Learning Analytics for Education 4.0

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SOLAR
SOCIETY for LEARNING ANALYTICS RESEARCH

Research on Learning Analytics

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Learning analytics to support self-regulated learning in asynchronous online courses: A case study at a women's university in South Korea

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ABSTRACT

With the recognition of the importance of self-regulated learning (SRL) in asynchronous online courses, recent research has explored how SRL strategies impact student learning in these learning environments. However, little has been done to examine different patterns of students with different SRL profiles over time, which precludes providing optimal on-going instructional support for individual students. To address the gap in research, we applied learning analytics to analyze log data from 284 undergraduate students enrolled in an asynchronous online statistics course. Specifically, we identified student SRL profiles, and examined the actual student SRL learning patterns.

Course Outcome

- Understand the importance of teaching analytics
- Understand the importance of learning analytics
- Analyze the tools for teaching and learning analytics
- Conduct learning analytics process

Students and Learning

Student X: “We were asked to discuss on something I think. Then have to upload our discussion in e-Learning. I think that’s all kot.”

Student Y: “Ok lah, nothing much then. I just reply the discussion. What else did you learn when I was absent?”

Student X: “Not sure, I think that’s all”

Online Discussion 1: Quality of Learning Interaction

How do you assess students based on their interaction?

- For example, do the students who frequently respo
- Will this type of interaction has the 'quality? Why?

Re: our answers

by IRENE TIONG YEE TING MPP161193 - Wednesday, 26 September 2018, 11:09 PM

How do you assess students based on their interaction?

- For example, do the students who frequently respond to questions are given better marks?
- Will this type of interaction has the 'quality? Why?

From my opinion, assessment only can be done when involved all the students. Teacher as a facilitator should encourage the involvement of students with quick respond or active interaction with students. With the two-way interaction happened, assessment can be done easily. Students who frequently respond to questions doesn't mean they can give a better marks. But, we can say that they are more active on online media. Interaction in new media can help to produce a more quality discussion within the learners instead of one-way communication only. Learners can search for highly credible information before deliver to others. Learners also can use their time to analyze the topic of discussion. This type of interaction also give chance to learners who are more introverted or shy to give their opinions without any stress. Thus, this type of interaction gives multiple responds based on the users.

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Re: our answers

by KAVIPRIYA A/P RAVINDARAN MPP172063 - Wednesday, 3 October 2018, 1:46 PM

from my opinion, students who responds immediately or frequently do not mean they are giving quality answers. they might e nearly saying out their opinion or thoughts. however students who tent to interact more in classroom need to be given credits for their effort. students interaction need to be assessed based on their relevancy to the discussion. for instance, inn a classroom where students rally responds but they are certain individual who gives responds these students can be given marks for their effort

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Re: our answers

by LIEW CHUAN TONG MPP161142 - Wednesday, 3 October 2018, 4:20 PM

a) In my personal point of view, a frequent reply may indicate the pupils do participate in the online interaction for actively. They may given marks on the level of participation and the concern they shown toward the platform of interaction. However, the content of their content of reply and posts need to be evaluated too. If their content of reply and posts is related to the learning topic, then extra credit must be given. On the contrary, if they are spamming the platform with unrelated content, then the participant should be penalize.

b) The quality of interaction are measure by both of the frequency of participation and the content of interaction. A good interaction build up from active members who discuss upon topic related to the learning content and objective. Members may even debate based on their personal point of view and research without offending others. Everybody is given freedom to voice out their opinion yet realizing the boundaries.

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Teachers and Teaching

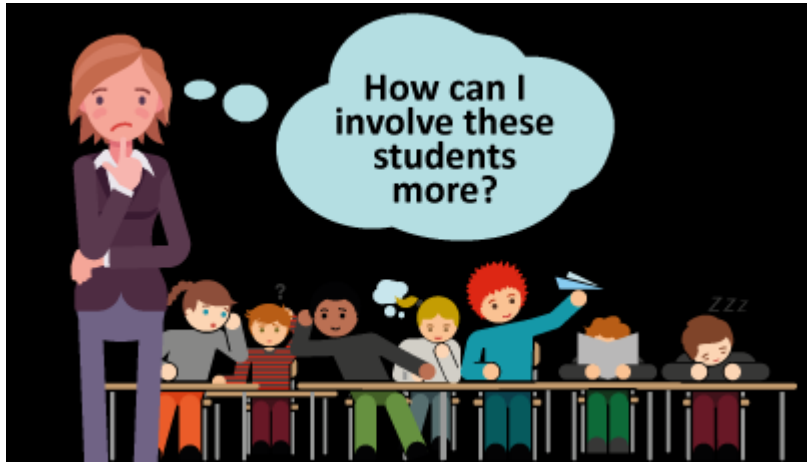
“Today, I wanted to try something different. I organized a simple discussion task for peer discussion and carried out in a form of jigsaw. Their discussion output has to be shared in e-Learning UTM. I will evaluate their group work there then.”

……. Later …….

“Well, I think all of them has responded to my discussion questions.”

How frequent do we check on ourselves?

Reflect-in-action vs Reflect-on-action (Schon, 1983)



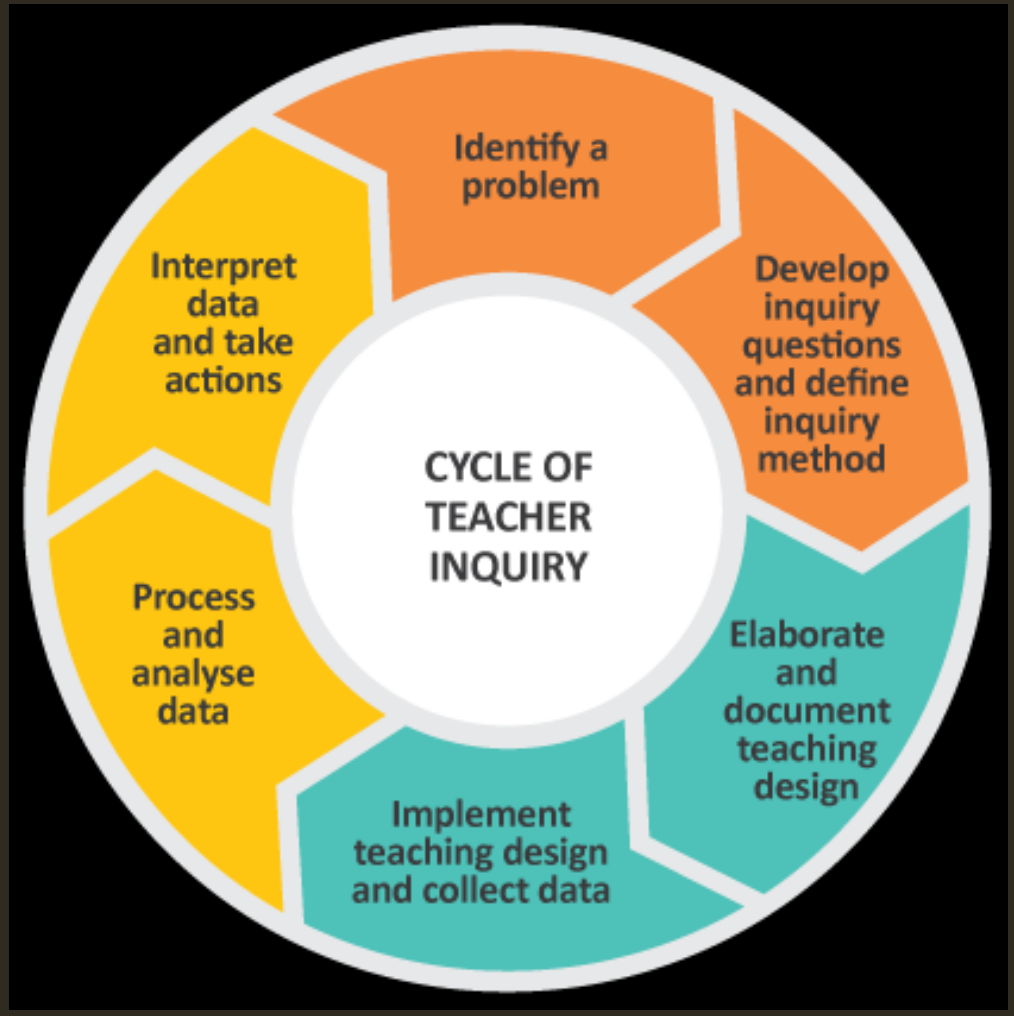
Teaching analytics

Learning analytics

Teacher Inquiry

"[a process] that is conducted by teachers, individually or collaboratively, with the primary aim of understanding teaching and learning in context" (Stremmel, 2007)

Teacher inquiry involves identify a problem, develop questions to define the inquiry method, design the teaching, implement teaching design by collecting data, process and analyze data, interpret data and take actions.



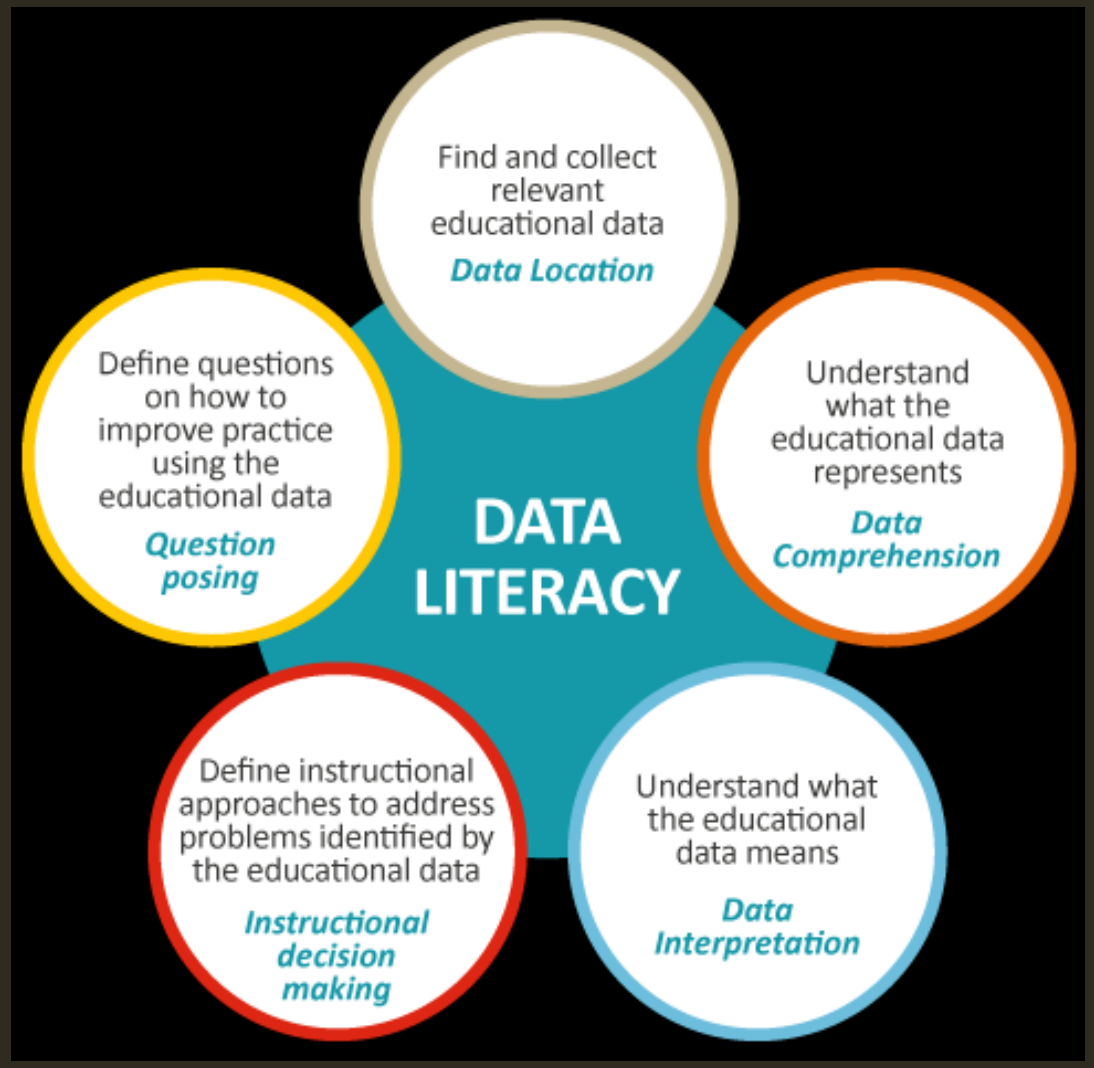
Teaching Analytics

- Methods and tools
- Teaching design
- Improve learning conditions
- Learners
- Teaching analytics Tool: The use of lesson plan

Using data for Teaching & Learning Analytics

Video Source: Data Quality Campaign

Data Literacy for Educators



What kind of Teaching Analytics?

- Time allocation for teaching activities?
- Orchestration of activities, assessment and educational objectives?
- Peer feedback?
- Is the number of activities sufficient?

Tools for Teaching Analytics

- Learning Designer
- Lesson Plan Creator
- Common Curriculum

- 10 minutes: Explore Learning Designer: learningdesigner.org

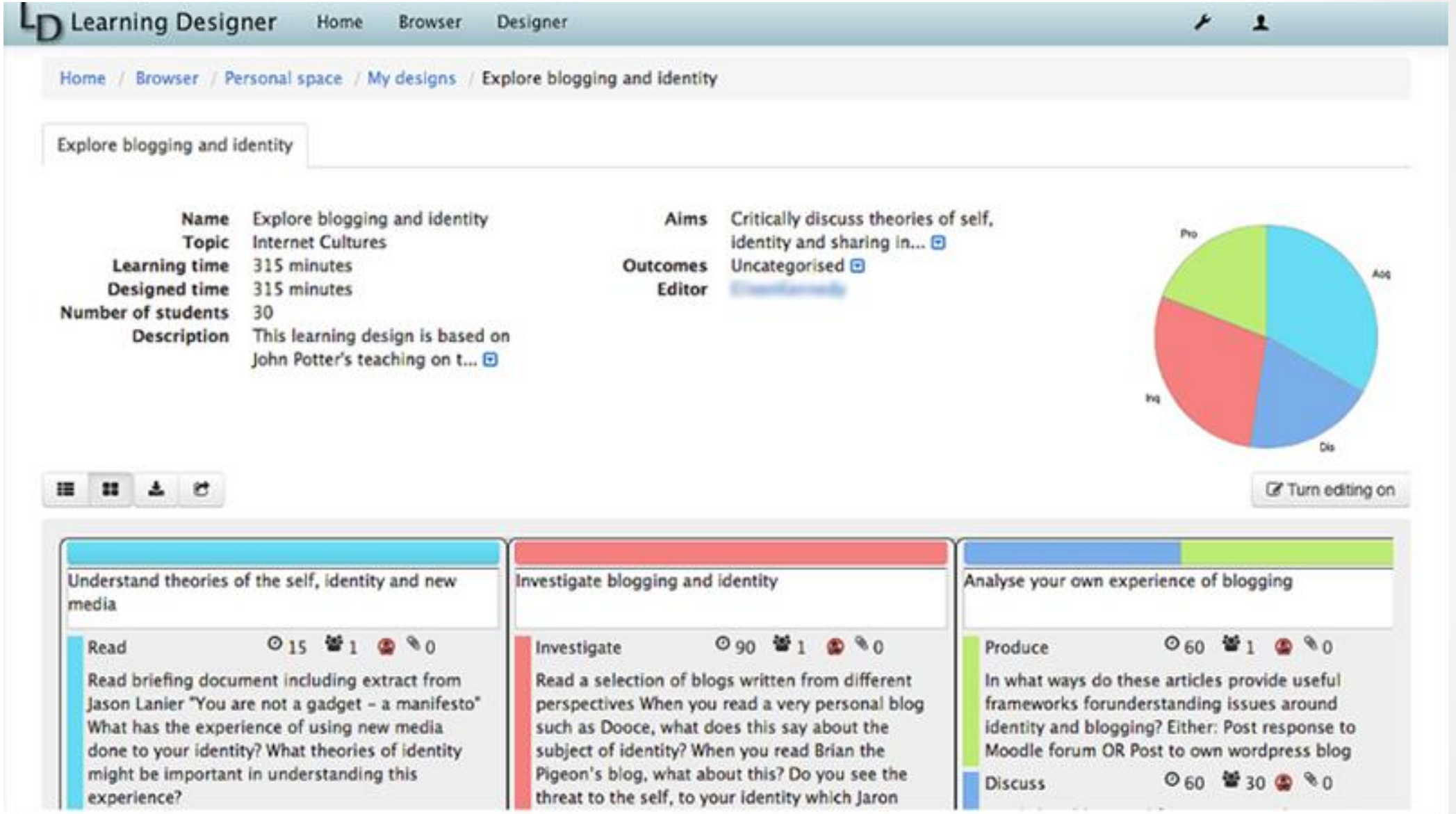


Image source: Learning Designer

Check Ourselves

Login to: socrative.com < Student Login

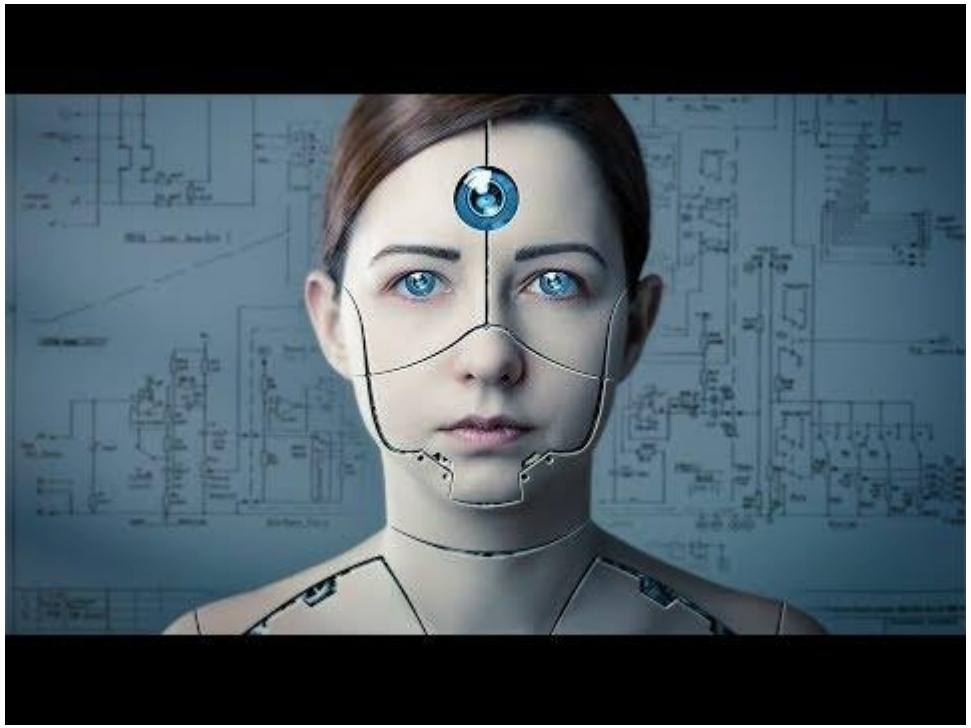
Room Name: NUBIS

What is Learning Analytics?

"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" (SOLAR, 2011).

The Importance of Personalization

- Students' different background
- Students' different interest
- Students' different learning needs

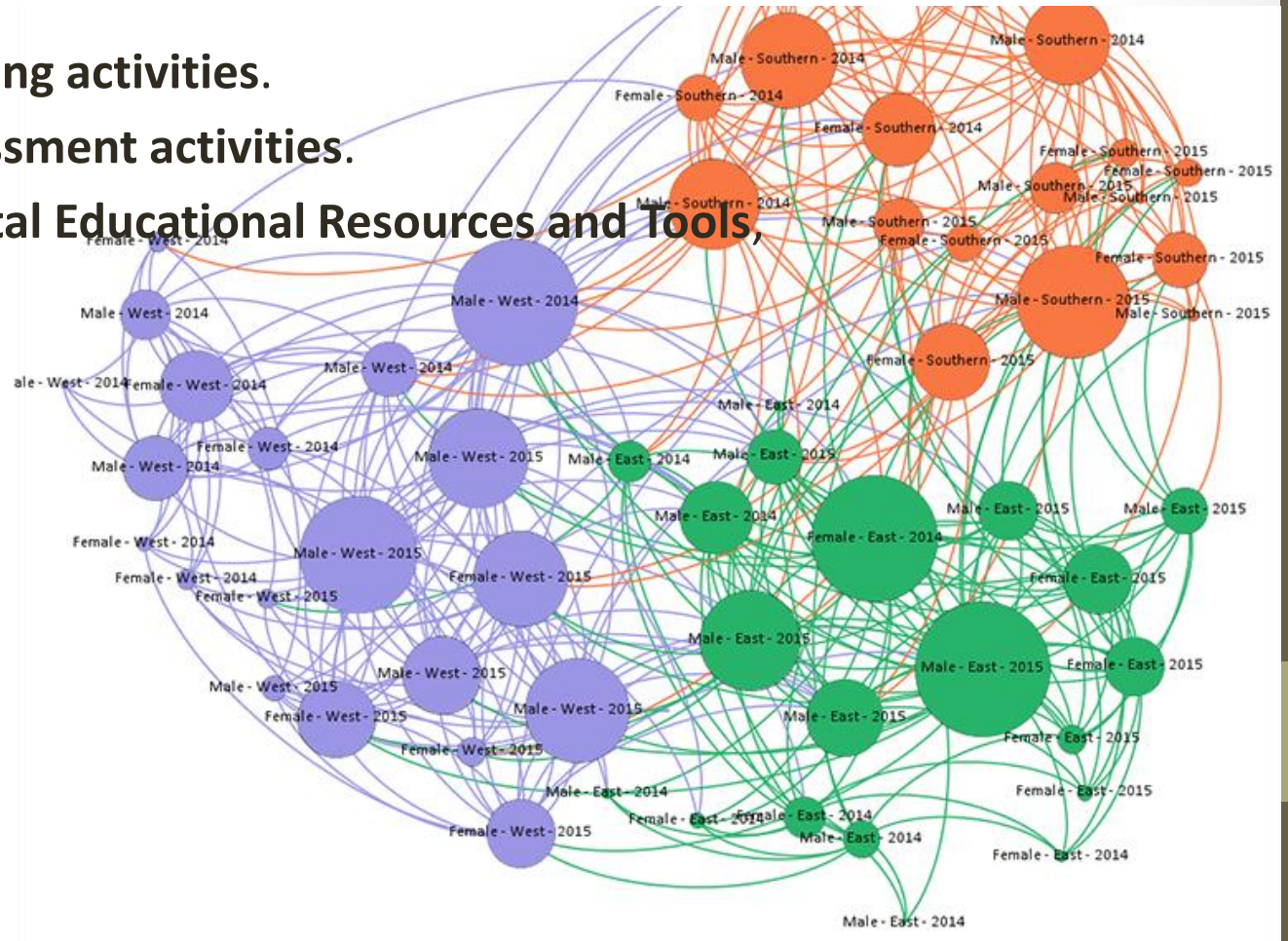


Robot

Human

What Types of Data that We Collect?

- Static vs Dynamic Data
- Dynamic data:
  - **Data type #1: Engagement in learning activities**.
  - **Data type #2: Performance in assessment activities**.
  - **Data type #3: Interaction with Digital Educational Resources and Tools**,
  - **Data type #4: Behavioural data**



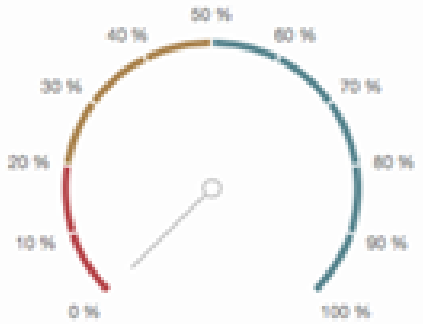
Dashboard / *Finance and capital markets*

Klap / Dashboard

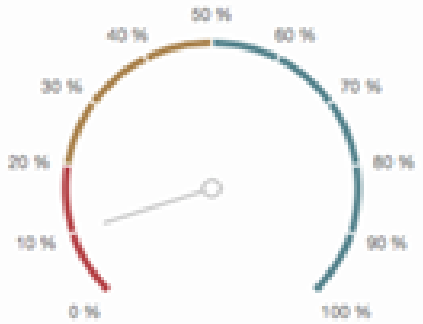
Overview | Evolution by groups | State by student | Messages

All students | Outstanding students | Average students | Students with difficulties

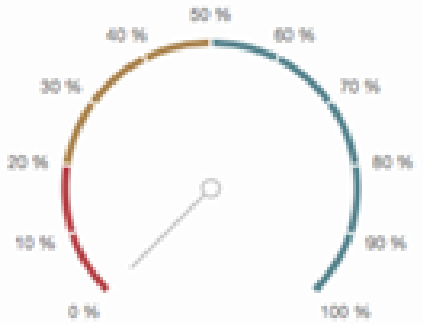
Individual work



Collaborative work



Results



Email	Name	Individual work	Collaborative work	Results	
a.garcia@aarcu.net	Alejandro García Sánchez	0.00	0.00	0.00	
a.navarro@aarcu.net	Antonio Navarro Ruibal	0.00	1.00	0.00	
r.martin@aarcu.net	Raquel Martín Lorenzo	0.00	2.00	0.00	

Showing 1 to 3 of 3 entries

First | Previous | 1 | Next | Last

What do we get from Data?

Discover patterns from students' data

Predict future trends in student progress

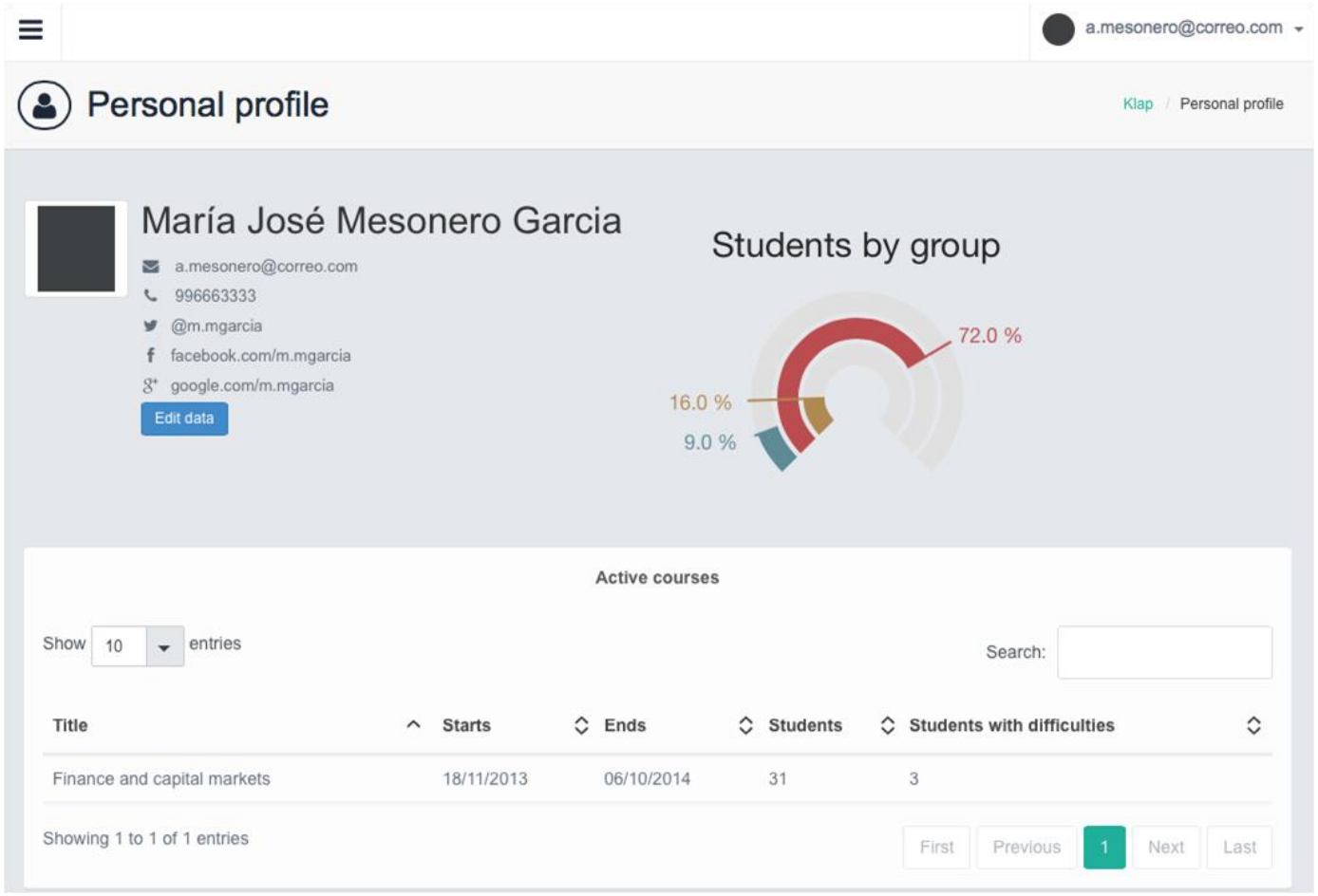
Recommend teaching and learning actions

Remember these Tools?

Strands in Learning Analytics

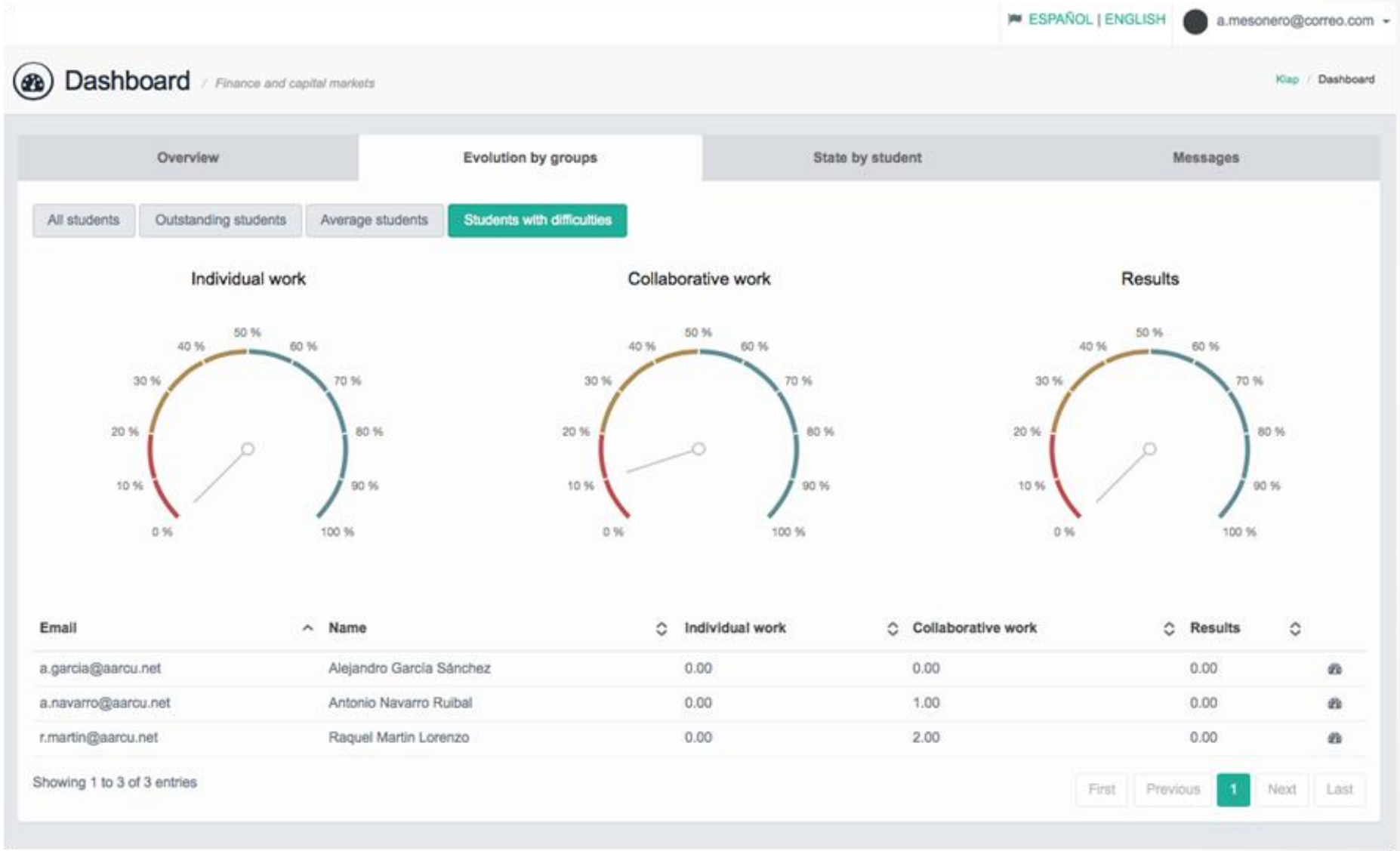
- Descriptive learning analytics – What has happened?
- Predictive learning analytics – What will happen?
- Prescriptive learning analytics – What should I do?

Descriptive Learning Analytics

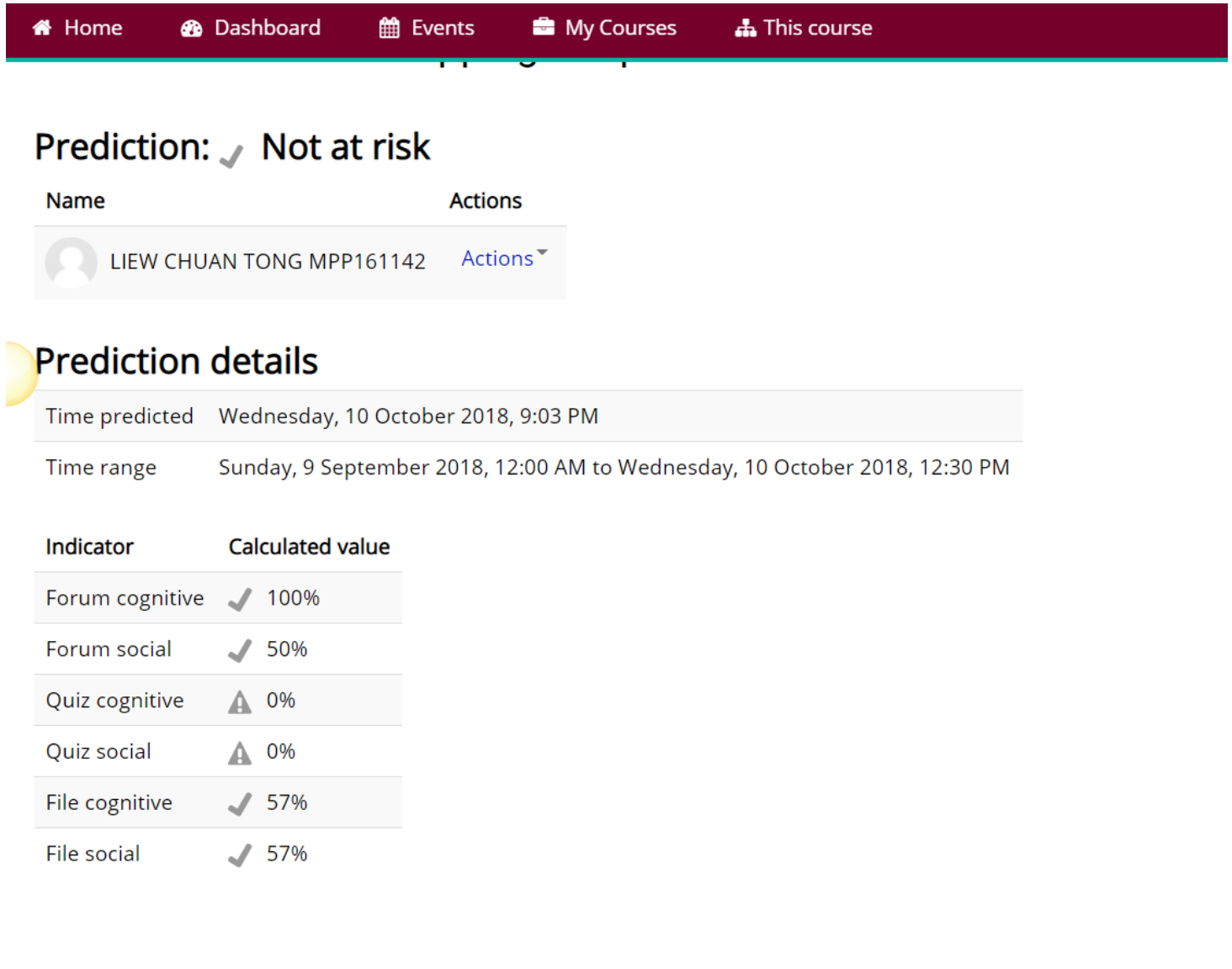


- SmartKlass - Dashboard

Descriptive Learning Analytics

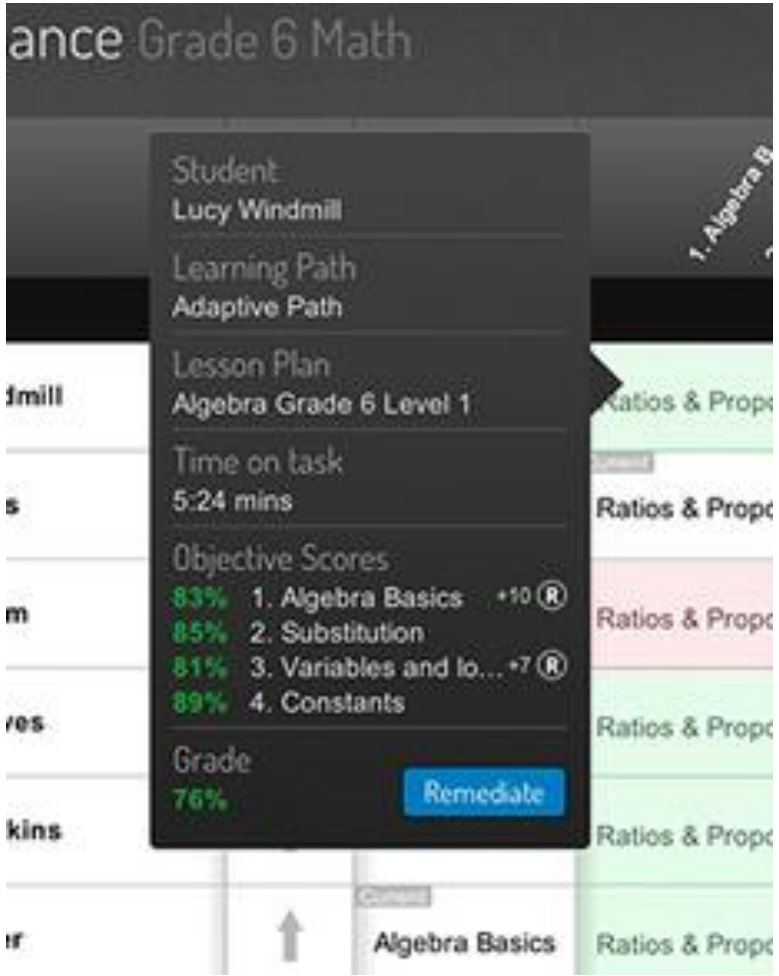


Predictive Learning Analytics



Prescriptive Learning Analytics

fishtree



Learning Analytics Exercise

- Work in a group of 4 (20 minutes)
- Identify: Based on the data, what do you think has happened?
- What can he do to improve his teaching and learning?
- Write down your discussion findings.

Mr. Ali implemented blended learning in his classroom. He gave away materials 2 days before class for students to read. Students then came to his class and he wanted to test whether they have done their reading by having a pop quiz. He received the following results.

WEKA Data

https://tinyurl.com/y9z6mej3

Data Interpretation

- === Summary ===

- Correctly Classified Instances 14 100 %
- Incorrectly Classified Instances 0 0 %
- Kappa statistic 1
- Mean absolute error 0
- Root mean squared error 0
- Relative absolute error 0 %
- Root relative squared error 0 %
- Total Number of Instances 14

Data Interpretation

- === Summary ===

- Correctly Classified Instances 19 95 %
- Incorrectly Classified Instances 1 5 %
- Kappa statistic 0.9184
- Mean absolute error 0.0583
- Root mean squared error 0.1708
- Relative absolute error 13.8793 %
- Root relative squared error 37.3954 %
- Total Number of Instances 20

MOOCs on Learning Analytics

- Analytics for the Classroom Teacher on edX

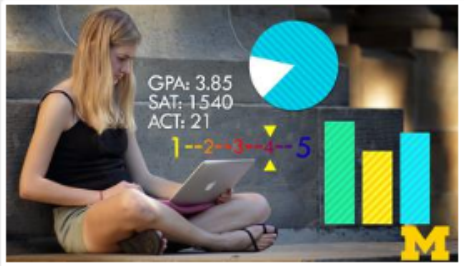
Analytics for the Classroom Teacher

CurtinX - EDU1x

Started - May 28, 2018

Resume Course

- Practical Learning Analytics on edX



Practical Learning Analytics

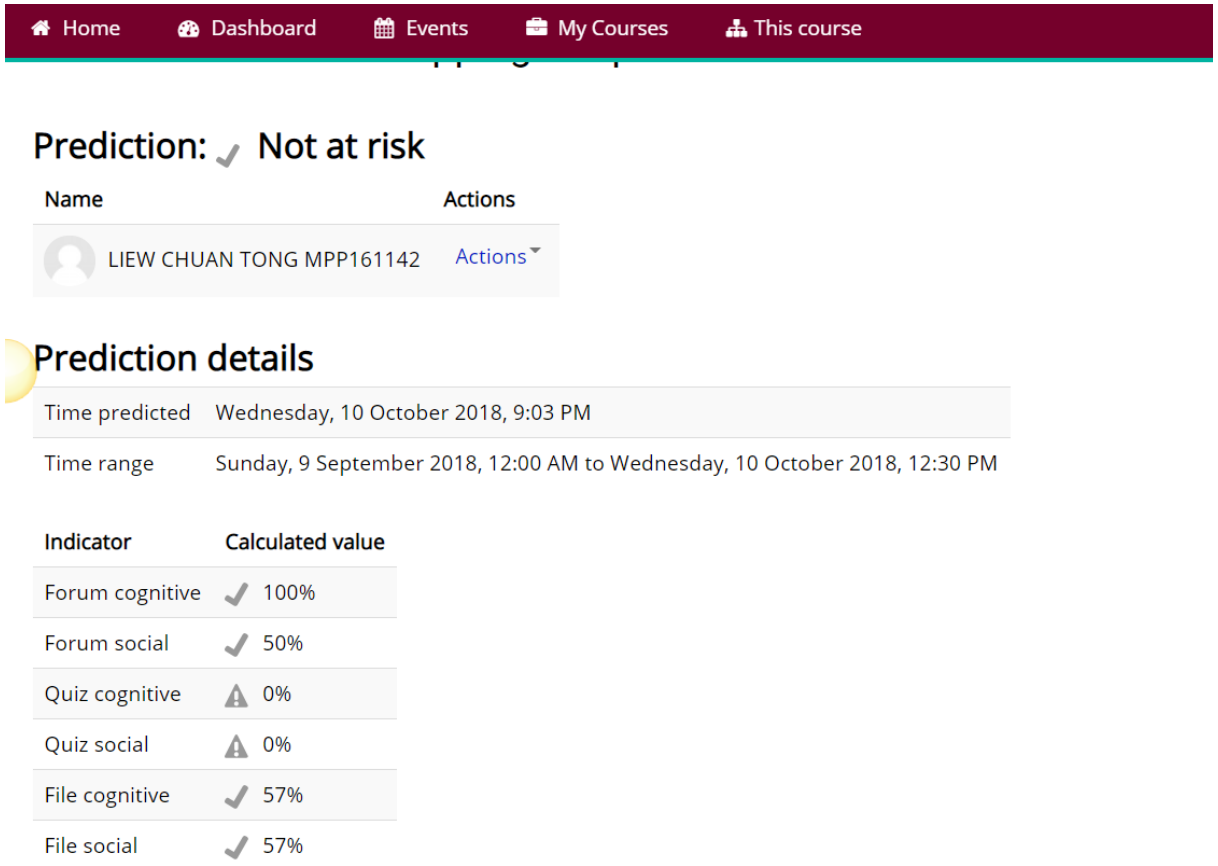
MichiganX - PLAx

Ended - Aug 1, 2016

View Archived Course

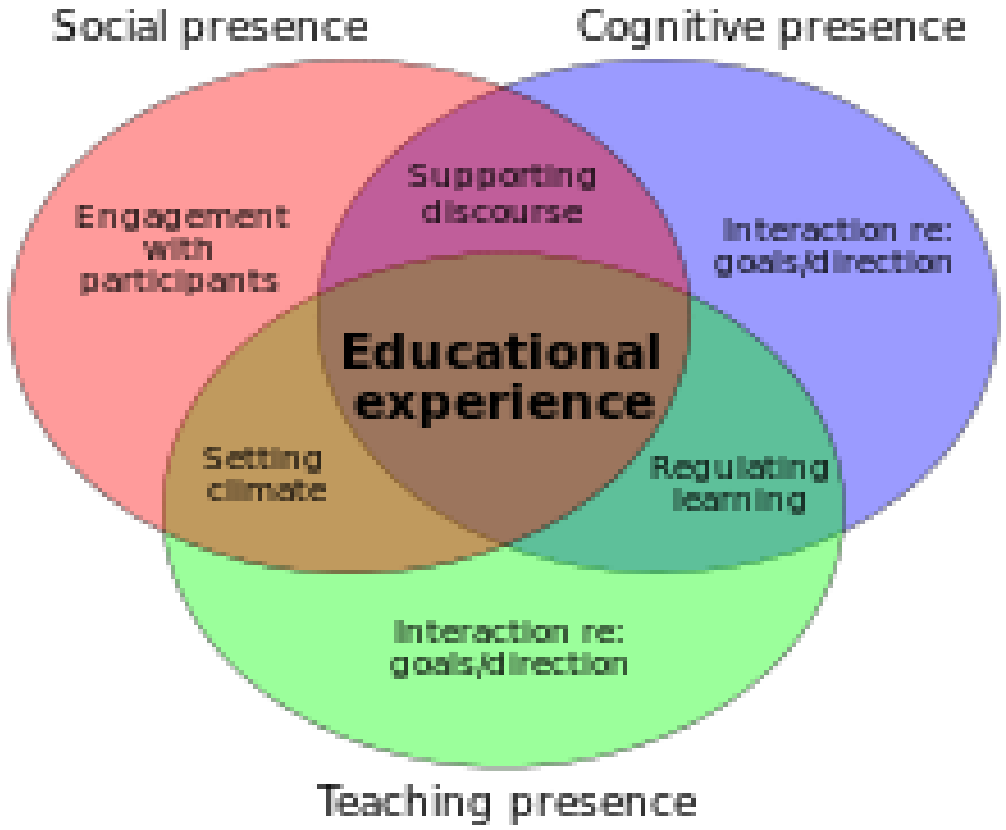
Predictive Learning Analytics in e-Learning UTM

- “Dropping out" = "no student activity in the final quarter of the course.



Predictive Model Indicator in e-Learning UTM: Community of Inquiry

- Cognitive Presence
- Social Presence
- Teacher Presence



(Garrison, 2009)

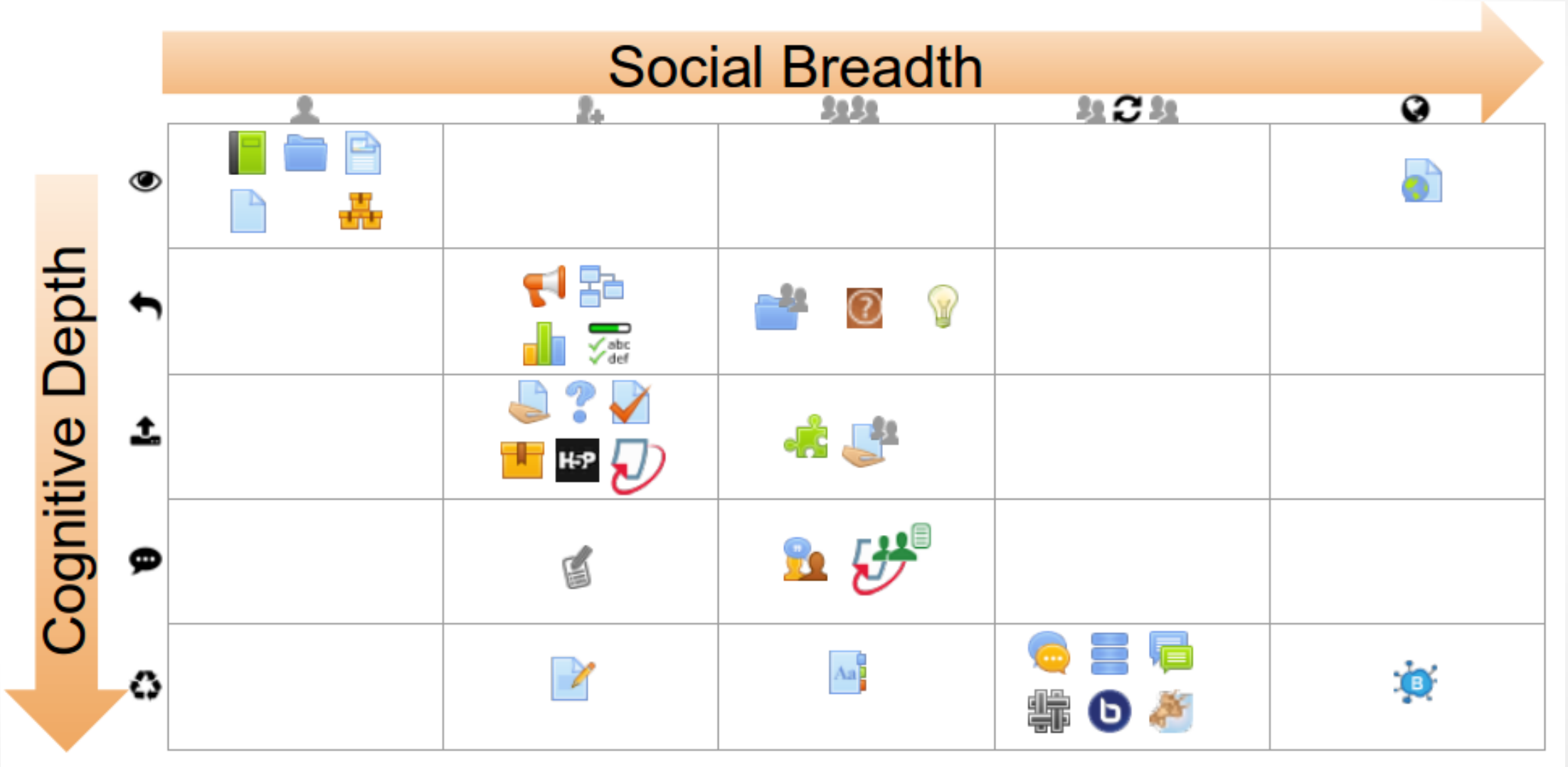
Cognitive Presence

- based on the type of activity offered to the student, and the extent to which the student demonstrates cognitive engagement in that activity
- Level of depth ranges from 0 to 5, where 0 indicates that the learner has not even viewed the activity.
- The levels of potential cognitive depth are:
  - The learner has viewed the activity details
  - The learner has submitted content to the activity
  - The learner has viewed feedback from an instructor or peer for the activity
  - The learner has provided feedback to the instructor or a peer within the activity
  - The learner has revised and/or resubmitted content to the activity

Cognitive Presence

- Once the potential levels are assigned, each student enrolled in a course is evaluated based on the **proportion of the potential depth reached**.
- For example, if **an activity only supports up to level 3** and the student has reached level 3, the **student is participating at 100 percent of the possible level of cognitive depth.**

Depth and Breadth



Social Breadth

- Is a measure of social presence
- The ability of participants to identify with the group or course of study, communicate purposefully in a trusting environment, and develop personal and affective relationships progressively by way of projecting their individual personalities”
- Examining the breadth of opportunities the participant has to communicate with others.
- The level of breadth ranges from 0 to 5, where 0 indicates the learner has not interacted with anyone.

Social Breadth

- The levels of potential social breadth are:
  - The learner has **not interacted with any other participant in this activity** (e.g. they have read a page)
  - The learner has **interacted with at least one other participant (e.g. they have submitted an assignment or attempted a self-grading quiz providing feedback**)
  - The learner **has interacted with multiple participants in this activity, e.g. posting to a discussion forum, wiki, database, etc**.
  - The learner **has interacted with participants in at least one "volley" of communications back and forth**
  - The learner has interacted with people outside the class, e.g. in an authentic community of practice

Social Breadth

- Model begins by assigning a maximum potential value of social breadth to each activity module.
- For example, the Assignment module allows up to social breadth of 2
- Once the potential levels are assigned, each student enrolled in a course is evaluated based on the proportion of the potential depth reached.
- For example, if an activity only supports up to level 3 and the student has reached level 3, the student is participating at 100 percent of the possible level of social breadth.

What to do with the Insights?

- First, the user can acknowledge the insight.
  - This removes that particular prediction from the view of the user, e.g. a notification about a particular student at risk is removed from the display.
- The second general action is to mark the insight as "Not useful."
  - This also removes the insight associated with this calculation from the display, but the model is adjusted to make this prediction less likely in the future.