The 7Cs of Learning Design

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Introduction

There are now a wealth of ways in which digital technologies can be used to support learning. Social and participatory media provide a plethora of ways in which learners can communicate with others, interactive materials, podcasts and videos provide engaging mechanisms for the presentation of concepts and the testing of understanding, mobile devices mean that learning anywhere, anytime is now a reality, virtual worlds and games for learning provide rich authentic learning environments to support situative learning, authentic and experiential learning, and role play. New surfaces promise the possibility of learning seamlessly across different environments and devices.[1] In addition, there are now hundreds of Open Educational Resource (OER) repositories, and a rapidly growing offering of Massive Open Online Courses (MOOCs).

So theoretically anything you want to learn is out there somewhere on the Web. Despite this, technologies are not being used extensively and teachers are not making effective use of OER. More worryingly there is a lot of replication of bad pedagogy, i.e. simple web page turning. The reasons are that teachers lack the necessary digital literacy skills to harness the affordances of digital technologies. They fear that they don't have time to experiment with technologies, and feel there is a lack of support to help them. Finally, in research-led institutions there is a tension between teaching and research, with the latter being privileged over the former.

This chapter describes the 7Cs of Learning Design framework, which aims to help teachers/designers make design decisions that are pedagogically effective and make appropriate use of digital technologies. The 7Cs framework aligns with the three central facets of Learning Design, as outlined in the Larnaca Declaration on Learning Design,[2] namely: guidance, representation and sharing. The tools and activities associated with the 7Cs framework help guide the design practice, and enabled teachers/designers to make their designs explicit through visualisation, so that they can be shared and discussed with others. The 7Cs of Learning Design framework is the culmination of work carried out at the Open University UK as part of the OU Learning Design Initiative[3] and the University of Leicester's Carpe Diem work (Armellini, Salmon et al. 2009).

[1] See for example https://www.youtube.com/watch?v=jZkHpNnXLB0 and more specifically for learning https://www.youtube.com/watch?v=uZ73ZsBkcus

[2] http://www.larnacadeclaration.org/

[3] http://www.open.ac.uk/blogs/OULDI/

The 7Cs of Learning Design framework

When they design a learning intervention, teachers typically focus on content, drawing on their own experience of learning (usually through lectures and tutorials). The 7Cs framework shifts the focus away from content to activities and the ultimate learner experience. The underlying philosophy associated with the 7Cs framework is shifting from a belief-based approach to design to one that is design-based. It is about helping the teacher/designer represent their designs, and fosters reflection and creativity. Visualising the design means that it can be shared and discussed with others.

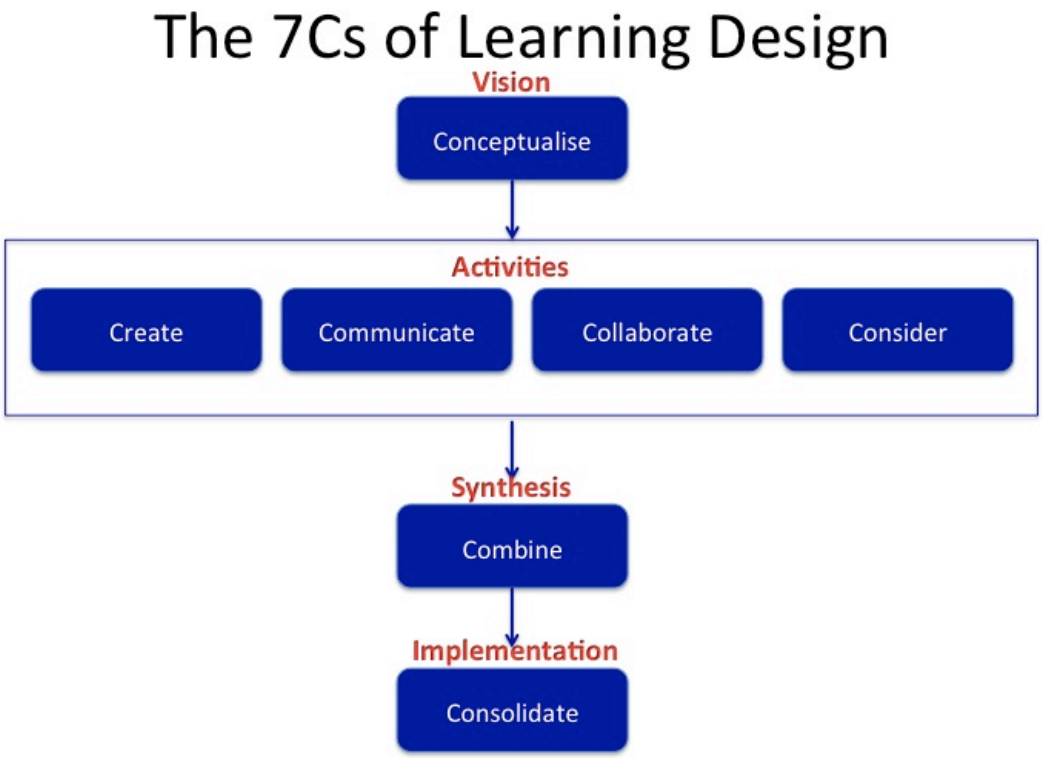


Figure 1: The 7Cs of Learning Design Framework

Figure 1 illustrates the 7Cs of Learning Design framework. The first C, Conceptualise, is about creating a vision for the course or module being designed. It helps the teacher/designer think about the nature of the learners who are likely to take the course or module, their age range, diversity, characteristics, skills, perceptions and aspirations. It is also about articulating the core principles associated with the course or module. The next four Cs are concerned with designing the resources and activities that the learners will engage with. The Create C helps the teacher/designer articulate what learning materials need to be created, whether these are text-base, interactive materials, podcasts or videos. In addition, it covers the use or repurposing of Open Educational Resources. Finally, the teacher/designer might also create some activities, which require the learners to create their own content. The Communicate C is concerned with methods to facilitate communication, between the learner and the tutor, the learner and their peers, and the broader community through social media. This might range from effective mechanisms

for fostering discussion in a forum, through effective moderation, or looser communication through social media. Similarly, the Collaborate C is about fostering mechanisms to enable collaboration or group work. Finally, the Consider C, is concerned with ways in which reflection and demonstration of learning achievements can be promoted. Assessment might be diagnostic, formative or summative. The Combine C enables the teacher/designer to step back and reflect on the design process to date and look at the design from different perspectives. Finally, the Consolidate C is about implementing the design in a real-life context and evaluating its effectiveness.

The Conceptualise C

The Conceptualise C enables the teacher/designer to create a vision for the module or course. To think about what the overall principles of the course are and how these are realised through the pedagogical approaches adopted and the resources and the activities that the learners engage with. It also enables the teacher/designer to think about the types of learners who are likely to take the course.

Course Features View

The course features view enables the teacher/designer to brainstorm the overall vision for the course and in particular: the principles associated with the course, the pedagogical approaches used, the forms of guidance and support, the nature of the content and activities, the ways in which communication and collaboration are fostered, and the nature of reflection and demonstration.

It enables teachers to think about the overall essence of the learning intervention and how it will be delivered and supported. Participants interact with a pack of cards around the following elements:

1. Principles: What is the essence of the course, what are the core principles? So for example cultural or aesthetic aspects may be important, the intervention may have a practical focus or be about applying theory to practice, it may be based on a professional community of peers or it might be important that the intervention includes elements of serendipity.
2. Pedagogical approaches: What pedagogies are involved? For example is the intervention based on constructivist principles, is it problem or inquiry-based?
3. Guidance and support: What guidance and support are provided? For example in terms of a website or module handout, or access to study materials.
4. Content and activities: What kinds of activities are included and what content will the learners be using?
5. Reflection and demonstration: Are the learners actively encourage to reflect at key points? How are they demonstrating their learning? What forms of diagnostic, formative and summative assessment are included?
6. Communication and collaboration: How are the learners interacting with each other and their tutors? Are there any elements of collaboration included?

Figure 2 shows the card pack associated with the Course Features activities. Participants work in teams of around five. The Course Features pack are available online as a PDF.[4] The cards can be used in a number of ways. For example, choosing just 12 cards, which represent the course or creating three piles of cards, one for the features that are really important, one for those features that are there to some extent, and one for those that are not present at all.

Figure 2: The Course Features View

Personas

In designing any course it is important to take account of the nature of the learners, a first-year Mathematics course will have very different students, than a post-graduate course for nurses. Understanding the nature of your learners, their competences, aspirations and perceptions is important and needs to feed into the design process. The Persona activity[5] helps the teacher/designer to articulate the types of learners that will complete the course. Articulating some learner personas will help guide what kind of teaching intervention is appropriate for those learners. Factors to take into account include: age, sex, cultural background, discipline, level of technological competence and motivations for doing the learning.

Figures 4 and 5 show two personas, for Joe and Marie. The personas illustrate the very different characteristics of the learners, in terms of their background and motivations and goals.

[4] http://jiscdesignstudio.pbworks.com/f/OULDI_Pedagogic_Aspects_v8_Release.pdf?ld=1 and there is an introductory video about the course features pack and how it can be used http://cloudworks.ac.uk/cloud/view/5950

[5] More on the Persona Design can be found at http://www.ld-grid.org/resources/representations-and-languages/personas

 [6]	Name: Joe Gender: Male Age: 19 Lives in: Gloucester, UK with his parents Likes football and music
Education and experience	Joe has had a conventional education completing 9 GSCEs and 3 A levels (in Chemistry, Physics and Maths). He works in a local restaurant as a waiter at the weekend. He has not travelled much outside of the UK. His hobbies include watching football and playing in a local band
Roles and responsibilities	He has worked as a waiter for two years and now supervises new employees. He runs a computer programming club, which has 15 members. They meet every Sunday more for two hours. He publishes a monthly newsletter on their activities.
Technical skills	He is a proficient internet user and has good programming skills, which he has learnt in his spare time. He has a laptop and an iPad. He uses the latter primarily for surfing the Internet and keeping in touch with friends.
Subject domain skills and knowledge	He has good science skills and a reasonable level of general knowledge, although he does not keep up much with current affairs.
Motivation and desires	He wants to get a job in the IT industry as a computer programmer, he is passionate about programming and is very gifted at it.
Goals and expectations	His goal is to complete a computer science course and then get a job in the IT industry.
Obstacles to their success	His one weakness is a lack of concentration. He does not have very good study skills and tends not to put too much effort into his learning.
Unique assets	He is a gifted computer programmer and is very sociable and confident with lots of friends.

Figure 3: Joe's Persona

 [7]	Name: Maria Gender: Female Age: 45 Lives in: London, UK with her husband and two children Likes classical music, theatre and reading
Education and experience	Marie left school having completed 5 O' Levels. She later returned to college to complete a HND in cooking. She has

[6] https://openclipart.org/people/jonata/jonata_Boy_with_headphone.svg
[7] https://openclipart.org/detail/173498/retro-woman-2-by-tikigiki-173498

	run her own Italian restaurant for 15 years. Her parents were Italian and moved to the UK when Maria was ten years old.
Roles and responsibilities	Her restaurant business is very successful. She employs five people, including a full-time chief. She has overall responsibility for the business, including the finances and deciding on the menus, in conjunction with the chief.
Technical skills	She does not use the Internet very much and has relatively low levels of IT proficiency. She does own a desktop computer but using it mainly for sending and receiving emails.
Subject domain skills and knowledge	She is more practically orientated than academic. Her Italian is rusty, she hasn't practiced it much since moving to the UK when she was 10.
Motivation and desires	Her husband and her would like to move back to Italy when their children (19 and 19) have left home. They would like to set up a restaurant business there. As a result she wants to improve her Italian skills. She is not interested in getting a qualification *per se*, she just wants to be proficient in Italian.
Goals and expectations	Her goal is to complete an online intermediate Italian course with the Open University, UK and then to move to Italy and set up a new restaurant business.
Obstacles to their success	The main problem she has is a lack of time, she is kept busy with the restaurant (working very long hours) and her family. The OU course requires 7 hours a week as a minimum, she will need to be very focused and motivated to ensure she meets this commitment. In addition, she will need support to begin with to develop her Internet skills, given that the course is wholly delivered online.
Unique assets	She is very practical and has a good business sense. Once she commits to something she is very driven. She has good general language skills and that fact that she lived in Italy for ten years should give her a good head start.

Figure 4: Maria's Persona

The six designs frame

The Six Design Frames

Description

The six design frames enables teachers/designer to view the design process from different perspectives to promote different pedagogical approaches. Each design view influences the nature of the curriculum, the learning, teaching and assessment, and the types of digital literacies and competences that the learners will develop.

Detailed description

The six design frames looked at the design process from a number of different perspectives. Bruce et al. argue that:

> …educators are daily challenged by an environment in which colleagues and students bring very different perspectives to curriculum design, teaching and learning, and by the need to apply theories of learning to information literacy education in coherent ways. The purpose of this paper is to propose a model, Six Frames for Information Literacy Education, as a tool for analysing, interpreting and understanding these challenges; and to explain the relational frame in more detail.

Central to their approach is the premise that people see teaching and learning differently, each teacher comes to the design space with their own inherent ideas and beliefs, about approaches to teaching, use of technology, discipline and cultural perspectives and their own background and competencies. Their framework consists of the following six frames:

1. The content frame – where the focus of the design is on the content
2. The competency frame – where the focus of the design is on the competences the learners will develop
3. The learning to learn frame – where the focus of the design is on enable learners to develop better learning strategies
4. The personal relevance frame – where the focus of the design is on articulating the personal relevant to the learner of the materials and activities
5. The social impact frame – where the focus of the design is on the social impact and relevance of the materials in a wider societal and/or local context
6. The relational frame – where the focus of the design is on relating elements of the materials and articulating different view points.

Which frame is used to guide the design process will influence the learning design process, the activities and content the learners engage with, how technologies are used, the way in which the learning is facilitated and the nature of any assessment elements. Figure 5 shows a diagrammatic representation of the six design frames. The first three can be seen to be associated with the learning process; in terms of a focus on content, competencies and learning to learn. The final three are more contextual, in terms of personal relevance, social impact and the relational and contested nature of the curriculum.

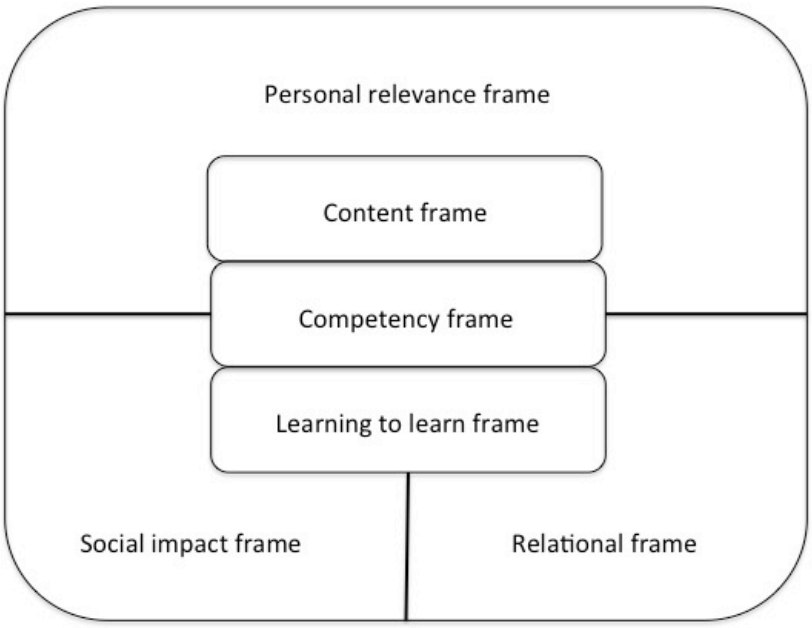


Figure 5: The relationship between the six design frames

The Create C

The Create C helps the teacher/design articulate what interactive materials, podcasts and video they need to create. It also helps them think about what skills will be needed and how much time it will take. It also helps them identify Open Education Resources they might use or repurposes. Finally, it helps them design activities so that the learners can find or create their own content.

The Resource Audit

The Resource Audit focuses on the use and repurposing of OER. Table 2 shows the template for the Resource Audit. The rows consist of: what I find and reuse as is, that I fine, tweak and use, what I find, repurpose and use, what I create for this module, learner-generated content. The columns reflect the format, i.e. text and graphics, audio, video, slides, other. The teacher/design completes the cells as appropriate, indicating the nature of the resource, the time needed to create, any skills needed and the appropriateness or relevance of the resource.

Table 1: The Resource Audit template for a module on Technology-Enhanced Learning

			Format		
↓**Content** (under the appropriate licences)	**Text & graphics**	**Audio**	**Video**	**Slides (e.g. PowerPoint)**	**Other (e.g. Adobe Presenter)**
What I find and reuse *as is*			Micheal Westch video on the machine is us.ing us https://www.youtube.com/watch?v=6gmP		Watch this presentation on the 7Cs of Learning Design (50 mins) http://meeting.uct.ac

	The e-learning timeline The innovating pedagogy report http://www.open.ac.uk/personalpages/mike.sharples/Reports/Innovating_Pedagogy_report_2013.pdf The NMC Horizon 2014 report http://www.nmc.org/publications/2014-horizon-report-higher-ed		4nk0EOE Useful video showing the key features of the web (4.32 mins) Social media revolution – video on key statistics associated with the web (3.50 mins) Changing educational paradigms (11.41 mins)		.za/p3y54vmg8zj/
What I find, tweak and use					
What I find, repurpose and use					
What I create for this module	Core text on the history of Technology-Enhanced Learning	Introductory podcast for each week (5 mins)			

Learner Generated Content	Creation of a wiki of key Technology-Enhanced Learning terms A reflective blog			Presentation on the affordances of one technology	

The Communicate C

The Communicate C is concerned with mechanism to foster communication between learners and the tutors, learners and their peers, and learners and the wider community. There are a variety of ways in which communicate can be fostered. Examples include open discussion, structured debate, brainstorming, investigating, critiquing, assessing, summarizing, and problem solving. Learners can be organized in different ways, such as in small groups of two or three, or whole cohort groups. Individuals can be assigned different roles, such as: contributor, facilitator, moderator or summariser; these roles can be assigned to learners and/or tutors

The Conversational Framework

Laurillard's Conversational Framework articulates the dialogical exchange between teachers and students (Laurillard 2002). It consists of the following four elements: the teacher's concepts, the teacher's constructed learning environment, the learner's concepts, and the learner's specific actions in relation to learning tasks.

There are four types of interaction between the teacher and the learner: discussion, adaptation, interaction and reflection. In terms of discussion, the teacher and learner concepts should be mutually accessible and both should be clear of the learning objectives. In terms of adaptation, teachers adapt objectives with respect to existing concepts and learners need to integrate feedback and link it to their own conceptualization. In terms of interaction, teachers adapt to learning environment and associated tasks, i.e. they create an environment adapted to the learner task given to the learner, and they need to focus on support for task and give appropriate feedback to the learner. Finally, in terms of reflection of the learner's performance, the teacher needs to support the learner to revise their conceptions and adapt the tasks to the learning needs. Learners are encouraged to reflect at all stages of the learning process (i.e. the initial concepts, the tasks, the learning objectives and the feedback).

Laurillard argues that different media forms have different affordance to provide a different level of support for various kinds of learning experiences. She lists the following five media forms: narrative, interaction, communicative, adaptive and productive.

Figure 6 illustrates the relationship between the four components of the Conversational Framework. The process begins with the teacher presenting

theory and ideas. The learner then comes back with questions and idea. The teacher refined their teacher's constructed learning environment and adapts the learner's activities in response to the learners' reply. This is followed by a reflection on learner's actions. In response to the teacher presenting ideas and theories, the learner adapts their actions in light of the theory and this informed their specific actions. Finally, the learner engages in a process of reflection in light of experience.

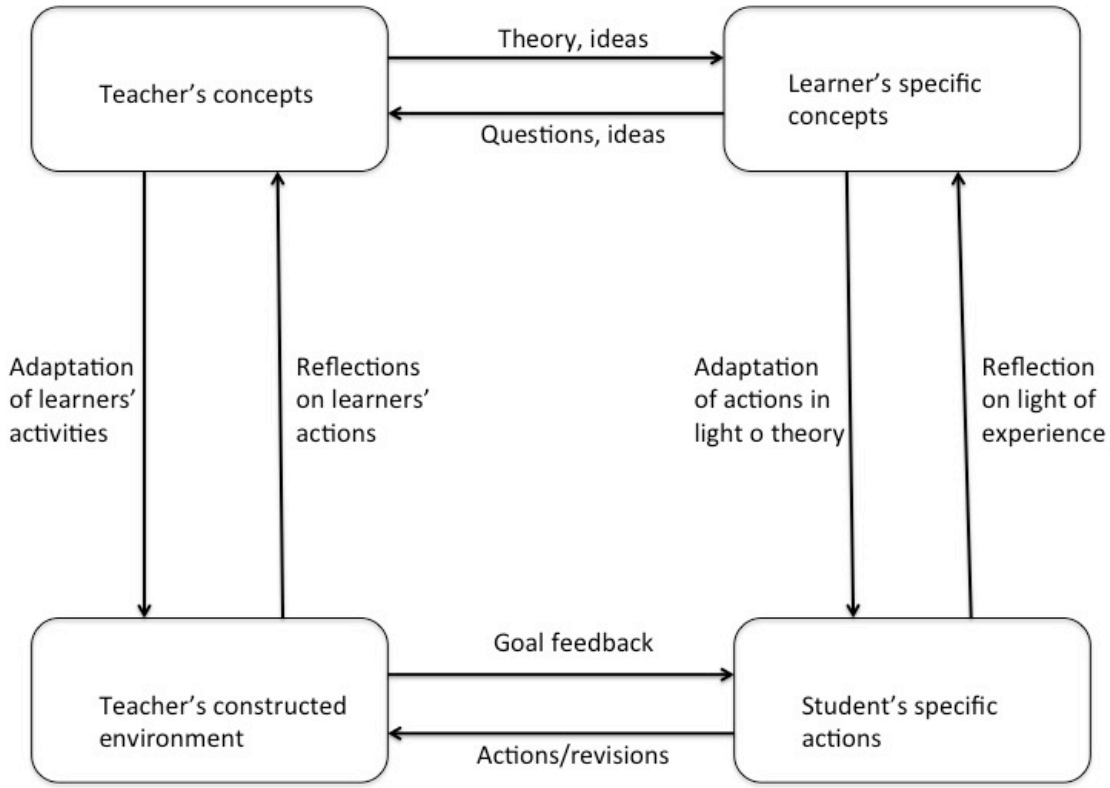


Figure 6" Laurillard's Conversational Framework[8]

Structured debates

Structured debates can provide a useful mechanism for learners to practice articulating different arguments and/or solutions to an issue or problem. A common technique is to divide learners into two teams. A motion is put forward, the first team puts forward their arguments for the motion, the opposing team then outlines their arguments. This process can be repeated a number of times and arguments can also be elicited from a wider audience. Finally the two teams summarise their position and the motion is put to a vote. Figure 3 illustrates an example of how this can be structured.

[8] Also see http://www2.smumn.edu/deptpages/~instructtech/lol/laurillard/ for an interactive version of the Conversational Framework, which shows the media types that can be used to promote each element of the framework.

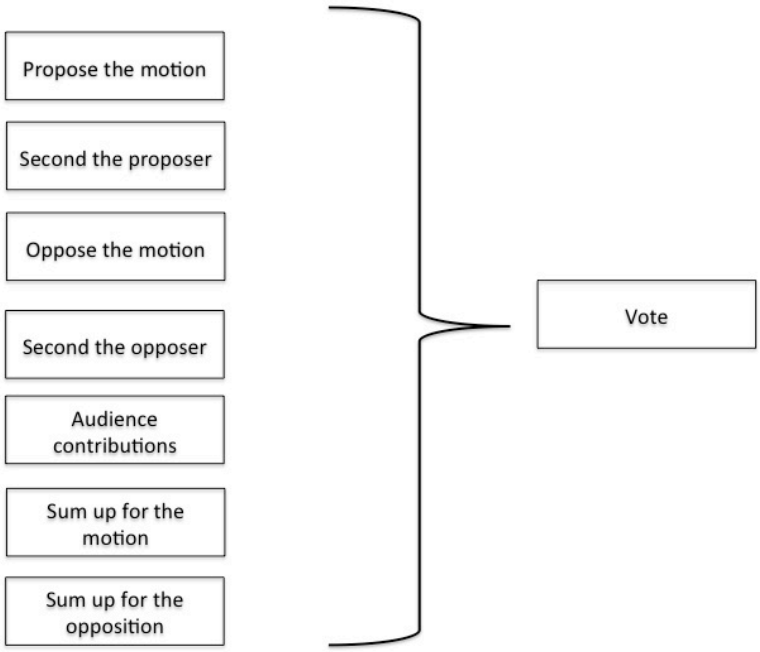


Figure 7: The debate format

It is advisable to set some 'ground rules' for the debate, for example encouraging learners to use appropriate language, to respect each others points of view, and to listen to the contributions of their peers. In this way they learn how to politely disagree or how to strongly disagree. Furthermore, they learn how to communicate and argue without being rude and aggressive. In addition to the approach outlined above, a simpler variant is to conduct the debate by having half of the learners for and the other half against a particular topic. This technique is valuable because through debating learners develop dialogic competencies which are likely to be useful in their everyday lives and their professional context.

Think-Pair-Share Pedagogical Pattern

This is particularly useful where learners are trying to resolve a challenge or open-ended question. Learners begin by reflecting on their own thoughts on the challenge or question; they then discuss their thoughts in pairs. Finally, they share their thoughts with the whole class and vote to resolve the issue. (Figure 4). It was originally developed by Lyman (1981).

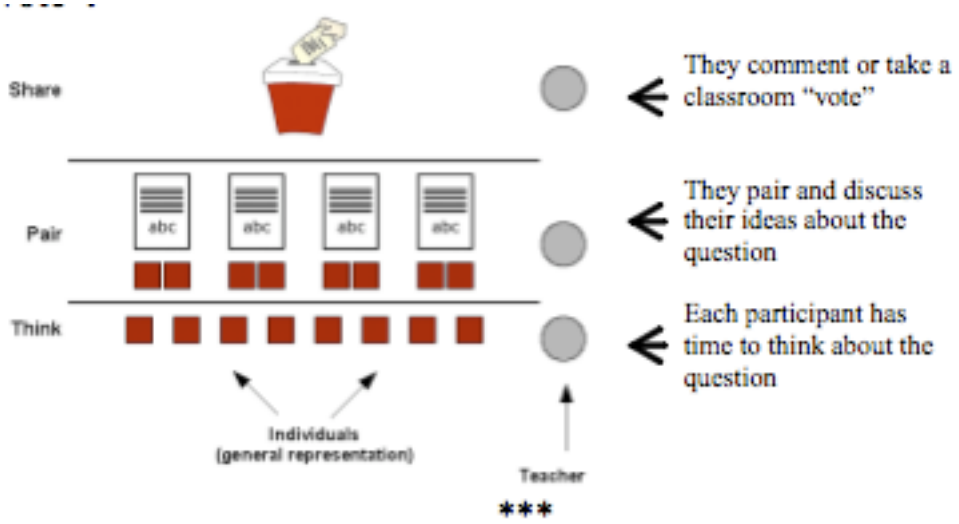


Figure 8: The Think-Pair-Share Pedagogical Pattern

Think-Pair-Share is a strategy designed to provide learners with a structured way of reflecting on and resolving a challenge or open-ended question. Starting from their own reflection, they then co-construct understanding in pairs and finally in a whole class context. It enables them to formulate individual ideas and share these ideas with other learners. It is a learning strategy developed by Lyman and associates to encourage participation. Rather than using a basic recitation method in which a teacher poses a question and one student offers a response, Think-Pair-Share encourages a high degree of learner response and can help keep learners on task.[9]

There are a number of benefits of Think-Pair-Share. Firstly, learners benefit from developing understanding in conjunction with others. Secondly, it provides a structured approach to helping learners construct knowledge. Thirdly, articulating their ideas with their peers helps them to resolve misunderstandings and clarify understanding. Finally, it can be a way of avoiding a few learners dominating the conversation, ensuring equal opportunities are provided for all to contribute. It also helps encourage shyer learners to participate.

There are numerous examples of applying the Think-Pair-Share design.[10] There are a number of variants on the basic approach, such as: Think-Tweet-Share, Think-Text-Share, Think-Pair-Wordle-Share, and Think-Blog-Respond.[11]

The Collaborate C

Many careers require teamwork, so learning how to collaborate and work in a group is a useful skill. Collaborating can also be a good way of breaking a problem down and sharing it amongst a number of learners.
The Consider C

[9] http://olc.spsd.sk.ca/De/PD/instr/strats/think/
[10] See for example http://serc.carleton.edu/econ/interactive/tpshareexm.html
[11] http://learningisgrowing.wordpress.com/2012/03/21/think-pair-share-variations/

The jigsaw pedagogical pattern

The jigsaw pedagogical pattern is a useful way of breaking down a problem. Students are grouped into teams of four. Each student is given a problem to investigate. For example, they might be useful to research different pedagogical approaches, one student looks at associative pedagogies, another constructivist pedagogies, another situative pedagogies and another connectivist pedagogies. They go away and research, and then get together with members of other teams who have been researching the same pedagogies and they share their knowledge and understanding. They then return to their team and combine the information retrieved (Figure 9).

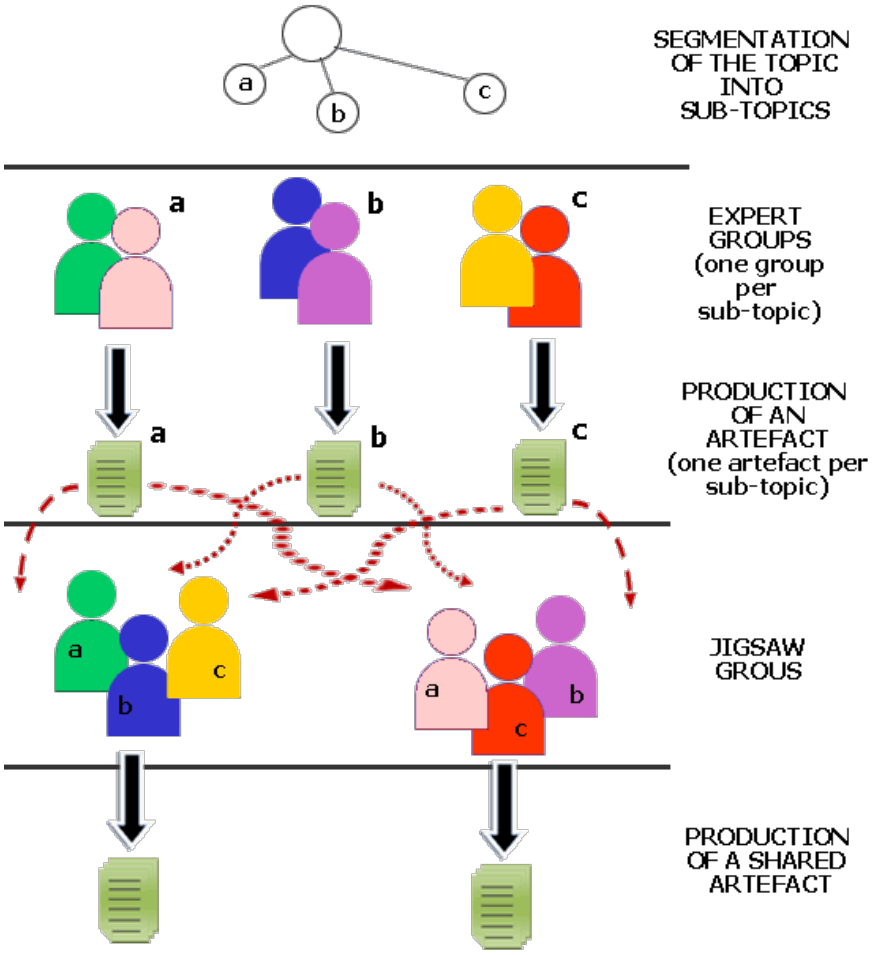


Figure 9: The jigsaw pedagogical pattern

The pyramid pedagogical pattern

The pyramid pedagogical pattern is useful where students are dealing with a complex task and where they need to come to some form of resolution. Hernández-Leo et al. (2010) list the following benefits of the pyramid approach:

- To promote the feeling that team members need each other to succeed (positive interdependence)
- To foster discussion in order to construct students' knowledge
- To enable the development of negotiation skills

Figure 10 illustrates the stages involved in the pyramid pedagogical pattern. In the first phase the students work on their own to consider the problem, in the second phase they discuss their ideas and thinking in pairs. In the final phase there is a class debate, which may be followed by a voting solution.

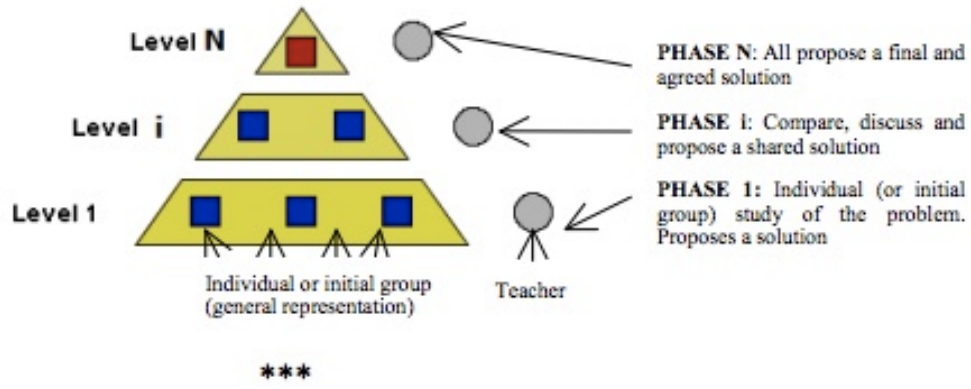


Figure 10: The pyramid pedagogical pattern

The Consider C

The Consider C is concerned with the ways in which learners are encouraged to reflect on their learning and also demonstration of achievement of learning outcomes; i.e. the assessment component of a unit of learning. Assessment might be diagnostic, where the level of learners' knowledge and competencies is assessed, formative assessment or summative assessment. Assessment and feedback are well known to be a key driver for learning. There are three types of assessment: tutor, peer or self-assessment. Nicol[12] argues that:

> Assessment and feedback practices should be designed to enable students to become self-regulated learners, able to monitor and evaluate the quality and impact of their own work and that of others.

The REAP principles

The REAP project developed a set of 12 principles[13] to promote more effective feedback and assessment:

1. Help to clarify what good performance is (goals, criteria and standards)
2. Encourage time and effort on challenging learning tasks
3. Deliver high-quality feedback information that helps learners to self-correct
4. Provide opportunities to act on feedback (to close any gap between current and desired performance)
5. Ensure that summative assessment has a positive impact on learning
6. Encourage interaction and dialogue around learning (peer-peer and teacher-learner)
7. Facilitate the development of self-assessment and reflection in learning
8. Give choice in a topic, method, criteria, weighting or timing of assessments

[12] http://reap.ac.uk
[13] Taken from http://www.jisc.ac.uk/media/documents/programmes/elearning/digiassass_eada.pdf

9. Involve learners in decision making about assessment policy and practice
10. Support the development of learning groups and learning communities
11. Encourage positive motivational beliefs and self-esteem
12. Provide information to teachers that can be used to help shape their teaching.

Reflective learning

Reflective learning has three components: learning from experience, thoughtful deliberation, and systematic, critical and creative thinking about action with the intention of understanding its roots and processes. Schon (1983) defines reflective practice as:

> The capacity to reflect on action so as to engage in a process of continuous learning

Gibbs' reflective learning cycle (Figure 11) consists of the following six stages of reflection:

1. Description – what happened?
2. Feelings – what were you thinking and feeling?
3. Evaluation – what was good and bad about the experience?
4. Analysis – what sense can you make of the situation?
5. Conclusion – what else could you have done?
6. Action plan – if it arose again what would you do?

The questions associated with the six stages can be used by the teacher to design activities for the learners, in which the teacher gets them to consider these questions, helping them to reflect on their learning. These might be achieved through getting learners to keep a reflective blog or asking them to contribute to a discussion forum.

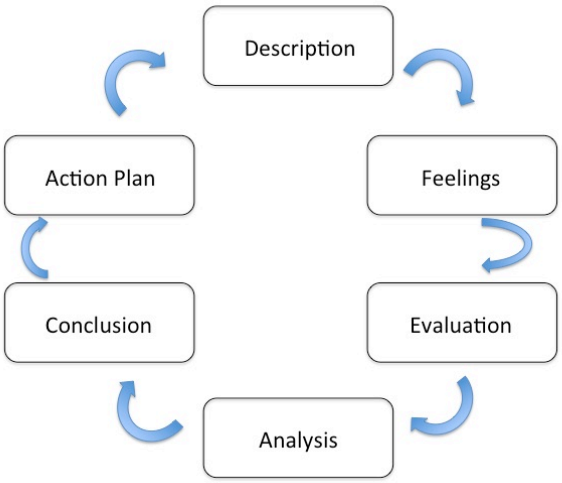


Figure 11: The Gibb's reflective learning model

Kolb's experiential learning cycle (Kolb 1984) is similar to the model developed by Gibbs (Figure 12). A core principle of Kolb's work is that learners learn through discovery and experience. The four aspects of the learning cycle are:

- Concrete experience – where the learner is assigned a task, which a focus on active learning.
- Reflective observation – where the learner steps back and reflects on their learning
- Abstract conceptualization – where the learner makes sense of what has happened and involves interpreting the events and understanding the relationships between them.
- Active experimentation – where the learner considers how they are going to put what the have learnt into practice.

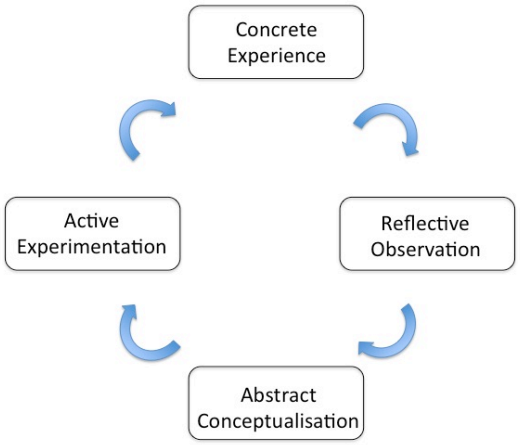


Figure 12: Kolb's experiential learning cycle

Table 2[14] shows examples of the types of activities that can be used to facilitate each of the stages.

Table 2: Mapping Kolb's learning cycle to activities and teaching activities

Stage	Activities	Teaching activities
Concrete experience	Ice breakers & energisers Team games Problem solving Discussion Practical exercises, e.g. making a Presentation Debates	Readings Examples Fieldwork Laboratories Problem sets Trigger films Observations Simulations/games Text reading

[14] This is taken from http://www2.le.ac.uk/departments/gradschool/training/eresources/teaching/theories/kolb

Reflective observation	Ask for observation Write a short report on what took place Give feedback to other participants Quiet thinking time Tea & coffee breaks Completing learning logs or diaries	Logs Journals Discussion Brainstorming Thought questions Rhetorical questions
Abstract conceptualization	Present models Give theories Give facts	Lectures Papers Projects Analogies Model building
Active experimentation	Give learners time to plan Use case studies Use role play Ask learners to use real problems	Projects Fieldwork Homework Laboratory Case study Simulations

The Combine C

The Combine C enablers the teacher/designer to take a step back and look at the design from different perspectives. Four examples are described, the course view, the activity profile, designing MOOCs and the storyboard.

The Course View

The course views map enables the teacher/designer to get a holistic overview of the unit, in terms of: what **Guidance and Support** is provided, what **Content and Activities** the learners will engage with, what forms of **Communication and Collaboration** are included, and the types of **Reflection and Demonstration**. This includes details of which tools and resources are associated with each of the elements and any notes such as details of prerequisites required or description of the philosophy underpinning the learning intervention, for example it might be that peer interaction is deemed important or that learners are expected to generate their own materials (Table 3).

Table 3: The Course map view

Course map representation	
Guidance and support	**"Learning pathway"** *Course structure and timetable* Course calendar, study guide, tutorials
Information and experience	**"Content and activities"** *Could include course materials, prior experience or student generated content* Readings, DVDs, podcasts, lab or field work, placements
Communication and interaction	**"Dialogue"** *Social dimensions of the course, interaction with other students and tutors* Course forum, email
Thinking and reflection	**"Meta-cognition"** *Internalisation and reflection on learning* In-text questions, notebook, blog, e-portfolio,
Evidence and demonstration	**"Assessment"** *Diagnostic, formative and summative* Multiple choice quizzes, TMAs, ECA

Table 4 is an example of a completed course map view for a post-graduate module on accessibility in online learning and teaching. A central feature of the course is to promote accessibility and improve access for disable students. The module is structured around a series of activities that ask students to collaboratively read, think, debate and write about a subject with reference to their own, or an adapted, context and practice.

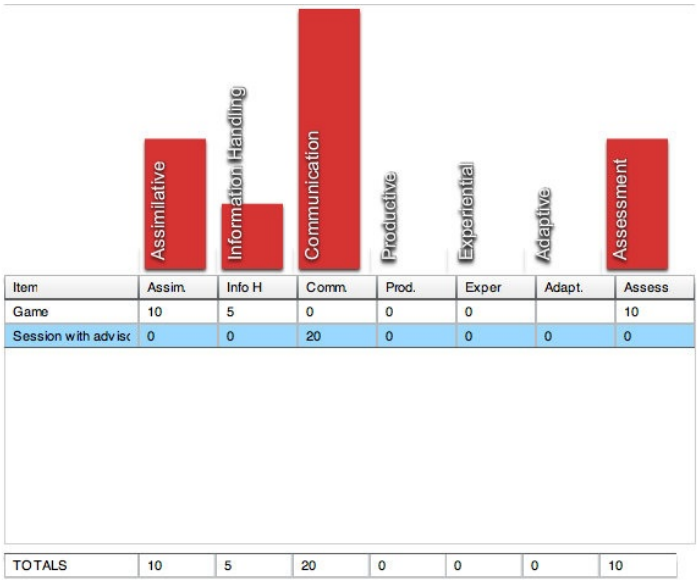
Table 4: A completed course map view

Guidance and support		Content and experience	
Tools & resources	***Responsibilities & relationships***	***Tools & resources***	***Responsibilities & relationships***
1. StudentHome (student support portal) 2. Programme website 3. Course website 4. Course Guide 5. Assignment Guide 6. University Library website 7. General forum 8. Technical self-Help forum 9. Café forum 10. Specific guidance and information (i.e. Delicious bookmarks)	It is expected that students will already be using graduate level study skills. A spirit of mutual encouragement and support is encouraged. Tutors use a developmental mentoring approach.	1. Three blocks of study activities 2. A set of detailed learning outcomes 3. Module material (categorised as core, further and background) which includes articles, reports, readings. 4. One set book 5. JISC TechDis website 6. Delicious bookmarks	Students study for approx 15 hours per week (Incl. course- & self-directed study and the completion of assignments) Variety of activities include reading, discussing, practical tasks and collaborative activities Students will use a real or adopted professional perspective throughout to frame their discussions and reflections and in their assignments
Reflection and demonstration		**Communication and collaboration**	
Tools & resources	***Responsibilities & relationships***	***Tools & resources***	***Responsibilities & relationships***
1. Personal reflective blog 2. Tutor group wiki 3. ePortfolio (student optional) 4. Tutor group forum (10% of module marks) 5. Assignment 1 (1500 word report 15% of module marks) 6. Assignment 2 (3000 word report 30% of module marks) 7. Final assignment (6000 word report 45%) 8. Assessment guide 9. Marking criteria for each assignment	Use of a reflective personal blog is encouraged throughout the module Assessment of the module integrated with the teaching and learning activities so that all assignment work is a learning experience Assignments relate to personal context and practices Students and tutors use a shared marking criteria	1. 4x Asynchronous online forums 2. Live online discussions via Elluminate (optional student) 3. Telephone (optional tutor) 4. Email (optional tutor) 5. Delicious (optional student) 6. ePortfolio (optional student) 7. Personal blog 8. Tutor group wiki 9. Access to an international professional student community	Strong emphasis on peer communication and collaboration, and learning from one another's experiences Wide variety of communication methods and tools used with an emphasis on the use of the tutor group forum Student activity on the forum is supported, guided and assessed

The Activity Profile

The **pedagogy or activity profile view** (Figure 13) enables the teacher/designer to map the types of activities the learners will engage with. There are six types: assimilative activities (reading, viewing, listening), information handling, communicative, productive, experiential (such as drill and practice exercises) and adaptive (such as modeling or simulation). The profile also indicates the amount of time spent on assessment activities. The profile is available as an online flash widget.[15]

[15] http://www.rjid.com/open/pedagogy/html/pedagogy_profile_1_2.html



Item	Assim.	Info H	Comm.	Prod.	Exper	Adapt.	Assess
Game	10	5	0	0	0		10
Session with advisc	0	0	20	0	0	0	0
TOTALS	10	5	20	0	0	0	10

Figure 13: An example of a completed pedagogy profile

Designing MOOCs

Table 5 shows a MOOC classification schema that can be used to design, describe and evaluate MOOCs. The classification consists of twelve dimensions: three to do with the context of the MOOC (the degree of openness, the scale of participation (massification), the diversity of the learners) and nine to do with the pedagogy (the amount of use of multimedia, the amount of communication, the extent to which collaboration is included, the way in which reflection is encouraged, the type of learner pathway (from learner centred to teacher-centred and highly structured), the level of quality assurance, the level of accreditation, how informal or formal it is, the level of learner autonomy.

Table 5: The 12-Dimensional MOOC classification schema

Dimension	Characteristics
Context	
Open	Degree to which the MOOC is open
Massive	How large the MOOC is
Diversity	The diversity of the learners
Learning	
Use of multimedia	Extent of use of rich multimedia
Degree of communication	Amount of communication incorporated
Degree of collaboration	Amount of collaboration incorporated
Amount of reflection	Ways in which reflection is encouraged
Learning pathway	Degree to which the learning pathway is supported
Quality assurance	Degree of quality assurance
Certification	Mechanisms for accreditation
Formal learning	Feed into formal learning offerings
Autonomy	Degree of learner autonomy

The Storyboard

Storyboarding is a well-established approach to visually representing a temporal sequence of activities. For example, it is used in the film industry to represent the key sequences involved in a plot. Storyboarding is used in our Learning Design work, as a means of representing to overall design. It enables the teacher/designer to see how the different elements of the design process fit together. It consists of a timeline, with the activities included in the design along the middle. Learning outcomes are mapped to the assessment elements. Above the activities any inputs to the individual activities are include: for example reading materials or podcasts. Below the activities outputs are listed, for example contribution to a discussion forum or creation of a blog post. Figure 14 shows an example of part of a storyboard. Along the top are listed the weeks and the topics. The learning outcomes are listed down the left hand side. The storyboard is activity centred; the activities the students will engage with are shown in the middle. Above the activities are the inputs the students are asked to engage with, so in week one they watch a video and read a document, in week two they listen to a podcast and read a document. In the final two weeks they read a document, listen to a podcast and watch a video. Below the activities the learning outputs are shown. In week one the students produce an essay, in week two a reflective blog post and in the final weeks they do a group presentation and write a reflective essay on their learning. Underneath this are the assessment elements. The tutor provides formative assessment on the written document in week one, the students peer comment on two other blog posts in week, and the tutor provides summative assessment on the group presentation and the reflective document in the final weeks. The final stage is to ensure that

all the learning outcomes are met through the assessment elements, which Bigg's refers to as constructive alignment (Biggs 1999).

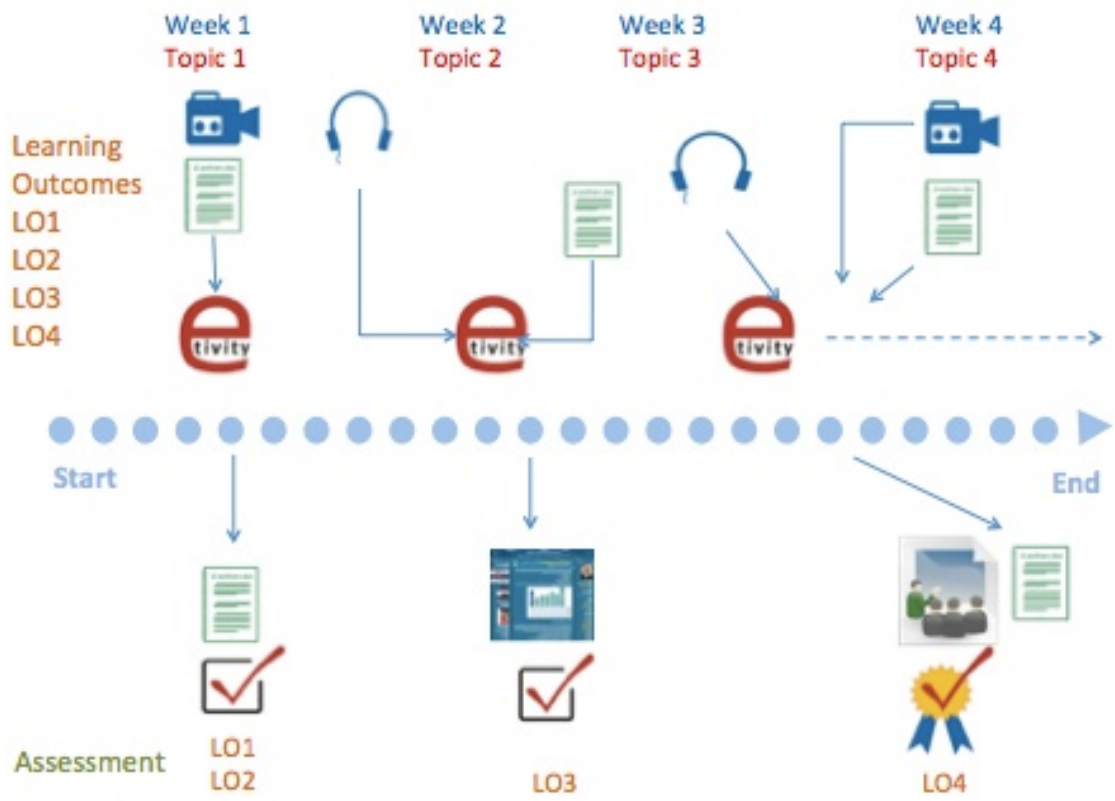


Figure 14: A storyboard

The Consolidate C

The Consolidate C focuses on implementation of the design in a real learning context and evaluating its effectiveness. Table 6 shows an evaluation rubric. The first column lists a set of metrics for the evaluation. These need to be measurable and observable. The second column is used to list the data collection techniques that will be used to evaluate the learning intervention and to assess the extent to which the learning design has been successful. The first four criteria are from Kirkpatrick's evaluation model(Kirkpatrick 1959).

Criteria	Data Collection Methods
Step 1: Reaction - How well did the learners like the learning process?	Survey Focus groups Interviews Observation Analysis of online interactions
Step 2: Learning - What did they learn? (the extent to which the learners gain knowledge and skills)?	Assignments Survey Focus groups Interviews
Step 3: Behaviour - (What changes in	Assignments

job performance resulted from the learning process? (capability to perform the newly learned skills while on the job?	Survey Focus groups Interviews
Step 4: Results - What are the tangible results of the learning process in terms of reduced cost, improved quality, increased production, efficiency, etc.?	

Table 6: Evaluation checklist

Focus	**Description**
Are learning outcomes indicated?	
Do the learning outcomes use active verbs?	
Are there clear signposts for navigation and labeling (i.e. are there clear headings and is it easy for the participants to navigate around?	
Is the learning time associated with resources and activities indicated?	
Is the material logically structured and coherent (are terms explained, do sections follow each other??	
Is there an appropriate mix of multimedia?	
Are videos kept to below 10 minutes?	
Is there a clear and logical learning pathway	
Is the way in which technologies are to be used made clear to the learners?	
Is the content coherent and logically structured?	
Are the pedagogical approaches explicit	
In what ways are communication and collaboration encouraged?	
Are all the materials accessible (variable fonts, suitable colours)?	
Do all the links work	
Are the activities consistent with the platform's functionality (i.e. discussion forum, feedback mechanism)?	
Are the materials open (are there any technological access issues)?	

What pedagogical approaches are used?	
Are sections given clear timeframes	
How are activities monitored?	I
Is there is clear minimum to complete and is there a clear learning timescale?	
What assessment elements are there?	

A more rigorous evaluation can be undertaken using the Apereo course evaluation rubric (Table 7).[16]

[16] Derived from http://www.apereo.org/twsia/rubric-course-project

Table 7: The Apereo course evaluation rubric

Criteria	Not evident	Somewhat effective	Effective	Excellent
Student engagement and community building		Instructor encourages exchange of information among students (e.g., bio, background, experiences) designed to increase communication and social rapport. Students are encouraged to collaborate, share learning resources, and assist each other with learning, but explicit supports are not provided. 60% or more of the students reply to messages from the instructor and other students, both when required and on a voluntary basis. Replies are usually on topic but often are brief, wordy and rambling.	Instructor encourages exchanges of information among students and also interacts with students on a social/peer basis to model community. Some structures (technologies and strategies) are provided (e.g., links and other resources) to support collaborative student learning in group communities. 80% or more of the students reply to messages from the instructor and other students both when required and voluntarily. Replies are usually on topic and sometime contain additional resources to other readings, community agencies, or links to other course/project/job experiences that can be shared for the good of the class members.	Instructor encourages exchange of information in both student to student and instructor to student interactions through a variety of ongoing course/project structures designed to promote social rapport and community. The course/project is designed to support collaborative student learning with clearly defined technologies and strategies. Links to outside resources and both structured and ad hoc internal and external learning communities are supported. 90% to 100% of the students reply and initiate messages to the instructor and classmates both when required and voluntarily. Replies are thought-provoking and on topic and frequently contain information on other readings, community agencies, or

				links to other course/project/job experiences that can be shared for the good of the class members. Students are encouraged to bring their own interests and discoveries into the course/project when relevant. Student reflection on their learning is built into the course/project. Student and instructor engagement with shared outside resources are evident. Students assisting each other and learning from each other is evident.
Communication		The instructor provides sufficient opportunities for instructor to student communication. However, the course/project offers limited opportunity for communication from student to student. Standards for instructor responsiveness and availability to students are loosely defined (e.g.,	The course/project provides an instructor introduction to students. Standards for instructor response to student queries are somewhat defined with basic contact information/ hours provided. Turnaround time between student question and instructor response	The course/project is structured with multiple technology options for communication from instructor to student and student to student with the aim of community building. These may include a variety of one-way and two-way written, voice, and visual communications tools. Standards are clearly stated for all interactions.

		turn-around time for email, grade posting, assignment feedback, etc.). Lag time between student questions /assignment submission and instructor response may be lengthy (e.g., turn-around time for email, grade posting, assignment comments, etc. exceeds 48 hours or is undefined).	is generally within 48 hours (e.g., for email, grade posting, assignment comments, etc.). Instructor provides somewhat regular analysis of student contribution/work and suggestions for improvement. Technologies are used for two-way asynchronous communication exchanges of primarily written information (chat, wiki, Google Docs, blogs, etc.) relating to specific course/project topics. In addition to instructor-to-student communication, standards for student-to-student interactions are somewhat defined. This may include netiquette, responsiveness requirements to postings, as well as group work (e.g., peer reviews, discussion participation, etc.)	Evidence is offered of instructor-to-student, student-to-instructor, and student-to-student interactions both replying to and initiating messages. Options are available for students to control interactions (e.g., presentations, leading discussions, sharing group work). Expectations for both student and instructor responsiveness and availability are clearly articulated both in engagement with material and individual assignments, as well as in group work (e.g., turn-around time for emails, peer review of assignments, participation in discussions, etc.) Instructor provides rapid feedback, including analysis of student work and suggestions for improvement.
Learning materials and strategies		The course/project provides few structural	Navigation is clear, and key components of the	Navigation is clear, and key components of the

		or easily identifiable learning components, and/or navigation beyond a Sakai tools menu is difficult such that the components are not easily found. There is little evidence of interactivity in the design of learning activities. Sequencing and expectations around access and use of materials are minimal or unclear. Technologies are primarily used for two-way asynchronous exchanges of primarily written information (e.g., Wiki, Google Docs, blogs, discussion forum, etc.)	course/project content are identified and easily accessible, such as the Syllabus, a reading list, assignments and due dates, basic contact information. There is some basic interactivity built into the course/project (e.g., interactive presentations, short quizzes that follow a learning sequence). Instructions as to sequencing and expectations are provided. Basic resources are provided to meaningfully enhance the content. In addition to technologies used for written two-way asynchronous communication, additional technologies for two-way voice and/or visual communication of learning materials are used.	course/project content are identified and easily accessible. Additional aesthetic visual cues are provided to increase ease of use for the student. Active learning strategies are built into the course/project. Instructional activities focus on learner input, and reward paired with group interaction. Students are expected to explore and use primary sources in as wide a range of media as possible, along with secondary sources such as books and articles. Student reflection is an integral part of the course/project. Via the visual design, as well as written material, students can clearly understand all components, structure, sequencing, and expectations. Roles are clearly delineated in written, auditory, and visual form. Resources are provided to address the content in multiple ways, taking into

				account student learning styles or abilities and levels. Technologies allow for a variety of one-way and two-way written, voice, and visual communications between instructor and students and among students relating to specific course/project topics.
Learning outcomes and assessment		Course/project objectives and outcomes are vague or incomplete. Alignment of outcomes with content and assignments/assessment is not always evident. Course/project provides limited activities to help students develop critical thinking/judgment, and problem solving skills, and digital literacy as they relate to the course/project objectives/outcomes and at the appropriate level of skill. Opportunities for students to receive feedback about their own performance are	Course/project objectives and outcomes are clearly defined and aligned with content and assignments/ assessment. Some activities are designed to develop critical thinking/ judgment, problem solving skills, and digital literacy as they relate to the course/project objectives/ outcomes and at the appropriate level of skill. Opportunity is provided for student feedback about their own performance. Students are encouraged to share their knowledge with others.	Course/project objectives/ outcomes are clearly defined and aligned with content and assignments/ assessment. Interaction and communication between students, peers, faculty, and content are provided in a variety of ways with choices sometimes available. Activities to help students gain critical thinking/judgment and problem-solving skills are integrated into every aspect of the course/project. This includes opportunities for students to relate the learning to real-life

		infrequent and sporadic.	There is some opportunity for students to relate the learning to real-life applications.	applications. Multiple assessment strategies, including ones that attend to student styles and needs, are used to measure content knowledge, attitudes, and skills. Feedback about student performance is frequent and timely throughout the course/project, and provides clear opportunities for improvement and encouragement to excel. Students are required to become self-reflective learners and are given feedback on their reflection. Other forms of feedback such as peer review or feedback from experts are encouraged. Students are encouraged to generate course/project content using traditional or new media.
Learner support		Course/project contains limited information on digital literacy requirements for the course and on the availability of campus resources.	Course/project contains basic information on digital literacy requirements for the course and on the availability of campus resources.	Digital literacy requirements for the course/project are evident and ample resources for student

				support are provided. Online orientations, practice technical/learning assessments, and/or a mechanism for supplying on demand support material is developed/ provided throughout the term as needed.

Conclusion

This chapter has described the 7Cs of Learning Design framework, which has been designed to help teachers/designers make design decisions that are pedagogically effective and make appropriate use of digital technologies. Each C has associated with it a set of Learning Design representation that guides the teacher/designer's thinking practice and helps them make their designs explicit and hence shareable with others. Evaluation of the use of the resources and activities associated with the 7Cs framework has been positive. Teachers state that the resources and activities help them to think beyond content to the learning activities and the learner experience. They enable them to be more creative in their design thinking. The resources and activities are easy to use, the teacher/designer can iteratively improve the design representations overtime.

References

Armellini, A., G. Salmon, et al. (2009). The Carpe Diem journey: Designing for learning transformation. Transforming higher education through technology-enhanced learning T. Mayes, D. Morrison, H. Mellar, P. Bullen and M. Oliver. York, The Higher Education Authority**:** 135-148.

Biggs, J. (1999). "What the student does: teaching for enhanced learning." Higher Education Research & Development **18**(1): 57–75.

Hernández-Leo, D., J. I. Asensio-Pérez, et al. (2010). Generating CSCL Scripts: From a Conceptual Model of Pattern

Languages to the Design of Real Scripts. E-learning design patterns. P. Goodyear and S. Retalis. Rotterdam, Sense Publishers**:** 49-64.

Kirkpatrick, D. (1959). "Articles on Reaction, Learning, Behavior and Results." Journal of the American Society of Training Directors, ASTD.

Kolb, D. (1984). Experiential learning: experience as the source of learning and development. Englewood Cliffs, NJ, Prentice Hall.

Laurillard, D. (2002). Rethinking university teaching, Routledge %@ 0415256798, 9780415256797.

Schon, D. (1983). The reflective practitioner, how professionals think in action. USA, Basic books.