



# 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.”

# 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



A screenshot of a Panopto workflow diagram and a video player interface. The workflow diagram is titled "Workflow" and shows three steps: 1. Capture &amp; Record using Panopto Event Capture Recorder or Personal Capture Recorder; 2. Store, manage, track and edit online via the Learn Plus Portal (https://cardiff.co.uk/panopto.eu/); 3. Share your finished recordings to students via Learning Central and other websites. The video player interface shows a search bar for "Search this recording" and a list of recordings with details such as "Comments", "Notes", "Bookmarks", "Revision", "The viewing experience", "Features", "Panopto via cases", "Capture &amp; Record using Panopto Event Capture Recorder...", "Learn Plus Portal", and "Learn Plus: Event Capture".

# Blackboard – Panopto integration

The screenshot displays the Blackboard Learning Central interface. At the top, the navigation bar includes 'Home', 'Modules', and 'Intranet'. The user profile 'Karl Luke 135' is visible in the top right. A left-hand sidebar lists various navigation options: 'Learn Plus', 'Announcements', 'Module Team', 'Deadlines', 'Learning Materials', 'Assessment', 'Discussions', 'Groups', 'LibrarySearch', and 'Learn Plus Recordings'. The main content area shows a folder view for 'Learn Plus'. At the top of this view is a search bar with the text 'Search in folder "Learn Plus"...' and a 'Create' button. Below the search bar, there are icons for sharing, settings, and a refresh button. The content is sorted by 'Name' and lists four video items:

- Using the Panopto applications**  
2 months ago in Learn Plus  
Not available to viewers
- Learn Plus Training 29-11-17**  
4 months ago in Learn Plus  
Not available to viewers
- Learn Plus Training 14-11-17**  
4 months ago in Learn Plus  
Not available to viewers
- Learn Plus Training 14-11-17**  
4 months ago in Learn Plus  
Not available to viewers

At the bottom of the interface, it indicates 'Viewing 1 - 25 of 52' and 'Results per page: 10 | 25 | 50 | 150 | 250'. There are also pagination controls showing '1 | 2 | 3 | Next >'.



# Student engagement

Using qualitative and quantitative approaches

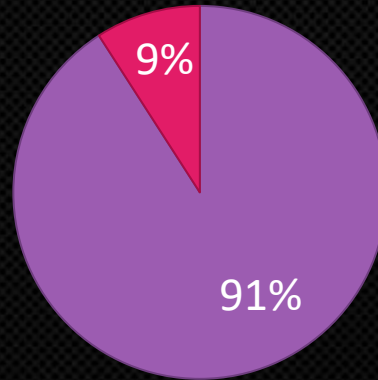
## Student engagement with lecture capture



# Student engagement

## How helpful did you find lecture capture?

■ Very helpful ■ Somewhat helpful



Source: Internal survey. N=230





# Activities students engage with whilst watching Lecture Capture



# Note-taking

Cardiff University - School of Engineering **CH-100V**  
 EN306 - ENT63 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<sub>x</sub>). 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 reactant temperature 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 change 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 change in kinetic or potential energy. Its temperature is lower than the constant volume process because some of the energy is utilized to change the volume of the system (i.e. generate work).

$Q = \dot{m} C_p \Delta T$

**Typical AFT values**

Common Flame Temperatures (assuming initial atmospheric conditions - 1 bar and 20°C)

- Propane in air: 1980°C
- Butane in air: 1970°C
- Natural gas in air: 1950°C (approx.)
- Acetylene in air: 2400°C
- Acetylene in Oxygen: 3100°C
- Hydrogen in air: 2330°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. That in real life we have the following non-adiabatic factors:

- Heat transfer through combustor wall convection losses.
- Incomplete combustion.
- Incomplete mixing of air and fuel (i)
- Dissociation, especially at temps as temps and across the flame. There is lower temperature zones.

**Dissociation**

Dissociation in chemistry is a general process which can occur in reversible reactions. This process occurs in combustion systems in the highest temperature zones of the flame, for example carbon dioxide will dissociate. This means that combustion reactions do not release of recently-formed molecules. This has been talked about up to this point to become.

Consider the following reaction:

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

At high enough temperatures there is sufficient CO molecules and make them collide such that:

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

Handwritten notes:

- 1) arrives into higher zones where turbulence
- 2) splits off from the turbine
- 3) number of molecules of O2 higher
- 4) you really power from that disc can capture
- 5) Esta formula le va a dar la grafica
- 6) between 5 and 10 bar water → pressure water coming
- 7) check a velocity of 14 m/s in combustor pressure and centrifuge
- 8) En este caso 10 bar en un caso 12 m/s que da una 100 kw
- 9) the velocity changes slowly → pressure changes fast
- 10) The power is the same
- 11) it is a small balance reduction
- 12) because 1-c has no interest
- 13) manual values a few m/s do the power of that wind
- 14) maximum velocity rate is 1.30
- 15) heat
- 16) you will always want to operate your wind power in this section
- 17) manually
- 18) the wind is full of turbulence, you get it. hace 4-12V
- 19) allow the turbine change speed with 5-11V but that gives → pressure 100 bar en un caso de 10 bar con 10 bar en un caso de 10 bar
- 20) (1) cuando cambia el comportamiento de los bloques y así disminuir el rendimiento
- 21) Por regulación: cuando el bloque que disminuye la potencia de salida
- 22) you start with a low speed una velocidad menor
- 23) así de ve el modelo real

So in reality, for high temp flames:

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

The forward reaction is exothermic, the reverse is endothermic.

**Dissociation in flames**

In a combustion reaction the concentrations of CO<sub>2</sub>, CO and O<sub>2</sub> will adjust until the reaction proceeds at the same rate as the rate of formation of the CO<sub>2</sub> molecules is equal to the rate of dissociation. A state has been reached, equilibrium has been reached, but only above 1000°C. This process also applies to H<sub>2</sub>O molecules.

Consider the following system: Reversible compressor

Equilibrium boiler mixture of CO, O<sub>2</sub> and CO<sub>2</sub> All at P, T

Reversible expander

Assume that all the temperatures are constant throughout the system. If all turbines are reversible, then the pressure of each component inside 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.

**Equilibrium constant**

This, the partial pressure of each of the system components describe the state of the reaction, i.e.

**DISSOCIATION**

Check when flame temperatures are high in these cases:

Molecules separate into smaller molecules.

So that the product gas has less heat of volume so that the same heat for adiabatic flame temp, which is an equilibrium process. This reduces flame temperature.

THE REACTION BECOMES REVERSIBLE

Example: Carbon monoxide burning in oxygen

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

But if the temperature is high enough, then the CO<sub>2</sub> molecules which are stable will break up: going

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

giving a stable (at low temp) equilibrium, but only above 1000°C

**EQUILIBRIUM CONSTANT, K**

In this static equilibrium, the states of the reaction is given by the CO and O<sub>2</sub> and the partial pressures of the system components.

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

K is the Equilibrium (or Dissociation) constant. K is a function of T, composition, but not pressure.

FOR A REVERSE REACTION:

a) adding A + 1/2 B → C + 1/2 D

b) LOST EQUILIBRIUM CONSTANT

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

or confusion of hydrogen:  $2H_2 + O_2 \rightleftharpoons 2H_2O$

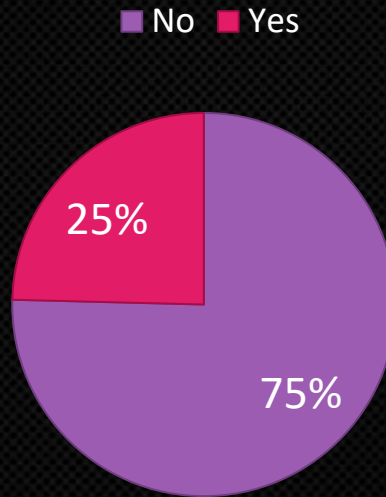
$$K = \frac{P_{H_2O}^2}{P_{H_2}^2 P_{O_2}}$$

A high K value indicates large amounts of products become available.

Equilibrium K values have been recorded

# Student engagement

Do you watch lecture capture with a group/pair?

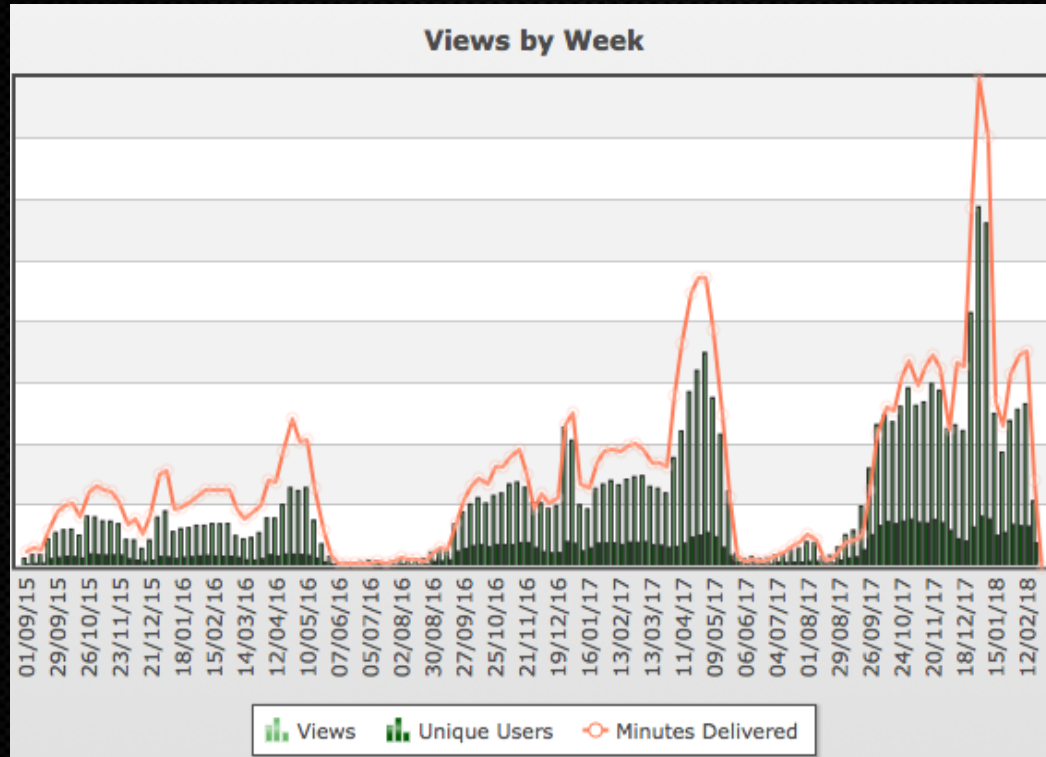


Source: Internal survey. N=195





# Analytics



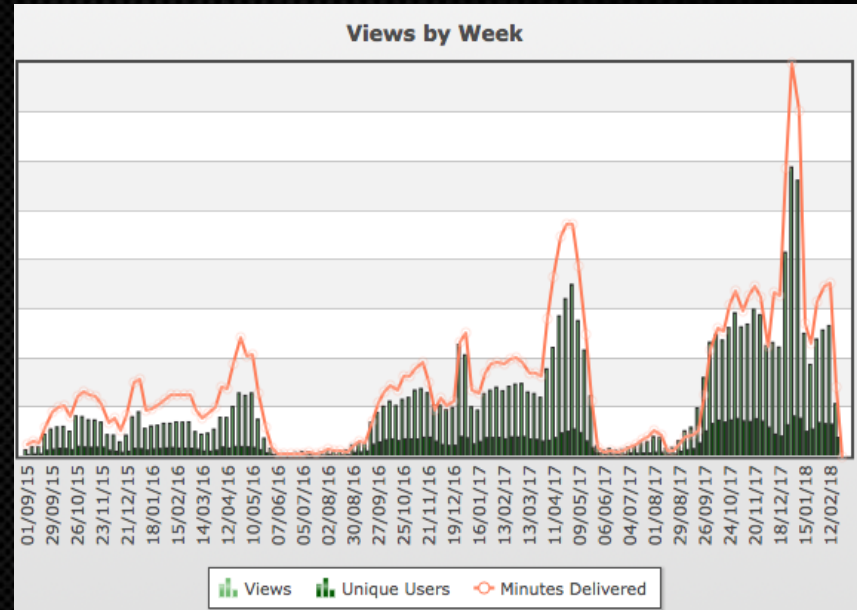
# Student interaction and engagement with VLE resources

- 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!”

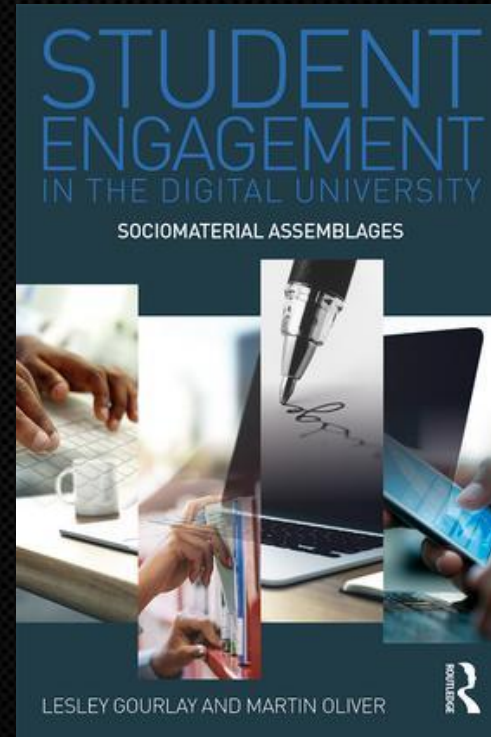
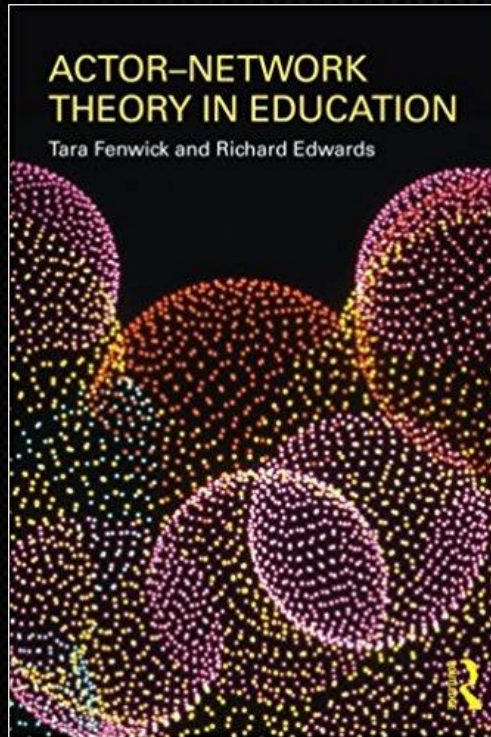


# Study networks

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>

The screenshot shows a video recording interface on the left and a web browser window on the right. The browser window displays the Blackboard Learning Central page for 'R Marsh'. The page has a navigation menu with 'Home', 'Modules', 'Content Collection', 'Intranet', and 'MyTimetable'. The 'Modules' section is expanded to show '16/17-ENT763 Energy Studies'. A sidebar on the left lists navigation options: Home, Module Description, Module Team, Module Schedule, Module Content, Assignments, Discussions, and LibrarySearch. The main content area is titled 'R Marsh' and contains a list of folders: 'Panopto videos', 'Lecture 1 - Introduction', 'Lecture 2 - Combustion processes', 'Lecture 3 - Types of flames', and 'Lecture 4 - Turbulent combustion'. The video recording interface includes a search bar, a 'Notes' section with a dropdown menu for 'Your notes (lukek1@cardiff.ac.uk)', and a 'Bookmarks' section. The video player at the bottom shows a progress bar at 0:38 and a volume icon.



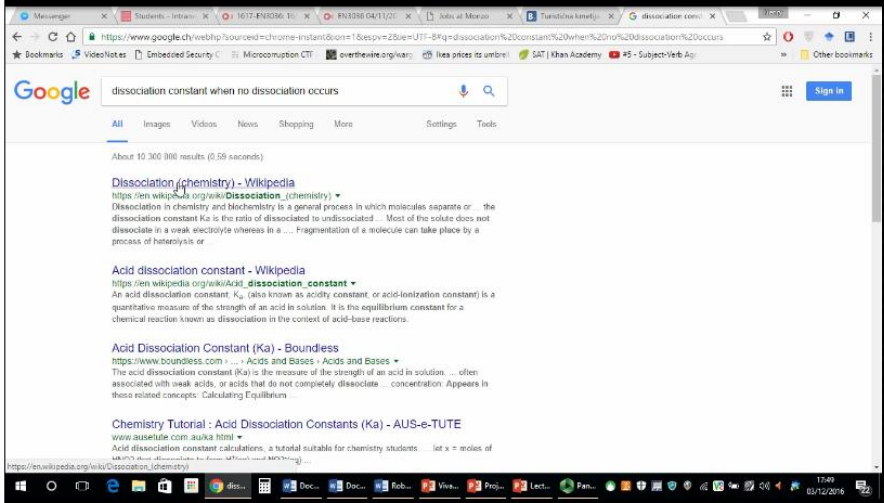
Search this recording 



**Notes** Your notes (luke1@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.



Google dissociation constant when no dissociation occurs   [Sign in](#)

All Images Videos News Shopping More Settings Tools

About 10 300 000 results (0.58 seconds)

**Dissociation (chemistry) - Wikipedia**  
[https://en.wikipedia.org/wiki/Dissociation\\_\(chemistry\)](https://en.wikipedia.org/wiki/Dissociation_(chemistry))  
Dissociation in chemistry and biochemistry is a general process in which molecules separate or the dissociation constant  $K_a$  is the ratio of dissociated to undissociated ... Most of the solute does not dissociate in a weak electrolyte whereas in a ... Fragmentation of a molecule can take place by a process of heterolysis or

**Acid dissociation constant - Wikipedia**  
[https://en.wikipedia.org/wiki/Acid\\_dissociation\\_constant](https://en.wikipedia.org/wiki/Acid_dissociation_constant)  
An acid dissociation constant,  $K_a$  (also known as acidity constant, or acid-ionization constant) is a quantitative measure of the strength of an acid in solution. It is the equilibrium constant for a chemical reaction known as dissociation in the context of acid-base reactions.

**Acid Dissociation Constant (Ka) - Boundless**  
<https://www.boundless.com/.../Acids-and-Bases-Acids-and-Bases>  
The acid dissociation constant ( $K_a$ ) is the measure of the strength of an acid in solution ... often associated with weak acids, or acids that do not completely dissociate ... concentration Appears in these related concepts: Calculating Equilibria

**Chemistry Tutorial : Acid Dissociation Constants (Ka) - AUS-e-TUTE**  
[www.ausetute.com.au/ka.html](http://www.ausetute.com.au/ka.html)  
Acid dissociation constant calculations, a tutorial suitable for chemistry students  $\text{let } x = \text{moles of dissociated acid}$

[https://en.wikipedia.org/wiki/Dissociation\\_\(chemistry\)](https://en.wikipedia.org/wiki/Dissociation_(chemistry))

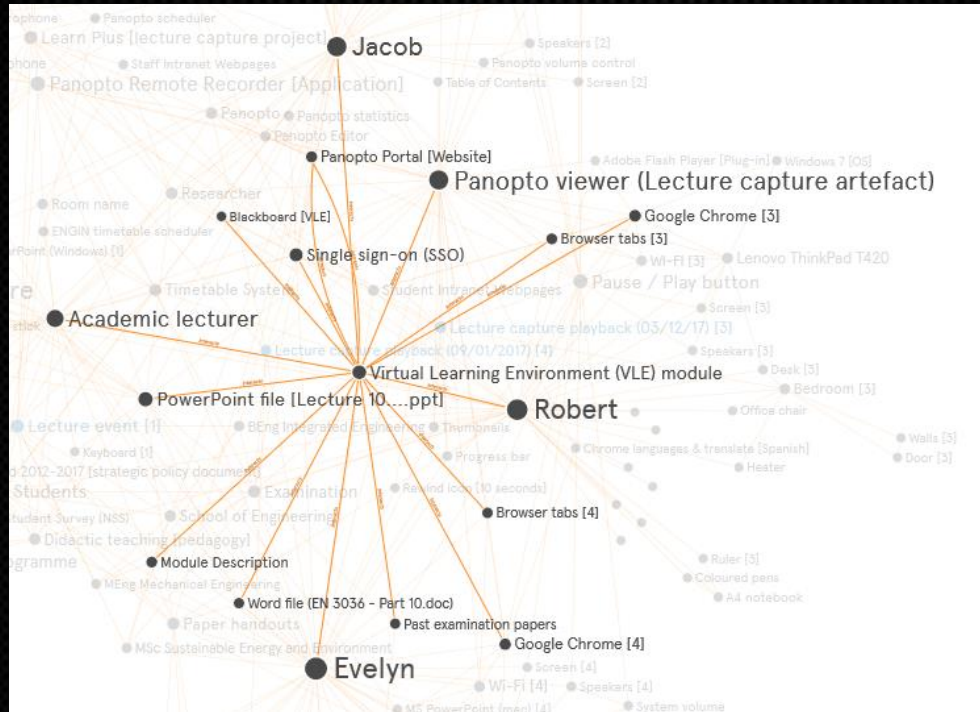
Taskbar: 17:49 03/12/2016







# 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)

The screenshot shows a web browser window displaying the Wikipedia article for "Dissociation (chemistry)". The browser's address bar shows the URL "https://en.wikipedia.org/wiki/Dissociation\_(chemistry)". The page features a standard Wikipedia layout with a left-hand navigation sidebar, a main content area, and a bottom taskbar. A prominent red banner at the top of the article text reads: "This article needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. (June 2014)". Below this banner, the article text begins with "Dissociation in chemistry and biochemistry is a general process in which molecules (or ionic compounds such as salts, or complexes) separate or split into smaller particles such as atoms, ions or radicals, usually in a reversible manner." A "Contents" table of contents is visible, listing sections like "Dissociation constant", "Dissociation degree", "Salts", "Gases", "Acids in aqueous solution", "Fragmentation", "Receptors", "See also", and "References". The "Dissociation constant" section is partially visible, showing the text "Main article: Dissociation constant" and "For reversible dissociations in a chemical equilibrium". The browser's taskbar at the bottom shows various application icons and the system clock indicating the date as 03/12/2016.

## (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 ?



Teaching and Teacher Education

Volume 67, October 2017, Pages 135-142



## The myths of the digital native and the multitasker

Paul A. Kirschner <sup>a, b, c, d, e</sup>, Pedro De Bruyckere <sup>c</sup>

[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



# 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



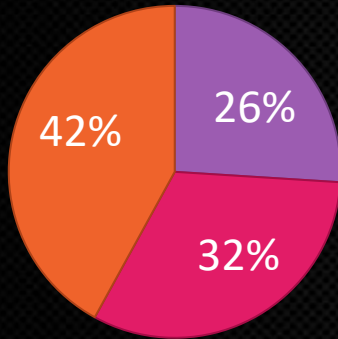
<http://repository.jisc.ac.uk/6684/1/Jiscstudenttrackerbriefing17.pdf>

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

# Student engagement

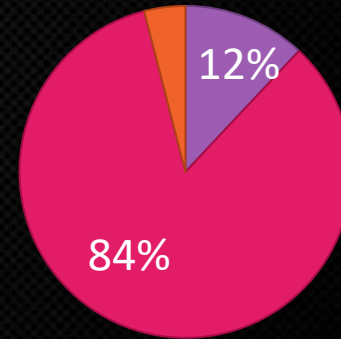
**Do you use the notes/discussions feature in Panopto?**

■ Yes ■ No ■ I don't know what that is



**Do you use the search feature in Panopto?**

■ Yes ■ No ■ Maybe



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)





# 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

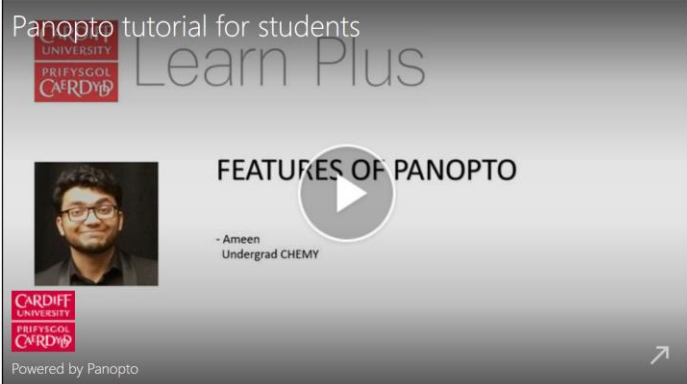
##### Learn Plus

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.



Panopto tutorial for students  
Learn Plus

FEATURES OF PANOPTO

- Ameen  
Undergrad CHEMY

Powered by Panopto

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](https://xerte.cardiff.ac.uk/play_6284)

PANOPTO / LECTURE CAPTURE

Recap  
Using Lecture Capture to review and enhance your notes


“ I find I can make much more detailed notes whilst using lecture captures, as sometimes lecturers go over things too quickly but with lecture captures I can easily go back and listen to it again ”  
- Psychology student

During this phase, review the notes you took in lecture and use them to make detailed notes. [Note making](#) may help you to understand and organize your ideas. You may find these notes useful throughout the rest of your study.

Use the Lecture Capture to complete and enhance the notes you have taken during the lecture and annotate the important points in the Panopto for future reference.

You can re-watch specific sections of the recording at your preferred speed. To get to even more specific sections, you may use the search engine in Panopto. Re-listening to the specific sections can help you improve your understanding. You may even mark the timestamps in your notes, so that you can revisit them during your revision period. [Click here to watch a video tutorial explaining all the above features of Panopto.](#)

Students also use online sources, textbooks and recommended reading materials to enhance their understanding. Clarifying the online sources, summarising and linking them together may help you attain a general overview. For more on critical thinking and analysis visit the [academics skills page](#).



5. Reflect

1. Prepare

2. Attend lecture

3. Recap

4. Revise

« » ⌂ 🔍 6 / 9

# 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>



# 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

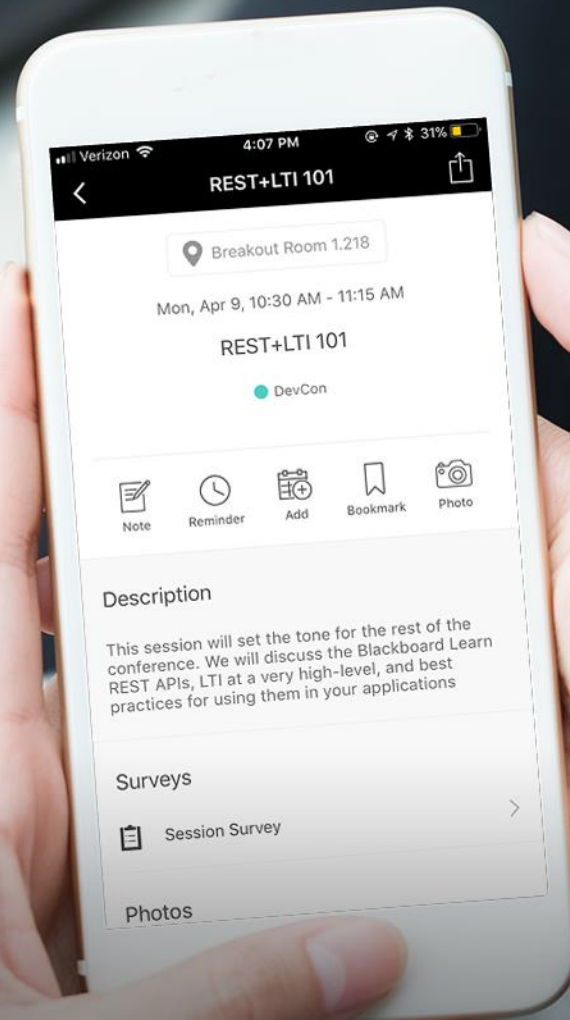
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