Moving Forwards with Learning Analytics

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Learning Analytics at the Institute of Educational Technology

Research

Teaching

Quality Enhancement and Innovation

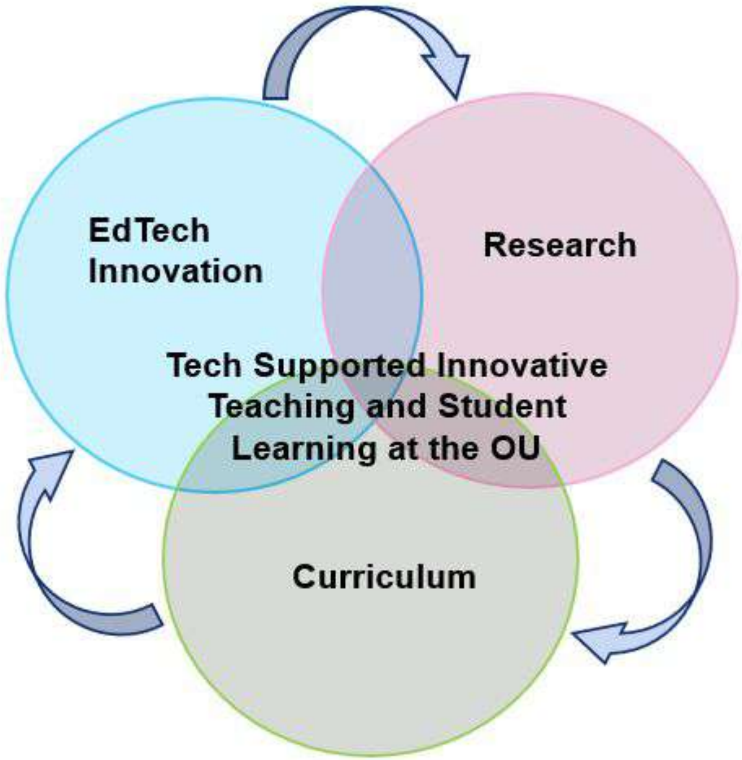
IET Innovation through pedagogically driven technology

Learning Analytics Research Tools migrated to Main Stream Use

1. **Research** - drives internal and external innovation, supported by KE work.

2. **Innovative Curriculum** – instantiates and tests research outcomes.

3. **Quality Enhancement with Innovation in EdTech** – evaluates and feeds innovative curriculum including Learning Analytics. Offers opportunities for further Research funding.



Moving Forwards with Learning Analytics Reviewing User FEED BACK is essential

- What is Learning Analytics?
- Where are we now?
- Predictive dashboards
- Student facing feedback
- Generative AI
- Challenge FEEDBACK

LEARNING ANALYTICS: DEFINITION

The measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs.

What and Why ?

What is Learning Analytics for ?

Assists with identifying and finding patterns in the data and then making sense of them!

Why use Learning Analytics?

To improve teaching

Learning and

Learning environments

What we have learned in 10 years in terms of benefits of LA?

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Learners

- Enhance engagement of students
- Personalization of learning
- Enrich personalized learning environments
- Increase self - reflection & self-awareness
- Parents (Monitoring students' activities)
- Improve learning outcomes
- Increase in students adaptivity

Faculty

- Enhance Assessment services
- Get a real - time feedback
- Understand students learning habits
- Monitoring students' activities
- Provide warning signal
- Improve instructor performance
- Get a deeper understand teaching/learning
- Researchers (Increase efficiency Education & serious games, Identify knowledge gaps)
- Make efficient interventions
- Get a real - time insight
- Modify content for students' desire
- Predicting student performance
- Improve teaching strategy
- Sources recommendation

Institutions

- Identifying target course
- Improve learning design

1. Support access and inclusion
2. EDI

1. Improved pedagogical awareness
2. Improved data literacy and confidence
3. Driver for change based upon evidence

1. Identify good practice/teachers/modules
2. Alignments between modules/qualifications
3. Indications of good practice between/across institutions

Case-studies included from Arizona State University (*USA*), Dublin City University (IRE), Georgia State University (*USA*), Northern Arizona University (USA), New York Institute of Technology (USA), **The Open University (UK)**, Open Universities Australia (AUS), Purdue University (USA), Rio Salado College (USA), Sinclair Community College (USA), Tecnológico de Monterrey (Mex), University of Alabama (USA), University in Ankara (TUR), University of Maryland (USA), University of Michigan (USA), University of Wollongong (AUS)

Hernández-de-Menéndez, M., Morales-Menendez, R., Escobar, C. A., & Ramírez Mendoza, R. A. (2022). Learning analytics: state of the art. International Journal on Interactive Design and Manufacturing (IJIDeM), 16, 1209–1230. https://doi.org/10.1007/s12008-022-00930-0

331 OU papers on Learning Analytics can be found here: https://tinyurl.com/2p892rf2

What we have learned in 10 years in terms of challenges of LA?

1	**Ethics and privacy**. Various questions arise here, e.g., who has access to the data and personal information, how long it is kept, how much data is safe and who owns the data.	OU has Ethics LA policy since 2014
2	**Scope and quality of data**. Questions that arise include how much data should be collected, how much data should have variety, what type of data has value for learning and how much reliable predictions can be made.	Data Governance
3	**Theoretical and educational foundations**. There is a lack of attention to learning and teaching theories. *LA* should be based on pedagogical and epistemological assumptions.	Actual adoption and sense making
4	**Research.** More research is needed to establish the foundations of *LA* (Dollinger & Lodge, 2018).	OU #1 in Europe, #2 in world
5	**Practice**. There is a lack of transference of *LA* theory to practice (Dollinger & Lodge, 2018). A user center design methodology as well as include the final user in the design process is needed to develop *LA* systems and applications (Dominguez F et al., 2020).	Actual adoption and sense making
6	**Institutions**. It is essential to align the points of view of researchers, educators, learners, educational technologists and administrators regarding *LA* (Leitner & Ebner, 2019).	LA embedded in design and practice
7	**Measurement of impact**. It is well known that *LA* can impact students learning by supporting teaching and learning strategies (Knight, Gibson, & Shibani, 2020).	Good evidence within a module, more needed across qualifications and diversity

Hernández-de-Menéndez, M., Morales-Menendez, R., Escobar, C. A., & Ramírez Mendoza, R. A. (2022). Learning analytics: state of the art. International Journal on Interactive Design and Manufacturing (IJIDeM), 16, 1209–1230. https://doi.org/10.1007/s12008-022-00930-0
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Ethics and Privacy: More to do

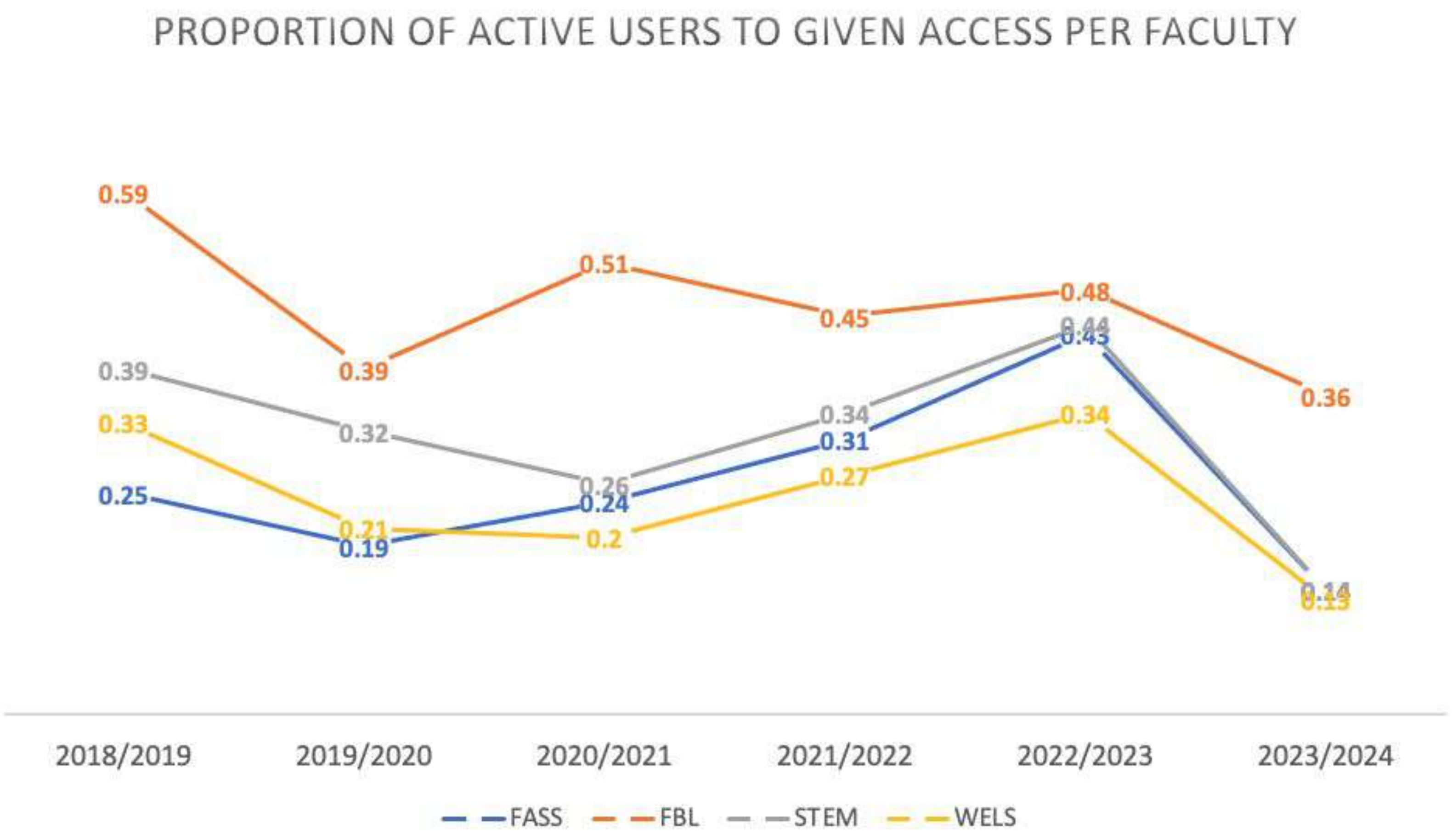
7 Principles

1. Improving conditions for learning and teaching
2. Support services for all students
3. Transparent handling of data
4. Critical handling of data
5. Human control
6. Managerial responsibility
7. Commitment to continuing training

Hansen, J., Rensing, C., Hermann, O., & Drachsler, H. (2020). **Verhaltenskodex für Trusted Learning Analytics: Entwurf für die Hessischen Hochschulen**. Frankfurt am Main, Germany. https://bit.ly/German_CoC_LA

OU Analyse Predictive Analytics

- 200K+ students at the Open University
- EAID supporting 86% of students
- EAID in more than 500 modules
- Publicly endorsed by VCE as a means to support student retention



New **OU Analyse in top four in UNESCO awards**

OU Analyse, the OU's Predictive Learning Analytics system, was selected as a finalist and among the four best projects for the 2020 edition of the UNESCO Prize in Education

Winners at the DataIQ 2020 Awards

September 2020 - winners of the DataIQ 2020 Awards in Best use of data by a not-for-profit organisation.

Excellence in enhancing teaching and learning at the Open University

April 2020 - OUAnalyse awarded Recognition of Excellence in Teaching at the OU.

Shortlisted for THE awards 2019

5 September 2019 - OU Analyse was shortlisted for the Times Higher Education Awards 2019 in the category Technological or Digital Innovation of the Year.

Recognised by the Open University by receiving the Research Excellence Award 2019

for Outstanding Impact on Teaching, Curriculum and Students.

OU students' progress to be monitored by software

28 July 2015 - OU Analyse was featured on the BBC News website.

Students under surveillance

24 July 2015 - Predicting at-risk students at the Open University was part of the weekend article in The Financial Times.

The week in higher education – 30 July 2015

30 July 2015 - Times Higher Education mentioned OU Analyse in their weekly overview in academia.

Two systems:

- **OU Analyse (OUA):** Short –term predictions of submitting course assignments (based on machine learning)
- **Student Probabilities (SPM):** Long-term predictions of completing and passing a course (based on regression analysis)

OUA &SPM produce predictions as to whether students are at risk of failing their studies

OUA: The model predicts on a weekly basis whether or not a given student will submit their next course assignment.

OUA: The model predicts on a weekly basis whether or not a given student will submit their next course assignment.

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Dashboard information

timely interventions

Student Information						Next TMA predictions Generated: 07/11/18 (7 days ago) Week: 5			Long term predictions Generated: 22/10/18 (23 days ago) Week: 3	
	Student PI	Name	Tutor PI	Staff tutor PI	TMA	Submission	Risk of NS	Grade	Completion	Passing
-	AXXXXXXX	Mara Rempel	36363055	33650217		Submit		Pass 3	70-80%	80-90%
-	AXXXXXXX	Kian Wisoky	80489403	62763544		Submit		Pass 3	70-80%	70-80%
	AXXXXXXX	Lambert Harvey	08627544	99976574	S	N/A	N/A	N/A	80-90%	80-90%
	AXXXXXXX	Craig McGlynn	07319920	46831221	S	N/A	N/A	N/A	70-80%	70-80%
-	AXXXXXXX	Bradford Bins	94514471	26920693		Submit		Pass 3	80-90%	90-100%
-	AXXXXXXX	Adam Bosco	33720208	37534639		Submit		Pass 3	60-70%	60-70%
-	AXXXXXXX	Hollie Fisher	36044157	53930445		Submit		Pass 2	80-90%	80-90%
	AXXXXXXX	Blanche Bode	19208845	24052581		Not Submit		Not Submit	40-50%	50-60%
-	AXXXXXXX	Frida Kiehn	78191699	38103031		Submit		Pass 3	80-90%	80-90%
	AXXXXXXX	Eulah Mraz	86995088	89187335		Not Submit		Not Submit	60-70%	50-60%
-	AXXXXXXX	Jocelyn Bartell	74240344	31486517		Submit		Pass 3	50-60%	40-50%
-	AXXXXXXX	Deborah Watsica	99359149	61217869		Submit		Pass 3	80-90%	70-80%
-	AXXXXXXX	Frieda Kunze	87156737	26155957		Submit		Pass 3	80-90%	80-90%
-	AXXXXXXX	Kip Nolan	49604671	28613777		Submit		Pass 3	60-70%	50-60%
	AXXXXXXX	Ignacio Reinger	49019365	31486117	S	N/A	N/A	N/A	90-100%	90-100%

Student details

Short-term predictions

(Assignment Submission)

OUAnalys

Long-term propensity of success

SPM

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Evidence Predictive Analytics is making a difference

Paper: Educational Technology Research and Development, 2019

59 ALs 1325 Students

9 OU Courses

Paper: British Journal of Educational Technology, 2019

559 ALs 14K Students

15 OU Courses

Paper: Int. Conf. on Artificial Intelligence in Education, 2021.

1500 Students

3 OU Courses

World-class research, with large-scale studies and over 30 publications

The more ALs use OUA, the more retention is increased

More students pass courses (~7-8% more) where ALs regularly use OUA than when they don't

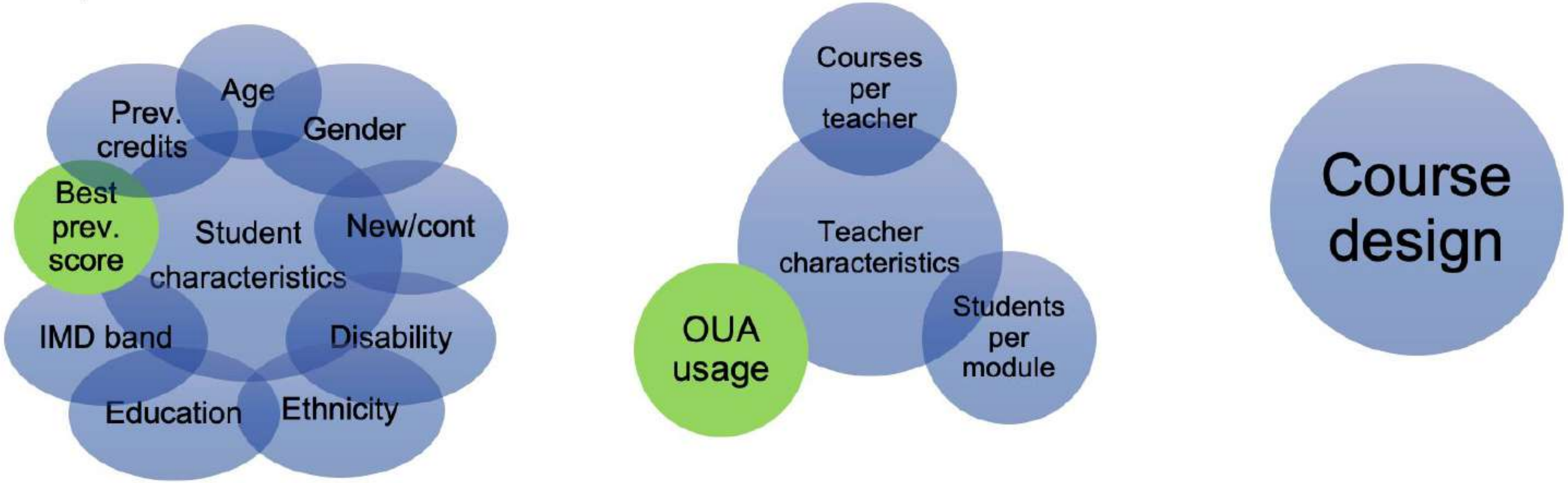
Retention of ethnic minority students increases by ~10% with the use of OUA

Does OU Analyse use by tutors lead to better student OU performance?

What are the factors best explaining student pass and retention rates?

Sample: 59 teachers, 1325 students, 9 year 1 courses across all Faculties.

Findings: OUA usage and best previous score as best predictors of student pass and completion rates.



Herodotou C., Rienties B., Boroowa A., Zdrahal Z., Hlosta M. A large-scale implementation of Predictive Learning Analytics in Higher Education: The teachers' role and perspective. Educational Technology Research and Development, https://link.springer.com/article/10.1007/s11423-019-09685-0 [

Is OUAnalyse better than other ways of monitoring students' progress?

- **54 teachers who taught the same courses in the academic year 2015/16 and 2016/17. Access to EAID only in 2016/17.**
- **No statistically significant differences in previous best performance between groups of students in the two academic years. Observed differences not related to students' variation in academic ability.**
- **Significant differences in student performance for teachers who made EAID use the year they were using OUA.**

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Herodotou, C., Hlosta, M., Boroowa, A., Rienties, B., Zdrahal, Z., Mangafa, C. (2019b). Empowering online teachers through predictive learning analytics. British Journal of Educational Technology. 50(6) pp. 3064–3079. https://doi.org/10.1111/bjet.12853

What are tutors' views about OU Analyse?

OUA complements existing teaching practices and empowers teachers to become more proactive and engaging with their students.

Teachers who tend to check on students and their progress often:

- OUA systematized their practices and made it easier to identify what students were doing at certain times.

For others:

- it influenced their practices positively by making them more proactive in contacting students

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Herodotou, C., Rienties, B., Hlosta, M., Boroowa, A., Mangafa, C., Zdrahal, Z. (2020). The scalable implementation of predictive learning analytics at a distance learning university: Insights from a longitudinal case study. Internet and Higher education. https://doi.org/10.1016/j.iheduc.2020.100725

Can OU Analyse use help specific student groups?

Impact of Predictive Learning Analytics on Course Awarding Gap of Disadvantaged students in STEM

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Abstract. In this work, we investigate the degree-awarding gap in distance higher education by studying the impact of a Predictive Learning Analytics system, when applying it to 3 STEM (Science, Technology, Engineering and Mathematics) courses with over 1,500 students. We focus on Black, Asian and Minority Ethnicity (BAME) students and students from areas with high deprivation, a proxy for low socio-economic status. Nineteen teachers used the system to obtain predictions of which students were at risk of failing and got in touch with them to support them (intervention group). The learning outcomes of these students were compared with students whose teachers did not use the system (comparison group). Our results show that students in the intervention group had 7% higher chances of passing the course, when controlling for other potential factors of success, with the actual pass rates being 64% vs 61%. When disaggregated: 1) BAME students had 10% higher pass rates (55% vs 45%) than BAME students in the comparison group and 2) students from the most deprived areas had 4% higher pass rates (58% vs 54%) in the intervention group compared to the comparison group.

Keywords: Predictive Analytics · Course Awarding Gap · BAME · SES

1 Introduction

Historically, the performance of some demographic groups of students has been persistently worse than others. The impact of low socio-economic status (SES) on learning has increased over the last 50 years across countries, including the UK [3]. The attainment of ethnic minorities is consistently worse than White students. In the UK, in the past decade, 57% of Black students gained an upper second or first in their undergraduate degree, compared with 81% of White students [10]. There may be a significant overlap between Black, Asian and Minority Ethnic (BAME) students and low SES students. Recent post-pandemic statistics show that nearly half of BAME households (46%) live in poverty as opposed to 20% of White households [11].

Predictive Learning Analytics (PLA) focuses on forecasting the future students' outcomes using Machine Learning (ML) models and provide actionable

- Impact of dashboard on the course awarding gap of students from black & minority ethnic backgrounds and low socio-economic status(SES)
- Students from black and minority ethnic groups in the intervention group better passing rates (62%) as opposed to similar students in the control group (52%)
- Students from low SES (in intervention group) better outcomes (pass and overall score) than similar students in the control group
- Students found in disadvantaged contexts such as poverty are more likely to benefit from the EAID dashboard.

Predictive Dashboard Co-designed with OU students

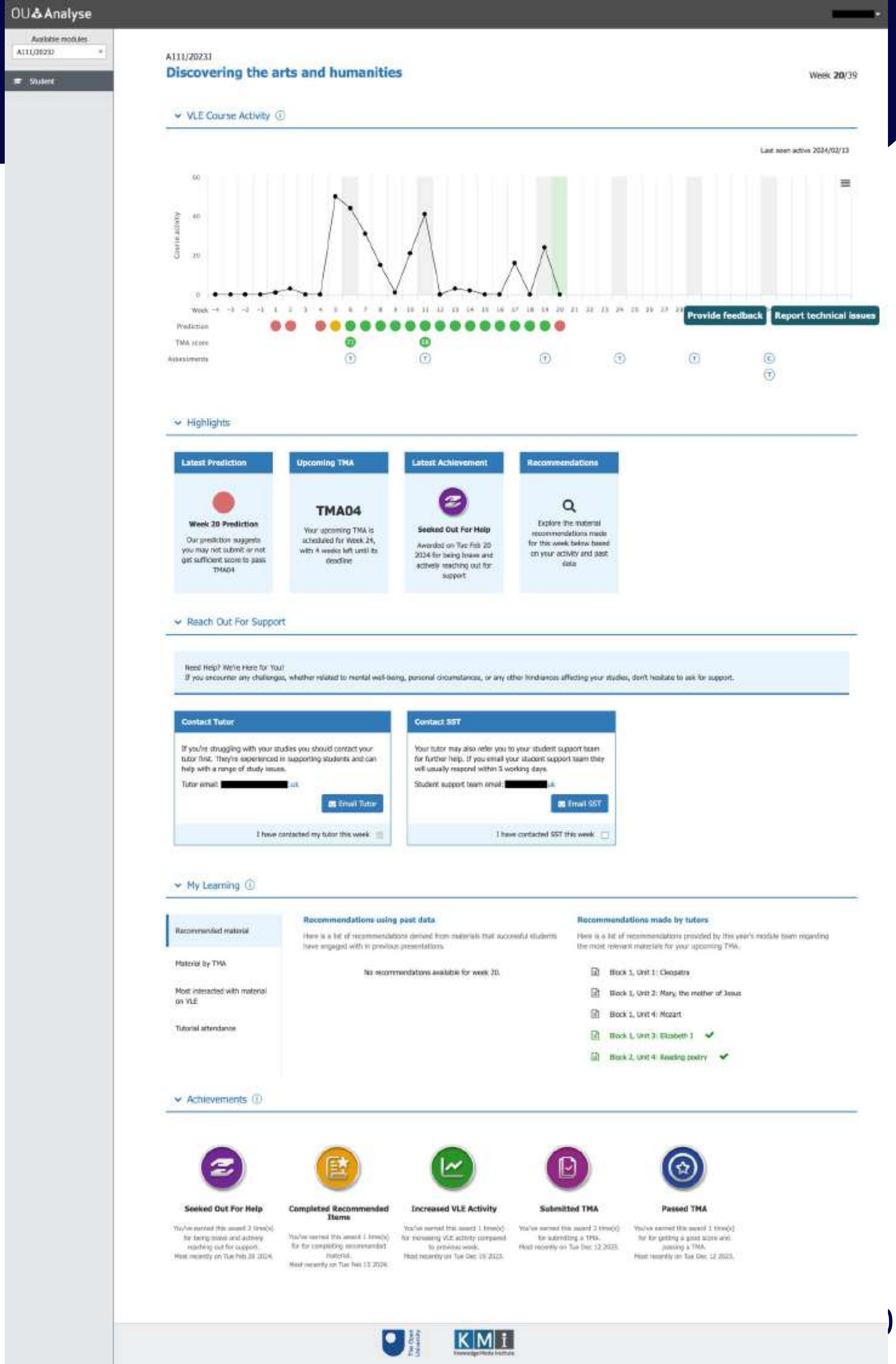
- **Based on the OU Analyse Early Alert Indicators dashboard**
- **Focus groups with 20 students**

- **Data points endorsed by students related to”**
  - descriptive (assignment scores, engagement with VLE, material accessed),
  - predictive (score prediction),
  - prescriptive data (material recommendations and contact information).

- **Students’ choices of data points driven by a desire to better understand their study progress and take appropriate action.**

Student facing dashboard :

- Students can monitor their own performance on a module
- Raises awareness of study progress
- Provides material recommendations
- Provides support options (email tutor, contact SSTs)
- Enables students to take action to improve their performance



IET Authors for OU Anlayse :Herodutu and Rienties

Herodotou, C., Maguire, C., Mcdowell, N. D., Hlosta, M., & Boroowa, A. (2021). The engagement of university teachers with predictive learning analytics. *Computers & Education*, 104285.

Herodotou, C., Naydenova, G., Boroowa, A., Gilmour, A., & Rienties, B. (2020). How Can Predictive Learning Analytics and Motivational Interventions Increase Student Retention and Enhance Administrative Support in Distance Education?. *Journal of Learning Analytics*, 7(2), 72-83.

Herodotou, C., Rienties, B., Hlosta, M., Boroowa, A., Mangafa, C., Zdrahal, Z. (2020). The scalable implementation of predictive learning analytics at a distance learning university: Insights from a longitudinal case study. *Internet and Higher Education (IHE),* 45, 100725.

Herodotou, C., Hlosta, M., Boroowa, A., Rienties, B., Zdrahal, Z., Mangafa, C. (2019). Empowering online teachers through predictive learning analytics. *British Journal of Educational Technology*, 50(6) pp. 3064–3079.

Herodotou, C., Rienties, B., Boroowa, A., Zdrahal, Z., Hlosta, M. (2019). A large-scale implementation of Predictive Learning Analytics in Higher Education: the teachers' role and perspective. *Educational Technology Research and Development*, 67(5) pp. 1273–1306.

Herodotou, C., Rienties, B., Verdin, B., & Boroowa, A. (2019). Predictive learning analytics 'at scale': Guidelines to successful implementation in Higher Education based on the case of the Open University UK. *Journal of Learning Analytics*, *6*(1), 85-95.

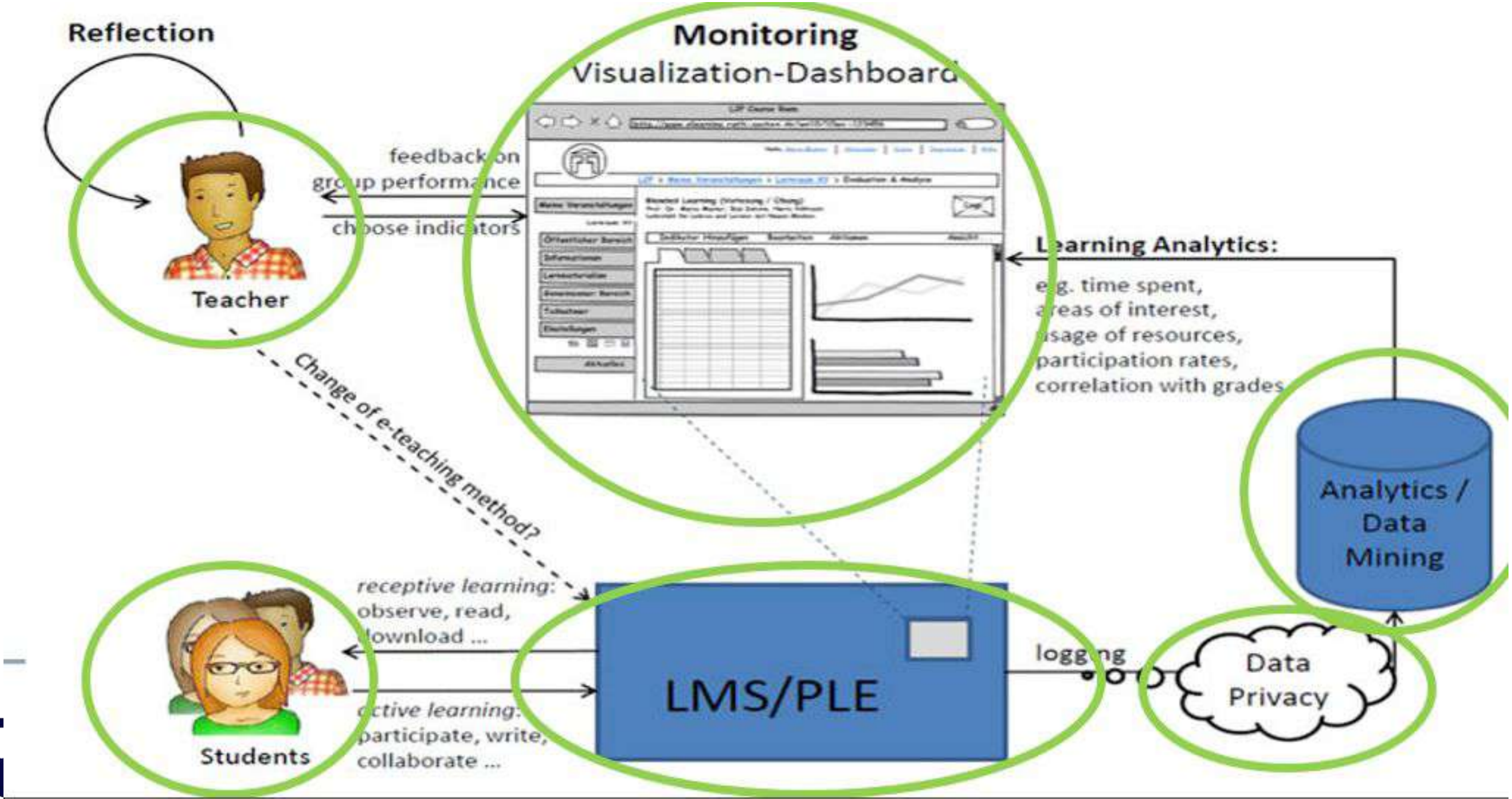
Hlosta, M., **Herodotou,** C., Fernandez, M. and Bayer, V. (2021). Impact of Predictive Learning Analytics on Course Awarding Gap of Disadvantaged students in STEM. In: *22nd International Conference on Artificial Intelligence in Education, AIED 2021, Lecture Notes in Artificial Intelligence,* Springer.

Boroowa, A. & **Herodotou**, C. (2022). Learning analytics in open and distance higher education: The case of the Open University UK. In (Eds) Paul Prinsloo, Sharon Slade, Mahammad Khalil: *Learning Analytics in Open and Distributed Learning: Potential and Challenges*. Springer Nature.

Kaliisa R., Gillespie A., **Herodotou.** C., Kluge A., Rienties B. (2021) Teachers' Perspectives on the Promises, Needs and Challenges of Learning Analytics Dashboards: Insights from Institutions Offering Blended and Distance Learning. In: Sahin M., Ifenthaler D. (eds) Visualizations and Dashboards for Learning Analytics. *Advances in Analytics for Learning and Teaching*. Springer, Cham.

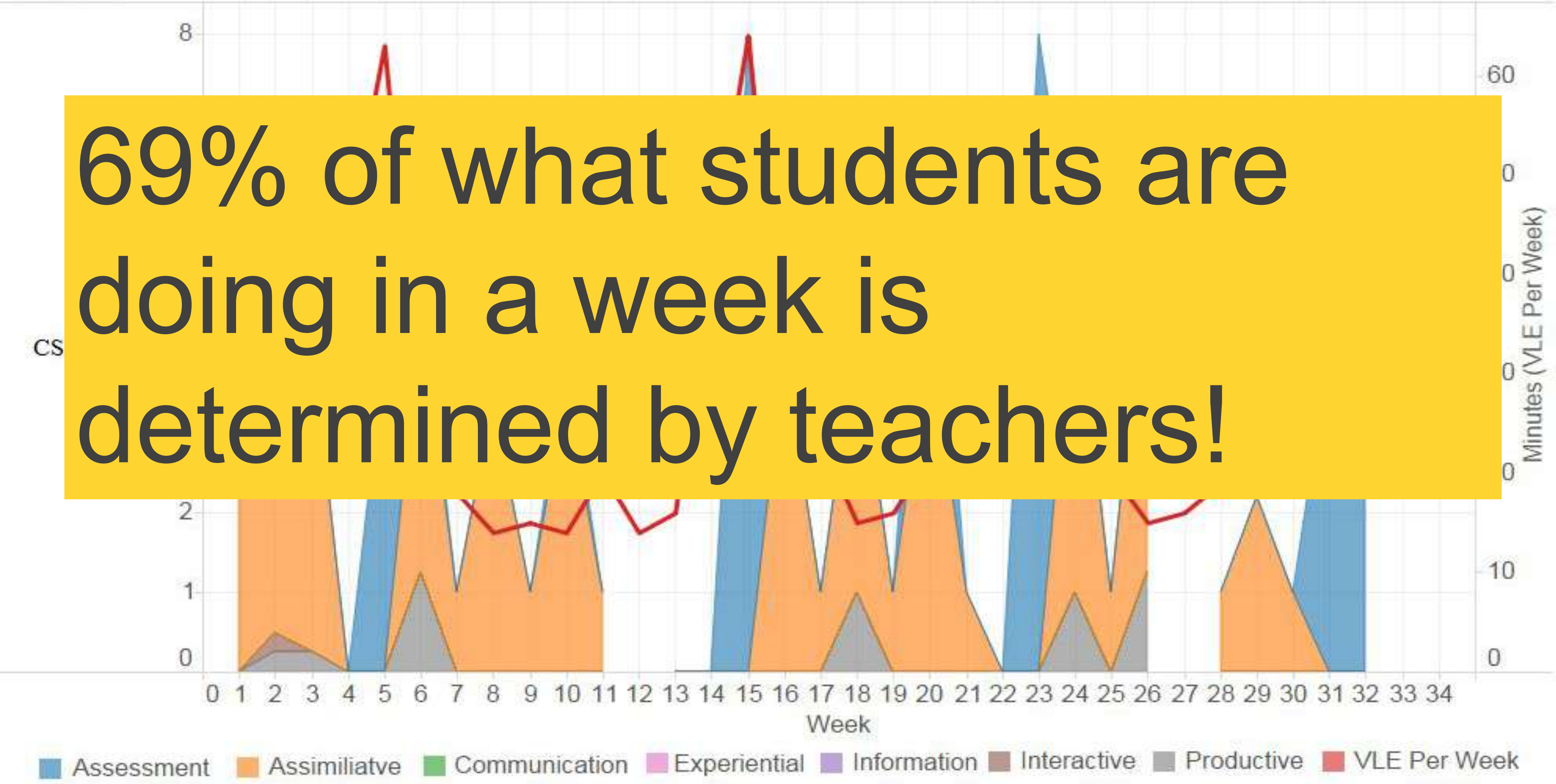
Rienties, B., & **Herodotou**, C. (2021). Making sense of learning data at scale. Sharpe, Rhona; Bennett, Sue and Varga-Atkins, T. eds. *Handbook for Digital Higher Education*. Cheltenham: Edward Elgar Publishing.

Model of LA Usage with Staff and Students



Dyckhoff, A. L., Zielke, D., Bültmann, M., Chatti, M. A., & Schroeder, U. (2012). Design and Implementation of a Learning Analytics Toolkit for Teachers. *Journal of Educational Technology & Society*, *15*(3), 58-76.

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



Nguyen, Q., Rienties, B., Toetenel, L., Ferguson, R., Whitelock, D. (2017). Examining the designs of computer-based assessment and its impact on student engagement, satisfaction, and pass rates. *Computers in Human Behavior*. DOI: 10.1016/j.chb.2017.03.028.

Learning Analytics and Learning Design

Magic of learning design (does not come easy)

TechTrends
https://doi.org/10.1007/s11528-020-00498-0

ORIGINAL PAPER

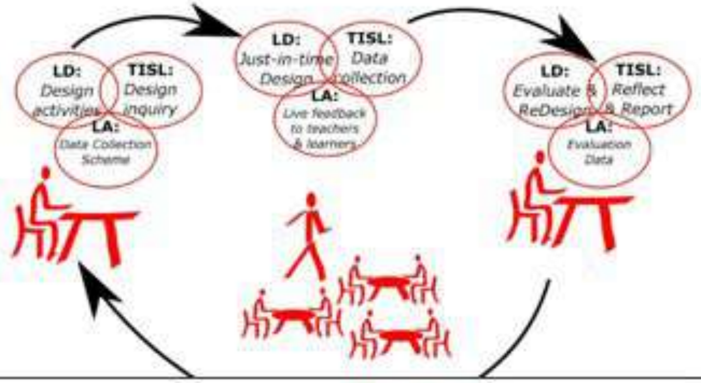
Check for updates

Learning Design: European Approaches

Barbara Wasson[1] · Paul A. Kirschner[2]

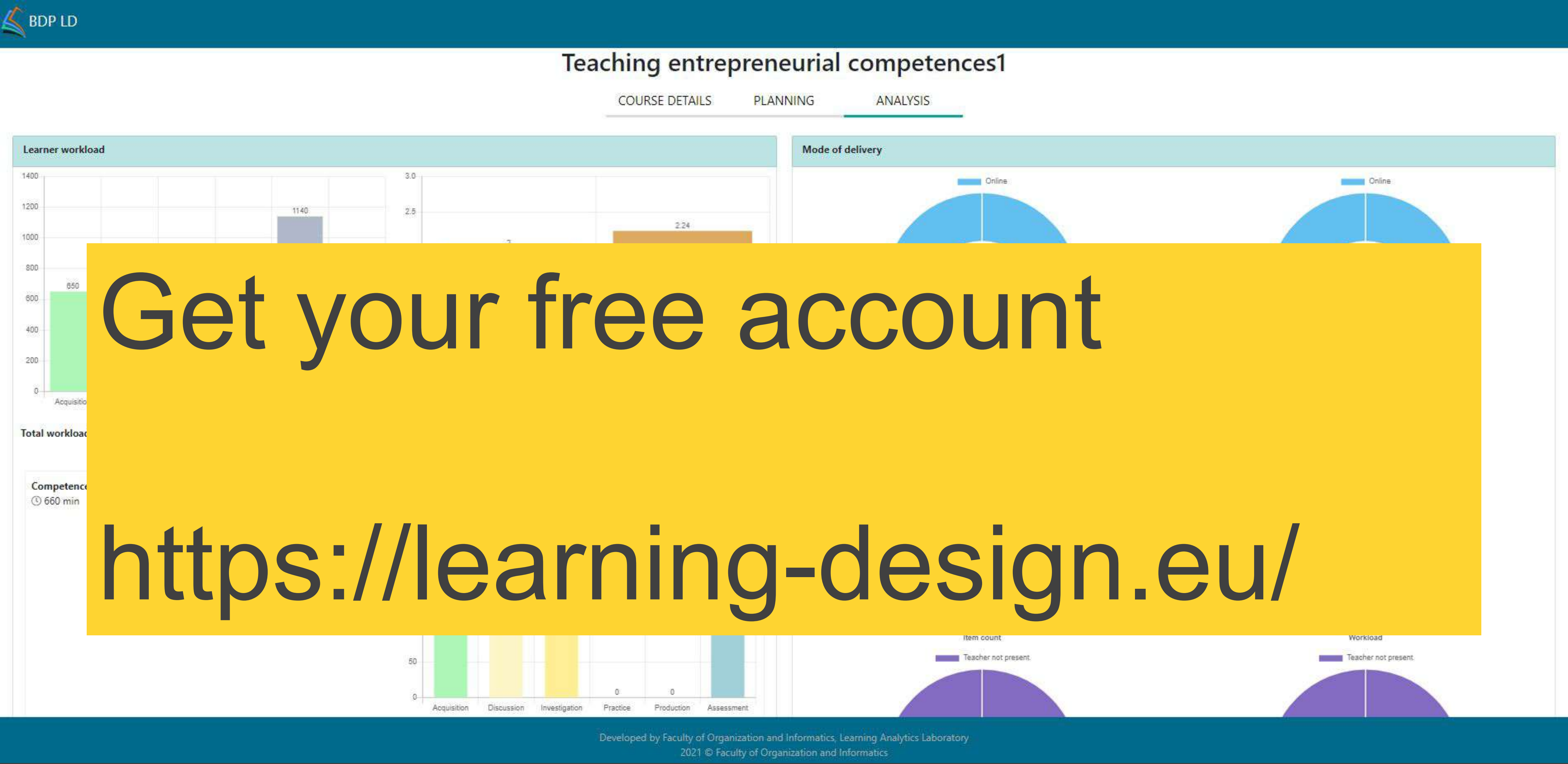
Abstract
Research on instructional and learning design is 'booming' in Europe, although there has been a move from a focus on content and the way to present it in a formal educational context (i.e., instruction), to a focus on complex learning, learning environments including the workplace, and access to learner data available in these environments. We even see the term 'learning experience design' (Neelen and Kirschner 2020) to describe the field. Furthermore, there is an effort to empower teachers (and even students) as designers of learning (including environments and new pedagogies), and to support their reflection on their own practice as part of their professional development (Hansen and Wasson 2016; Luckin et al. 2016; Wasson et al. 2016). While instructional design is an often heard term in the United States and refers

Fig. 7 Teacher-led design inquiry of learning and innovation cycle (Wasson et al. 2016)



"Research on **the relationship between learning design and learning analytics** has also been a focus in European research in recent years. For example, in their research at **the Open University UK**, Toetenel and Rienties combine learning design and learning analytics where learning design provides context to empirical data about OU courses enabling the learning analytics to give insight into learning design decisions. **This research is important as it attempts to close the virtuous cycle between learning design to improve courses and enhancing the quality of learning, something that has been lacking in the research literature**. For example, they study the impact of learning design on pedagogical decision-making and on future course design, and the relationship between learning design and student behaviour and outcomes (Toetenel and Rienties 2016; Rienties and Toetenel 2016; Rienties et al. 2015)."

Wasson, B., & Kirschner, P. A. (2020). Learning Design: European Approaches. *TechTrends*, 1-13.



Get your free account

https://learning-design.eu/

Rienties, B., Balaban, I., Divjak, B., Grabar, D., Svetec, B., Vonda, P. (2023). Applying and translating learning design approaches across borders. *Practicable Learning Analytics.* O. Viberg and A. Gronlund (Eds). Springer Nature.

Rienties, B., Divjak, B., Eichhorn, M., Iniesto, F. Saunders-Smits, G., Svetec, B., Tillmann, A., Zizak, M. (2023). Online professional development across institutions and borders. *International Journal of Educational Technology in Higher Education*.

Balanced Design Planning

learning-design.eu

1600+
USERS

30+
COUNTRIES

1500
COURSES

RAPIDE e-course on relevant pedagogies and LA

COURSE DETAILS | PLANNING | ANALYSIS | EXPORT

Edit TLA

Name ⓘ: Peer-assessment

Description ⓘ: Solutions to the problem assignement are peer-assessed.

Learning type ⓘ: Assessment

Description: Use this category to allocate time to activities which are directly assessed, either by a tutor, a peer or a computer. Assessment includes both formative and summative assessment.

Example usage: Quizzes, tests, written assignments, peer assessment activities,...

Workload in minutes ⓘ: 60

Activity delivery ⓘ: **Online** | On-site | Hybrid

Synchronous | **Asynchronous**

Teacher-present | **Teacher not present**

Collaboration ⓘ: ☐

Work in groups ⓘ: ☐

Feedback ⓘ: ☑

Feedback provider ⓘ: ☑ Teacher ☐ Automated ☑ Peer ☐ Other

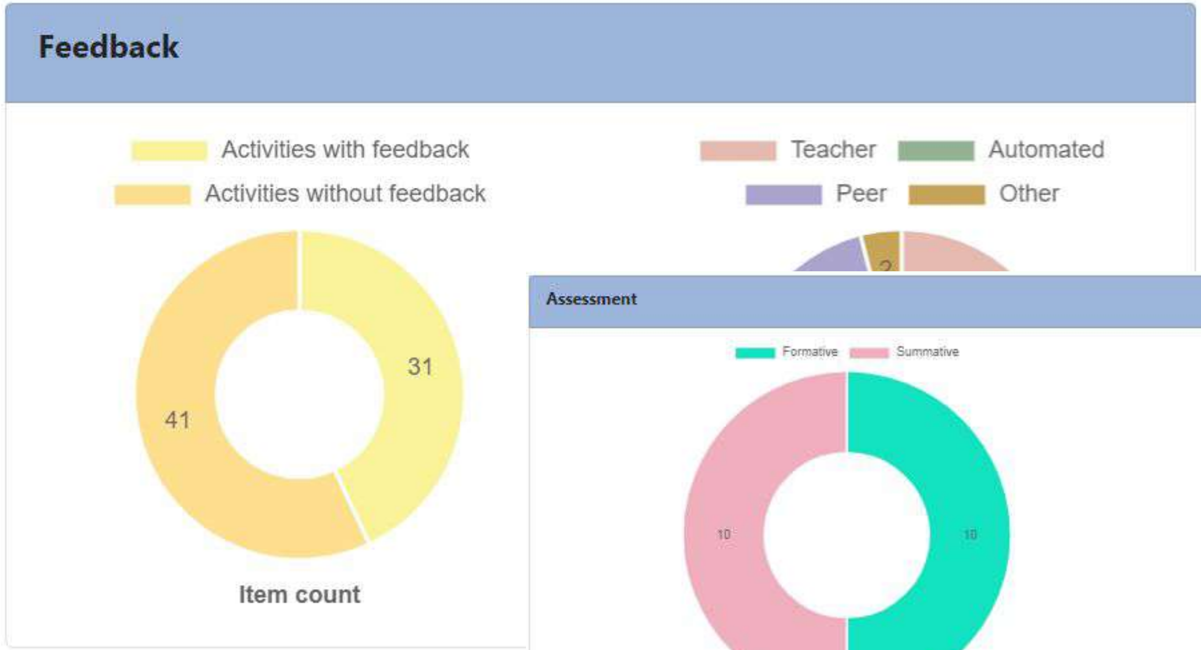
Assessment ⓘ: ☑

Assessment type ⓘ: Summative

Assessment provider ⓘ: ☑ Teacher ☑ Automated ☐ Peer ☑ Self ☐ Other

Assessment points ⓘ: 10

iLed Innovating Learning Design in Higher Education



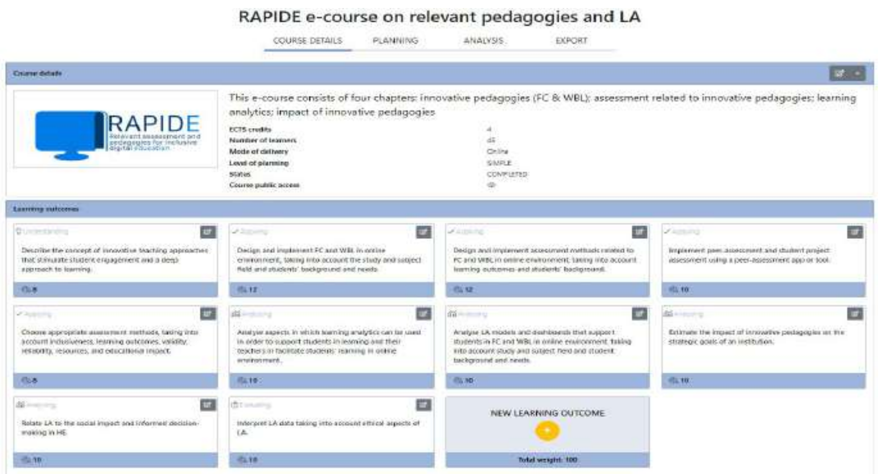
Assessment and learning outcomes

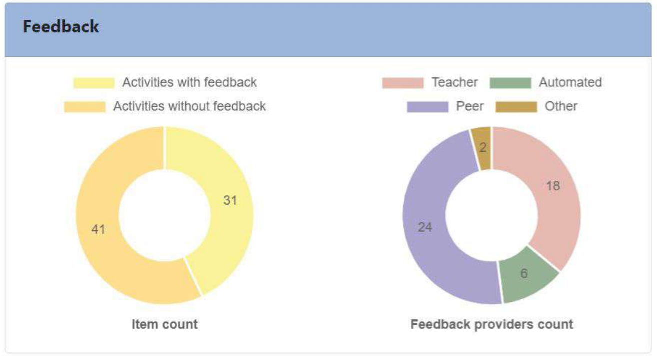
Topic	Assessment: Formative	Assessment: Summative	Describe the concept of innovative teaching approa... (8)	Design and implement FC and WBL in online environm... (12)	Design and implement assessment methods related to... (12)	Implement peer-assessment and student project asse... (10)	Analyse aspects in which learning analytics can be... (10)	Analyse LA models and dashboards that support stud... (10)	Interpret LA data taking into account ethical aspe... (10)	Choose appropriate assessment methods, taking into... (8)	Estimate the impact of innovative pedagogies on th... (10)	Relate LA to the social impact and informed decisi... (10)
Innovative pedagogies (FC & WBL)	6	30	90%	90%	10%						10%	
Assessment related to innovative pedagogies	4	11	10%	10%	90%	100%				100%		
Learning analytics and dashboards	11	20					100%	100%	90%			20%
Impact of innovative pedagogies	2	20							10%		90%	80%
Total	23	81	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	104											

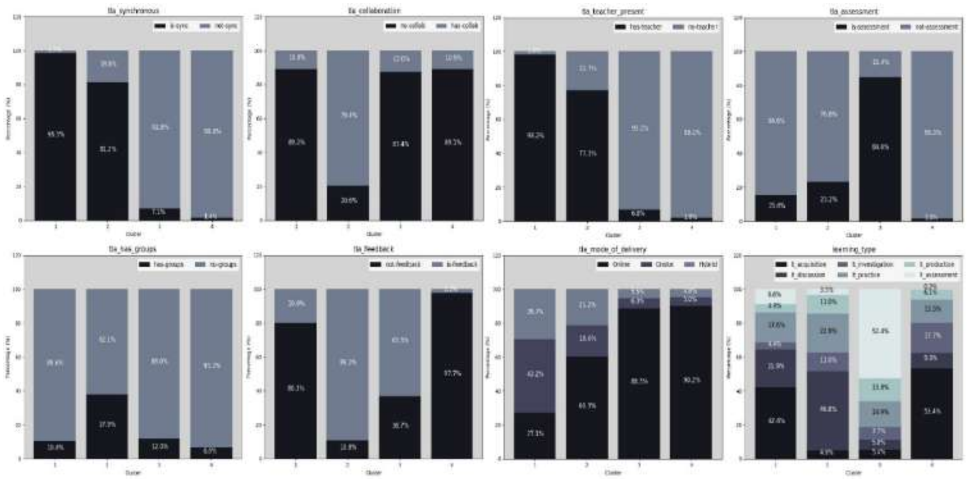
Divjak, B., Grabar, D., Svetec, B., & Vondra, P. (2022). Balanced Learning Design Planning: Concept and Tool. *Journal of Information and Organizational Sciences*.
Rienties, B., Balaban, I., Divjak, B., Grabar, D., Svetec, B., & Vonda, P. (2023). Applying and translating learning design approaches across borders. In O. Viberg & A. Gronlund (Eds.), *Practicable Learning Analytics*. Springer Nature.

How can we improve our automatic advice to educators to design better learning opportunities?

1. European project iLED aims to enhance digital readiness, resilience and capacity of HE through purposeful use of innovative digital pedagogies, tools and learning design
2. Rienties et al explored how 165 educators across 40+ institutions in Europe designed and integrated 12,749 teaching and learning activities (TLA) in 218 Learning Designs using freely available learning-design.eu tool
3. The findings suggest educators use only a combination of four common learning design activities (i.e., Generating independent learning, Traditional classroom activities, Assessment, Collaboration).
4. Next step will be to include AI for automatic recommendations

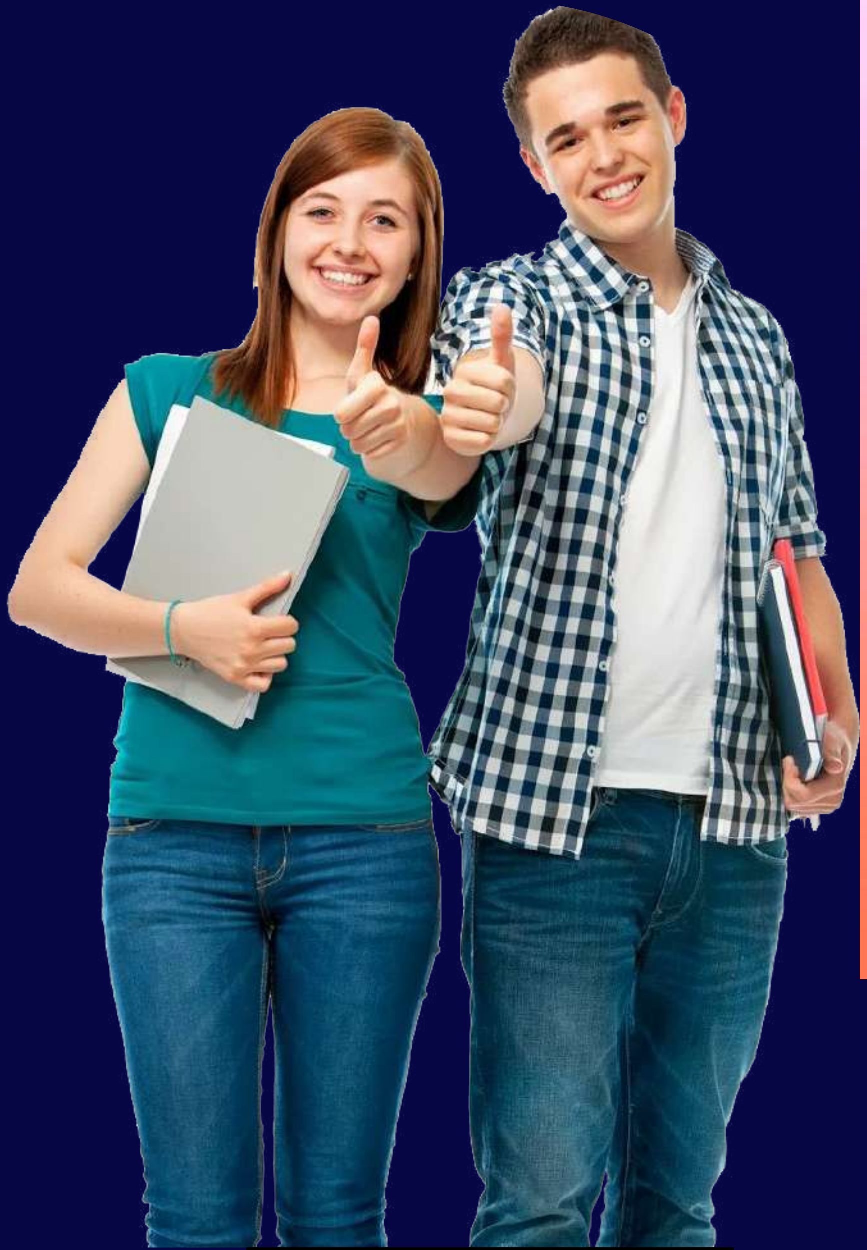






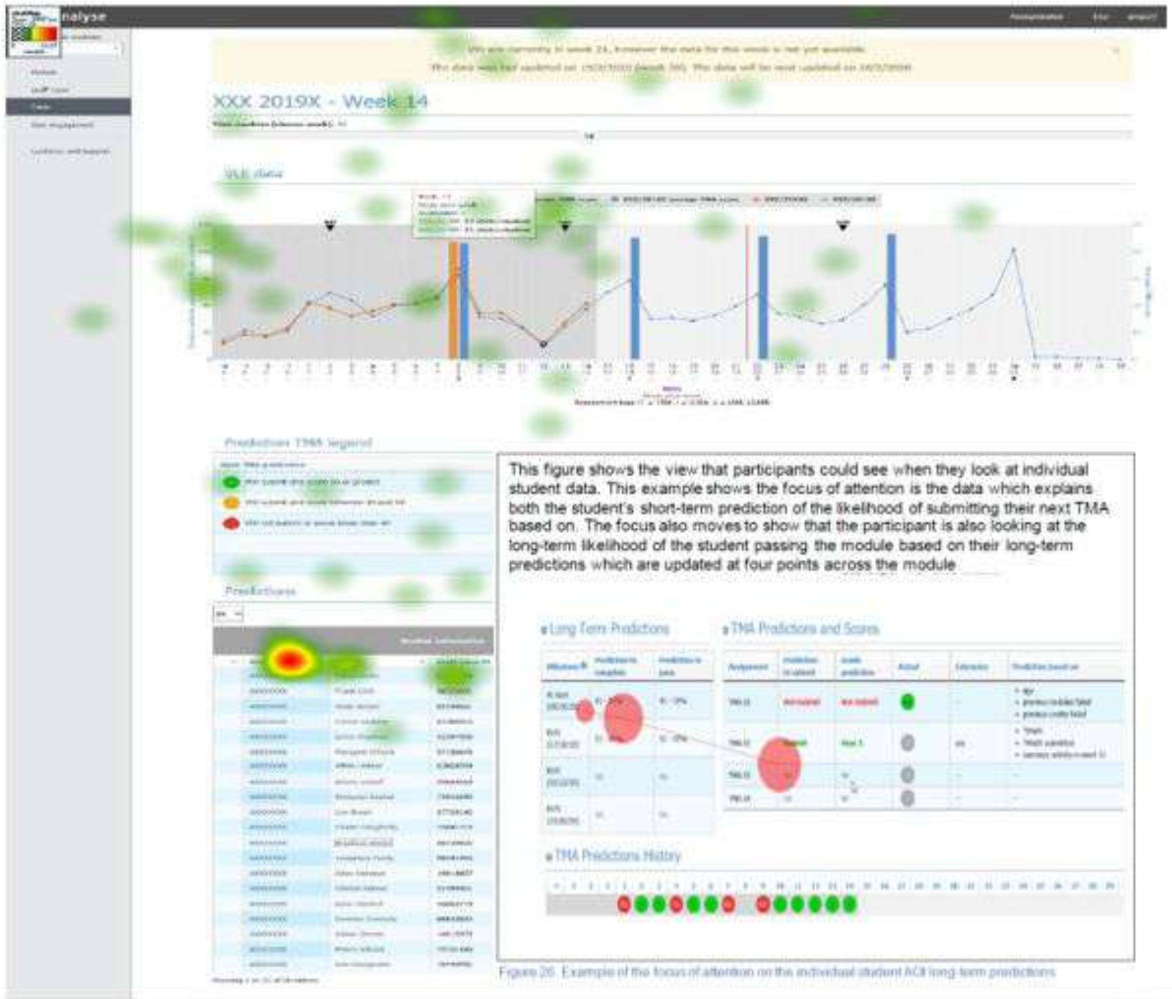
Albuquerque, J., Rienties, B., Divjak, B. (Submitted: 02-10-2023). Unpicking the DNA of learning design decisions. 14th LAK conference, Kyoto, Japan

Effective Learning Analytics: Feedback for Effective Learning



Reading Dashboards: Is this the best type of Feedback?

Figure 22. Heat map example of the density of the fixations on stimuli



- Eye-tracking combined with think-aloud protocol of experienced teachers using PLA
- Most teachers comfortable with main dashboard, but worried about ethics/data
- Some erroneous interpretations and sense making of actual data
- Uncertainty about what options to address identified issues

Gillespie, A. (2022). Teachers' Use of Predictive Learning Analytics: Experiences from The Open University UK. Doctorate in Education, Milton Keynes.

Short text for illustration of Rainbow Diagrams

Text (Extract from online FAQ about foxes)

Will the foxes in my garden attack my dog or cat?

This is extremely unlikely. ***2. Foxes avoid dogs, even small dogs, because many foxes are killed by dogs.*** So it is much more likely that your dog will attack the fox, not the other way round. Attacks on cats are equally rare: cats and foxes are roughly the same size, and cats are very capable of defending themselves against foxes. So it is hardly surprising that foxes generally give cats a wide berth and flee when threatened by a cat. Occasionally small kittens are killed, but this is rare. Keeping your cat indoors at night greatly reduces the chances of an encounter with a fox. ***8. There are also a variety of other benefits: cats kept in at night are healthier and live longer, and kill less of the local wildlife.***

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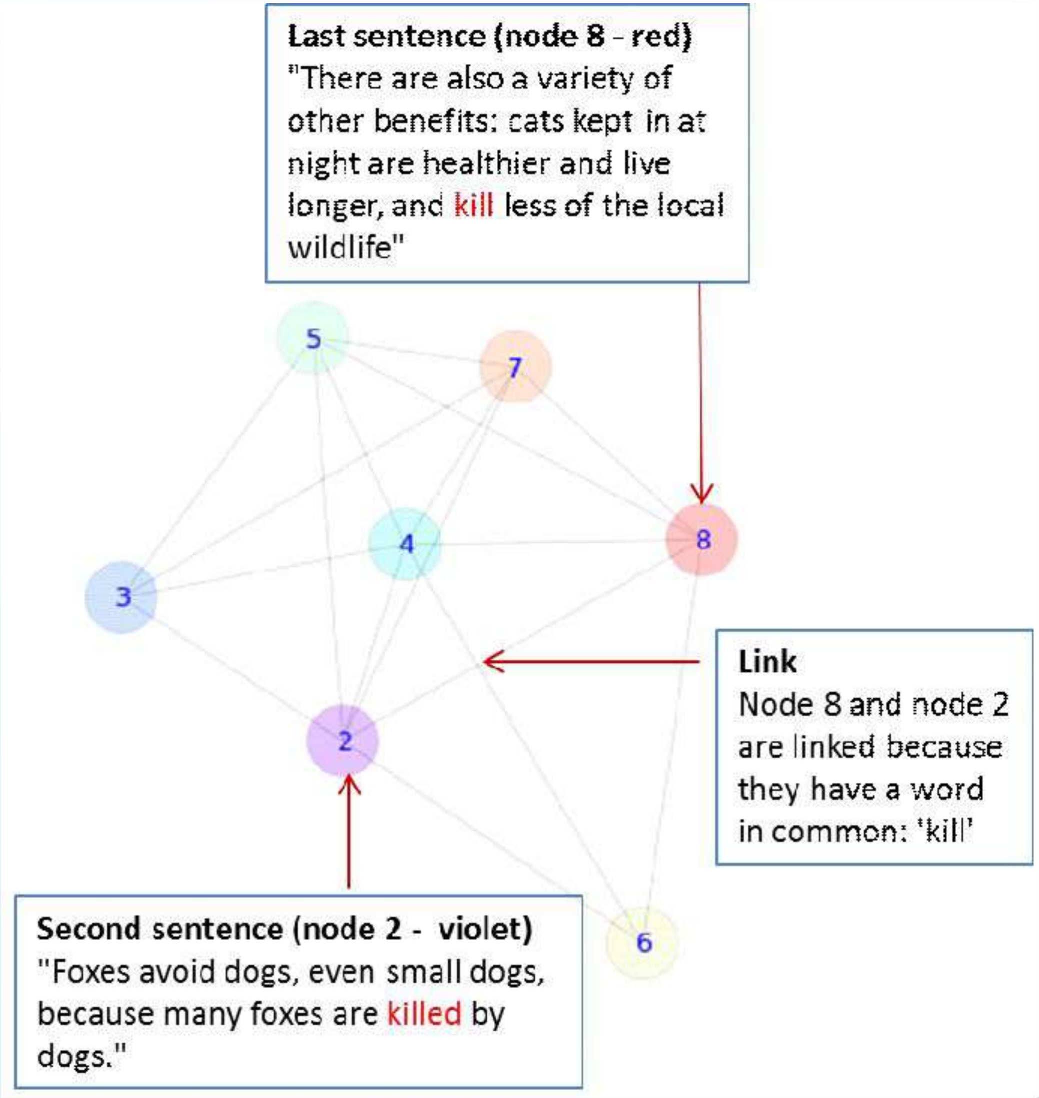
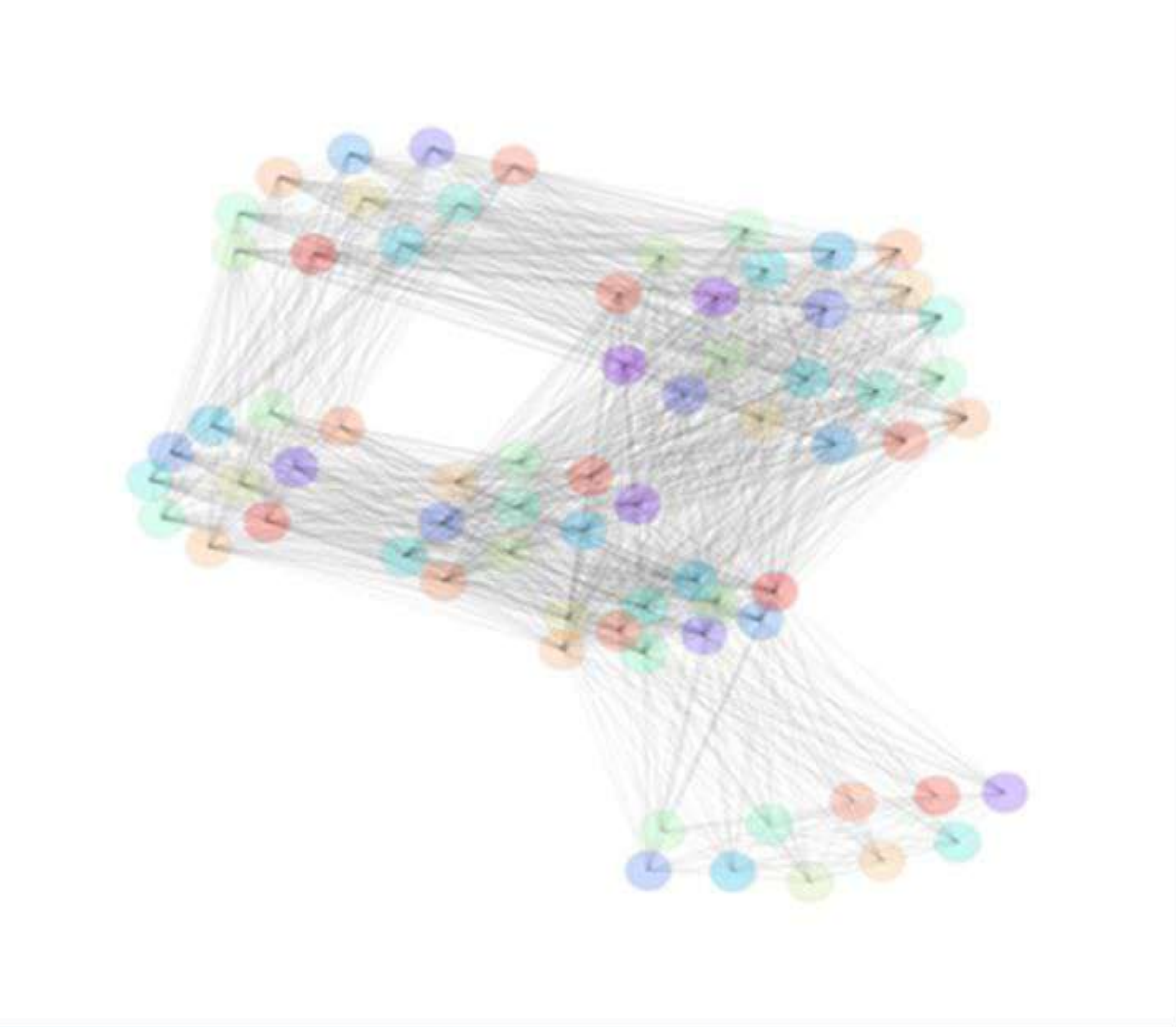
Sentence graph of short text



The Open University

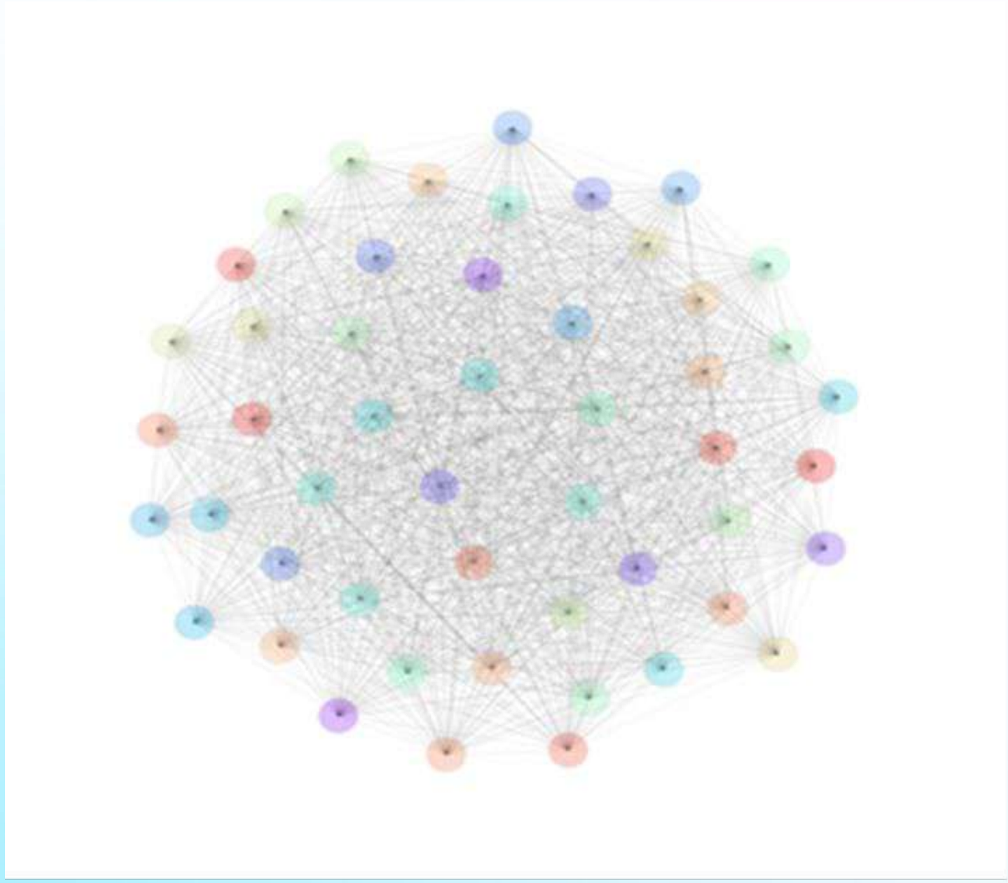
Researchers

Pretend essay: 10 identical paragraphs



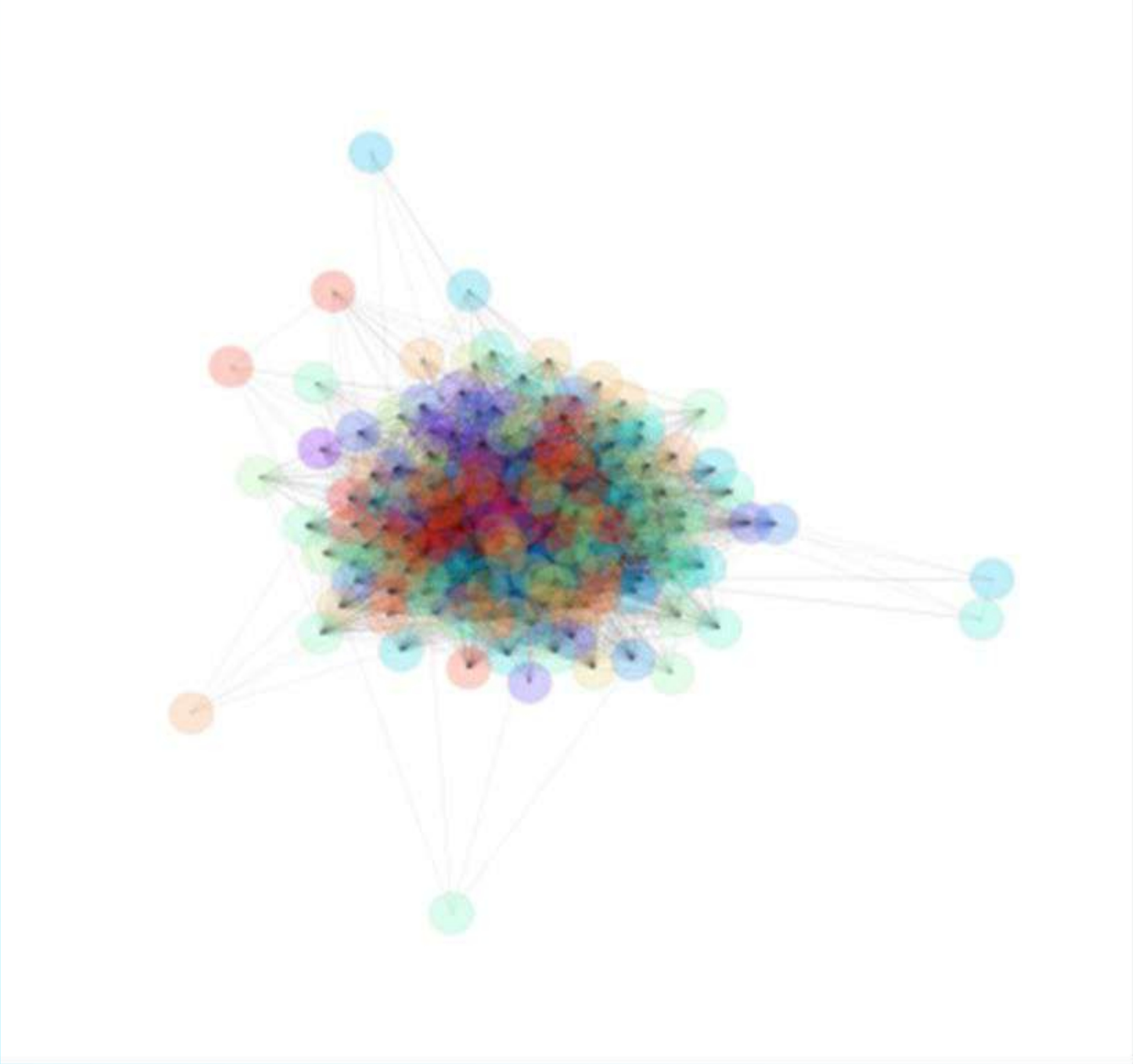
Researchers

Pretend essay: 50 identical sentences



Researchers

Stanford University Boothe Prize essay



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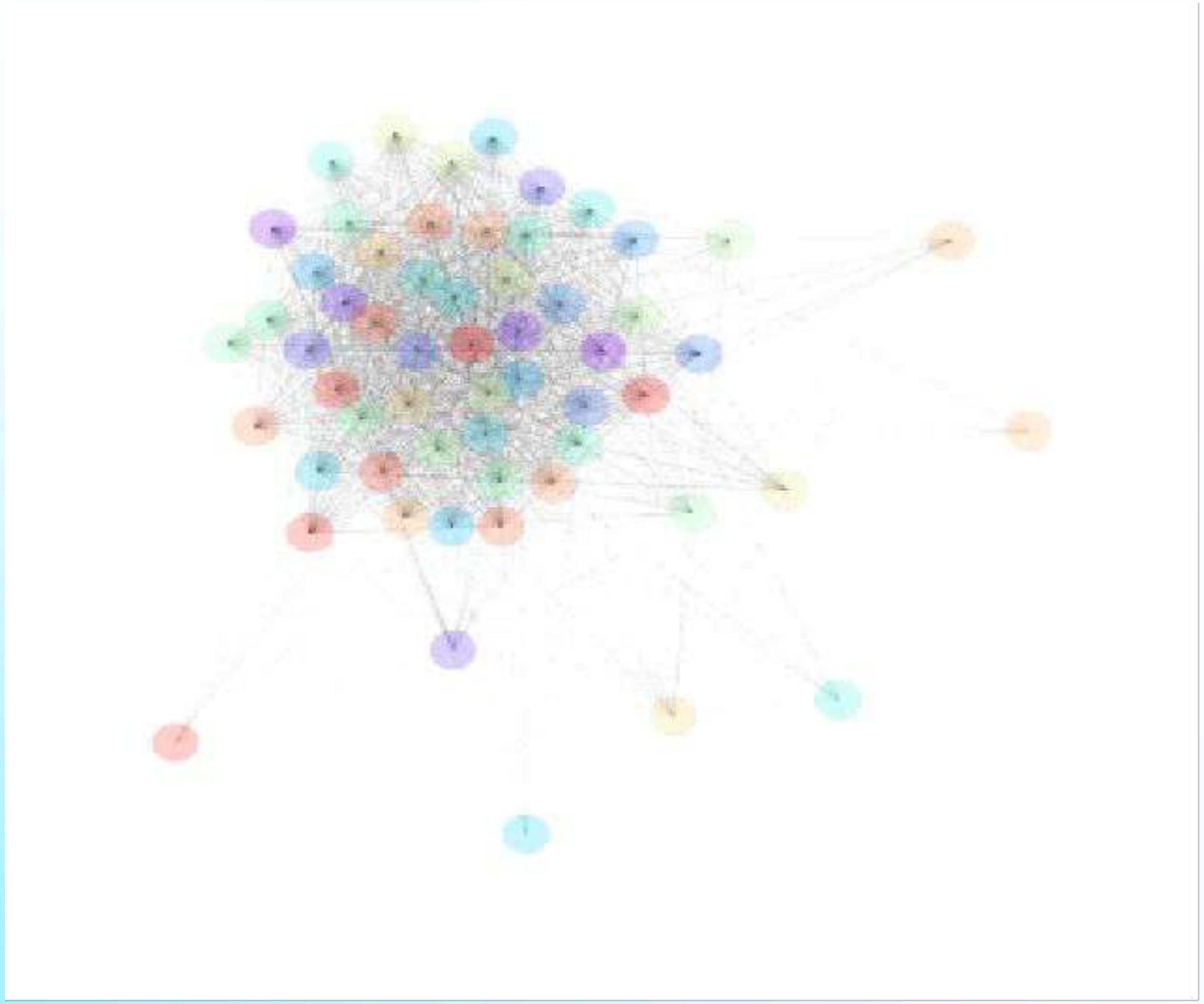
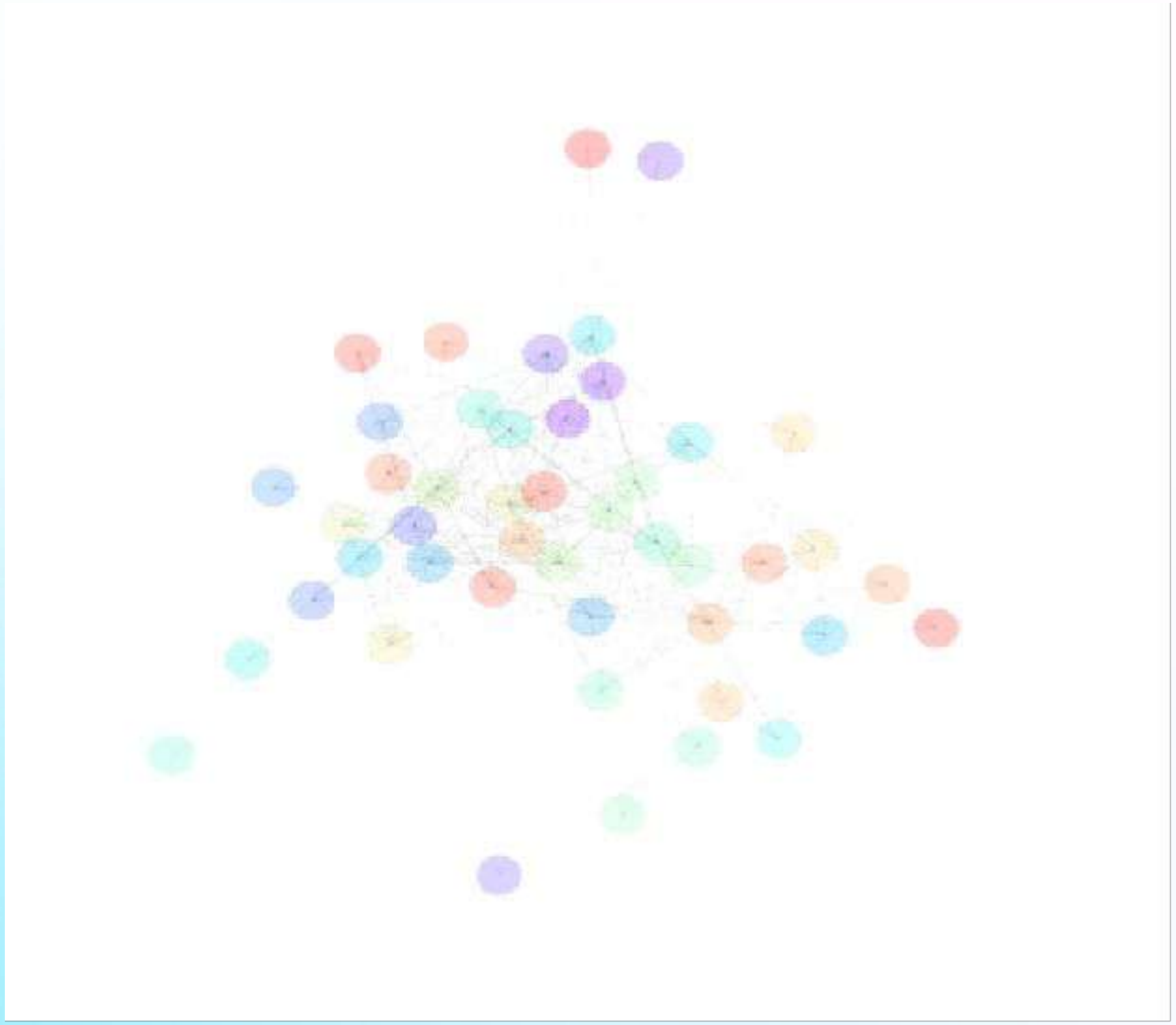
OU Essay awarded high grade



Researchers

OU essay awarded low grade



Researchers

Rainbow diagrams related to mark awarded

- Multivariate analysis of variance on marks awarded to 45 students
- Submitted two essays
- Rainbow diagrams produced from these essays and rated as high, medium or low attainment
- Covariate showed a significant relationship with the marks
- $F(1, 43) = 5.92$, $p = .01$ using a directional test
- Essays rated as high would be expected to receive 8.56 percentage points more than essays rated as medium
- 17.2 percentage points higher than essays rated from rainbow diagrams as low

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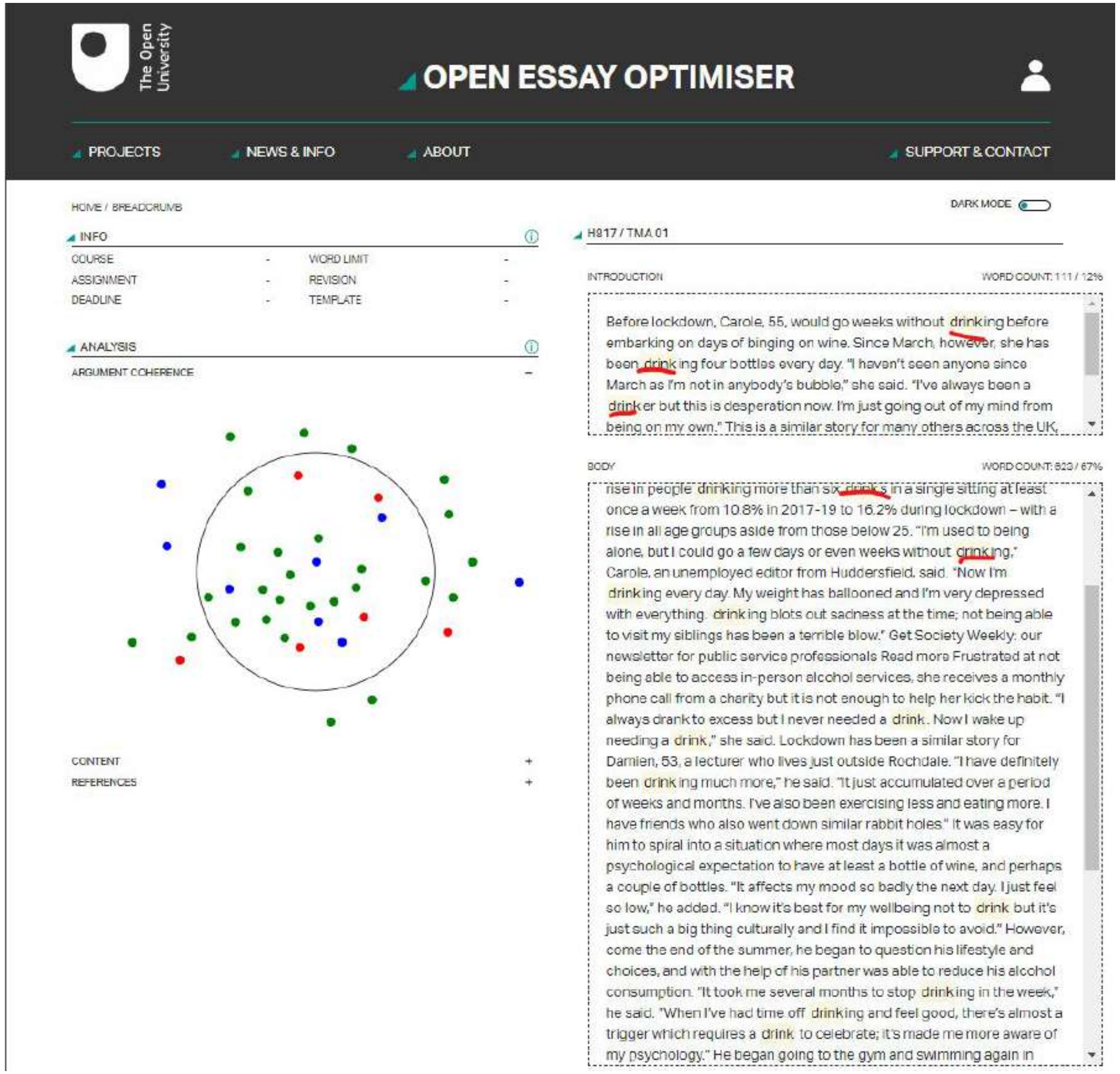
Visualisation of learning Analytics: Example from Whitelock et al

- Summarisation through different visualisations
- Using Key words and key phrases
- Mean grade for overall module for students in cohort who used Open Essayist (64.2) and students previous cohort (53.7) p0.4

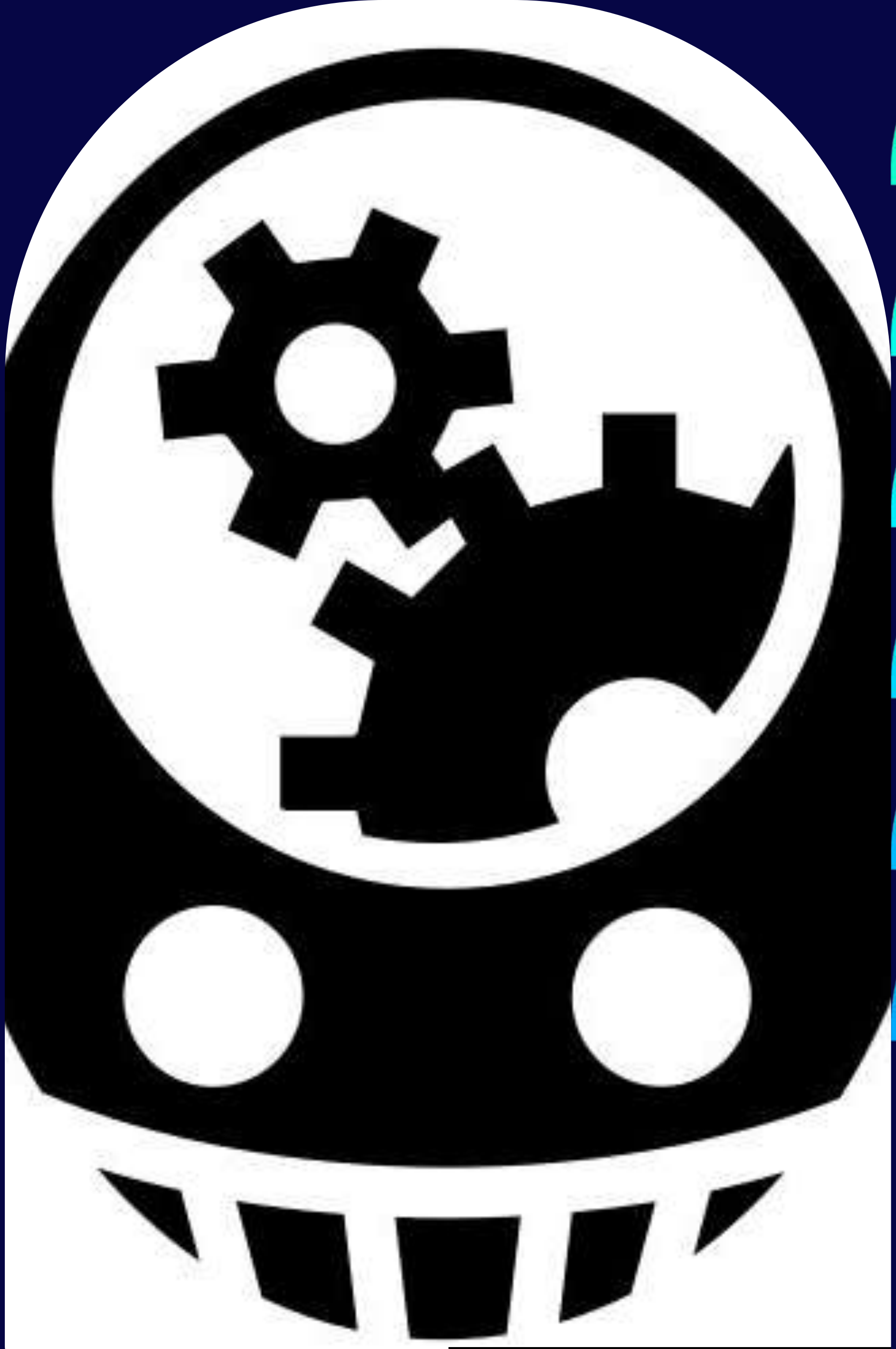


- Coherence related to mark awarded now available with Open Essay Optimiser Whitelock et al (2022)

Whitelock, D., Twiner, A., Richardson, J.T.E., Field, & Pulman, S. (2018). What does a 'good' essay loo like? Rainbow diagrams representing essay quality In: E. Ras & A. Guerrero Roldan (Eds.) Technology Enhanced Assessment (TEA2017). Communication in Computer and Information Science, Springer, Cham, 829, 1-12.

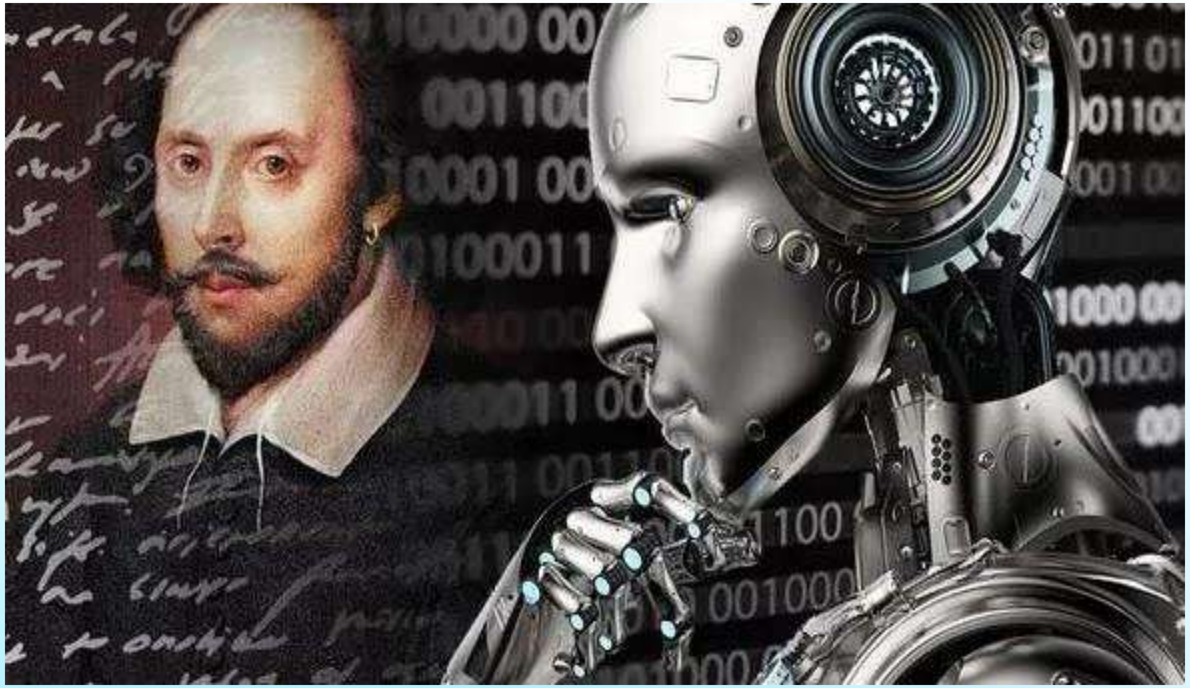
Generative Artificial Intelligence

Moving Forward



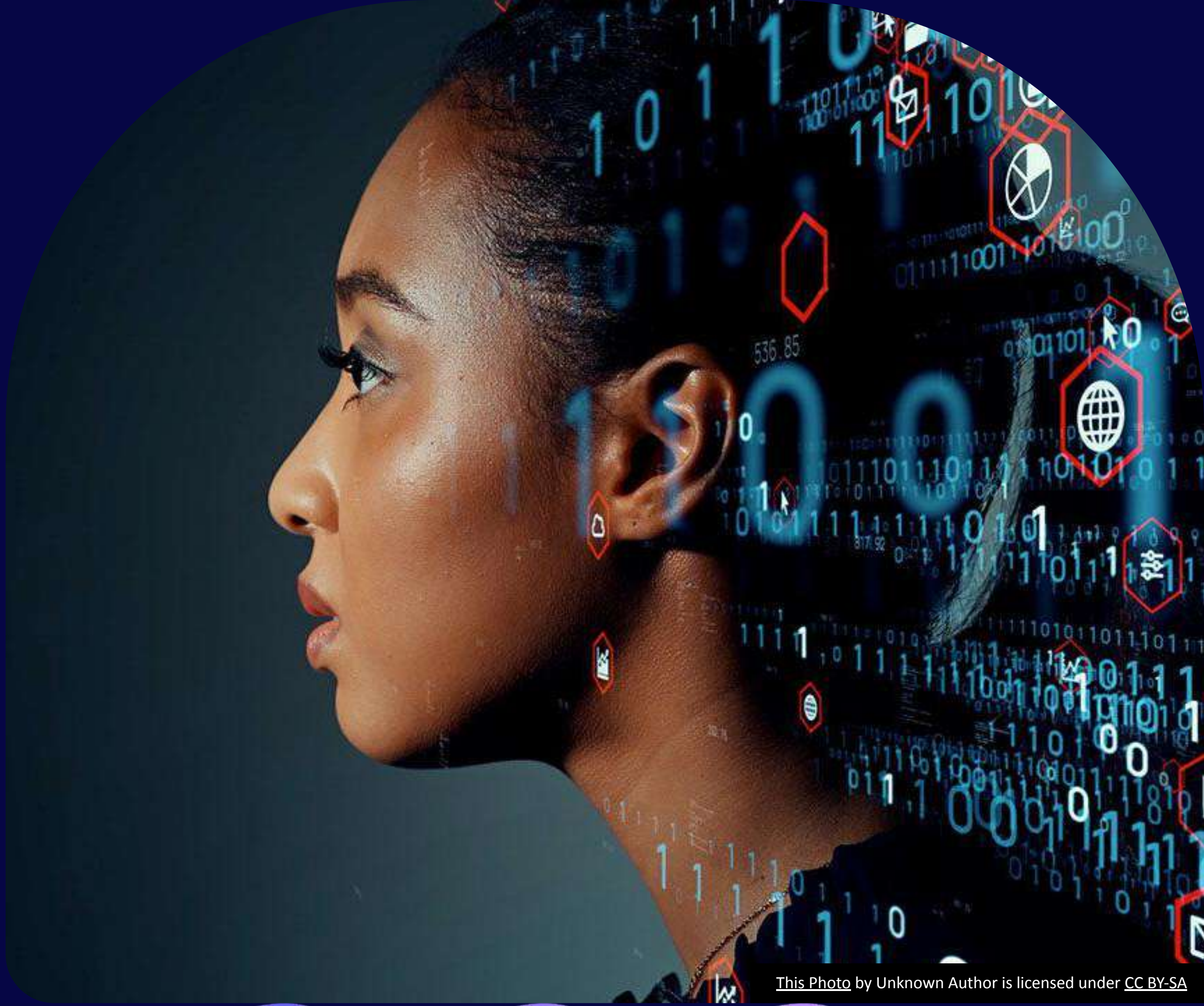
Disrupter

Generative AI



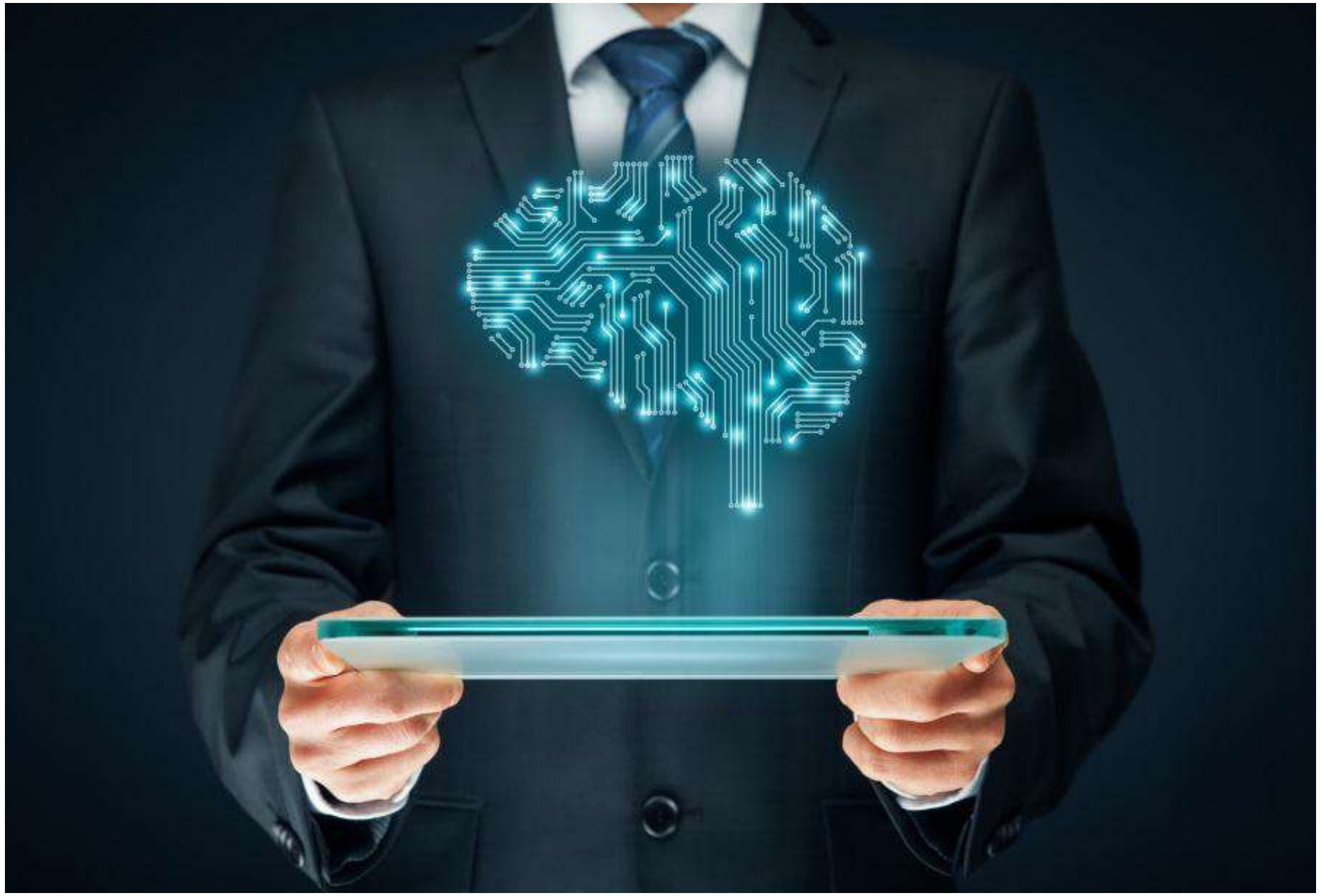
- Generative AI models are trained by toggling 'weights' or the strength of connections between different variables
- Applied statistics not such a good term as AI?
- Can generate academic text rapidly
- Chat GPT 4 Improving but not for journal abstract
- Hallucinates
- Amoral and Biased

Generative Artificial Intelligence And Learning Analytics



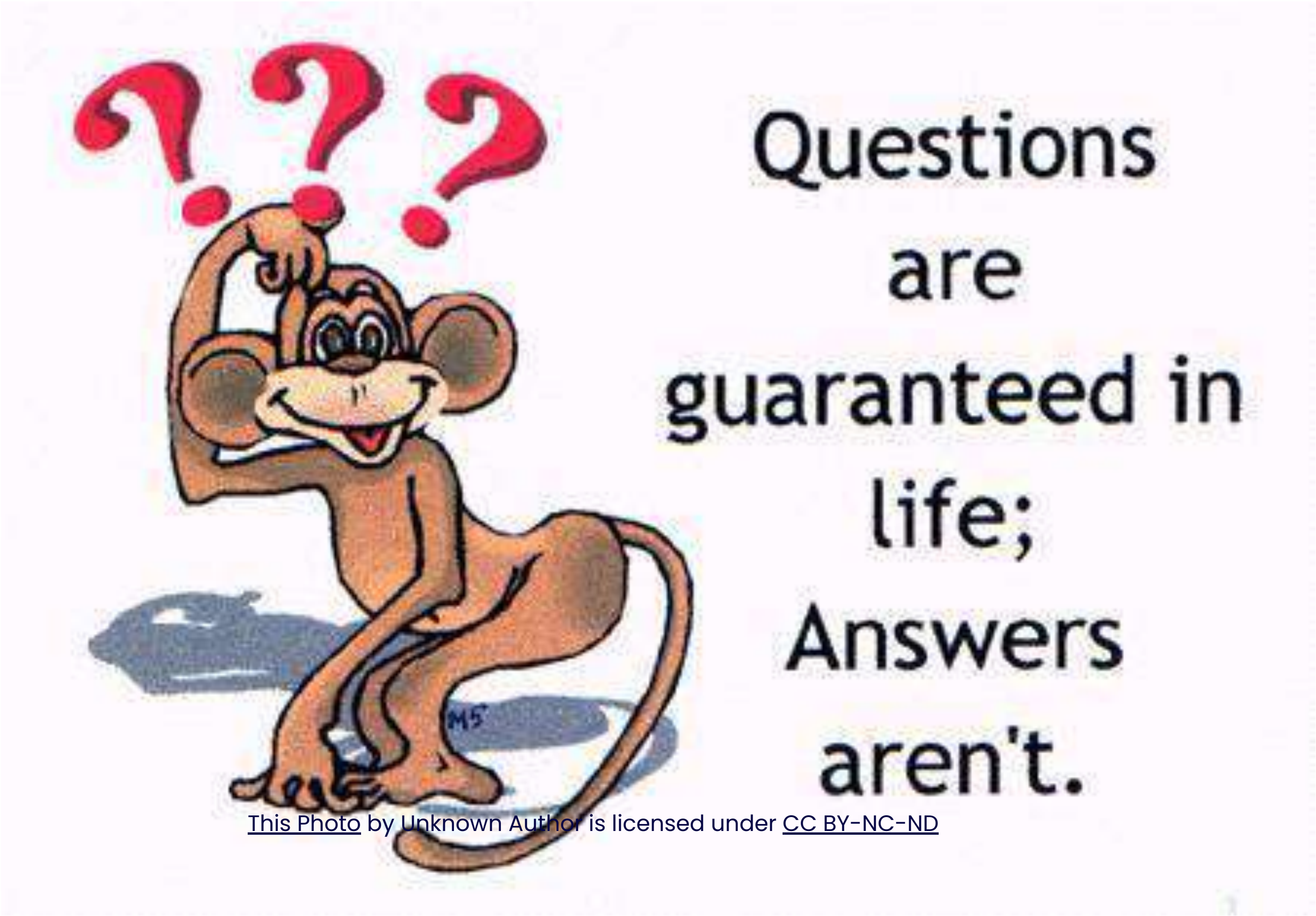
AI and Learning Analytics

- Finding patterns in data sets for student success
- Recommender system
- Highlight best outputs to user with:
  audio and visual feedback
- User interrogate feedback /dashboard with an audio dialogue
- Give more control to users by AI finding the relevant questions they want answered



Questions

1. What is the effect of different LA feedback types for effective learning?
2. How does feedback literacy affect teachers' pedagogical strategies?
3. What is the relevant data to affect student outcomes?
4. How does student feedback literacy influence their interpretation and then their reaction to feedback?



Research Agenda for Learning Analytics

Ethics revisited

Co design with students feedback dashboards or .....

Models of feedback with embedded AI tools

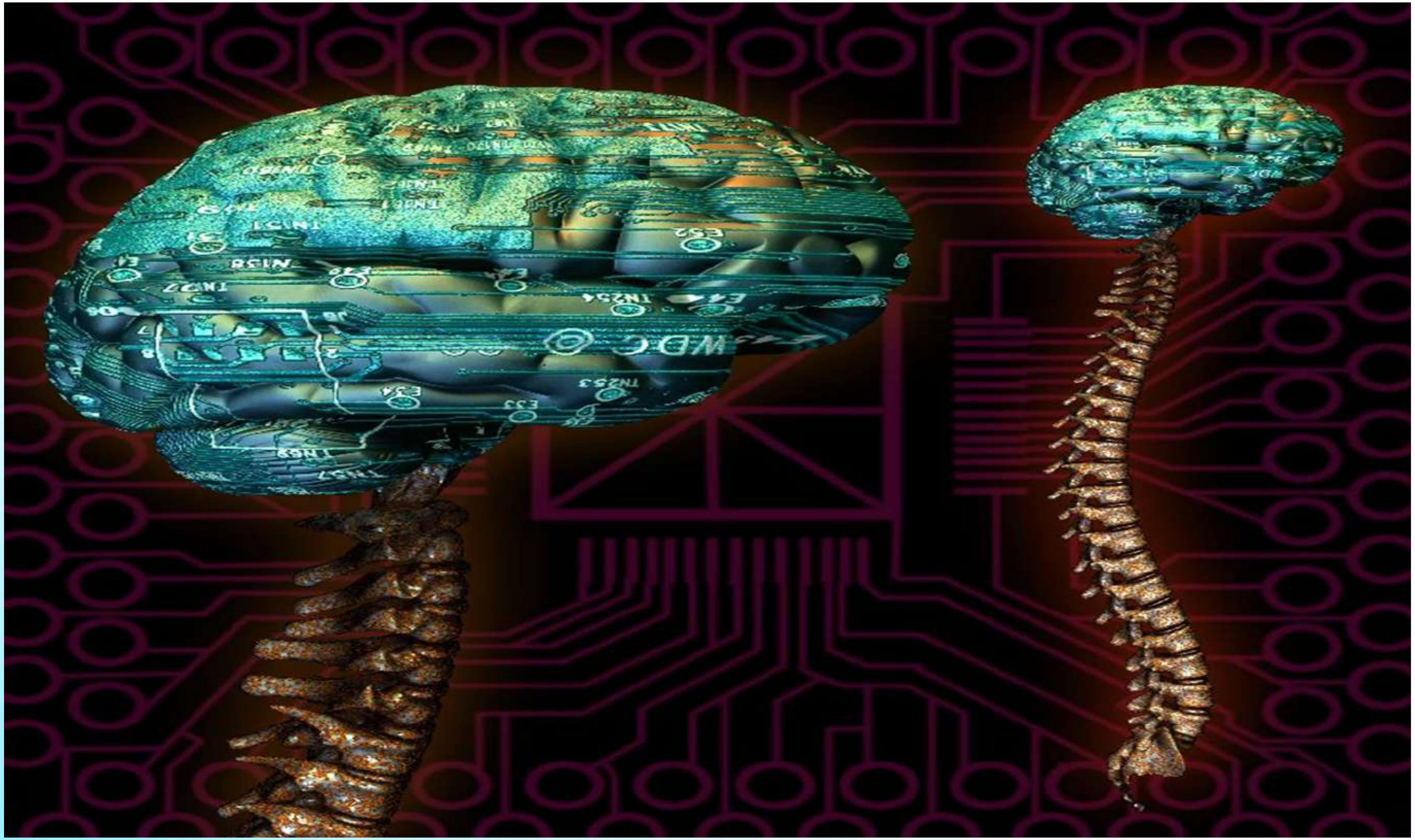
Integration AI Tools means re-evaluation of Course DesignLearning

Data Analytics Literacy for students and teachers

Investigate multimodal models and theories of Learning that will guide the missing loop of critical feedback that will enhance Learning with Analytics

Mobile feedback to students / equitable systems

Grand Challenge for Learning Analytics: what does it mean to assess human learning that can be readily understood by students and teachers? Moving Feedback Forwards



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