A photograph of a large, modern university building with a grid of windows and a prominent vertical tower. The sky is blue with some clouds. In the foreground, there is a paved area with some bicycles parked.

Conceptualising teaching as a science of design: How to become an innovator in teaching

Diana Laurillard
UCL Knowledge Lab

Outline of the argument

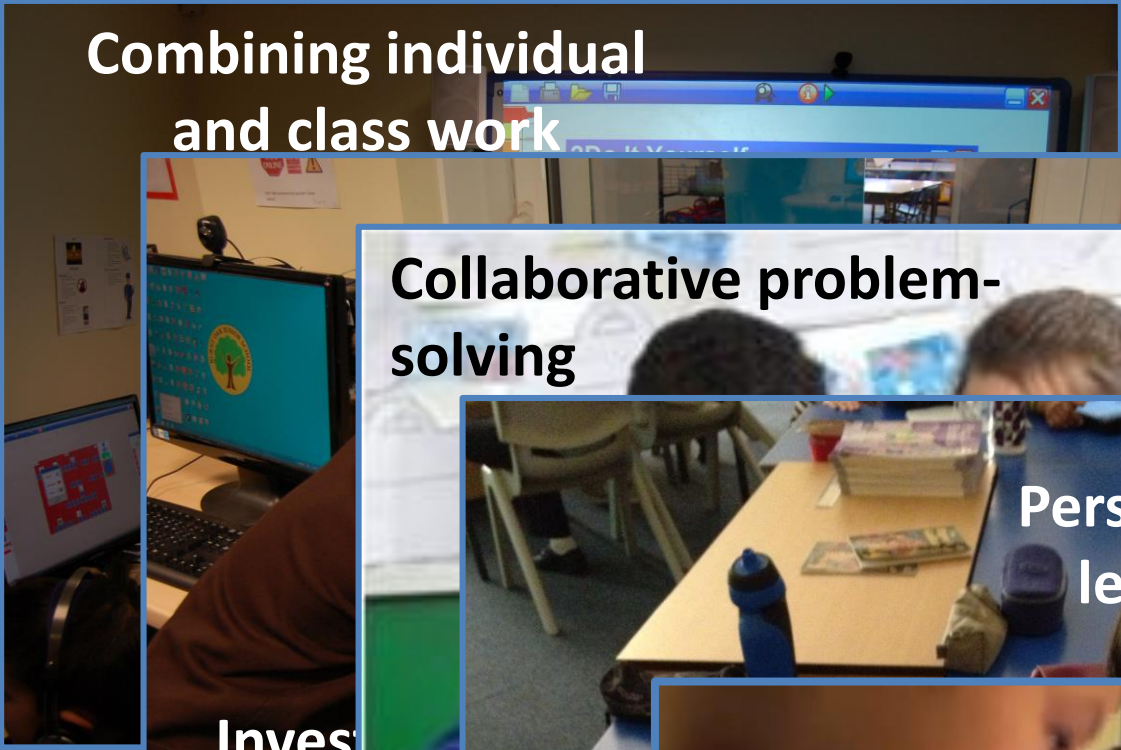
- Leaping Development of Fundamental Education
 - improving classroom teaching efficiency, exploring theories
 - One-to-One learning
 - Thinking development
 - IT in the curriculum – pedagogies – small learning resources
 - IT in class to extend engagement, knowledge and thinking
- How to build that new knowledge, and share what we discover about digital pedagogies?
- Teachers cannot work in isolation given the challenges we face
- Can we use the technology to become more professional in building our collective knowledge about how to teach, in each of our subjects?



Why should digital technology be part of teaching innovation?

IT in the curriculum...

**Combining individual
and class work**



**Collaborative problem-
solving**




**Personalised
learning**



Invest



**Learning through
creating**



IT in the curriculum...

New kinds of

Efficient
class

IT in cl
exte
engage

Thinking development –
small learning resources

Inquiry
learning in
the wild

Learning types

Learning through:

Acquisition (Read, Watch, Listen)

Discussion

Inquiry

Practice

Collaboration

Production

Teaching in a digital world

The digital skills required of a professional teacher:

Keeping up with new digital tools and resources

Blending conventional and digital methods

Helping students with the skills of digital learning

Using digital resources and tools designed by non-teachers...

Unlike most other professionals:

Teachers have to discover and develop their own blended learning pedagogies *while still doing their everyday job*

Teaching in the 21st century?

- Teachers **discovering** new digital pedagogies
- Teachers **being supported** for innovation
 - **Blending** in digital methods to focus on learning
 - **Testing and improving** their designs
 - **Sharing** new pedagogic ideas and practices
- Teachers recognised as **design professionals**
- Professional development via **peer collaboration**

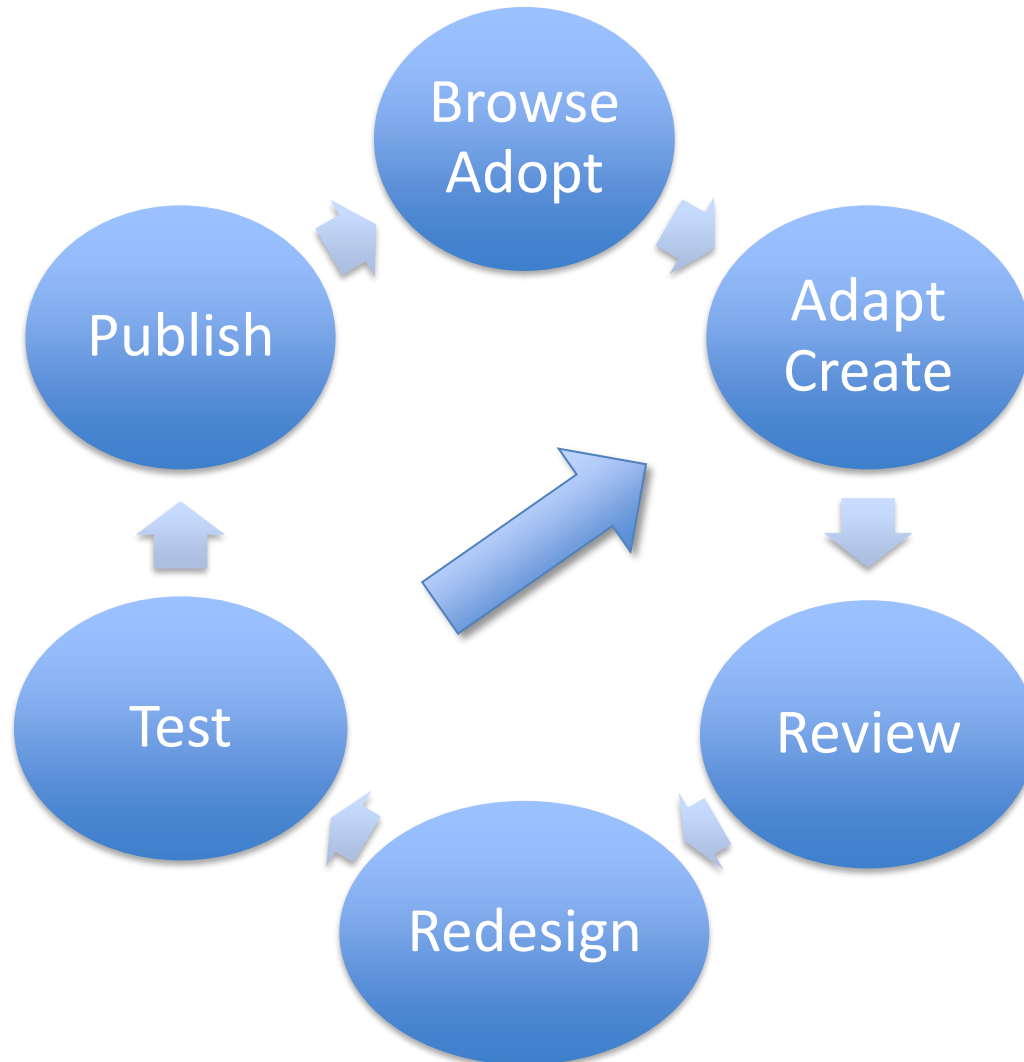


*Who else can develop the new digital pedagogies?
- What is **your** question?*

The background of the image is a dense, interconnected network of nodes and lines. The nodes are represented by small circles in various colors, including blue, green, and black. The lines connecting them are thin and light-colored, creating a complex web of relationships. A semi-transparent white rectangular box is centered over the network, containing the text "Teaching has to be seen as a design science".

Teaching has to be seen
as a design science

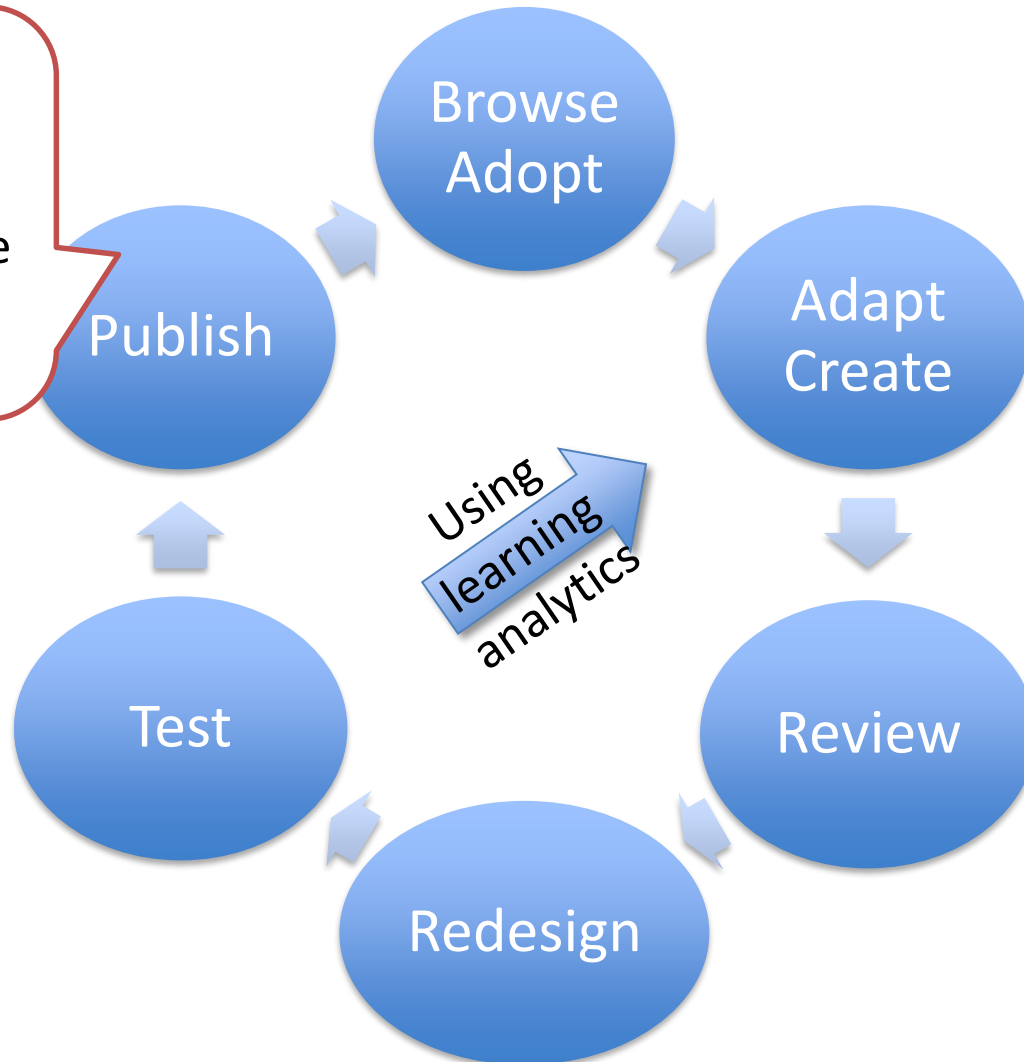
A community of practice: innovating, testing, and sharing new ideas for effective design



Building scientific and scholarly knowledge

A community of practice: innovating, testing, and sharing new ideas for effective *teaching* design

Question:
What is the
teaching design
equivalent of the
scholarly
journal?



Building *learning technology* knowledge

A background image featuring a complex network diagram with numerous nodes and connecting lines in shades of blue, green, and grey, set against a light blue and white gradient.

Teachers need a tool for pedagogic innovation - planning, testing, reviewing, publishing teaching designs:
The Learning Designer

A power tool for teachers: The Learning Designer

- The teacher as designer must be able to
 - Browse existing designs for blended learning
 - Adapt these and create their own designs
 - Review and analyse their pedagogic potential
 - Test them with learners
 - Redesign and re-test
 - Publish their design for others to find

The Learning Designer: Browsing designs

<http://learningdesigner.org>

The image shows two overlapping screenshots of the Learning Designer web application. The top screenshot displays the 'Add to personal space' dialog box, which prompts the user to select a location for a design. The dialog shows a tree view of the personal space structure:

- Directory (highlighted with a dashed box)
- Curated designs
 - By topic
 - By pedagogy (highlighted with a red box)
 - Inquiry-based
 - Collaborative
 - Construction
 - Discussion-based
 - Submitted designs
 - Personal space

The bottom screenshot shows the 'By topic' page, which lists various design topics as blue hyperlinks:

- Any or all topics
- Art History
- Business
- Computing
- Education
- Environment
- History
- Mathematics
- Research methods
- Science

The Learning Designer: Creating a design

Explaining a complex concept (blood pressure)

Name

Topic

Learning time

Designed learning time

Number of students

Description

Aims

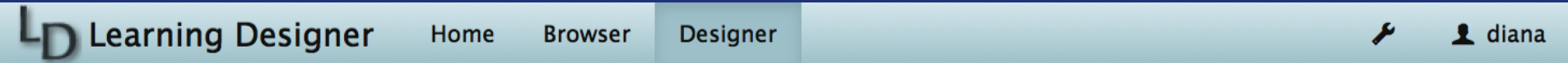
Outcomes

Define the aims and learning outcomes for the session

[+ Add TLA](#)

[New design](#) [Import design](#) [Export design](#) [Share](#) [Save](#)

The Learning Designer: Creating a design



Explaining a complex concept (blood pressure)

Name: Explaining a complex concept (blood pressure)

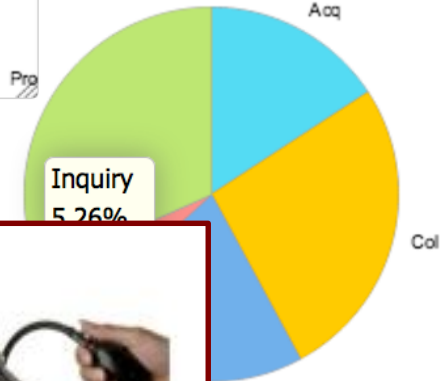
Topic: Effects on blood pressure

Learning time: 190 minutes

Designed learning time: 190 minutes

Aims: Students able to give a physiological account of blood pressure

Outcomes: Explain
Able to explain the role of...



Select learning through:

- Acquisition
- Inquiry
- Practice
- Discussion
- Collaboration
- Production

Create a link to a digital resource for students to work with



New design

Save

Read Watch Listen 30 1 2 +

Work through video to ensure you understand the role of the critical factors in the blood pressure simulator, and feel ready

Produce 20 1 0 +

Prepare your animated powerpoint describing the blood pressure simulator, focusing in particular on what you

Collaborate

Share your animated p of your group, and loc

The Learning Designer: Adapting a design

Explaining a complex concept (cash flow)

Name

Topic

Learning time

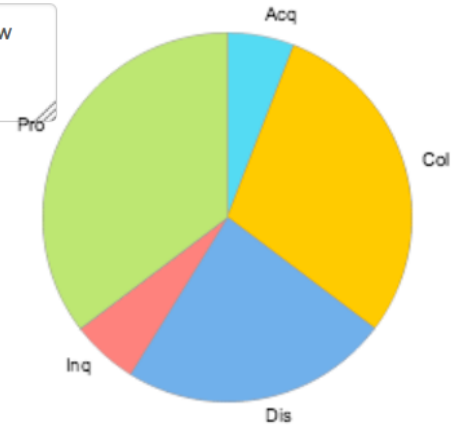
Designed learning t...

Number of students

Description

Aims

Outcomes



Adds their own resource

A central blue circle labeled 'Business Plan' is surrounded by ten smaller circles, each containing a business plan component: Executive Summary, Mission Statement, Company Background, Product Description, Marketing Plan, Competitor Analysis, SWOT Analysis, Operations, Financial planning, and Timeline.

Edits the text, duration, group size, etc

Exports for students and other teachers

A screenshot of the Learning Designer activity interface. It shows a list of activities with controls for duration and group size. The first activity is 'Work through the video of the spreadsheet to ensure you understand the role of the critical factors in the cash-flow' with a duration of 10 minutes and a group size of 1. The second activity is 'Produce Prepare your own animated powerpoint describing the cash-flow model, focusing in particular on what you feel' with a duration of 20 minutes and a group size of 1. The third activity is 'laborate Share your animated p of your group, and loc' with a duration of 20 minutes and a group size of 1.

The Learning Designer: Publishing

<http://learningdesigner.org>

The screenshot shows the Learning Designer web application. The top navigation bar includes 'Learning Designer', 'Home', 'Browser', 'Designer', a key icon, and 'Administrator'. The breadcrumb trail is 'Home / Browser / Submitted designs / Submitted for t'. The main content area lists several submitted designs:

- Micro modulo teorico DL
Edited by alehyppo, derived from Review o
- Personal Learning Environments in Langua
Edited by angelIntini
- The Introduction to the Latin Language.
Edited by annatch
- Introduction to E-Learning Concepts for E
Edited by arnemoeller
- Revision (v.2) of Introduction to E-Learning
Edited by arnemoeller
- Marvelous PPT Presentations in HE (final)
Edited by BeataTworzewska

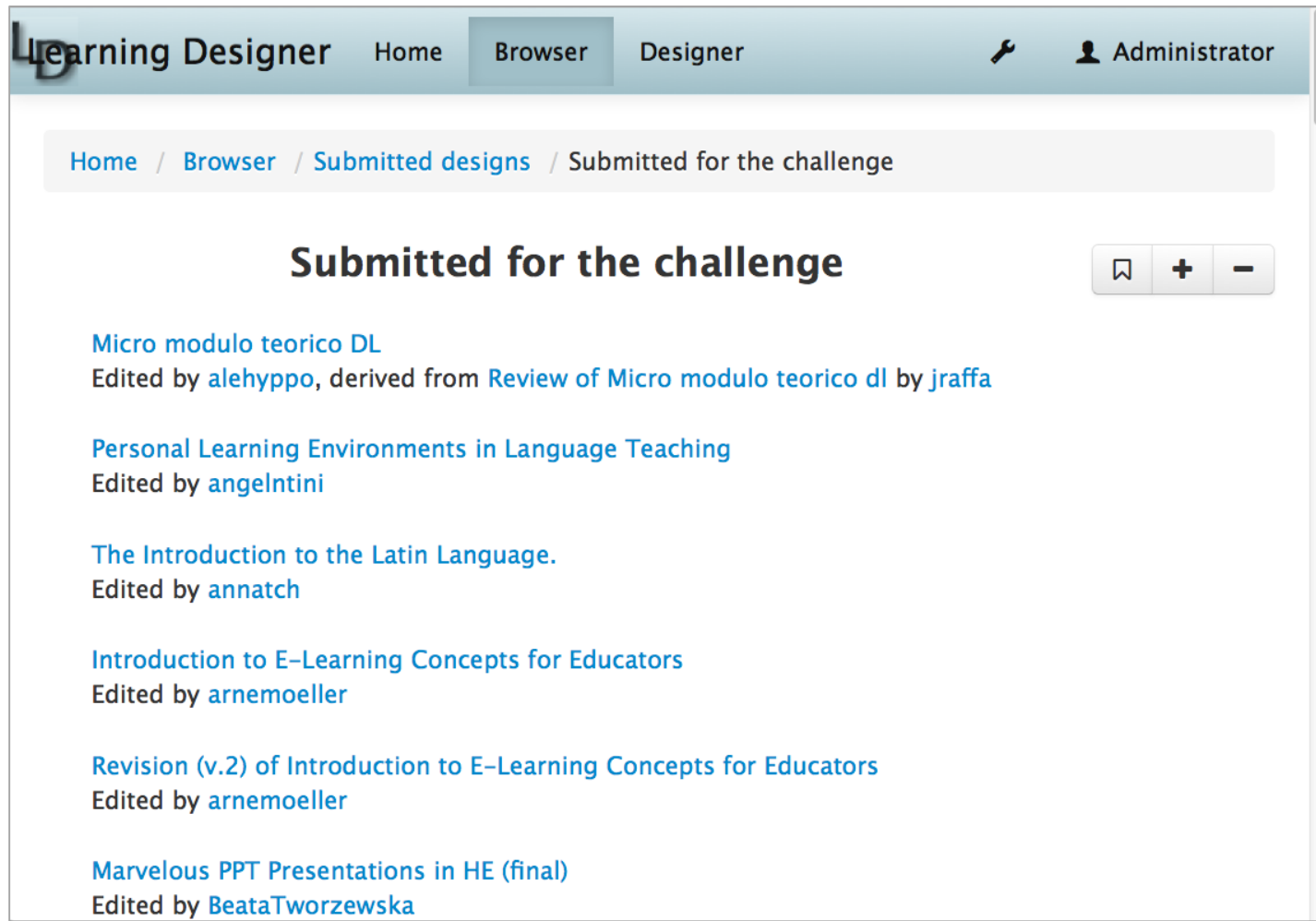
An 'Add to personal space' dialog box is open, prompting the user to select where to add 'My designs'. The dialog shows a tree structure:

- Directory
 - Curated designs
 - By topic
 - By pedagogy
 - Inquiry-based learning
 - Collaborative learning
 - Constructionist learning
 - Discussion-based learning
 - Submitted designs
 - Personal space



The 'By pedagogy' folder and its sub-items are highlighted with a red rounded rectangle. At the bottom of the dialog are 'Add' and 'Cancel' buttons.

Designs submitted for peer review

<http://learningdesigner.org>



The screenshot shows the Learning Designer website interface. The top navigation bar includes the Learning Designer logo, 'Home', 'Browser' (selected), and 'Designer' tabs. On the right, there are icons for a wrench and a user profile labeled 'Administrator'. Below the navigation bar is a breadcrumb trail: 'Home / Browser / Submitted designs / Submitted for the challenge'. The main heading is 'Submitted for the challenge', followed by a control panel with a bookmark icon, a plus sign, and a minus sign. The content area lists six submitted designs, each with a title and the editor's name.

Learning Designer Home **Browser** Designer   Administrator

Home / Browser / Submitted designs / Submitted for the challenge

Submitted for the challenge

[Micro modulo teorico DL](#)
Edited by [alehyppo](#), derived from [Review of Micro modulo teorico dl](#) by [jraffa](#)

[Personal Learning Environments in Language Teaching](#)
Edited by [angelIntini](#)

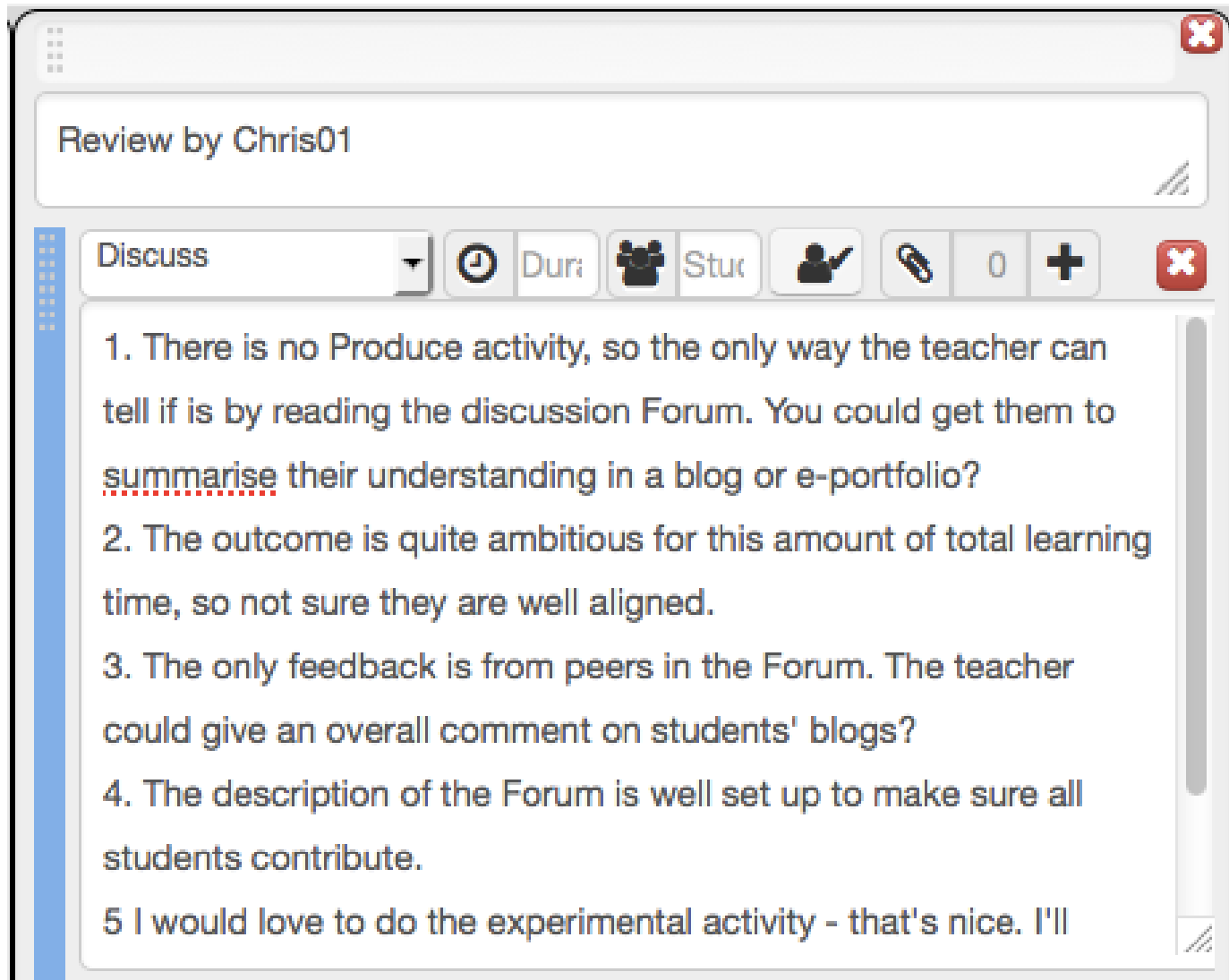
[The Introduction to the Latin Language.](#)
Edited by [annatch](#)

[Introduction to E-Learning Concepts for Educators](#)
Edited by [arnemoeller](#)

[Revision \(v.2\) of Introduction to E-Learning Concepts for Educators](#)
Edited by [arnemoeller](#)

[Marvelous PPT Presentations in HE \(final\)](#)
Edited by [BeataTworzewska](#)

The Learning Designer: Peer review for a design



Review by Chris01

Discuss

1. There is no Produce activity, so the only way the teacher can tell if is by reading the discussion Forum. You could get them to summarise their understanding in a blog or e-portfolio?
2. The outcome is quite ambitious for this amount of total learning time, so not sure they are well aligned.
3. The only feedback is from peers in the Forum. The teacher could give an overall comment on students' blogs?
4. The description of the Forum is well set up to make sure all students contribute.
- 5 I would love to do the experimental activity - that's nice. I'll

The Learning Designer: Reviewing a learning design

Review by Chris01

Discuss

1. There is no Produce activity, so the only way the teacher can tell if is by reading the discussion Forum. You could get them to summarise their understanding in a blog or e-portfolio

2. The outcome is quite ambitious for this amount of total learning time, so not sure they are well aligned.

3. The only feedback is from peers in the Forum. The teacher could give an overall comment on students' blogs?

4. The description of the Forum is well set up to make sure all students contribute.

5 I would love to do the experimental activity - that's nice. I'll

Criteria for a good design

1 Test? - is there a 'Produce' activity, or some way the teacher can use to test whether outcomes are met?

2 Aligned? - outcome, activities, and produce activity aligned?

3 Feedback? - from teacher, other students, or the technology?

4 Technology? - good use of technology?

5 Other?

Reviews and redesigns added to the Browser

Teachers' designs, reviews, and redesigns in the Browser

The screenshot shows the Learning Designer interface. At the top, there is a navigation bar with the Learning Designer logo, 'Home', 'Browser' (highlighted), and 'Designer' tabs. On the right, there are icons for a wrench and a user profile labeled 'Administrator'. Below the navigation bar is a breadcrumb trail: 'Home / Browser / Submitted designs / Submitted for the challenge'. The main content area is titled 'Submitted designs, reviews, revisions' and includes a bookmark icon, a plus sign, and a minus sign. The list of items includes:

- [Micro modulo teorico DL](#)
Edited by [alehyppo](#), derived from [Review of Micro modulo teorico dl](#) by [jraffa](#)
- [Personal Learning Environments in Language Teaching](#)
Edited by [angelIntini](#)
- [The Introduction to the Latin Language.](#)
Edited by [annatch](#)
- [Introduction to E-Learning Concepts for Educators](#)
Edited by [arnemoeller](#)
- [Revision \(v.2\) of Introduction to E-Learning Concepts for Educators](#)
Edited by [arnemoeller](#)
- [Marvelous PPT Presentations in HE \(final\)](#)
Edited by [BeataTworzewska](#)

A power tool for teachers: The Learning Designer

- The teacher as designer must be able to
 - **Browse** existing designs for blended learning
 - **Adapt** these and create their own designs
 - **Review and analyse** their pedagogic potential
 - **Test them with learners** – export to VLE
 - **Redesign** and re-test
 - **Publish** their design for others to find

But will teachers use such a tool?

*- What is **your** question?*

Is collaborative innovation viable for teachers?

Learning Designer user data:

>34,000 unique visitors per month

>300 shared learning designs

36% returning visitors

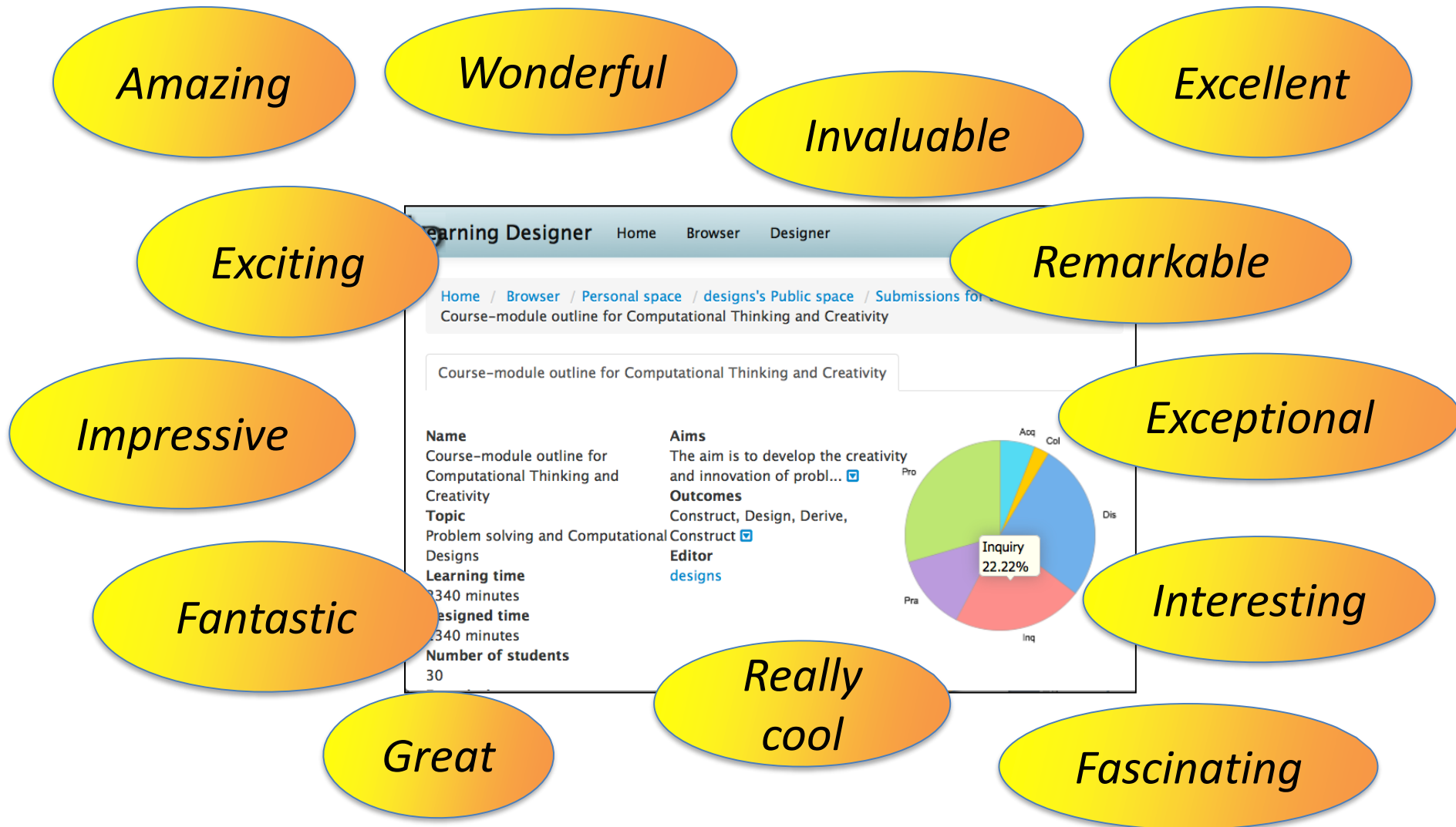
The screenshot displays the Learning Designer interface. At the top, there is a navigation bar with 'Learning Designer', 'Home', 'Browser', and 'Designer' links, along with a user profile icon for 'diana'. Below the navigation bar is a breadcrumb trail: 'Home / Browser / Personal space / designs's Public space / Submissions for the challenge / Course-module outline for Computational Thinking and Creativity'. The main content area shows the title 'Course-module outline for Computational Thinking and Creativity' in a search bar. Below this, there are two columns of metadata:

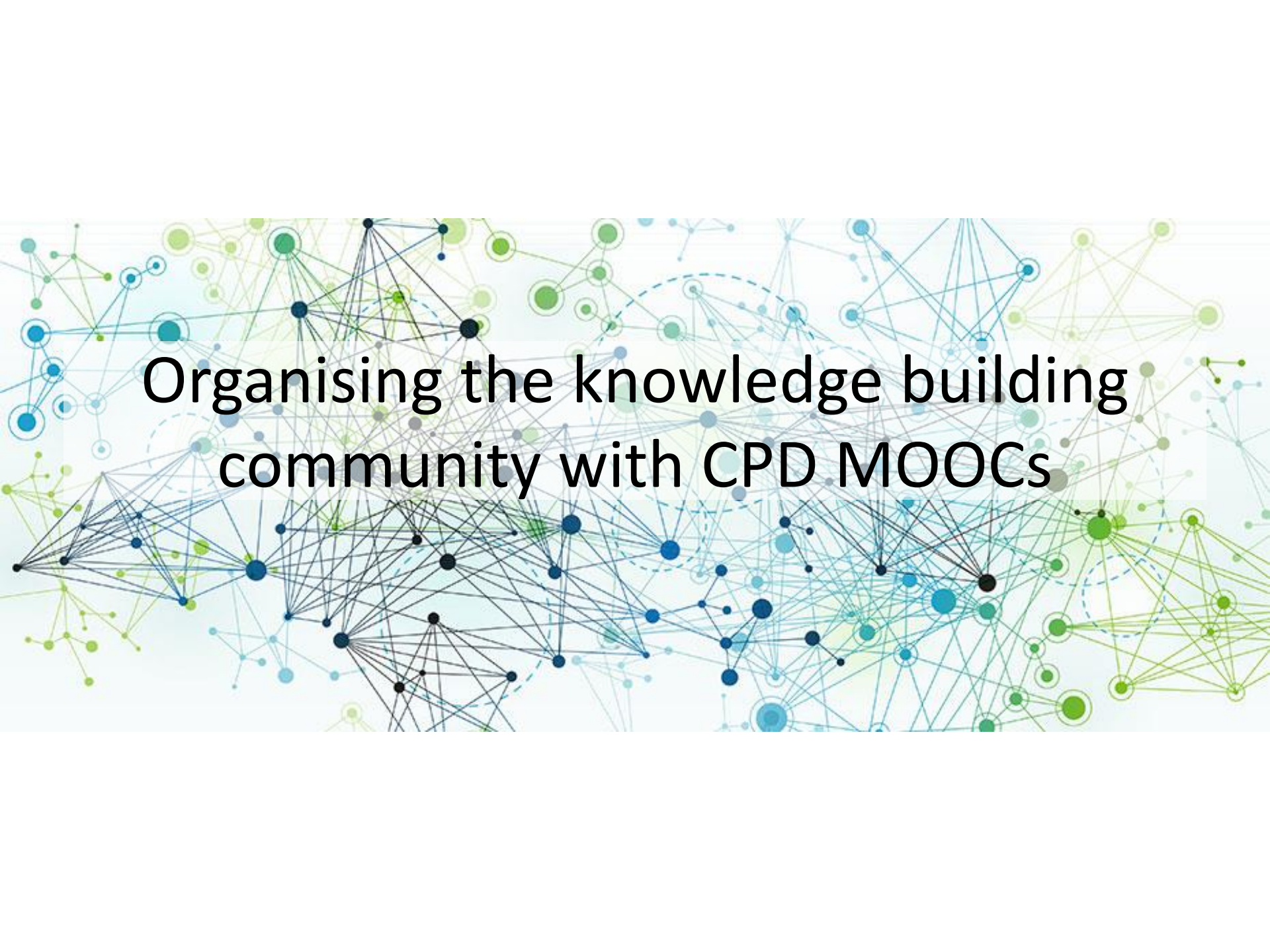
Name Course-module outline for Computational Thinking and Creativity	Aims The aim is to develop the creativity and innovation of probl... <input type="checkbox"/>
Topic Problem solving and Computational Designs	Outcomes Construct, Design, Derive, Construct <input type="checkbox"/>
Learning time 2340 minutes	Editor designs
Designed time 2340 minutes	
Number of students 30	

To the right of the metadata is a pie chart with six segments labeled 'Pro', 'Acq', 'Col', 'Dis', 'Inq', and 'Pra'. A tooltip for the 'Inq' segment shows 'Inquiry 22.22%'.

Is collaborative innovation viable for teachers?

Comments from a MOOC for primary teachers





Organising the knowledge building community with CPD MOOCs

A MOOC for Blended Learning

For Vocational Education and Training



[Courses](#)

[About](#)

[Partners](#)

50



FREE ONLINE COURSE

Blended Learning Essentials: Getting Started

A free course for the Vocational Education and Training sector to promote effective practice and pedagogy in blended learning.

[Go to course – started 2 Nov](#)



[View transcript](#)

Download video: [standard](#) or [HD](#)


UNIVERSITY OF LEEDS

 FREE online course

 Duration: 5 weeks

 4 hours pw

>17000
teachers
registered,
>120 countries

Professionals debating the latest teaching ideas



[View transcript](#)

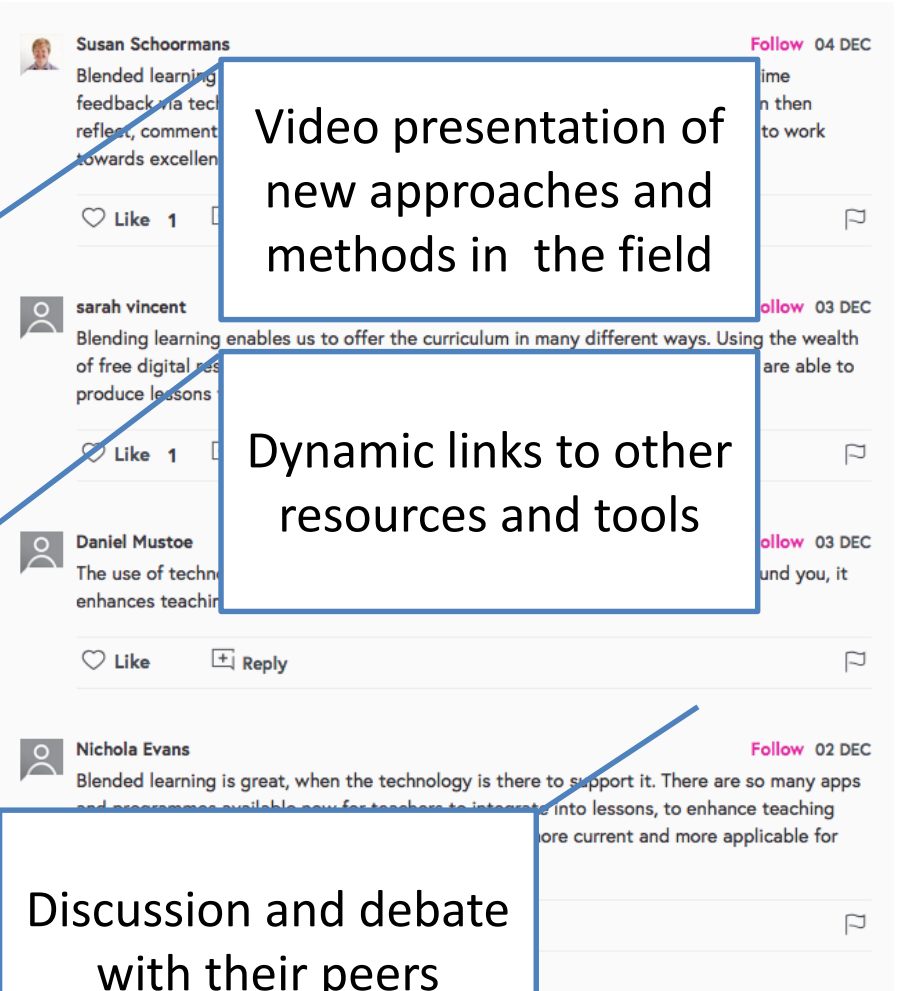
Download video: [standard](#) or [HD](#)

Blended learning

This video illustrates why we use digital technologies in learning and teaching in the vocational education and training sector.

It outlines the properties of digital technologies and shows how they have been used to improve motivation, personalised self-pacing, learning outcomes, active learning, inclusion and flexibility for working students.

Have your say:



Video presentation of new approaches and methods in the field

Dynamic links to other resources and tools

Discussion and debate with their peers

Padlet: Collaborating to define the value of Blended Learning

Learning Designs for Peer Review

Once your design is completed use the long url to add the design to the wall. Make sure your name and email is

Click on the wall, insert your Title, Name, and a Link to your design or review

Example



Lynne Taylerson

Learning Design for week 2 of MIOC:
Year 2 Diploma in Education & Training session -
Economic & Political Initiatives in the FE & Skills Sector
email lynne@realtimededucation.co.uk

Jim Harris
Learning Design
email: jim.harris@realtimededucation.co.uk



Author Patricia Charlton

Learning Design for week 2 move-it-online challenge
email: patricia.charlton@pobox.com



Shona Robertson

Formative activity on Constructive Curriculum Alignment
email: s.y.robertson@dundee.ac.uk
Reviewed by Patricia Charlton
Patricia.Charlton@pobox.com



Marianne Checkley

Learning Design for week 2 move-it-online challenge
email: marianne@iscoil.ie
Being reviewed by Lynne Taylerson
Reviewer's email:
lynne@realtimededucation.co.uk



Viktorija

I'm not finish it y
email: viktorija.fl@realtimededucation.co.uk



Eileen Kennedy/Lindy Zubairy

From Face-to-face to Online in 3 hours
email: e.kennedy@ioe.ac.uk
Being reviewed by Christina Preston
Reviewer's email
christina@mirandnet.ac.uk



Christina Preston

Using a VLE to improve learning in schools and beyond
email: christina@mirandnet.ac.uk



Professionals building a shared knowledge base

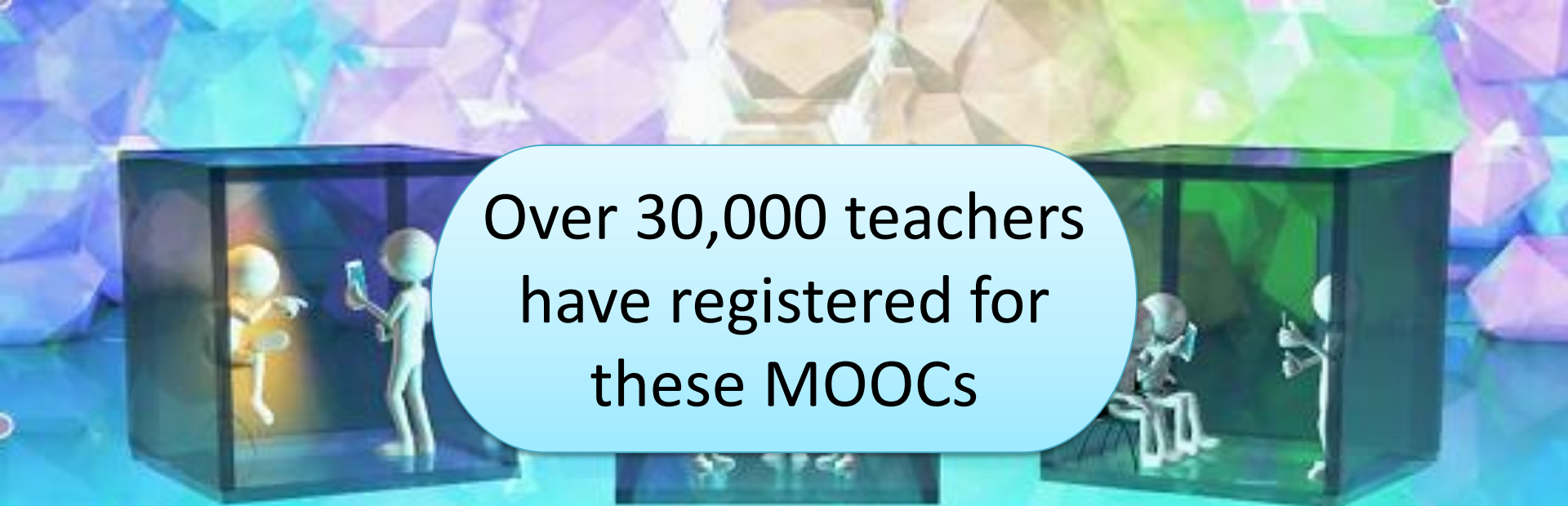
The screenshot shows the Diigo website interface. At the top, the Diigo logo is on the left, and navigation links for 'What's New', 'Tools', 'Help', 'Feedback', 'Sign In', and 'Join Diigo' are on the right. Below the logo, the breadcrumb path is 'Groups / ICT in Primary Education'. A search bar is located on the right side of the page.

The main content area features a group description for 'ICT in Primary Education' with an image of two children. Below this, there are several posts. The first post is titled 'Simon Haughton's website' and includes a URL and tags for 'ICT', 'education', and 'primary'. The second post is titled 'Products/Reading/Raz-Kids | LearningA-Z.com' and includes a URL and tags for 'primary', 'education', 'reading', and 'ICT'. The third post is titled 'Case Study of ICT in Primary Schools' and includes a URL.

On the right side of the page, there is a grid of user avatars and a 'Top 10 Tags' section. The tags listed are: ICT (232), education (216), primary (140), resources (121), and Technology (117).

Three callout boxes provide additional information:

- The top callout box points to the group description and states: "The Coursera MOOC links participants to the Diigo site".
- The middle callout box points to the 'Simon Haughton's website' post and states: "They can browse useful sites shared by others".
- The bottom callout box points to the 'Products/Reading/Raz-Kids | LearningA-Z.com' post and states: "They can tag each link or search by the tags they are interested in".



Over 30,000 teachers
have registered for
these MOOCs

Blended Learning Essentials

Embedding Practice

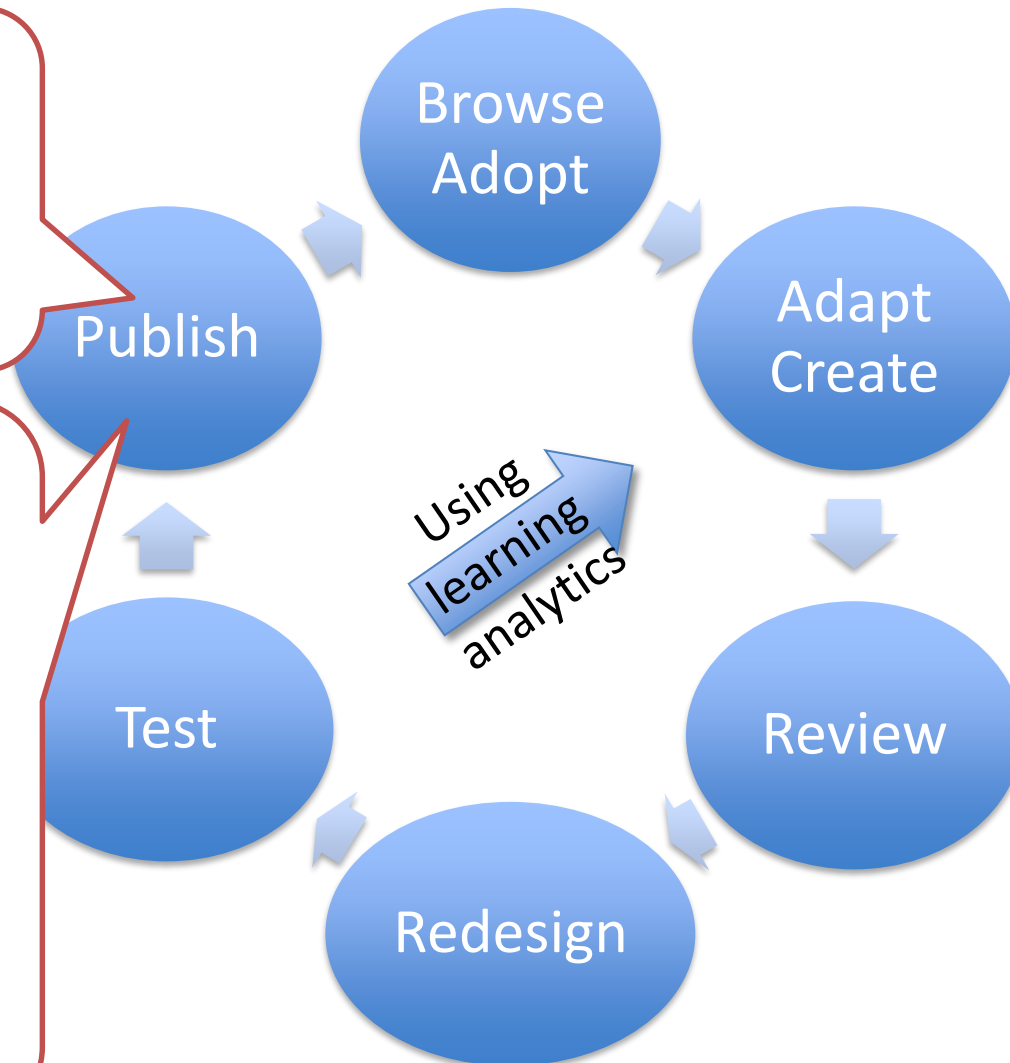


Part 1 'Getting Started' re-runs 30 Oct to 04 Dec 2017 #FLble1
Part 2 'Embedding Practice' re-runs 01 to 21 May 2017 #FLble2

Teaching as a design science

What is the teaching design equivalent of the scholarly **journal**?

Answer:
An online **collaborative community** sharing testable open co-designed peer-reviewed adaptable **learning designs**



A new BNU / UCL IOE collaborative project

Advanced Innovation Center for Future Education with UCL Knowledge Lab

Building teacher community knowledge of blended learning: An online collaboration, focusing on problem-based learning, to:

- Establish an online community of teachers, supported by digital technology to build and test their knowledge of blended learning
- Use the model of scientific scholarship, by supporting
 - public exchange of innovative ideas for blended learning
 - empirical testing of innovation in problem-based learning
 - peer review of designs and reports of innovative blended learning
- Test an online environment for this community-knowledge-building
- Curate teachers' learning designs and community contributions
- Establish the teachers' requirements for the digital support needed

With Ning Ma, Associate Professor of Faculty of Education

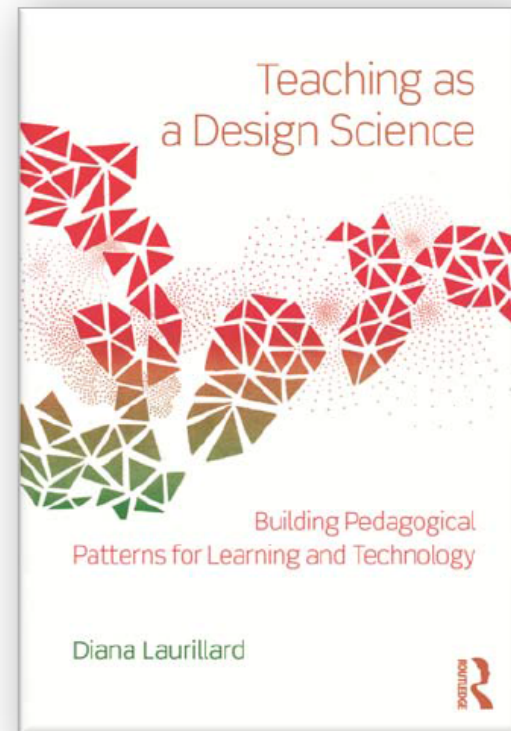
20% Discount!

Teaching as a Design Science

*Building Pedagogical Patterns for
Learning and Technology*

By Diana Laurillard

Teaching is changing. It is no longer simply about passing on knowledge to the next generation. Teachers in the 21st century, in all educational sectors, have to cope with an ever-changing cultural and technological environment. Teaching is now a design science. Like other design professionals - architects, engineers, town planners, programmers – teachers have to work out creative and evidence-based ways of improving what they do. But teaching is not treated as a design profession.



Every day, teachers design and test new ways of teaching, using learning technology to help their learners. But their discoveries remain local. By representing and communicating their best ideas as

Summary: Teachers collaborating to develop blended learning



Blending online and classroom learning

Teachers are supported to develop the new pedagogies

~ with a design tool like academic journals for sharing ideas

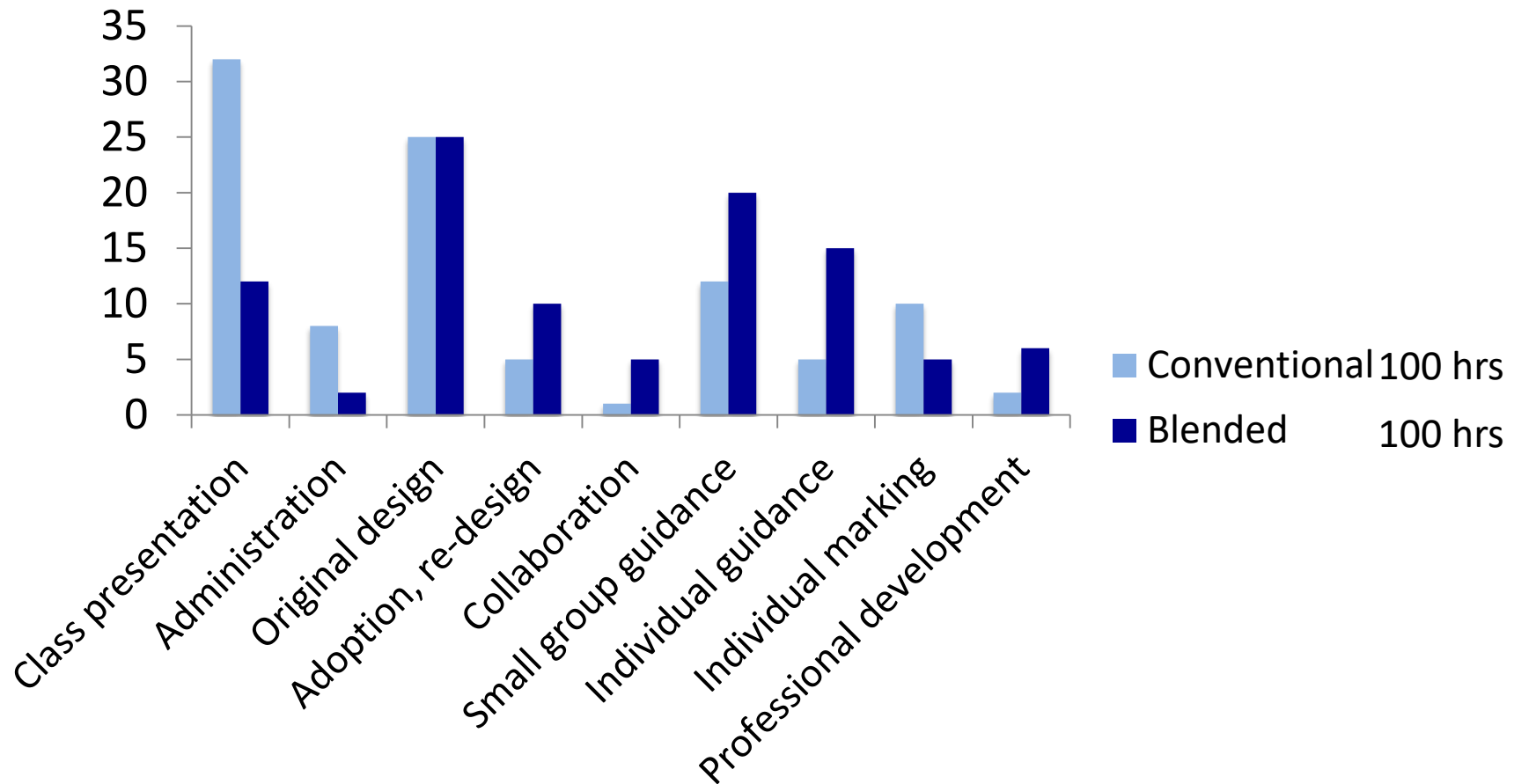
~ and an online professional community to build knowledge

Who else can develop the new digital pedagogies?



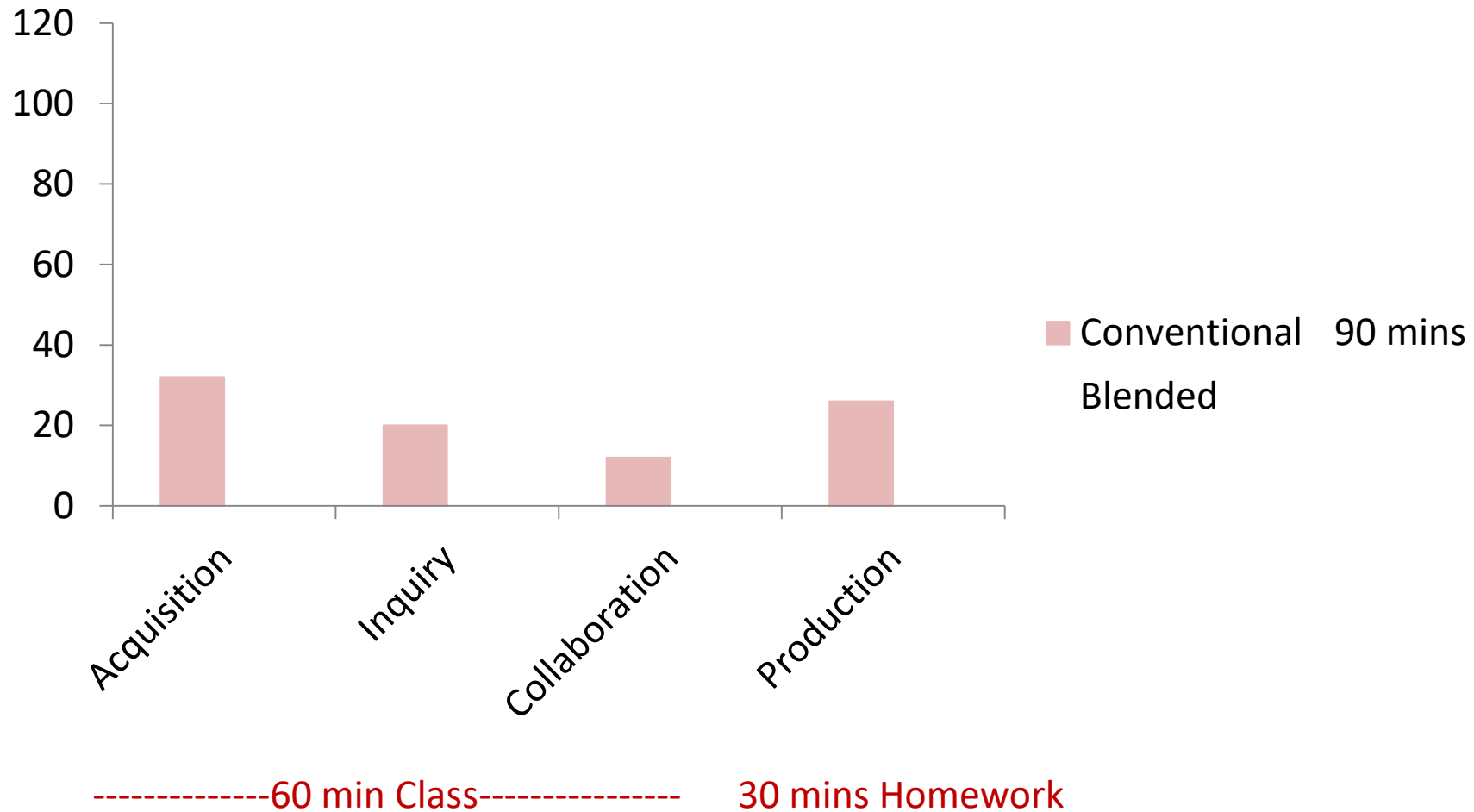
Who owns the responsibility for learning in formal education and training?

Digital demands a new distribution of trainer time

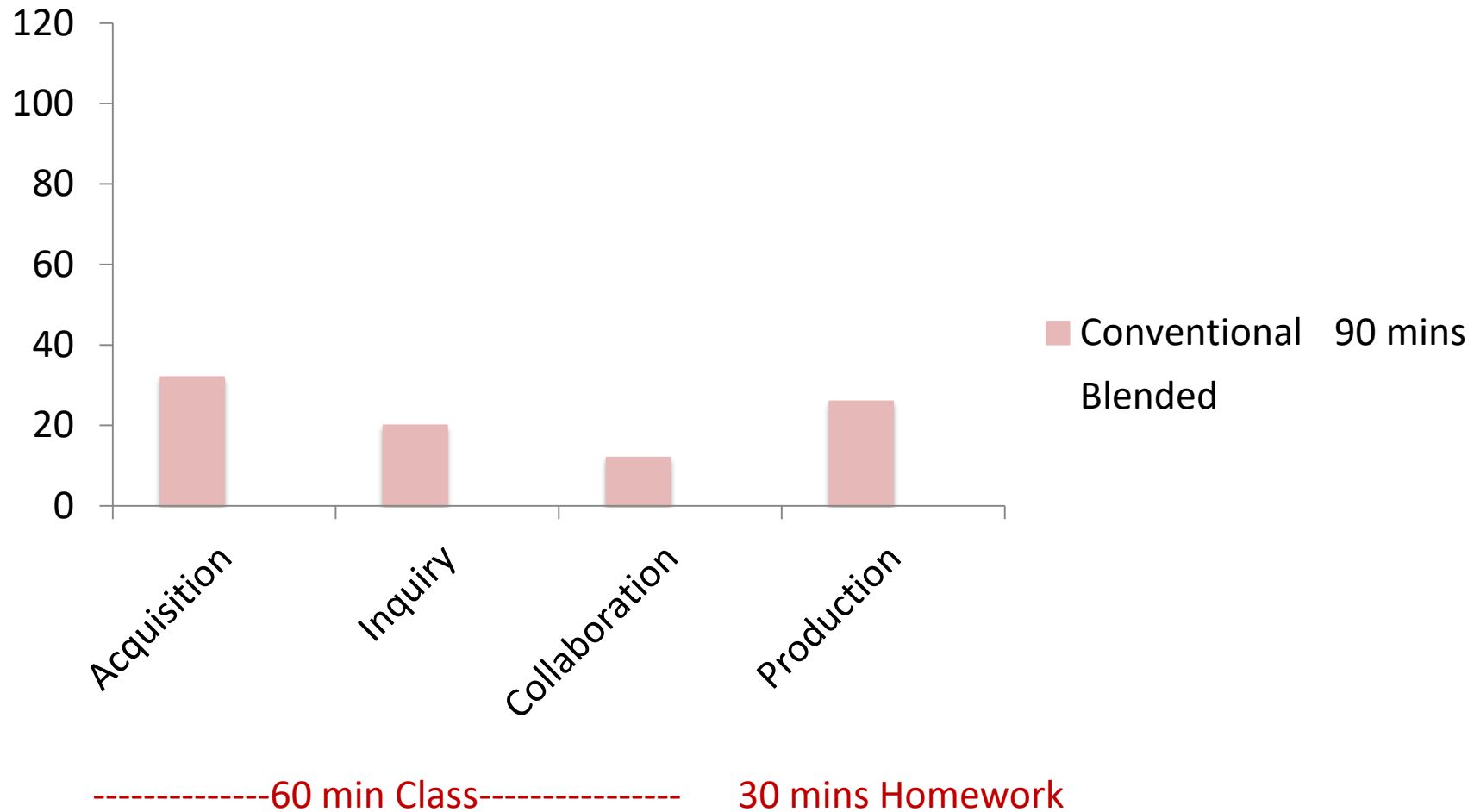


New distribution will prioritise **specialised innovation**, more **generalist adoption, adaptation and collaboration**; more **learner guidance**; more **professional development and sharing**

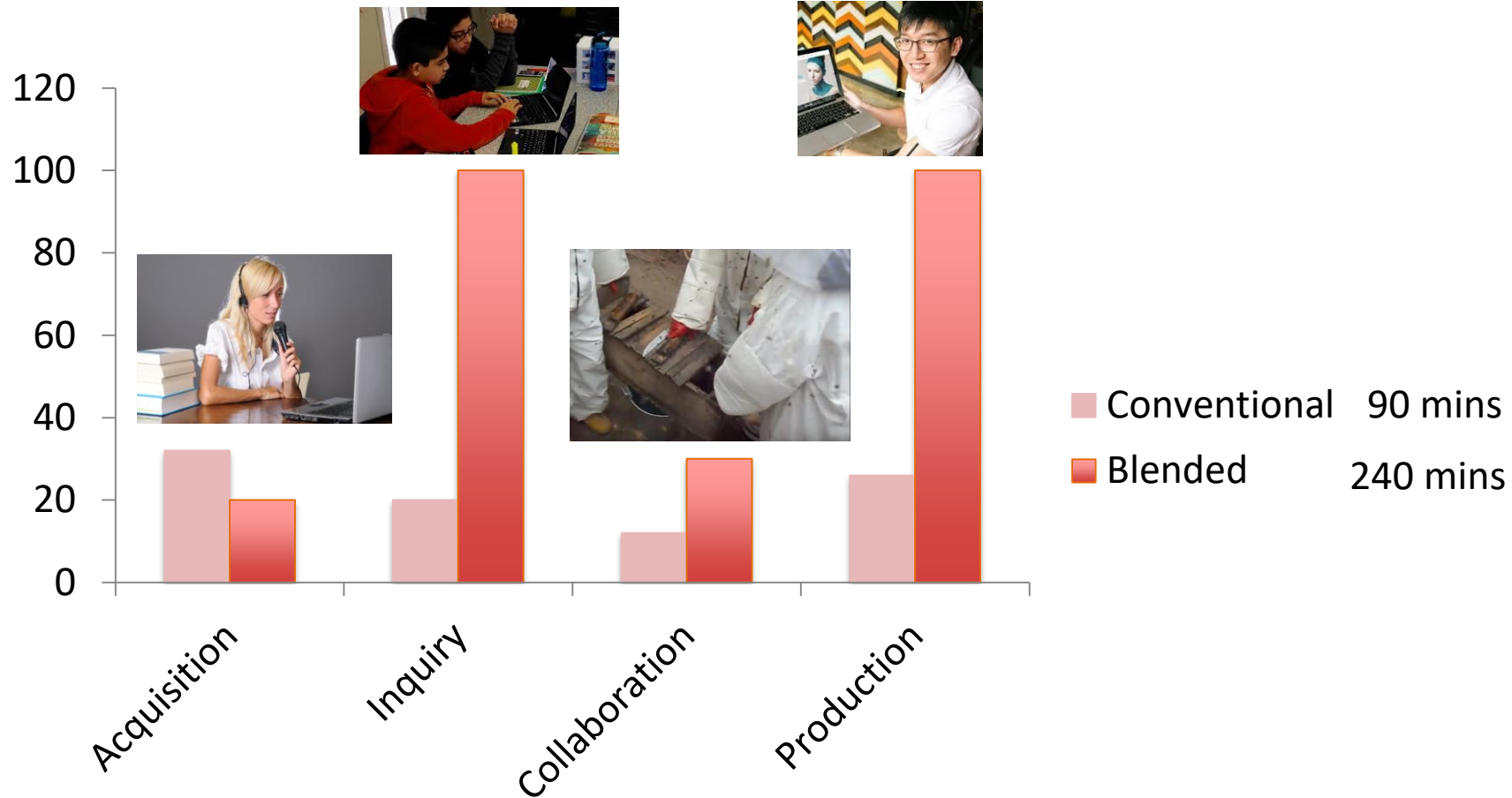
Current distribution of learner time for a session



A new distribution of learner time for a session

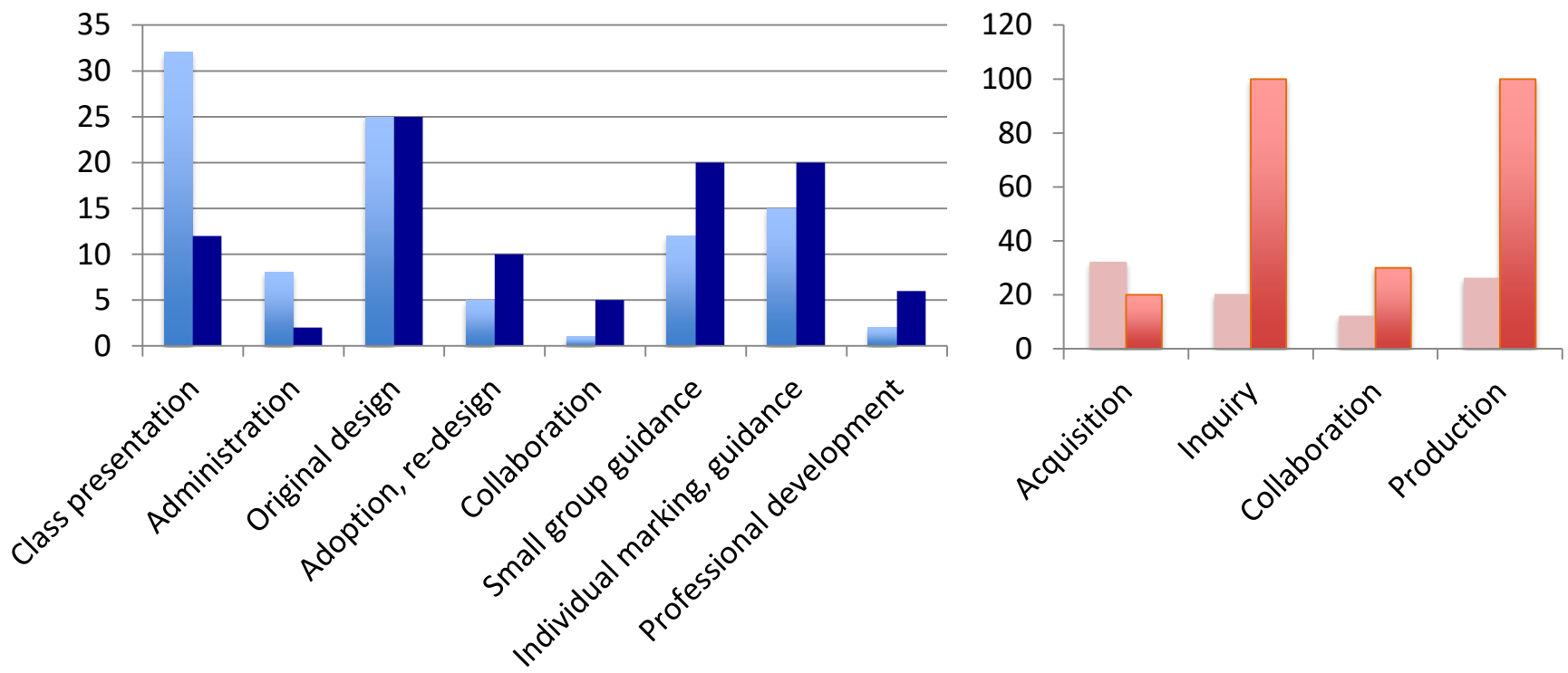


A new distribution of learner time for a session



More and better supported use of learner time

Planning the new distribution of teacher/learner time



Good use of time is not a zero-sum game:
Better distribution and use of same teacher time
→ More and better supported use of learning time
→ Shared responsibility accelerates better quality learning
But teachers have to lead the change

Over 30,000 teachers
have registered for
these MOOCs

Blended Learning Essentials

Getting Started

<http://bit.ly/28RNQpl>

Part 1 'Getting Started' re-runs 30 Oct to 04 Dec 2017

Part 2 'Embedding Practice' re-runs 01 to 21 May 2017