TLC 18 EUROPE MANCHESTER

Studying learning journeys with video - and what it may mean for pedagogy

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Outline

- Background
- Student engagement and study networks
- Digital practices and digital literacies
- Student partnerships

Student VLE comments

“It's not student friendly enough.”

Student VLE comments

Layout and navigation

"Confusing layout."

"Too many different pathways to follow."

"Very poor interface on mobile."

"Learning Central feels very cluttered and disorganised, making it tricky to navigate."

"Learning central needs a search tool. Sometimes it is difficult to find a plenary."

Information overload

"There are lots of updated information. I can't receive important ones. I don't know how to close the unimportant information."

"I find that there is too much information in one place. It's hard to know what information is needed."

Study practices

"I don't understand why we need three apps (blackboard, onenote and outlook) to access uni materials. It is far much easier if they all in one place or app for example canvas app."

"It would be good to be able to right click on links and open them in new tabs rather than having to go back and forth all the time to see what is in folders."

"Email is a far superior method for communication than LC, especially for timetable changes."

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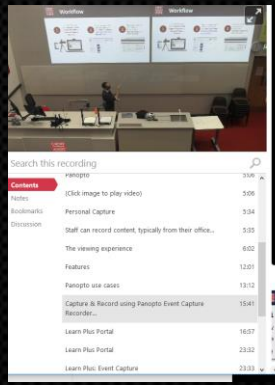
Background

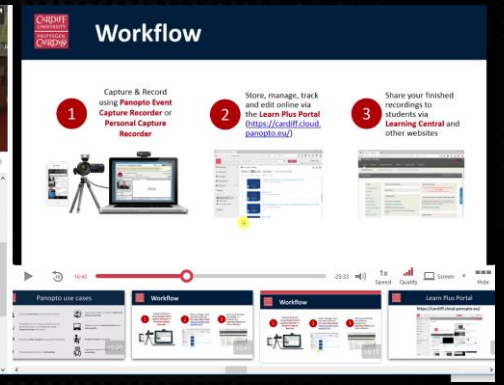
Lecture capture as a lens

Background

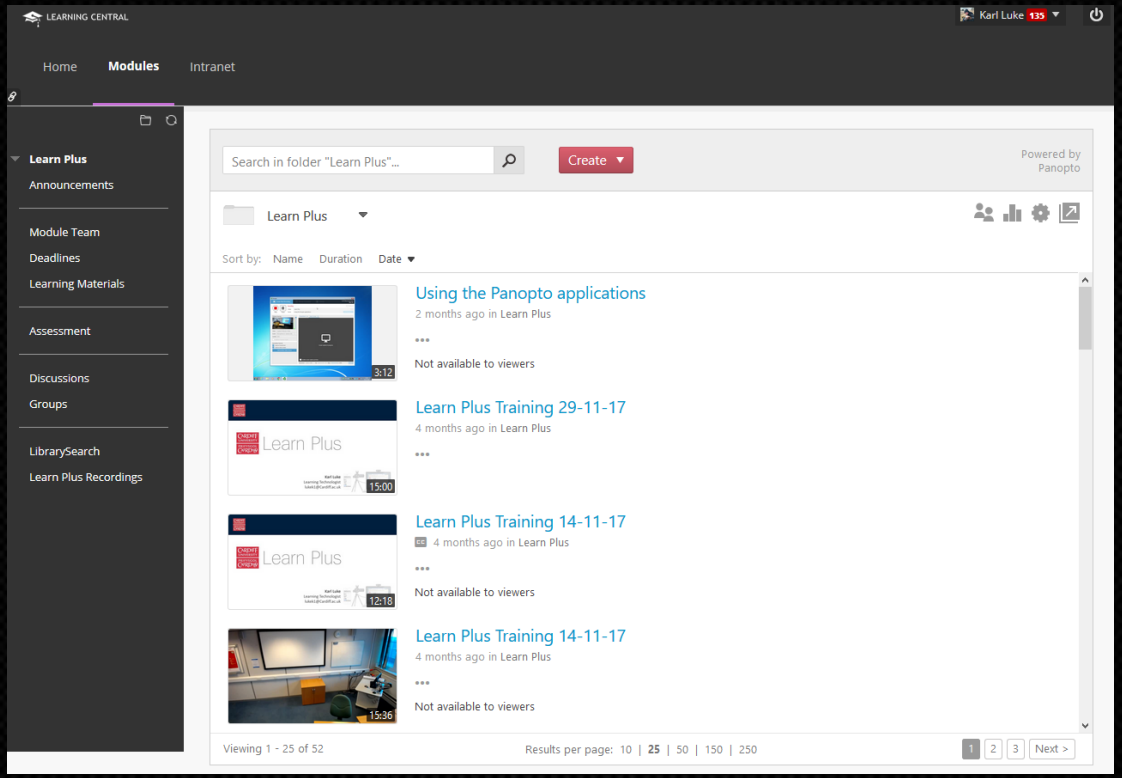
Lecture capture at Cardiff University

- 71% of UK universities have institutionally supported lecture capture systems (UCISA 2016)
- Automated ‘event capture’ service via Panopto
- Timetable (S+) integration via a scheduling tool GUI
- LTI via Blackboard (Learn 9.1)
- Available in ~380 teaching spaces
- ‘Opt Out’ policy change from 18/19 academic year





Blackboard – Panopto integration



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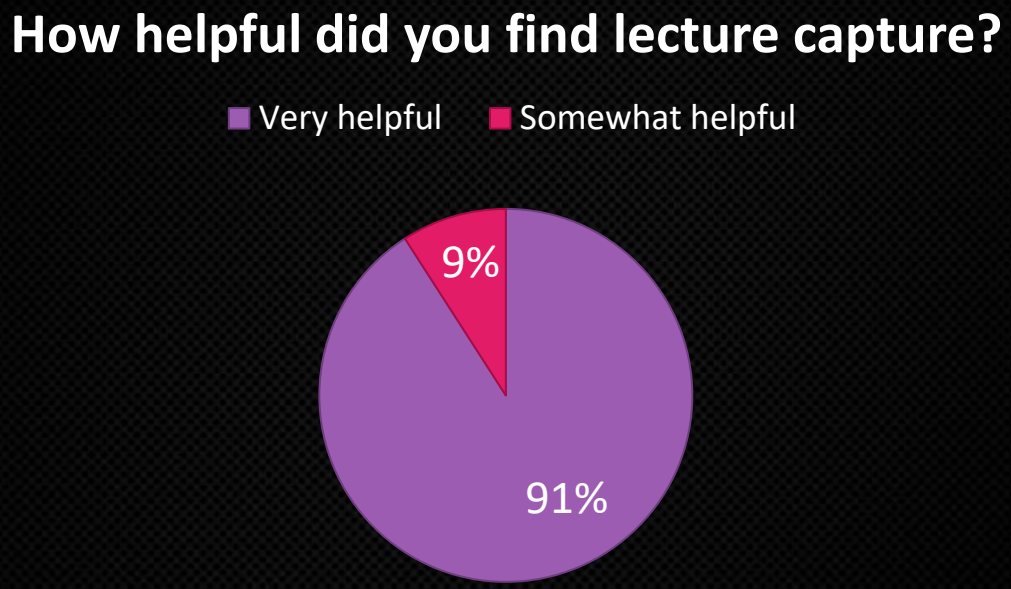
Student engagement

Using qualitative and quantitative approaches

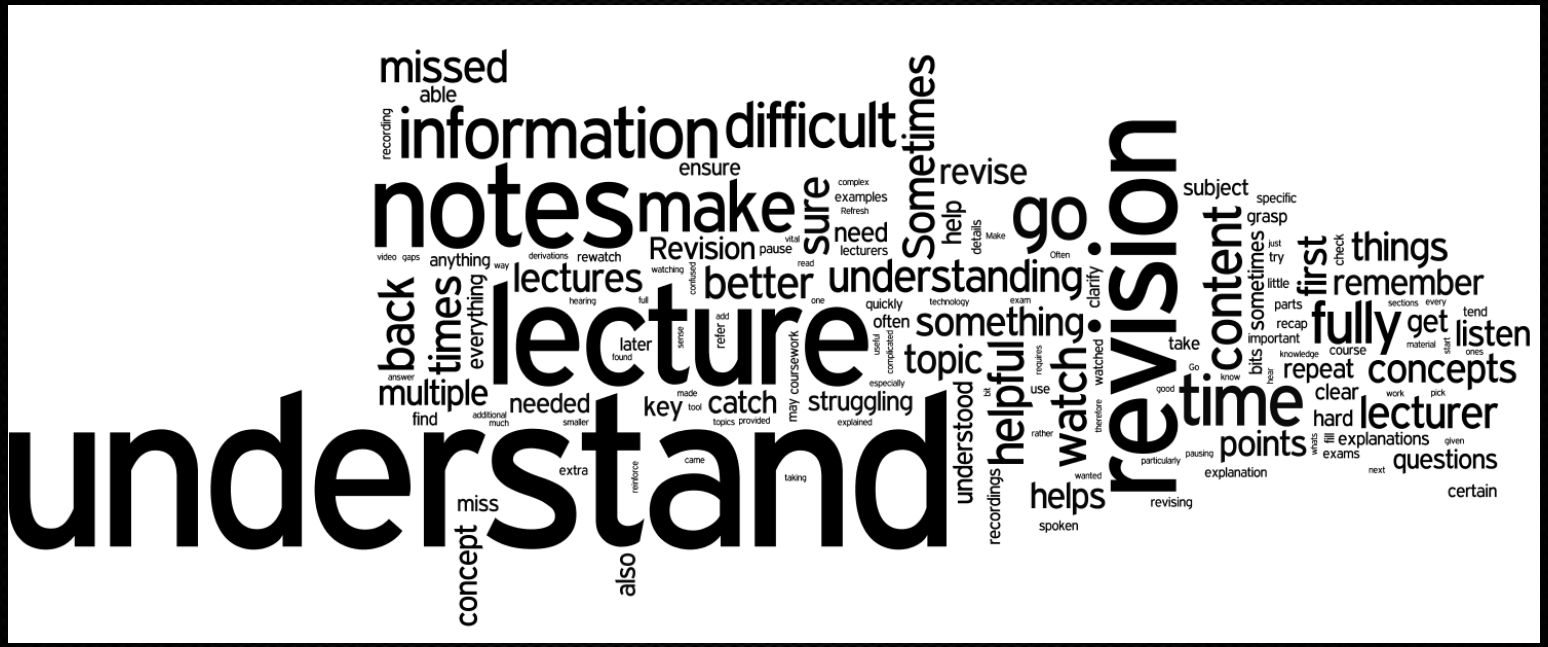
Student engagement with lecture capture

Student engagement



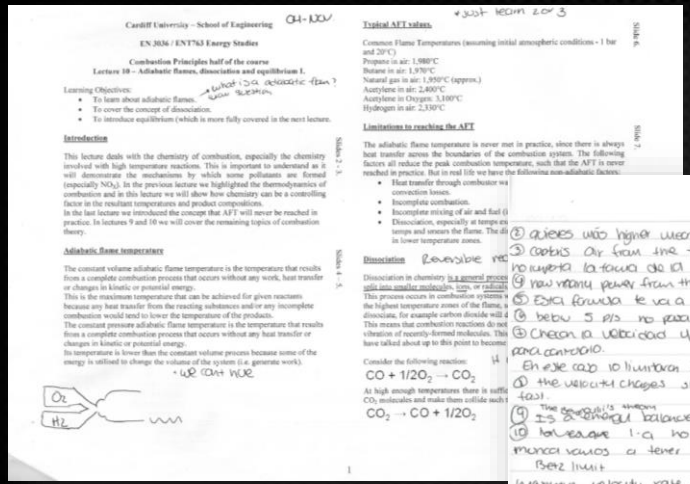
Source: Internal survey. N=230

Why Lecture Capture is used by students



Activities students engage with whilst watching Lecture Capture

Note-taking



Cardiff University – School of Engineering

EN 3036 / ENT763 Energy Studies

Combustion Principles half of the course

Lecture 10 – Adiabatic flames, dissociation and equilibrium I.

Learning Objectives:

- To learn about adiabatic flames.
- To cover the concept of dissociation.
- To introduce equilibrium (which is more fully covered in the next lecture.

Introduction

This lecture deals with the chemistry of combustion, especially the chemistry involved with high temperature reactions. This is important to understand as it will demonstrate the mechanisms by which some pollutants are formed (especially NO_x). In the previous lecture we highlighted the thermodynamics of combustion and in this lecture we will show how chemistry can be a controlling factor in the resultant temperatures and product compositions.
In the last lecture we introduced the concept that AFT will never be reached in practice. In lectures 9 and 10 we will cover the remaining topics of combustion theory.

Adiabatic flame temperature

The constant volume adiabatic flame temperature is the temperature that results from a complete combustion process that occurs without any work, heat transfer or changes in kinetic or potential energy.
This is the maximum temperature that can be achieved for given reactants because any heat transfer from the reacting substances and/or any incomplete combustion would tend to lower the temperature of the products.
The constant pressure adiabatic flame temperature is the temperature that results from a complete combustion process that occurs without any heat transfer or changes in kinetic or potential energy.
Its temperature is lower than the constant volume process because some of the energy is utilised to change the volume of the system (i.e. generate work).

- we can use

O2
H2

Typical AFT values.

Common Flame Temperatures (assuming initial atmospheric conditions - 1 bar and 20°C)
Propane in air: 1,980°C
Butane in air: 1,970°C
Natural gas in air: 1,950°C (approx.)
Acetylene in air: 2,400°C
Acetylene in Oxygen: 3,100°C
Hydrogen in air: 2,330°C

Limitations to reaching the AFT

The adiabatic flame temperature is never met in practice, since there is always heat transfer across the boundaries of the combustion system. The following factors all reduce the peak combustion temperature, such that the AFT is never reached in practice. But in real life we have the following non-adiabatic factors:

- Heat transfer through combustor wa
  convection losses.
- Incomplete combustion.
- Incomplete mixing of air and fuel (
- Dissociation, especially at temps ex
  temps and unsure the flame. The di
  in lower temperature zones.

Dissociation Reversible re

Dissociation in chemistry is a general process
cells into smaller molecules, ions, or radicals
This process occurs in combustion systems w
the highest temperature zones of the flame, s
dissociate, for example carbon dioxide will d
This means that combustion reactions do not
vibration of recently-formed molecules. This
have talked about up to this point to become

Consider the following reaction:

$$CO + 1/2O_2 \rightarrow CO_2$$

At high enough temperatures there is suffi
CO_2 molecules and make them collide such t

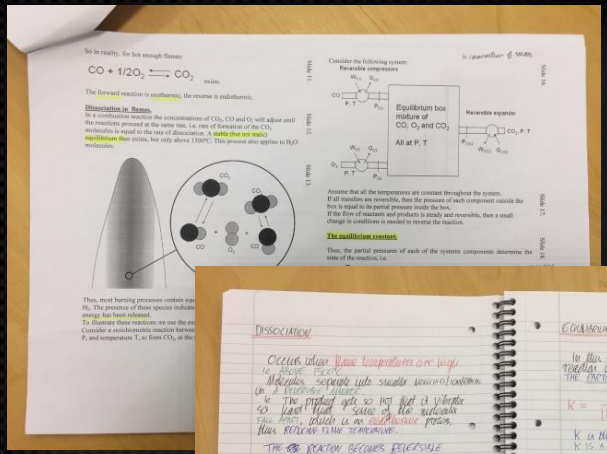
$$CO_2 \rightarrow CO + 1/2O_2$$

1

② quiero más higher wind u menos turbulencia
③ Coges Air from the turbine
no entra la fuerza de la hélice!
④ how many power from that disc con 1 capture
⑤ Esta formula te va a dar la gráfica
⑥ bebo 3 p/s no para nada → pequeño error cerebro
⑦ Chequea la velocidad u limitan la cantidad power para contenido.
En este caso la limitan a 12 m/s que debería 1800 kw
⑧ the velocity changes slowly. Pressure changes fast.
⑨ The Bernoulli's theorem
Es la energía balance reducción
⑩ tal vez que 1:a no nos interesa
manera vamos a tener mas de 59% de the power of that wind
Betz limit
Maximum velocity rate is : 3a
⑪ recap
you will always wanna to operate your wind power in this section

Advantages Disadvantages

① The wind is full of turbulence, you get all: faces u NO allow the turbine change speed all such by that gives → reduce loads to turbines. de ahora son turbines with variable speed
② Disconnect cambiar la orientación de los blades u así desinflar el reaction force
- Pitch regulation: cambiar el blade para disminuir la fuerza de reacción
③ You start with a low speed u va incrementando
④ así se ve el modelo final



So in reality, for hot enough flames:

$$CO + 1/2O_2 \rightleftharpoons CO_2$$ exists.

The forward reaction is exothermic, the reverse is endothermic.

Dissociation in flames.

In a combustion reaction the concentrations of CO_2, CO and O_2 will adjust until the reactions proceed at the same rate, i.e. rate of formation of the CO_2 molecules is equal to the rate of dissociation. A **stable (but not static) equilibrium** then exists, but only above 1500°C. This process also applies to H_2O molecules.

Consider the following system:

Reversible compressor

Equilibrium box: mixture of CO, O_2 and CO_2 All at P, T

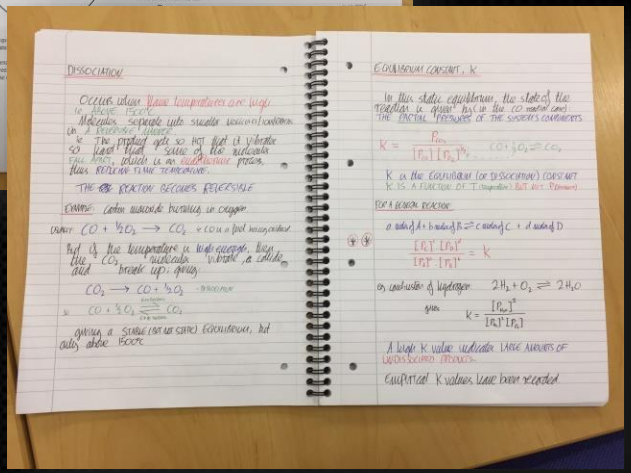
Reversible expander

Assume that all the temperatures are constant throughout the system.
If all transfers are reversible, then the pressure of each component outside the box is equal to its partial pressure inside the box.
If the flow of reactants and products is steady and reversible, then a small change in conditions is needed to reverse the reaction.

The equilibrium constant.

Thus, the partial pressures of each of the systems components determine the state of the reaction, i.e.

Thus, most burning processes contain equ
H_2. The presence of these species indicate
energy has been released.
To illustrate these reactions we use the eq
Consider a stoichiometric reaction betwee
P, and temperature T, to form CO2, at the



DISSOCIATION

Occurs when flame temperatures are high.
ie ABOVE 1500°C
Molecules separate into smaller molecules or ATOMS
ie. The product gets so hot that it vibrates so hard that some of the molecules FALL APART. Which is an endothermic process. Thus REDUCES FLAME TEMPERATURE.

THE REACTION BECOMES REVERSIBLE

Example: Carbon molecule breaks in oxygen

Under $CO + 1/2O_2 \rightarrow CO_2$ + CO is a fuel incomplete

But if the temperature is high enough, then the CO_2 molecules vibrate, collide and break up. giving

$CO_2 \rightarrow CO + 1/2O_2$ dissociation

$CO + 1/2O_2 \rightleftharpoons CO_2$ equilibrium

giving a STABLE (but not static) EQUILIBRIUM, but only above 1500°C

EQUILIBRIUM CONSTANT, K

In this stable equilibrium, the state of the reaction is given by the CO molecules and the partial pressures of the system's components.

$$K = \frac{P_{CO_2}}{[P_{O_2}]^{1/2}[P_{CO}]}$$

K is the Equilibrium (or DISSOCIATION) CONSTANT
K IS A FUNCTION OF T (temperature) BUT NOT PRESSURE

FOR A GENERIC REACTION:

a moles of A + b moles of B ⇌ c moles of C + d moles of D

$$\frac{[P_C]^c[P_D]^d}{[P_A]^a[P_B]^b} = K$$

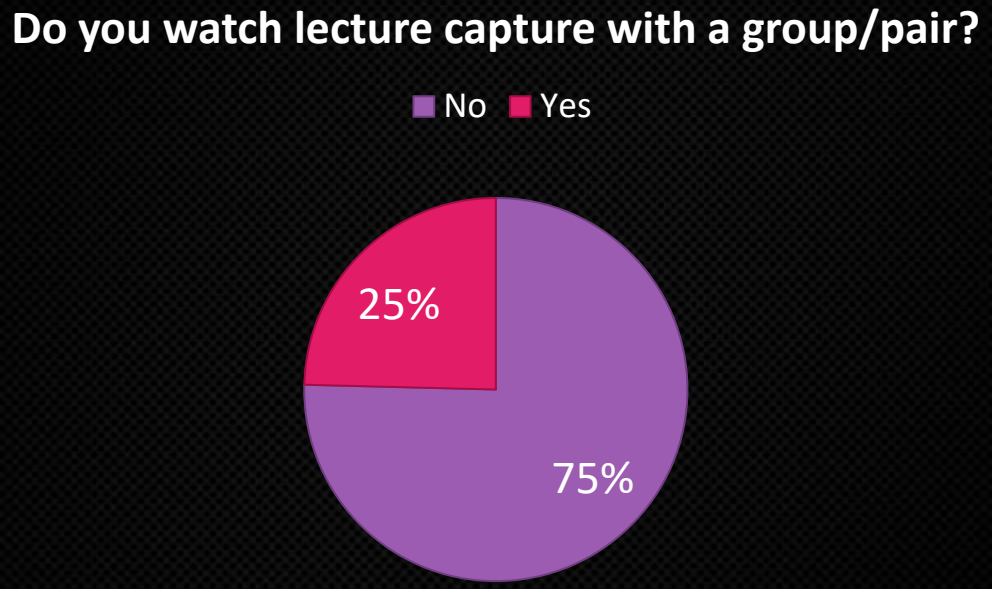
or combustion of hydrogen $2H_2 + O_2 \rightleftharpoons 2H_2O$

gives $K = \frac{[P_{H_2O}]^2}{[P_{H_2}]^2[P_{O_2}]}$

A high K value indicates LARGE AMOUNTS OF LIQUIDS OCCURRED ATOMICS

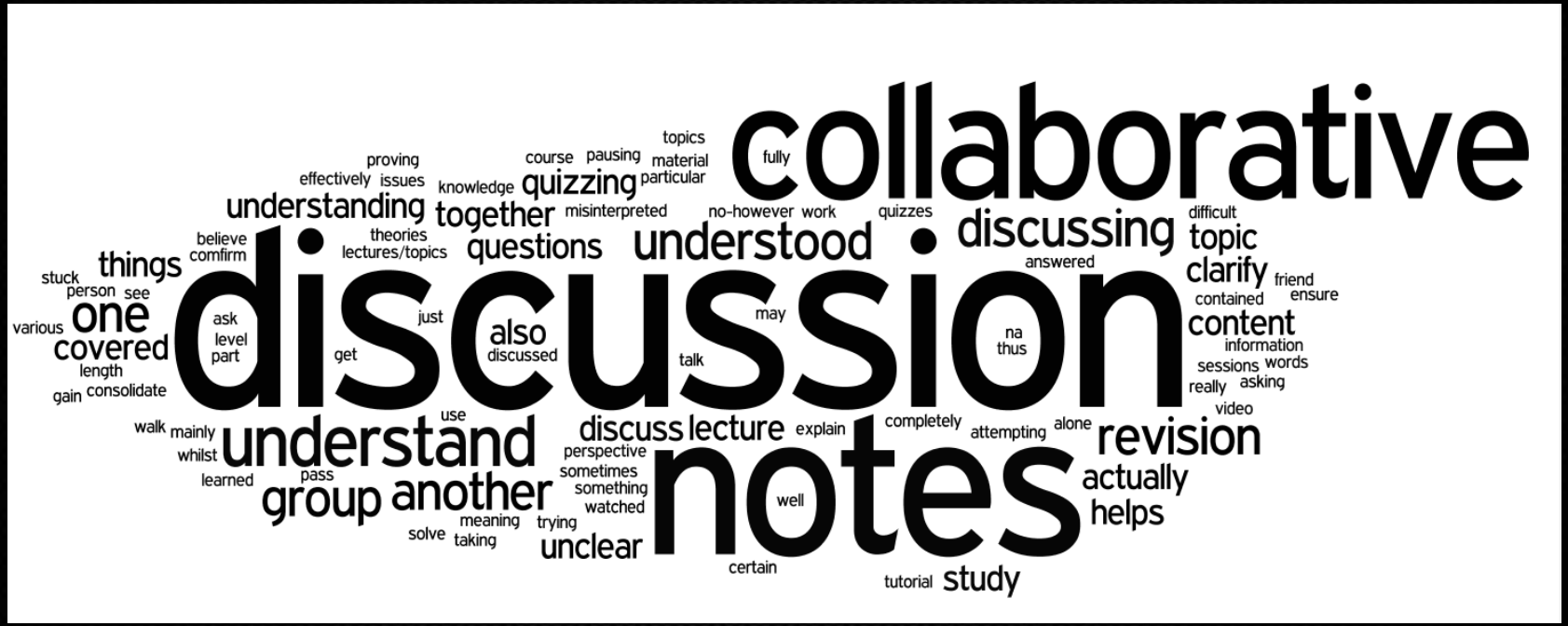
Equilibrium K values have been recorded

Student engagement

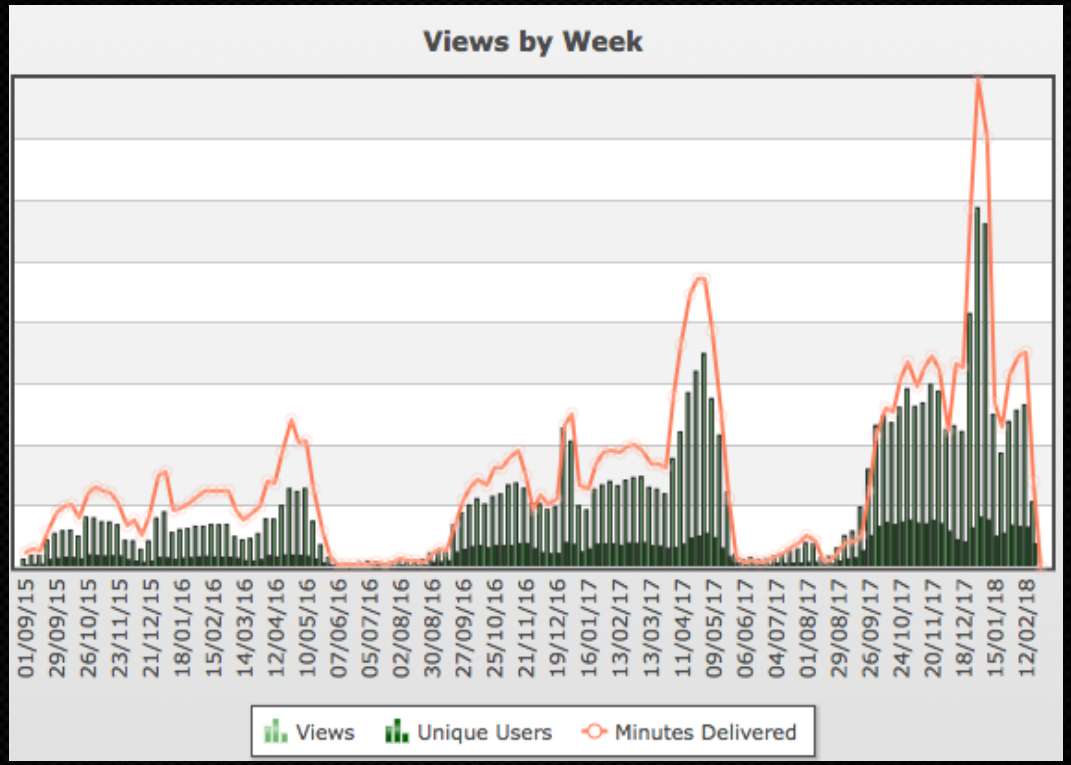


Source: Internal survey. N=195

Collaborative activities



Analytics


Views by Week
01/09/15
29/09/15
26/10/15
23/11/15
21/12/15
18/01/16
15/02/16
14/03/16
12/04/16
10/05/16
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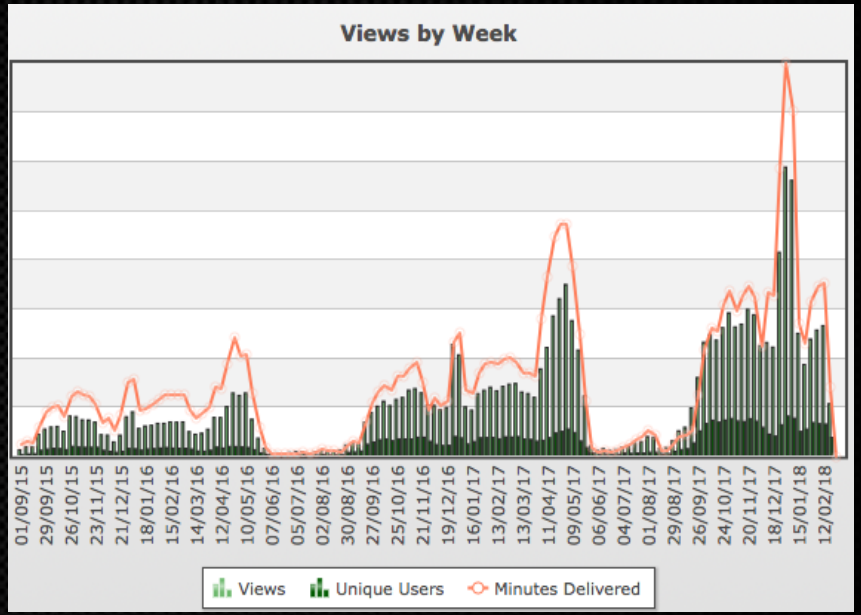
01/08/17
29/08/17
26/09/17
24/10/17
20/11/17
18/12/17
15/01/18
12/02/18
Views
Unique Users
Minutes Delivered

Student interaction and engagement with VLE resources

- Recent findings from Anglia Ruskin University using Talis Elevate (East 2018)
  - Little repeat business with content inside VLE modules and poor engagement with core materials (i.e. handbooks)
  - Cramming (before lecture / before assessment) is a common trend
  - Increased engagement at exam / assessment periods

Problems with analytics

- Collaborative / social viewing
- High access to lecture recordings may be associated with poorer academic performance (Colthorpe et al 2015, Nordmann et al 2017)
- Digital capabilities / literacies
- Not all study practices directly captured (i.e. interaction with physical artefacts)
  - "Learning central is quite confusing, I have had to print out and keep in a file what I need but this is probably my own preference. It is partly my age!"



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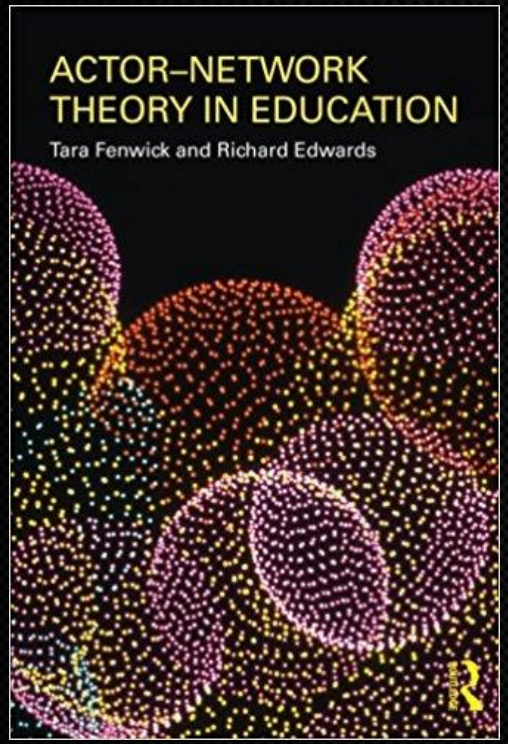
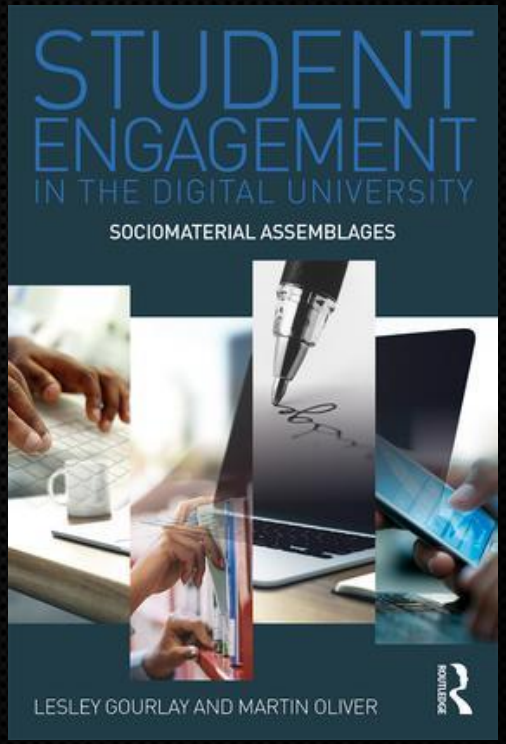
Study networks

Exploring assemblages

Sociomateriality and Actor-Network Theory (ANT)

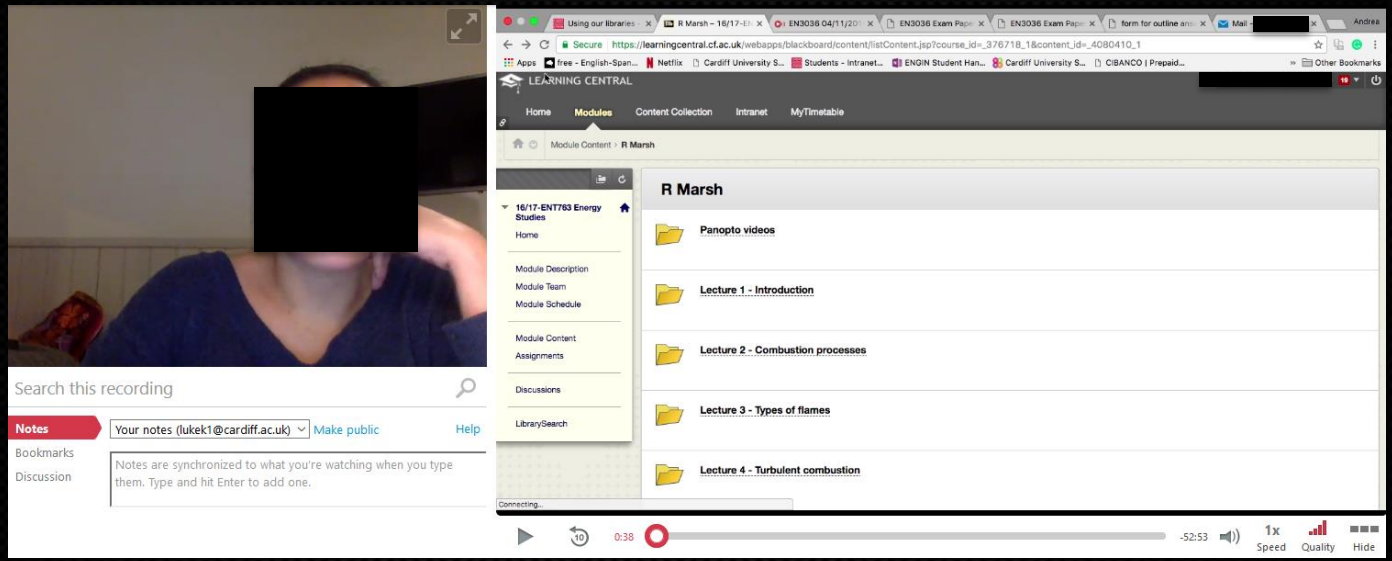




ANT 101

- Actors are “entities that do things” (Latour 2005)
- ‘Generalised symmetry’ between humans and non-humans
  - e.g. people, tools, programmes, documents, objects, machinery, texts, artefacts and technologies
- Relationality / Associations
  - Actors exist within a sociomaterial assemblage (or network) of materials linked to perform a particular function

Image: CC 2.0 by-nc-nd "Ant" by Chandan Kumar https://flic.kr/p/b2AoSk


Search this recording
Notes
Bookmarks
Discussion
Your notes (lukek1@cardiff.ac.uk)
Make public
Help
Notes are synchronized to what you're watching when you type them. Type and hit Enter to add one.
LEARNING CENTRAL
Home
Modules
Content Collection
Intranet
MyTimetable
Module Content › R Marsh
16/17-ENT763 Energy Studies
Home
Module Description
Module Team
Module Schedule
Module Content
Assignments
Discussions
LibrarySearch
R Marsh
Panopto videos
Lecture 1 - Introduction
Lecture 2 - Combustion processes
Lecture 3 - Types of flames
Lecture 4 - Turbulent combustion
0:38
-52:53
1x
Speed
Quality
Hide

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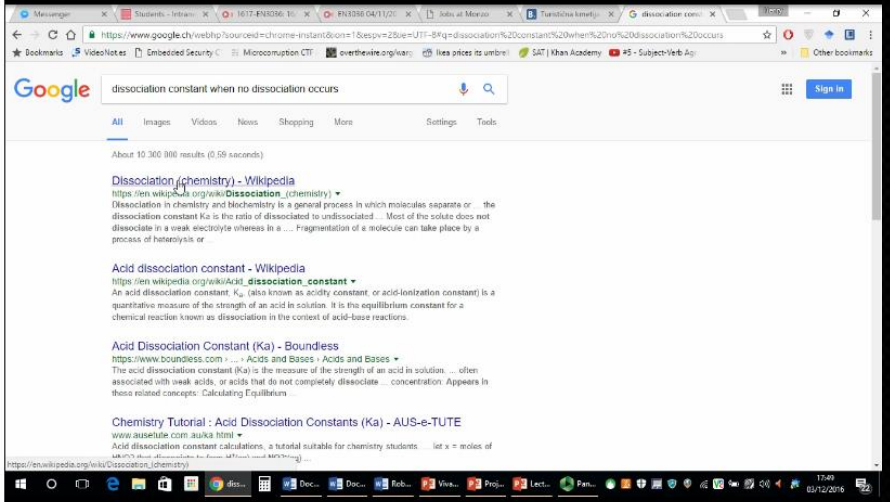
Notes | Your notes (lukek1@cardiff.ac.uk) | Make public | Help

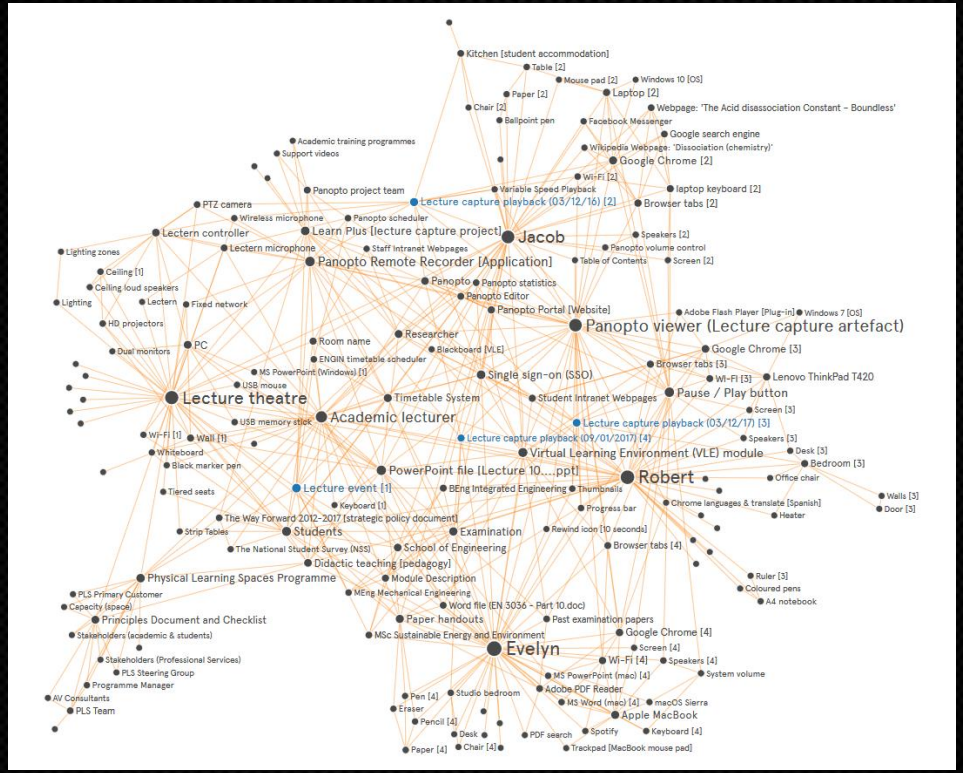
Bookmarks

Discussion

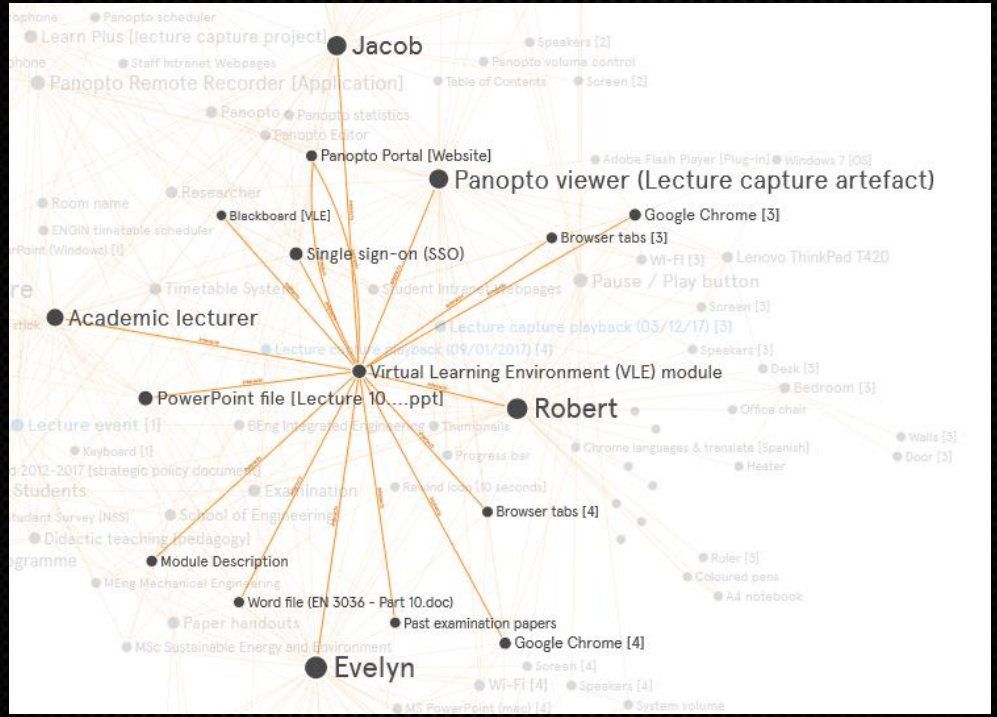
Notes are synchronized to what you're watching when you type them. Type and hit Enter to add one.



Visual mapping



VLE as an ‘obligatory point of passage’



Negotiating multi-spatial practices

- The lecture recording ‘play/pause’ button afforded switching between different ‘actors’ and spaces
  - e.g. electronic documents, VLE, webpages, physical notebooks and handouts
- However…the pause button serves conflicting qualities
  - Not harmonious with study practices (i.e. social networking / checking mobile phone)

(Re)Constructed study routines

- The practice of note-taking can be viewed in terms of a complex arrangement involving hybrid spaces and many interacting artefacts
- Fluid engagement with ‘digital’ and embodied inscription practice (physical note-taking)
- Pedagogic relationships with analogue technologies (Gourlay & Oliver 2018)
- Participants negotiated study practices within the spatiality of familiar environments

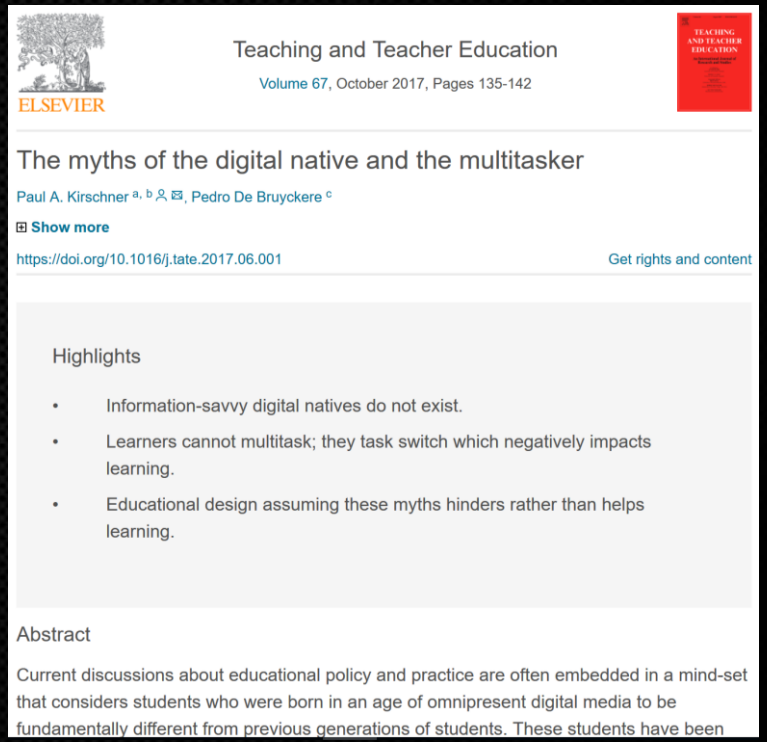
(Re)Constructed study routines

Table 17. The location in which online learners most commonly study

Places of study	% online learners
At home	85.1%
At work	8.1%
In a library or learning centre	3.5%
In a café or social space	1.1%
Other	2.3%

Implications for learning

- Efficient learning requires (momentary) stability and predictability ?
- Issues with multitasking ?
- What can we do to support such activities ?



ELSEVIER

Teaching and Teacher Education

Volume 67, October 2017, Pages 135-142

The myths of the digital native and the multitasker

Paul A. Kirschner [a, b], Pedro De Bruyckere [c]

Show more

https://doi.org/10.1016/j.tate.2017.06.001

Get rights and content

Highlights

- Information-savvy digital natives do not exist.
- Learners cannot multitask; they task switch which negatively impacts learning.
- Educational design assuming these myths hinders rather than helps learning.

Abstract

Current discussions about educational policy and practice are often embedded in a mind-set that considers students who were born in an age of omnipresent digital media to be fundamentally different from previous generations of students. These students have been

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Learners and digital practices

Exploring literacies in the digital age

Supporting students

“Learning Central is a complete nightmare…. they should have taken the time to explain how it works a bit before sending us off to find materials on it without thinking that we might have a bit of trouble with it.”

“After emailing a member of staff asking how to access a test through learning central I received a patronising email stating "No student has ever had a problem using learning central" followed by a helpful email from a member of IT staff.”

“Could have done with a session on how to use learning central. The attitude taken towards learning central was simply, "you will find this on learning central", no pointers were given. We were expected to jut use trial and error to find things.”

“Learning Central was extremely difficult for me to figure out, especially as a person who is bad with technology.”

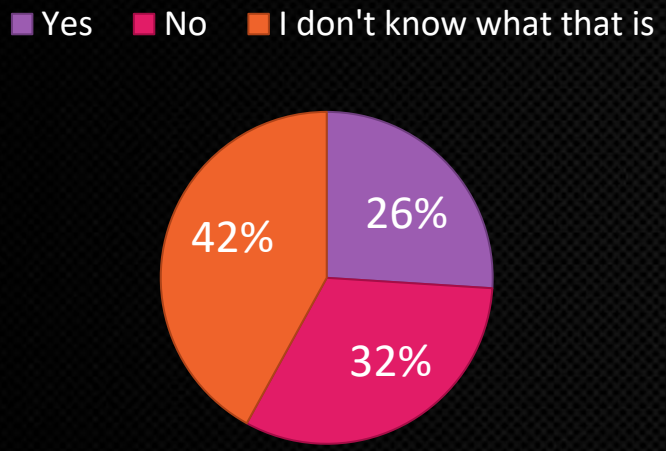
Exploring literacies

http://repository.jisc.ac.uk/6684/1/Jiscstudenttrackerbriefing17.pdf

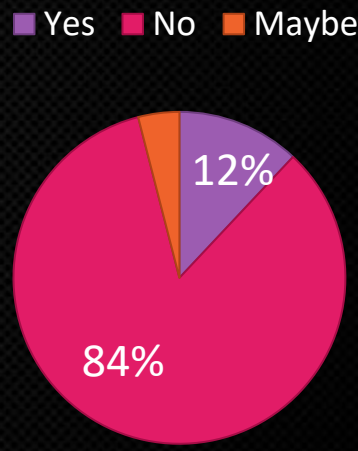
Learners need to be advised and supported on how best to use digital tools and systems in their studies

Student engagement

Do you use the notes/discussions feature in Panopto?



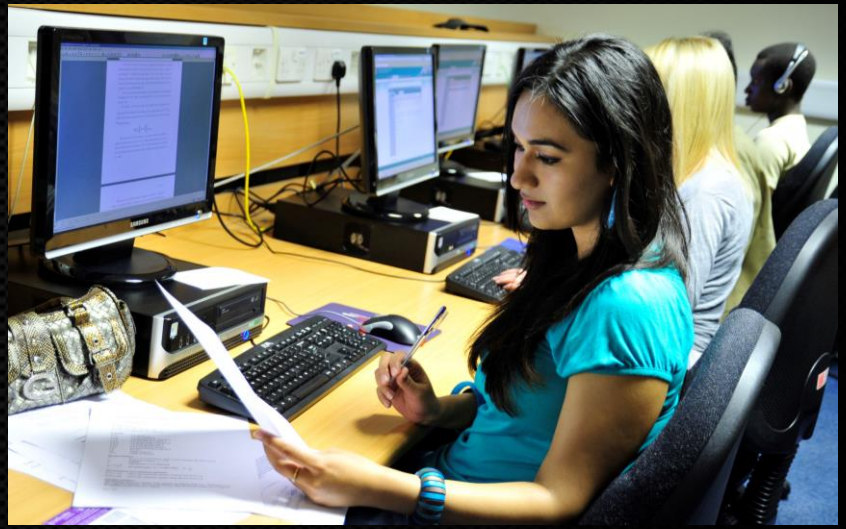
Do you use the search feature in Panopto?



Source: Internal survey. N=230

Digital literacies

- Digital literacy changes over time
  - People learn/forget
  - Technologies develop, settings adapt
  - ‘Visitors and residents’ continuum (White & Le Cornu 2011)
- Cannot be understood just in terms of individuals and skills, needs to take into account who is doing what and where (Gourlay & Oliver 2018)



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Student partnerships

Empowering the student voice in change

Student support materials

Study skills

- Study skills
- Academic skills classes
- Critical analysis
- English language support
- Information search and discovery
- Listening and note-making skills
- Manage, cite and reference information
- Managing your online presence
- Maths Support Service
- Research related skills modules
- Using recorded events for learning
- Writing and presenting

Using recorded events for learning

Some of your learning events may be recorded for you to watch online. This is known as Event Capture or Lecture Capture.

You may wish to confirm with your academic whether or not your lecture is being recorded prior to the session.

Learning with Panopto

This is an interactive model designed to aid your learning at Cardiff University using various resources like Panopto (Lecture Capture), Learning Central and Student intranet.

Click here

Applications

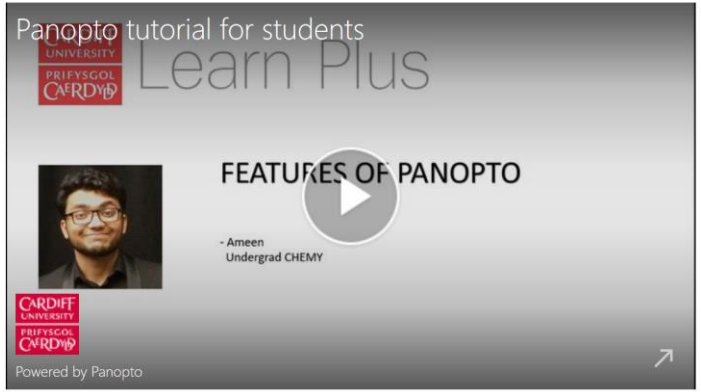
Learn Plus

Simultaneously capture audio, video and desktop applications. Record, webcast, manage, search and analyse video content.

Find out more Help

Tutorial

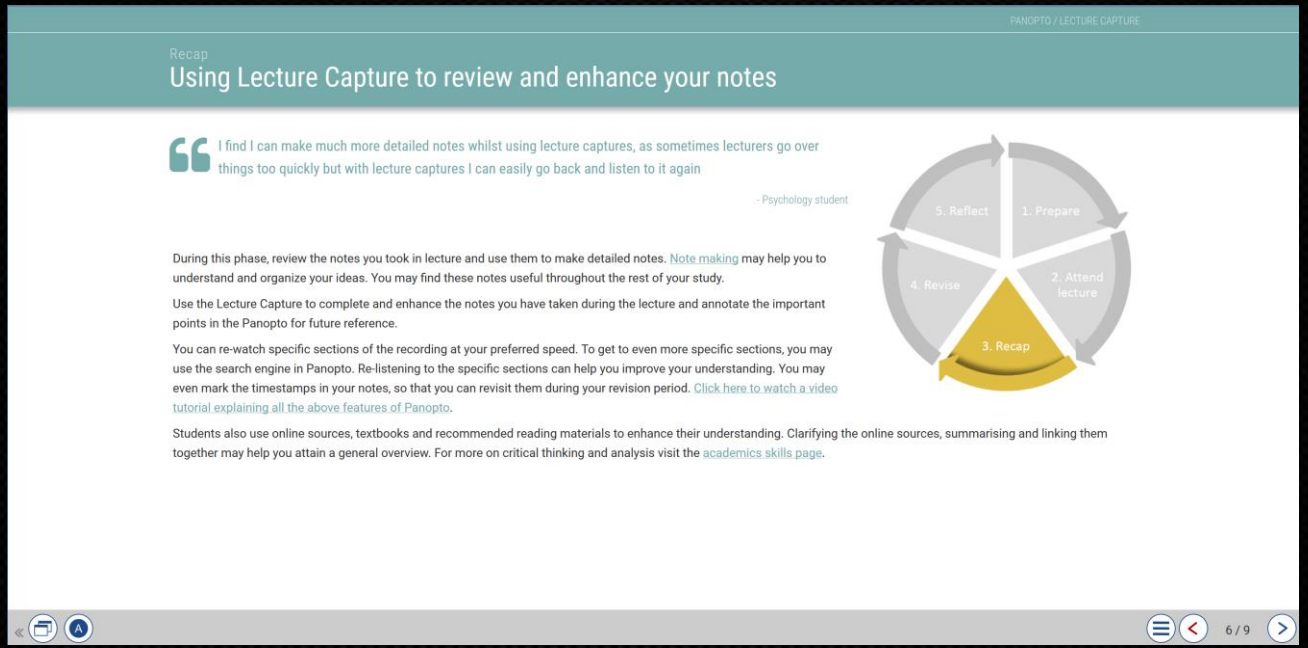
You can use your Event Capture in various ways in your study once it's uploaded by your teacher.



Based on the usage of captured content by Cardiff University students, we have designed an 'Event Capture Learning Model', which gives you a step-by-step guide on all the ways you could utilise the captured content.

Student support materials

https://xerte.cardiff.ac.uk/play_6284



Student partnerships

- Working together to a common agreed purpose, to achieve enhancements for all concerned.
- Change agents: working in partnership with students as a driver for change in designing, developing and implementing technology enhanced learning.
  - https://www.jisc.ac.uk/guides/developing-successful-student-staff-partnerships

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Summary

"Messy Realities"

Student VLE comment

“It's not student friendly enough.”

Discussion: Gourlay & Oliver (2018)

Control

Students often opt out of technologies controlled by the institution i.e. Whatsapp instead of the VLE for communication

Individual strategies

Many students found that the vast array of resources on and around the VLE resulted in ‘information overload’

Fluid practices

Students use a wide array of technologies, including many not institutionally supported

Developing literacies

Requirement to understand digital literacies holistically; rather than isolated elements

Summary

- If used pragmatically, ANT can provide nuanced insights for the development of learning technologies and learning spaces (Johri 2011)
- “Matter matters”
  - Entangled nature of practice: Unfolding, fluid, divergent, emerging, messy, contingent
  - Diversity of engagement
  - Complexities of study practices, combining digital and analogue elements
- Information-savvy digital natives do not exist
  - Educational design assuming these myths hinders learning
- Student partnerships may help develop supportive digital environments, promote effective learning and advance engaging learning experiences

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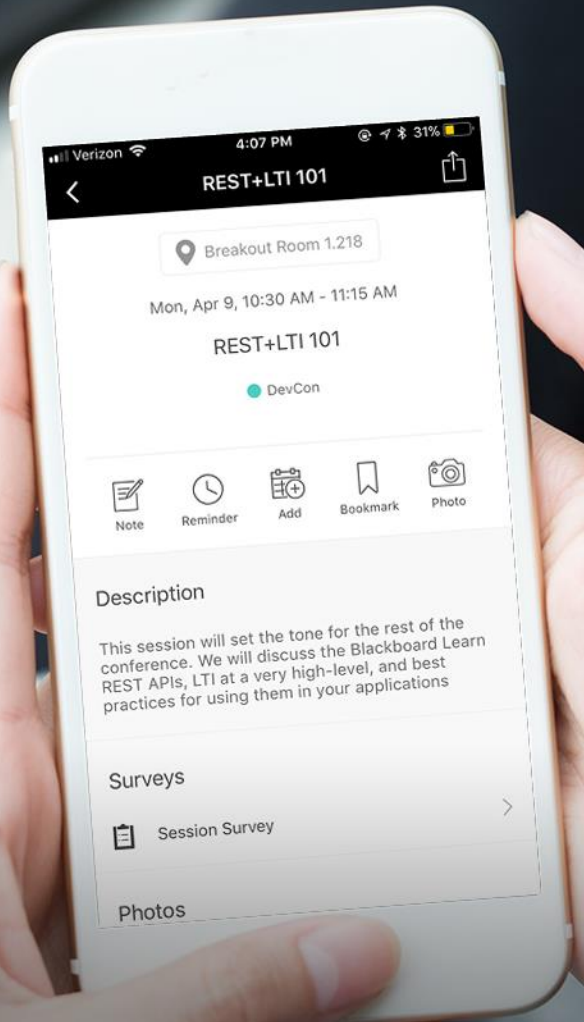

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