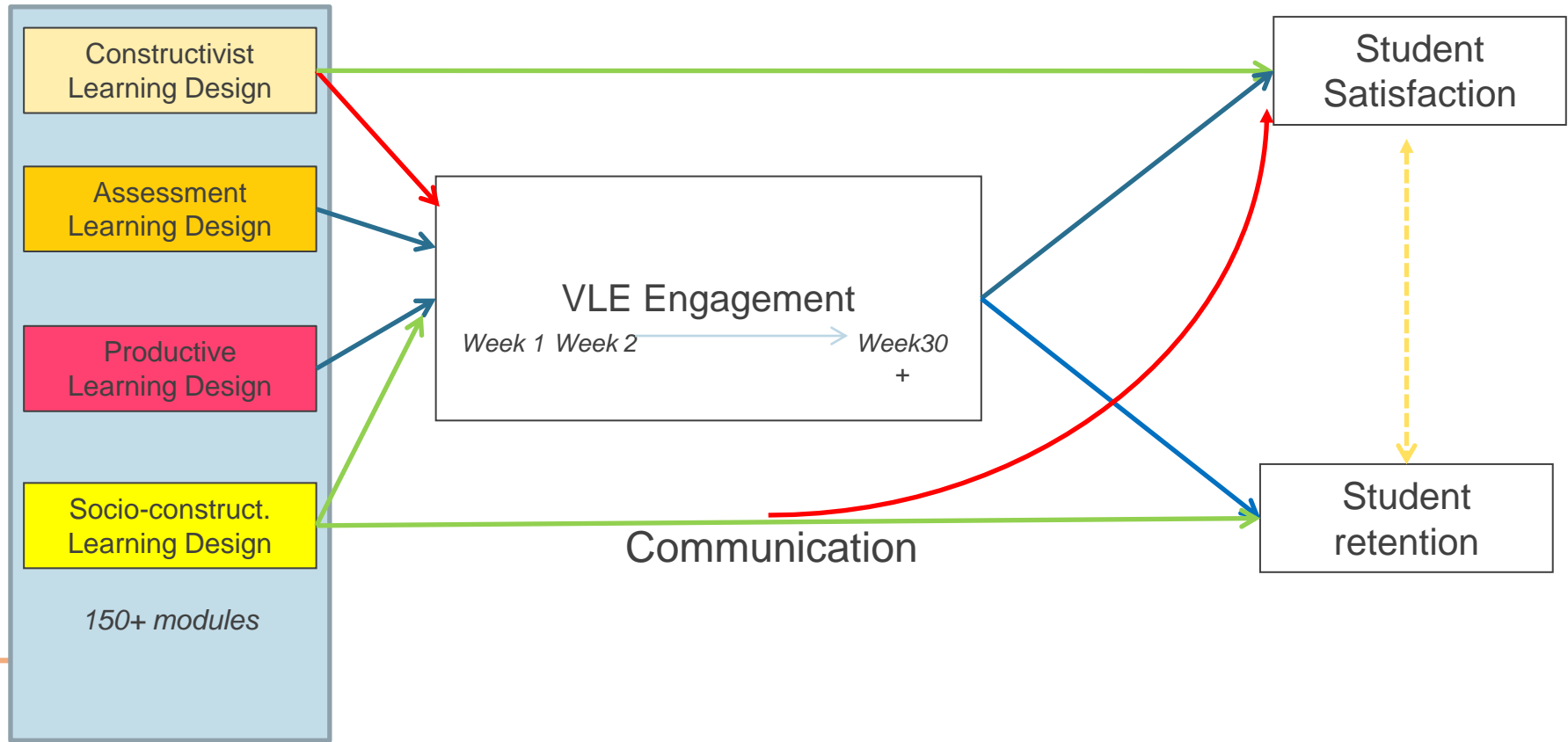
Rienties, B., Toeteneel, L., (2016). The impact of learning design on student behaviour, satisfaction and performance: a cross-institutional comparison across 151 modules. *Computers in Human Behavior*, 60 (2016), 333-341



Toeteneel, L., Rienties, B. (2016). Analysing 157 Learning Designs using Learning Analytic approaches as a means to evaluate the impact of pedagogical decision-making. *British Journal of Educational Technology*, 47(5), 981–992.

Merging big data sets

- Learning design data (>300 modules mapped)
- VLE data
 - >140 modules aggregated individual data weekly
 - >37 modules individual fine-grained data daily
- Student feedback data (>140)
- Academic Performance (>140)
- Predictive analytics data (>40)
- Data sets merged and cleaned
 - 111,256 students undertook these modules



Hours spent undertaking each type of activity

Design stages

Initial

Specification (REPO3)

Draft (D2)

Final

Copy and replace:

Initial → Specification

Specification → Draft

Draft → Final

Workload tool → Initial

Workload tool → Specification

Workload tool → Draft

Workload tool → Final

Week	Assimilative	Finding and handling information	Communication	Productive	Experiential	Interactive / Adaptive	Assessment	Total hours
Week 1	10	1.5	1	0.6	0	0	0.2	13.30
Week 2	6.1	0	0.5	0.6	2	0	6.2	15.40
Week 3	6.1	0	0	2.2	2.85	0	3.5	14.65
Week 4	0	0	0	0	0	0	0	0
Week 5	5.8	0	0	0	19.1	0	10.9	35.85
Week 6	13.5	0	0	3.55	4.3	0	1.8	23.15
Week 7	7.25	0.4	0	1	0.7	0	3.3	12.65
Week 8	5.79	0	0	0	0	0	9.3	15.09
Week 9	10.5	0	0	3	0.1	0	2.5	16.16
Week 10	6.31	0	0.5	0.35	0.7	0	2.65	10.51
Week 11	7.46	4	0	2.1	0	0	3.2	16.76
Week 12	5.69	0	0	1.3	0.35	0.5	1.8	9.64
Week 13	7.43	0.65	0	2.8	0.6	0	1.6	13.08

Avg: 12.16, StDv: 6.28 [Hide guides](#)

69% of what students are doing in a week is determined by us, teachers!

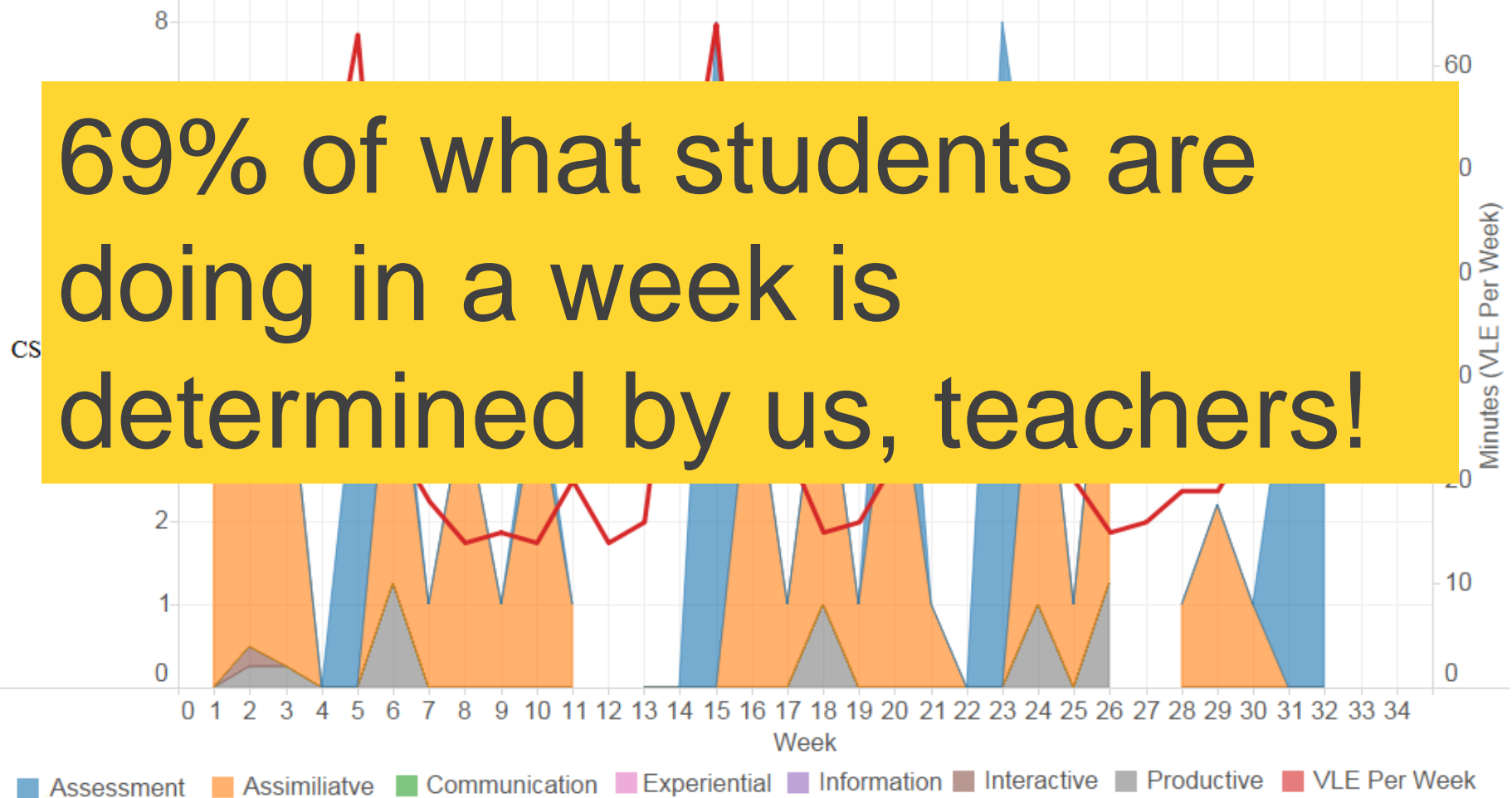


Table 8

Overview of assessment strategies of case study modules.

Context	Assessment strategy	CBA example
CS1 This introductory Arts module focuses on the past	Assessment is estimated to take 20% of the directed	All assignment briefs are provided online and
CS5 This introductory module develops knowledge and skills required for Engineering and prepares students for further study in Engineering or a related subject	Assessment takes place every 3–4 weeks and includes four assignments, interactive computer-marked assessments and an end-of-module assignment.	Assignments are the main form of assessment in this module.
CS6 This introductory module develops an understanding of design. Students acquire new design skills and build a portfolio of design projects.	Assessment takes up much of the time allocated to directed study for this module and is spread throughout the module. The time allocated for assessment is high because students are encouraged to work on their assignment for several weeks prior to submission.	Assignments are the main form of assessment in this module. This module also uses peer feedback methods. Students share their work and comment on this online. Participation in this process is a small part of the assessment mix for the module.

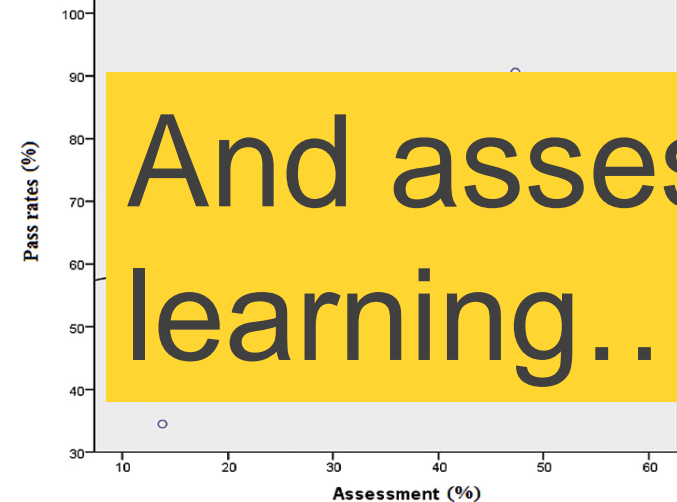


Fig. 1. Scatterplot of the 74 modules showing percentage pass rate of registered students who started the module in relation to the percentage of study time allocated for assessment activities. Note: The six case study modules are marked. R-Squared = 0.097.

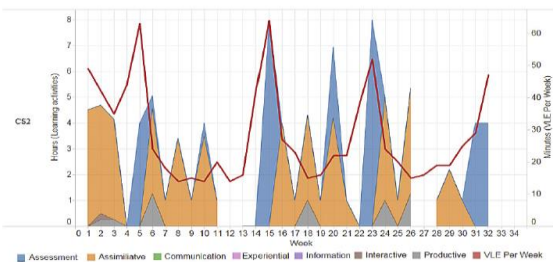


Fig. 4. Longitudinal visualisation of learning design (coloured blocks) and average students' engagement (red line) in the VLE each week for CS2. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version

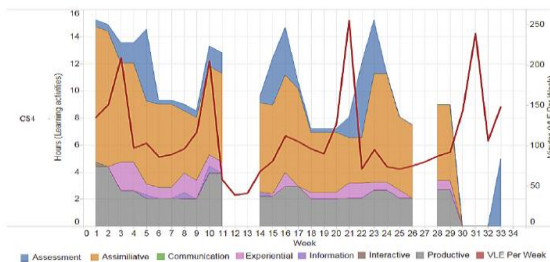


Fig. 6. Longitudinal visualisation of learning design (coloured blocks) and average students' engagement (red line) in the VLE each week for CS4.

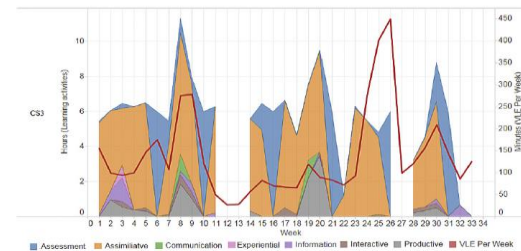


Fig. 5. Longitudinal visualisation of learning design (coloured blocks) and average students' engagement (red line) in the VLE each week for CS3. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Further reflections

1. Who owns the data?
2. What about the ethics?
3. What about professional development?
4. Are we optimising the record player?





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