Κύκλος διαλέξεων του Μεταπτυχιακού προγράμματος
“Ψηφιακός Μετασχηματισμός και Εκπαιδευτική Πράξη”, 23/06/2021

Designing Digital Tools for Learning Design

Prof. George Magoulas

Knowledge Lab, Birkbeck College

University of London

Birkbeck UNIVERSITY OF LONDON Knowledge Lab

klab.bbk.ac.uk

Outline

- Learning design and digital tools
- Challenges/open problems
- Understanding LD practice
- Initial findings
- Summary
- Concluding remarks

Learning design and digital tools

DESIGN for LEARNING is IMPORTANT

?

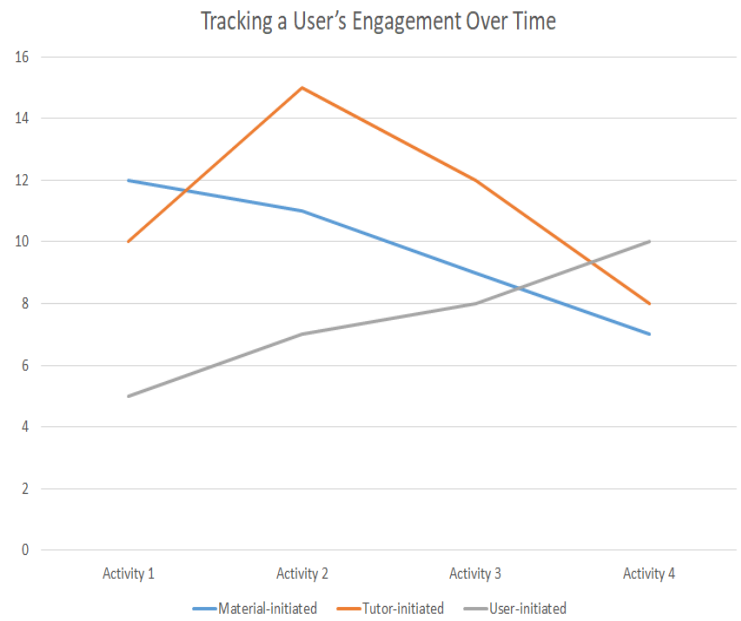
Quality Assurance Agency (QAA) in 2016 : “learning design – the quality of teaching materials, assessment strategies and workload – offers the most significant contribution to overall student satisfaction” (www.qaa.ac.uk).

Studies by Stanford University (Kizilcec et al., 2013) and Open University (Ferguson & Clow, 2015) showed ***that learners’ engagement depends on the pedagogical strategies of the course.***

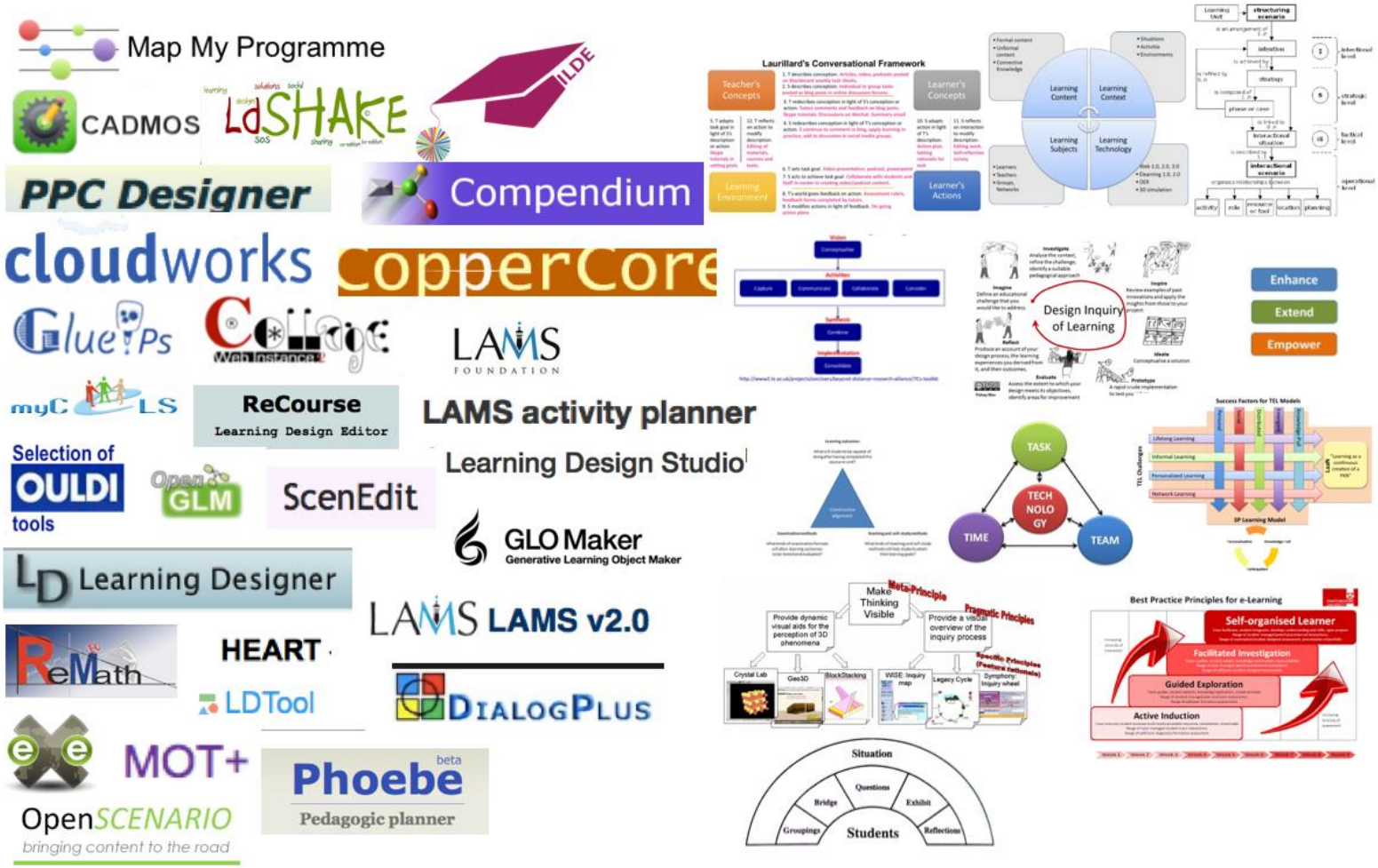
Wells, Wollenschlaeger, Lefevre and Magoulas, Poulovassilis (2016) Analysing engagement in an online management programme and implications for course design. *LAK '16*

Data analysis

- Engagement events may be:
  - Material-initiated (events that result from prompts within course materials, e.g. quizzes, polls, open discussions)
  - Tutor-initiated (replies to forum discussion topics initiated by course tutors)
  - User-initiated (forum discussion topics initiated by individual users)
- Analyse participants' individual and collaborative reflections as they progress through the course
  - *Sentiment analysis* techniques based on natural language processing, sentiment lexicons, and probabilistic reasoning, can be used to detect expressions of positive/negative/neutral sentiments towards the course content



Learning design and digital tools



Celik, D.; Magoulas, G. D. (2016). A Review, Timeline, and Categorization of Learning Design Tools.

Attempts to organize and evaluate LD tools

- Britain: **authoring environments, run-time environments, and integrated environments**
  - (2004): *A Review of Learning Design: Concept, Specifications and Tools*. A report for the JISC E-learning Pedagogy Programme.
  - (2007): *Learning design systems: current and future developments*.
- Conole: **visualisation tools, pedagogical planners, generic tools, and learning design resources**
  - (2008): *Tools and Resources to Guide Practice.*
- Persico and Pozzi: **based on functionality into reflection tools and pedagogical planners, authoring and sharing tools, repositories, and delivery tools**
  - (2015): *Informing Learning Design with Learning Analytics to improve Teacher Inquiry*

(2016): A Review, Timeline, and Categorization of Learning Design Tools

An approach that is based on a reconceptualization of the framework proposed by Britain

GENERAL PROPERTIES	**Scope** **Release date** **Target users** **Export/Import** **VLEs**
LEARNING DESIGN	**Design language** **Activity model** **Workflow model** **Learning analytics**
TECHNICAL	**Form of software** **User interface** **Technical requirements**

Celik, D.; Magoulas, G. D. (2016). A Review, Timeline, and Categorization of Learning Design Tools.

Multi-dimensional framework

GENERAL PROPERTIES	LEARNING DESIGN	TECHNICAL
Scope: What is the main function of the tool?	Design language: What notation language does the tool use?	Form of software: What is the form of the software of the tool?
Release date: What is the release date of the tool. Does the tool still exist?	Activity model: How does the tool illustrate activities?	User interface: What does the tool present in terms of user interface?
Target users: Who is the system for?	Workflow model: What is the model used in the representation of the LD flow?	Technical needs: Does the tool have any technical requirement or additional software to run the application?
Export & Import: Can the tool import and export of LDs into other file formats?	Learning analytics: Does the tool have any functionality regarding learning analytics?	
VLEs: Can the tool deploy LDs into Virtual Learning Environments?		

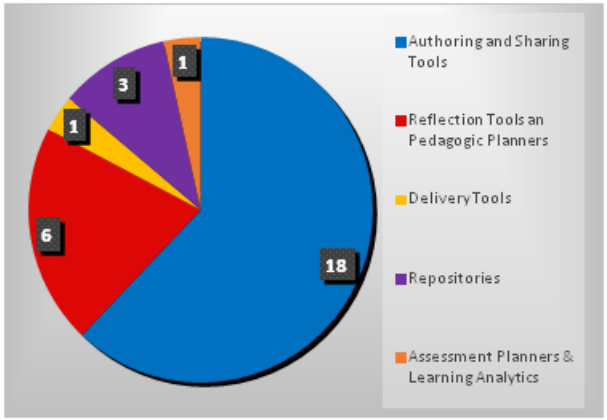
Learning design and digital tools

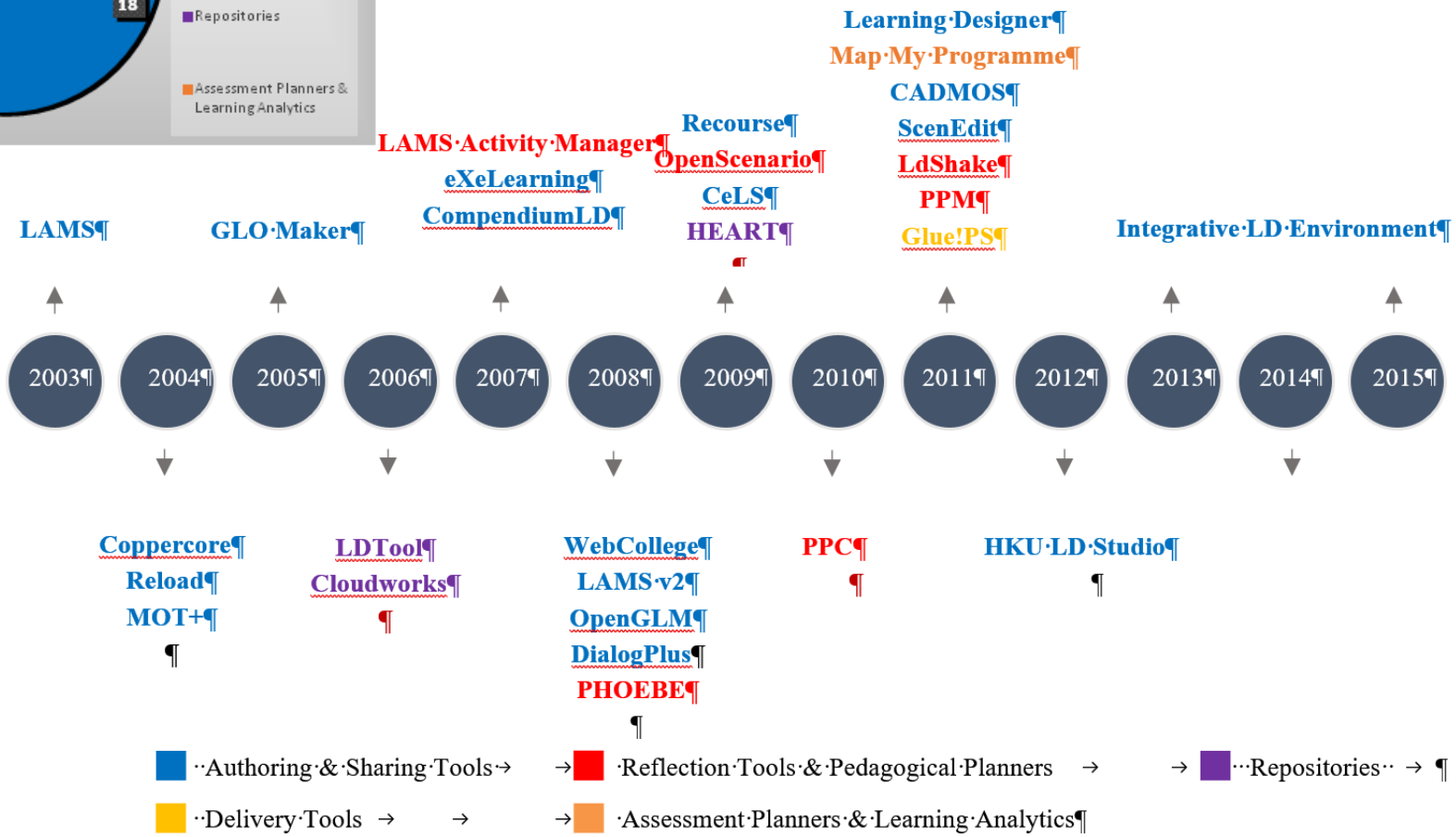
Authoring and sharing tools

		ILDE	HKU LD Studio	Learning Designer	GLO Maker	CeLS	Web Collage	Dialog PLUS	MOT+
GENERAL PROPERTIES	**Scope**	Authoring, sharing, editing, exploring	Authoring (For self-directed activities)	Authoring (create, share, edit and reuse)	Authoring	Create and re-use activity	Authoring tool (pattern-based)	Authoring tool	Authoring tool
	Release date	2012– still running	2013 – still running	2011 – still running	2006 – Not available	2009 – still running	2006 – still running	2006 – Not available	2008 – Not available
	Target users	Teachers	Teachers	Teachers,	Teacher-designers	Teachers and researchers	K-12 teachers	Teachers	Teachers
	Export & Import		JSON file.	MS Word, shared as an URL	N/A	XML-based model	IMS LD (A level)	IMS LD	IMS LD
	Deploy into VLEs	Moodle, SCORM, metisVLE, MediaWiki	N/A	N/A	N/A	N/A	LAMS, Moodle	N/A	LAMS, Moodle

Celik, D.; Magoulas, G. D. (2016). A Review, Timeline, and Categorization of Learning Design Tools.

Categorisation of tools





Reflection tools and pedagogical planners

		PPC	PHOEBE	LdShake	OpenScenario	Lams AP	PPM
GENERAL PROPERTIES	**Scope**	Pedagogical Pattern Collector	Pedagogic planner	Social network oriented tool	Scenario-based tool	Create learning activities	Pedagogic planning of LDs
	Release date	2011 – still running	2006 – Not available	2011 – still running	2009 – Not available	2007 – still running	2010 – still running
	Target users	Teachers	Teachers	Teachers	Teachers	Teachers	Teachers
	Export & Import	N/A	N/A	N/A	N/A	N/A	N/A
	Deploy into VLEs	N/A	N/A	N/A	N/A	Moodle	N/A
LEARNING DESIGN	**Design language**	Pattern-based	Wiki-based, and set of resource	Various pedagogical approaches	Scenario-based design	Sequential	Hierarchica entities
	Activity model	Cognitive model	Sequence structures	4SPPIces Model	Scenario-based model	Sequential	Pedagogica Hierarchy
	Workflow model	Cognitive model	Sequence structures	4SPPIces Model	Organization, learning, observation, evaluation	Sequential	Pedagogica Hierarchy
	Learning analytics	N/A	Assessment and activities	N/A	N/A	N/A	N/A
TECHNICAL	**Form of software**	Web-based	Web-based	Web and desktop based	Web-based	Web-based	Web-based
	User interface	Browser, designer, abstractor	N/A	N/A	Flexible	N/A	Hierarchy Manager, Field Secto Data Area
	Technical needs	N/A	N/A	N/A	N/A	Flash Player	N/A

Learning design and digital tools

Constructivism

The 4SPPIces model
The 4Ts
The Conversational Framework
3P
The e-Design Template
Constructive Alignment
The Design Principles Database
Design Narrative Approach
The 7Cs of LD Framework
ISiS
Quality Matters
3E

Connectivism

The Learning Ecosystem Model

Celik, D.; Magoulas, G. D. (2016). A Review, Timeline, and Categorization of Learning Design Tools.

The Learning Designer: Building Community Knowledge

Helps you with

Developing new teachers and CPD

Managing the Key Information Set

Doing more with existing resources

Complementing the value of OERs

Promoting reflection

Encouraging creativity and innovation

By delivering

Explicit pedagogical value in designs

Awareness of pedagogy in design tools

Research impact on learning design practice

Usable and re-usable learning design pattern

Advanced visualisation of designs.

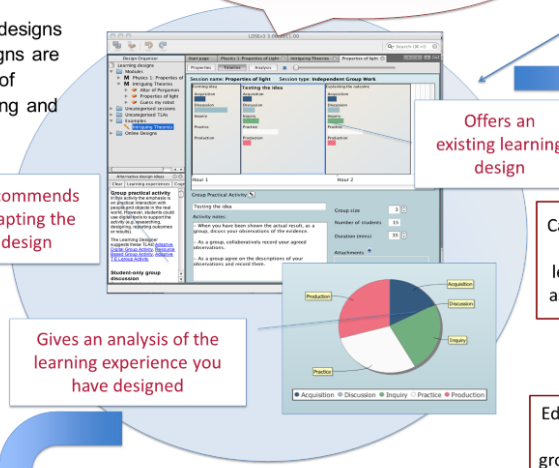
Resulting in

Knowledge building of shareable learning design artefacts

A world wide community

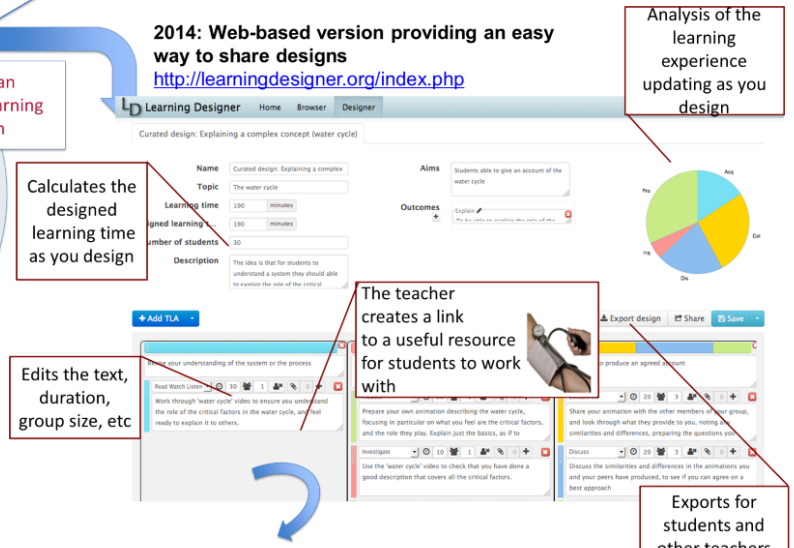
- Over thousand international members of the Learning Designer Community
- Over 13 thousand active users of the tool
- Over 5000 shared designs
- The tools and designs are embedded as part of international teaching and learning

I think that is very useful to see what someone else has done… that's an idea I hadn't got in my course"

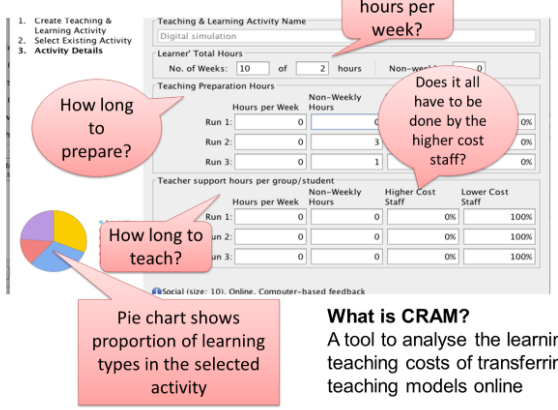


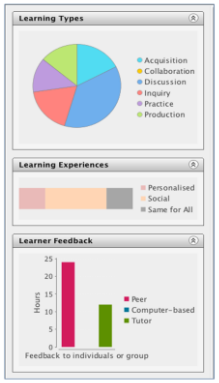
2011: Java-based desktop tool enabling a Semantic Web3.0 Learning Design Space for teachers
https://sites.google.com/a/lkl.ac.uk/ldse

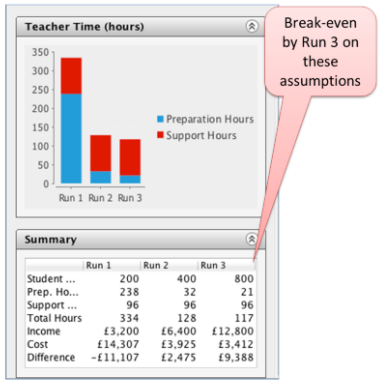
2014: Web-based version providing an easy way to share designs
http://learningdesigner.org/index.php



2014: CRAM (Course Resource Appraisal Module)
http://web.lkldev.ioe.ac.uk/cram/index.html



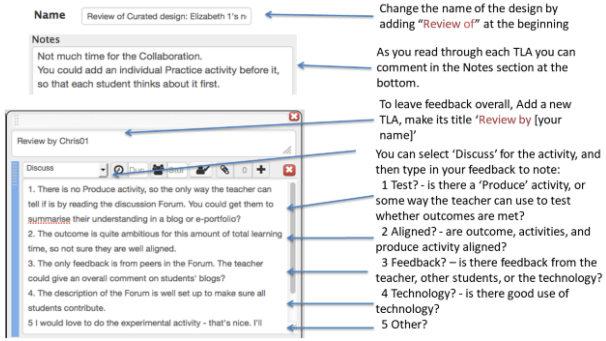




	Run 1	Run 2	Run 3
Student …	200	400	800
Prep. Ho…	238	32	21
Support …	96	96	96
Total Hours	334	128	117
Income	£3,200	£6,400	£12,800
Cost	£14,307	£3,925	£3,412
Difference	-£11,107	£2,475	£9,388

What is CRAM?
A tool to analyse the learning benefits and teaching costs of transferring traditional teaching models online

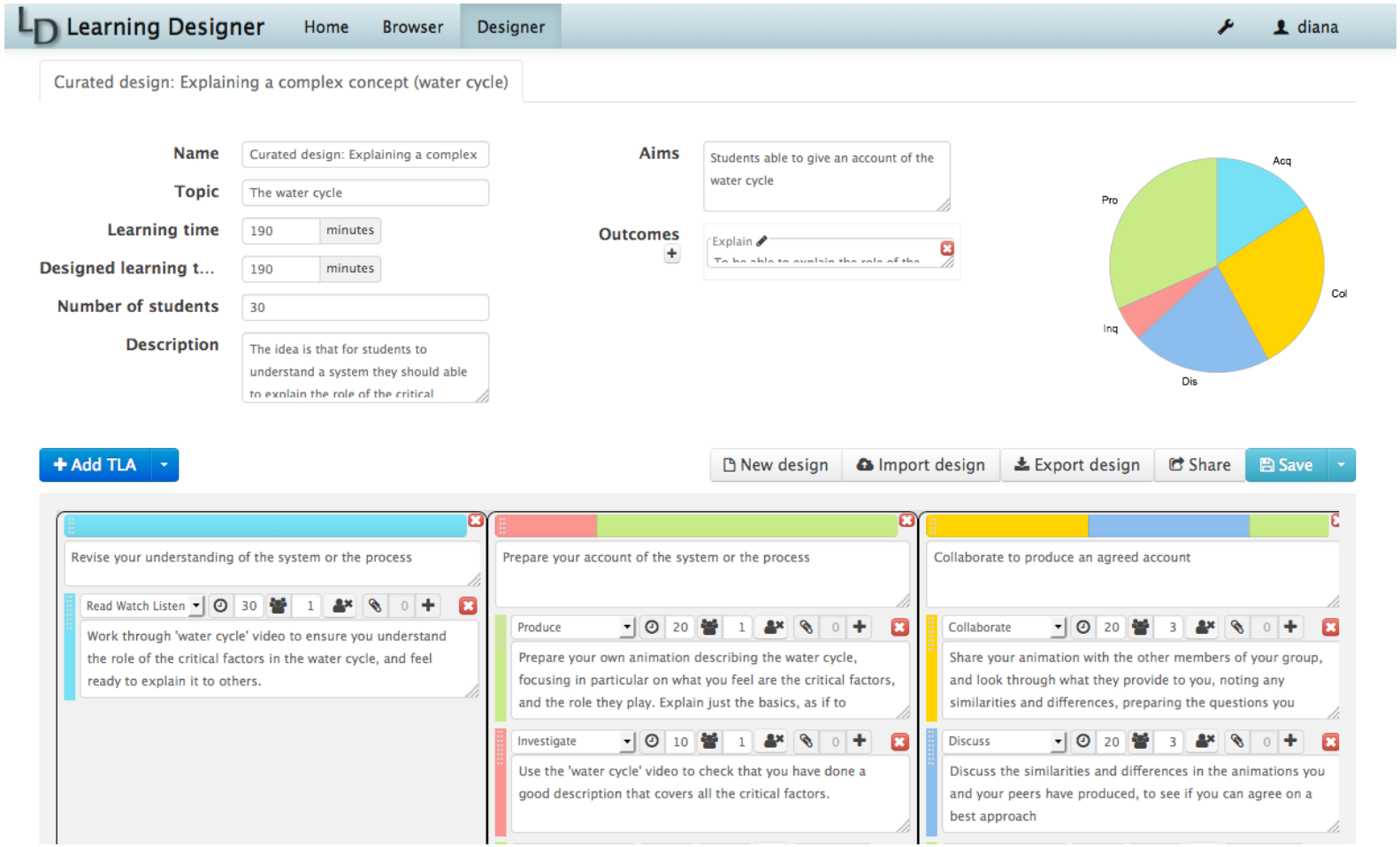
Building and sharing knowledge through peer review



London Knowledge Lab
Diana Laurillard d.laurillard@ioe.ac.uk
Patricia Charlton p.charlton@ioe.ac.uk
George Magoulas gmagoulas@dcs.bbk.ac.uk
Dionisis Dimakopoulos dionisis@gmail.com

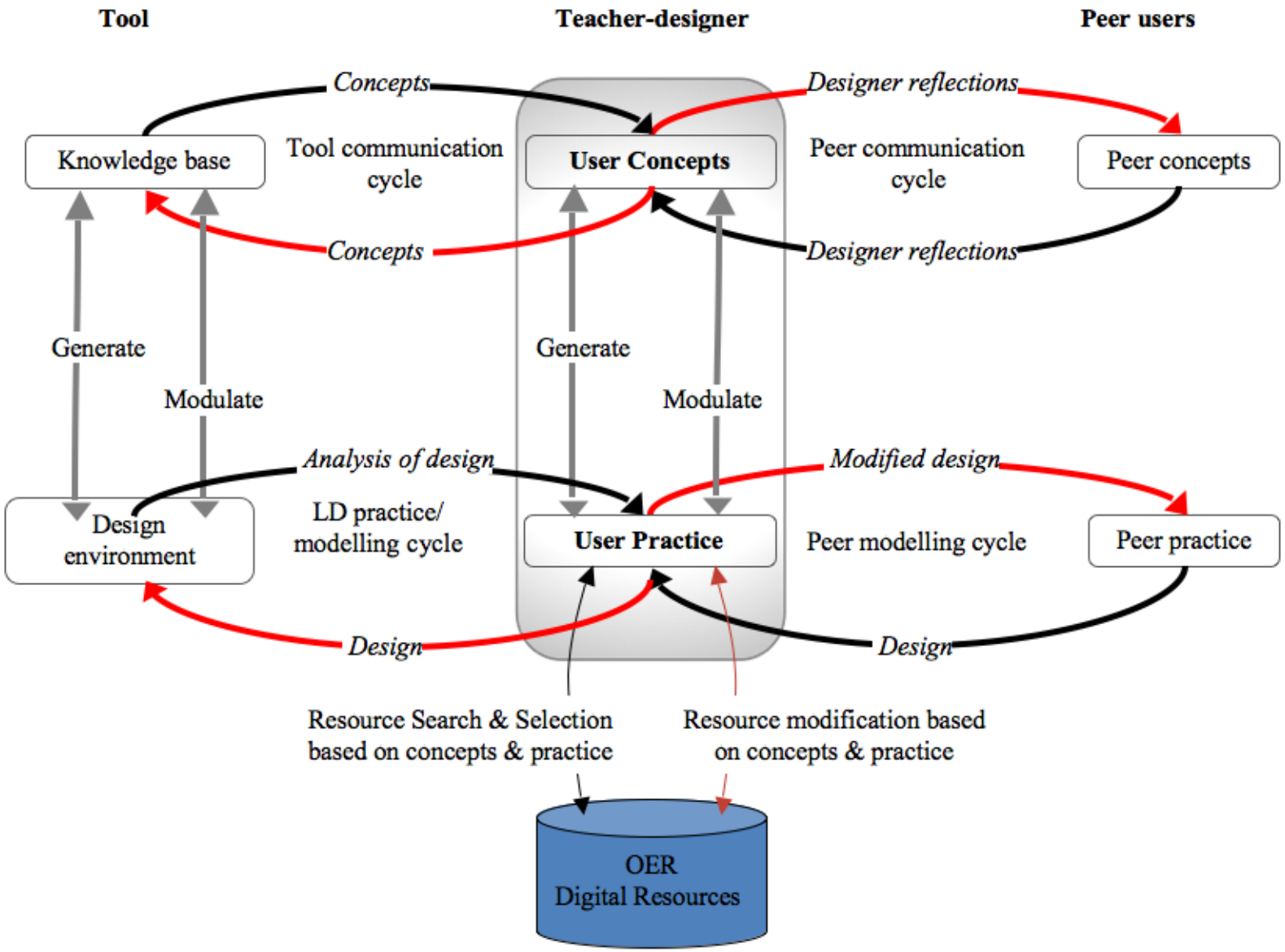
International Community and International Challenges
Https://buildingcommunityknowledge.wordpress.com
http://www.coursesites.com/s/_LDC

Example of module design in LDer



https://www.ucl.ac.uk/learning-designer/

Embedding the Learning Designer into the learning design process



Challenges/open problems

- None of these LD tools/frameworks has emerged as de facto standard
- No agreed common language used among the tools so far
- Lack of convergence and proliferation of new LD approaches inevitably leads to fragmentation of the field
- Widely acknowledged difficulties in capturing and representing LD practices' complexity in the tools (Bennett, Agostinho, & Lockyer, 2014; Persico & Pozzi, 2015).
- HE context: studies (Prieto et al., 2014; Bennett et al., 2011; Charlton et al.,2009) did not consider the complex socio-material environment but were mainly human-centric.

Understanding LD practice

Explore the factors that prevent the use of these digital tools in lecturers' learning design practice and influence their adoption in educational organisations through the lens of **socio-materiality**.

Aim:

Develop an enhanced conceptual understanding of factors influencing LD tools adoption and embedding in educational organisations, and of the requirements for these tools.

Develop a new conceptual model for the design of the next generation of LD tools.

Sociomaterial theory

Socio-materiality considers that social and material are constitutively entangled in everyday life.

LD practices are bound up with materiality in a sophisticated manner, and this relationship is inadequately reflected, or sometimes not reflected at all, in empirical studies.

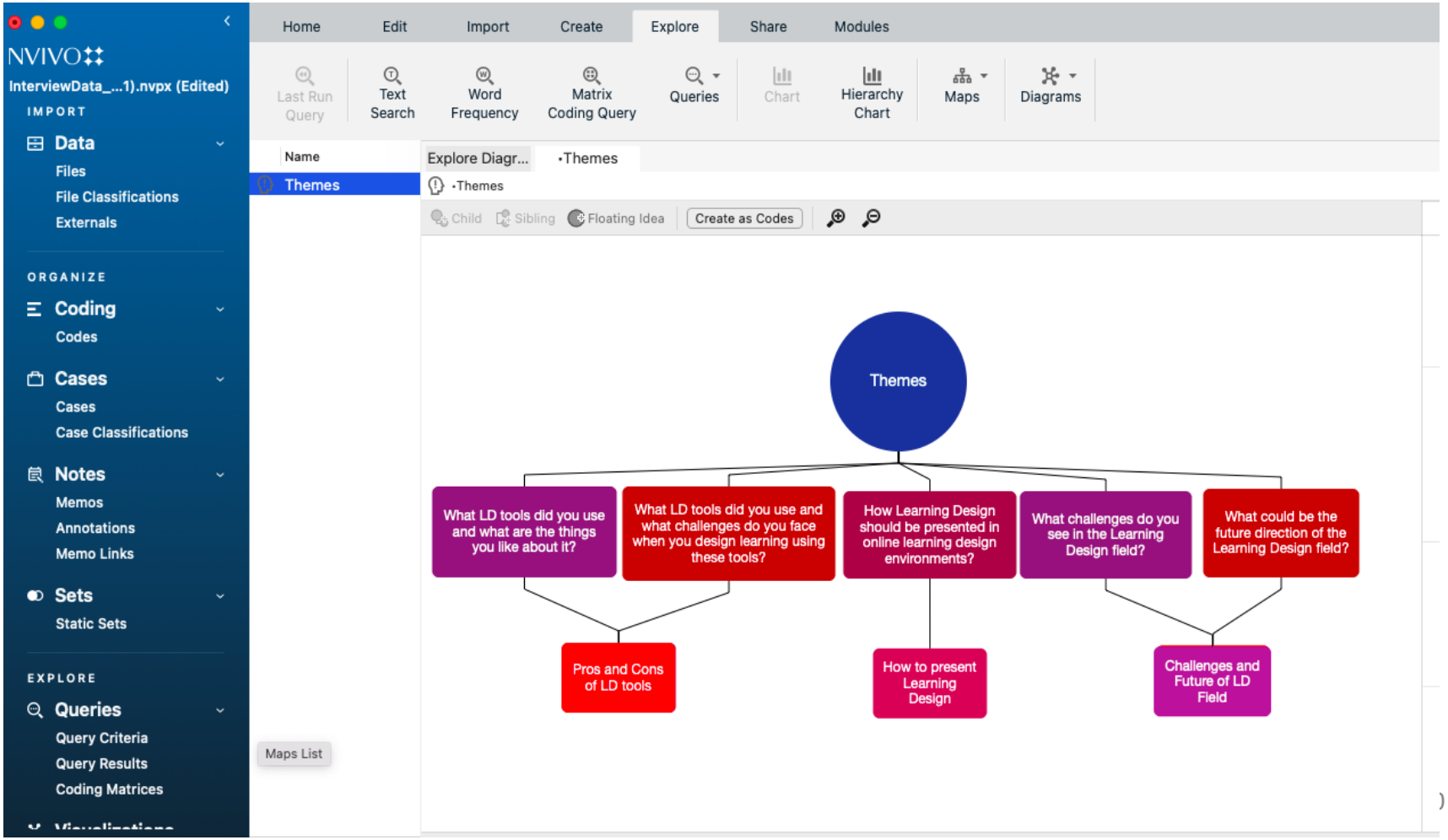
1. What are the human and non-human actors involved in the LD practice of HE lecturers?
2. What are the entangled relations of these actors in the LD practice of HE lecturers?
3. What boundaries or networks are created when human and non-human elements are enacted in the LD practice of HE lecturers? What do these boundaries or networks tell us?
4. How do existing LD approaches, conceptual models or frameworks, and LD tools align with LD practices?

Understanding LD practice

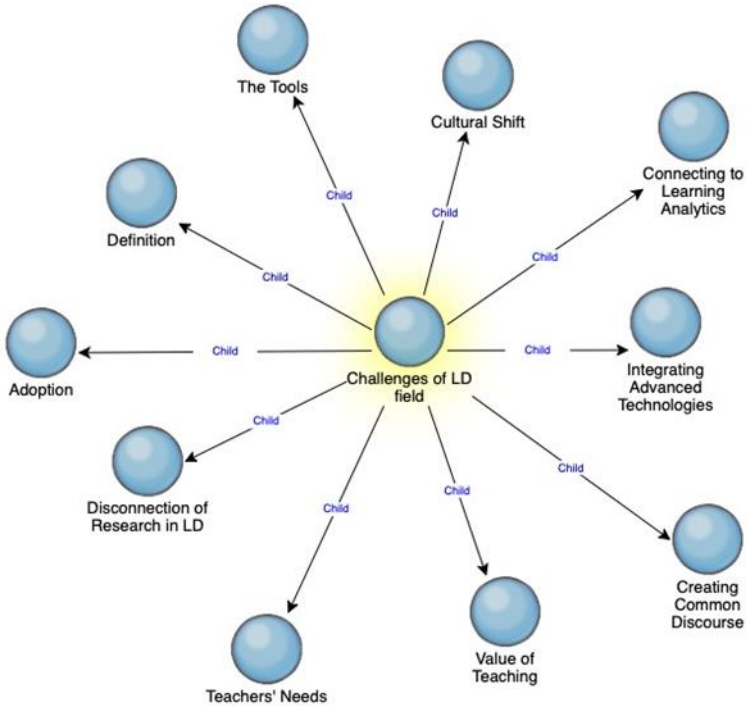
- Interviews (60 - 120 min) : 10 experts, from five countries, with established expertise in learning design (10+ years) who are also HE lecturers and had designed their own courses.
- Survey: 110 lectures (10+ years avg. LD experience), 27 countries
- Creswell (2014)'s qualitative data analysis steps : preparing the data for analysis, reading all the data, start coding, using coding to generate description, advancing how the themes will be presented, and interpretation.

Analysis

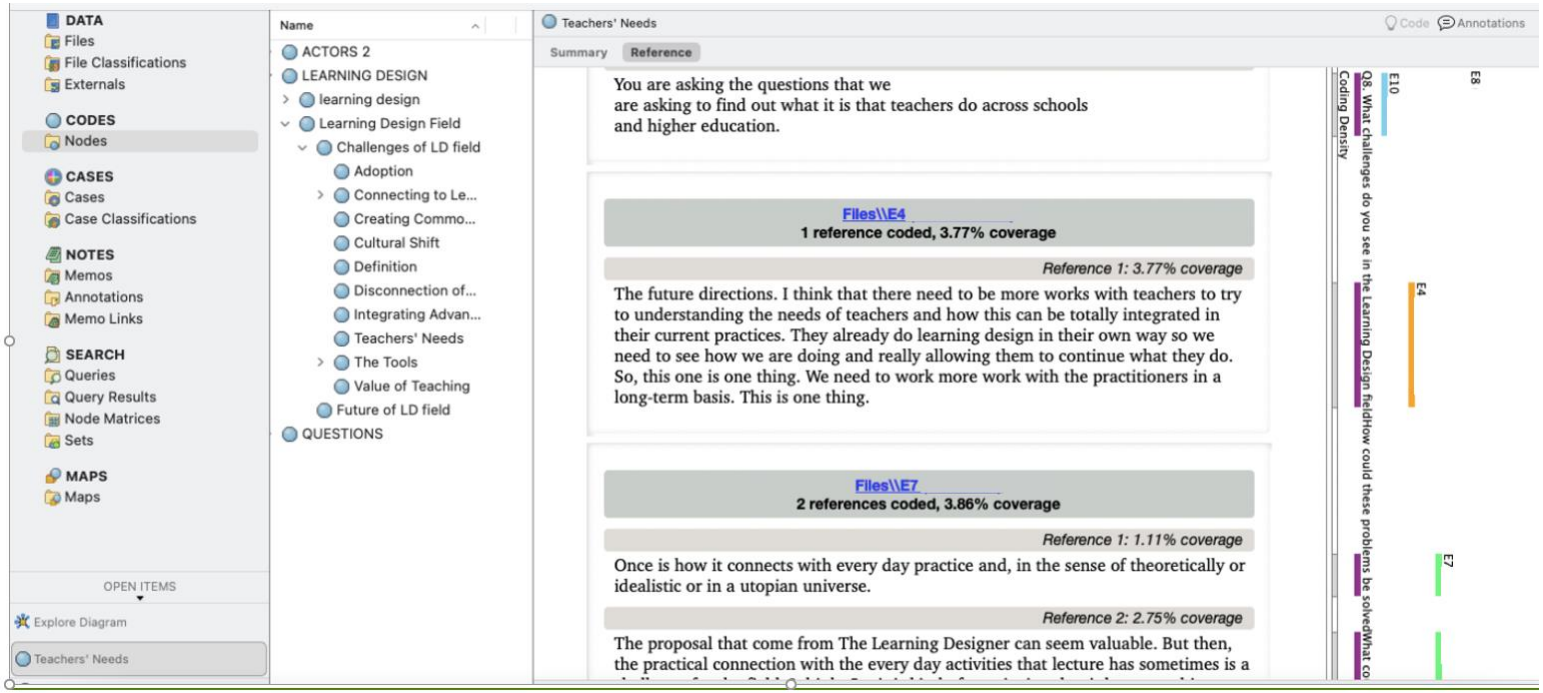
Tesch's (1990) eight steps procedure for coding
to analyse the LD field from the experts' or HE lectures' perspective



Example: Challenges of LD Field based on analysis of LD expert's data

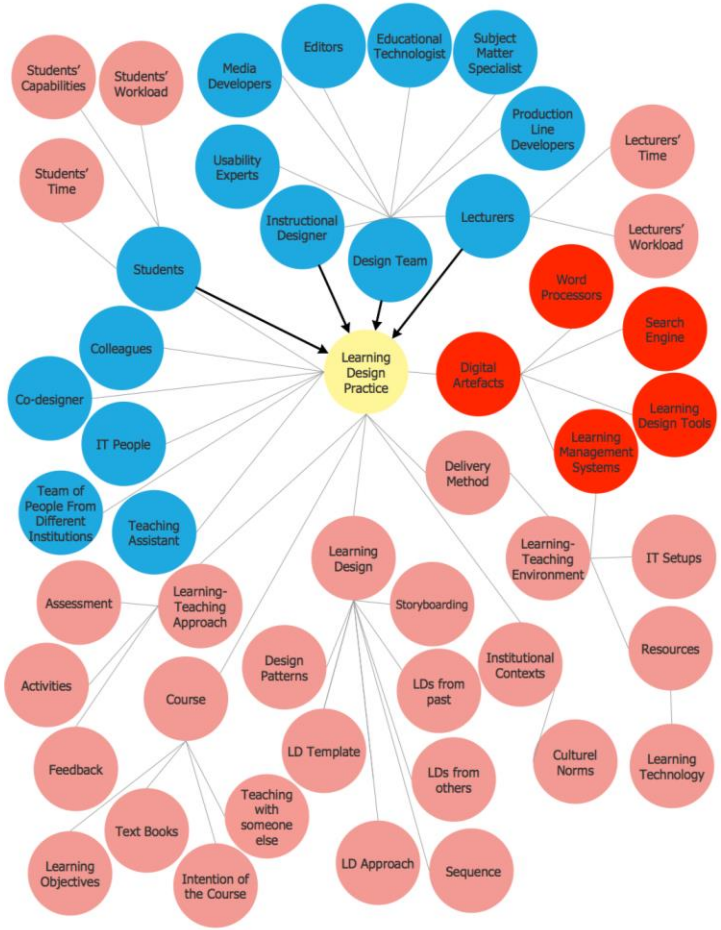


Relevant texts about "Teachers' needs"



Findings

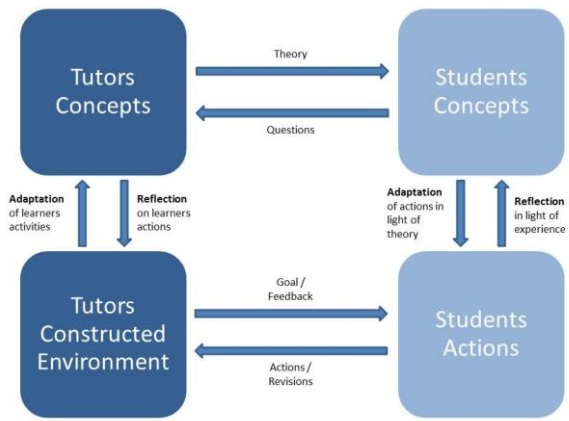
EXPERT'S MAP

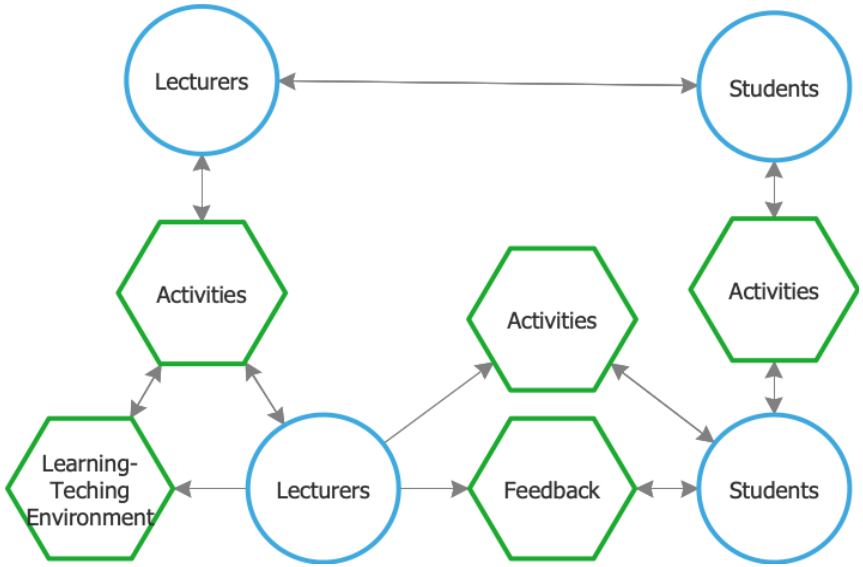


LECTURER'S MAP

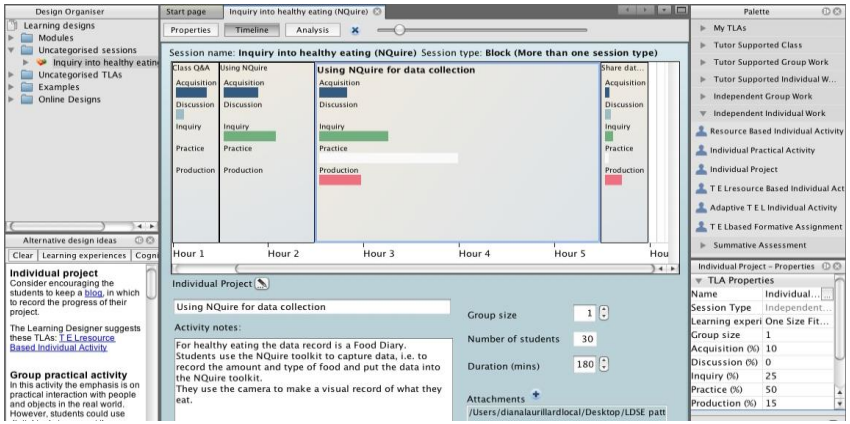
Findings

CONVERSATIONAL FRAMEWORK





THE LEARNING DESIGNER



- Human Actors
- Non-human Actors - Technological Artefacts
- Non-human Actors – Abstract Concepts

Sociomaterial Evaluation Framework

- Six dimensions: lecturers/designers, students, institution, course, technology, and feedback.
- That was done by combining related actors and associating those actors with thirty-five questions which can be used to explore the various aspects or features of LD tools.
- For more details:

  Celik, D.; Magoulas, G. D. (2019). Challenging the Alignment of Learning Design Tools with HE Lecturers' Learning Design Practice. In EC-TEL 2019.

Dimensions	Related Actors	ILDE Tool					Learning Designer	ScenEdit
		OpenGLM	WebCollege	exeLearning	CADMOS	ILDE Tool		
Designers/ Lecturers	Lecturers' Time and Workload	-	-	-	-	-	+	-
	Design Team	-	-	-	-	-	-	-
	Co-designer	-	-	-	-	-	-	-
	Colleagues	-	-	-	-	-	-	-
	People from other Universities	-	-	-	-	-	-	-
	Teaching Assistant	-	-	-	-	-	-	-
	Co-teachers	-	-	-	-	-	-	-
Students	Time and Workload	-	-	-	-	+	+	-
	Capabilities	-	-	+	-	+	-	-
Institution	Delivery Method	+	+	+	+	+	+	-
	Institutional Contexts / Cultural Norms	-	-	-	-	-	-	-
	Resources	-	-	-	-	-	-	-
	IT Setups	-	-	-	-	-	-	-
	IT People	-	-	-	-	-	-	-
	Learning Technologies	-	-	-	-	-	-	-
	LMS	-	-	-	-	-	-	-
Course	Course Aims	+	+	+	+	+	+	+
	Learning Objectives	+	+	+	+	+	+	+
	Learning Outcomes	+	+	+	+	+	+	+
	Assessment	+	+	+	+	+	+	+
	Activities	+	+	+	+	+	+	+
	Textbooks	+	+	+	+	+	+	+
	Learning-Teaching Approach	-	+	+	+	+	+	+
	Sequencing	+	+	+	+	+	+	+
	Storyboarding	-	-	-	+	+	+	+
	Design Patterns	-	-	-	-	-	-	-
	Feedback	-	-	-	+	-	-	-
	LD Approach	-	+	+	+	+	+	+
	LD from Past	+	+	+	+	+	+	-
	LD Template	+	+	+	+	+	+	-
	LD from others	+	+	+	+	+	+	-
Technology	Download in Different File Format	+	+	-	-	+	+	-
	LD Tools	-	-	-	-	+	-	-
	Search Engine	-	-	-	-	+	+	-

Alignment of LD tools with HE Lecturer's LD practice

- alignment points indicated with a "+"
- misalignment points indicated with a "-"
- Comparisons based on specific tool version- see ECTEL paper for details.

What next?

Areas of overlap and misalignment, and suggest features and functionalities for LD tools

	Related Actors	Overlap/Misalignment with LD-P identified	Desirable tool feature/functionality
Designers	Lecturers' Time and Workload	The time LD-P takes using LD tools is an important factor influencing adoption of LD tools. However, as participants highlighted, HE lecturers perceive usage of existing LD tools as time-consuming.	Ease of use and time-efficient institution of LD tasks. Good understanding of existing tasks. Customization of task model to institutional LD requirements.
	Design Team Co-designer Colleagues People from other Universities Teaching Assistant Co-teachers	Participants acknowledge that collaboration and co-design, in their various forms, are inherent features of the LD-P. Among LD tools, the Learning Designer and LAMS created a community of designers sharing their LDs and editing others' LDs. However, even in these tools, there is no advanced collaboration functionality.	Collaborative editing functionalities exploiting cloud infrastructure; communications tools, e.g. chatting, networking groups, bring designers together to talk LD ideas and develop LDs together.
Students	Time and Workload	Strengthening the alignment between students' workload and credits value, e.g. when designing activities or assessments, depending on the course/programme of study.	Personas based on realistic user profiles Customization to audience
	Capabilities	Aligning learning activities with students' skills, abilities, and competencies.	Features/functionalities to create LDs that accommodate different types of students and contexts of use

Summary

- Even though there are various human and non-human actors engaged in the LD practice, and they all have explanatory value when trying to understand the various ways technology is enacted into LD in HE, we see barely overlap of these actors with existing LD frameworks and LD tools.
- All these actors connect to each other in a complex manner and engage into bounding practices. However, although participants acknowledged the existence and influence of all these actors, some of these actors seems to disappear when participants practise learning design in their own institutions. Moreover, most of the fifty-four actors identified are currently not considered by the various LD tools and LD approaches.
- Although human actors, e.g. lecturers/designers, are at the core of the LD networks and bounding practices and perceived to be the most important ones in educational technology systems, this view can be problematic when other actors involved in LD practice are ignored or are given little value.

Concluding remarks

- Understanding the LD practice requires considering all of the human and non-human actors, including knowledge of the context of teaching, students' skills and abilities, institutional environment, subject matter and standards, staff competencies, and conceptions of lectures and educational software designers about LD approaches.
- Identifying issues of misrepresentation of LD practice and misalignment of lecturers' LD practice with LD methods and LD tools can inform the development of new conceptual models, LD tools, and technologies with larger potential to be adopted by practitioners and educational organisations more broadly.

To explore it further

- **[LDer]** Charlton P., Magoulas G. and Laurillard D., Enabling Creative Learning Design through Semantic Technologies, **Technology, Pedagogy and Education**, 21(2), 231-253, 2012.
- **[LDer]** Laurillard, D., Charlton, P., Craft, B., Dimakopoulos, D., Ljubojevic, D., Magoulas, G., Masterman, E., Pujadas, R., Whitley, E.A., Whittlestone, K., A constructionist learning environment for teachers to model learning designs, **Journal of Computer Assisted Learning**, 29(1), 15–30, 2013.

- **[LDTools]** Celik, D.; Magoulas, G. D. (2016). Approaches to Design for Learning. In ICWL Conference. Rome, Italy.
- **[LDTools]** Celik, D.; Magoulas, G. D. (2016). A Review, Timeline, and Categorization of Learning Design Tools. In ICWL Conference. Rome, Italy.
- **[LDTools]** Celik, D.; Magoulas, G. D. (2019). Challenging the Alignment of Learning Design Tools with HE Lecturers' Learning Design Practice. In EC-TEL 2019.