BYOD4L : learning to use own smart devices for learning and teaching through the 5C framework

BECKINGHAM, Sue <http://orcid.org/0000-0001-5660-125X> and NERANTZI, Chrissi

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Chrissi Nerantzi and Sue Beckingham

Introduction

Opportunities to learn informally have exploded since the arrival of social media and mobile technologies. These technologies disrupt the way we learn and create new opportunities for learning (Beetham & Sharpe, 2013). Google is rapidly becoming our dynamic encyclopaedia and connecting to global sources of information and learning is normal behaviour for anyone with a question or desire to learn. This chapter discusses an open approach to learning which was designed to engage educators in HE innovatively with CPD for learning and teaching called Bring Your Own Devices for Learning (BYOD4L).

The design of BYOD4L harnessed social media, mobile learning and ideas about open learning to create a rich and interactive learning space mediated through personal smart technologies. It was conceptualised as an immersive open CPD event to be run mostly online over five days.

Previously (Nerantzi & Beckingham, 2014, in review) we have described open CPD as professional development afforded by Open Educational Practices (OEP) and Open Educational Resources (OER). Such practices and resources encompass open courses or events, online and face-to-face events and MOOCS as well as freely available and accessible materials, both digital and physical. These create opportunities for "self-directed and self-organised CPD driven by professional interests, priorities and aspirations." (Nerantzi & Beckingham, in review, p. 3)

At the time of writing three iterations of BYOD4L have informed the development of a collaborative and scalable open CPD model which presents a versatile approach to delivering CPD for institutions while the 5C framework has been used unmodified.

BYOD4L - a collaborative development

The idea of creating BYOD4L as an open event was first conceived in 2013 by Chrissi Nerantzi as a way to create opportunities for extended engagement linked to a conference, event or other development activities. Chrissi Nerantzi and Sue Beckingham developed the idea into a concept and put all the pedagogical building blocks together for BYOD4L. The Smart Learning events offered by the Media-Enhanced Learning Special Interest Group (MELSIG, see http://melsig.shu.ac.uk/) provided a useful platform to test this idea. Development through collaboration of BYOD4L was central to the approach from its outset. The authors, Chrissi Nerantzi and Sue Beckingham, based at different UK universities, developed the initial concept, the BYOD4L online presence, pedagogical design, activities and resources using a range of freely available social media technologies but also Open Educational Resources (OER) developed by Nerantzi & Uhlin (cited in Nerantzi, 2014). Further OERs were developed especially for BYOD4L which as a whole is openly licensed and also made available as a stand-alone OER course.

The main BYOD4L event site was built using Wordpress.com. Wordpress is a free tool that allows anyone with moderate IT skills to construct a web presence made up of media rich pages. New community spaces were established in Facebook as well as Google + and Twitter. In addition a closed social space using Facebook was created to provide a supported space for facilitators. Later, volunteer co-facilitators, identified through their personal networks, were invited to be involved in the lead up to first iteration of BYOD4L in January 2014. The facilitation team then consisted of 12 collaborators from nine institutions and two countries. These social media platforms and tools were chosen as these have been used successfully in the past in other open educational initiatives.

Before it was run, BYOD4L was peer reviewed by Dr Cristina Costa who recognised BYOD4L's strength and innovative character. The review was especially important for us as it provided a valuable mechanism for quality assurance: BYOD4L as an open collaborative event or course, sits outside

the normal institutional quality processes that apply to other academic programmes and Cristina's experience and expertise in using social media for learning, as well as her recognition as an ALT Learning Technologist of the Year, made her a credible reviewer for this project.

In BYOD4L 'bite-size learning', which can be understood as flexible, short and just-in-time interventions (Simpkins & Maier, 2010), was recognised through the awarding of the open badge system to recognise informal learning and achievement of bite-size learning. To secure a badge participants were invited to use an online form to submit evidence of their active engagement with each of the 5Cs. Typically this was in the form of a reflective blog post. Their evidence was then peer reviewed. Facilitators were also eligible to gain credits linked to the 5Cs as a participant. Other forms of recognition were associated with BYOD4L. For example, at Manchester Metropolitan University BYOD4L was offered as a FLEX opportunity. FLEX is a practice-based CPD scheme developed by the Centre for Excellence in Learning and Teaching (CELT) with informal and formal pathways which maximises on the opportunities available within and beyond an institution. It can lead to up to 30 credits of the Postgraduate Certificate or the Masters in Academic Practice as a way to formalise informal learning, FLEX awards, which are open badges for CPD linked to learning and teaching and are a way to evidence relevant engagement. Engagement in FLEX can also help when working towards professional recognition of the HEA. BYOD4L was mapped to the UKPSF and presented opportunities to work towards professional recognition in some further participating institutions, for example at Sheffield Hallam University.

Pedagogic considerations

An engaging enquiry-based learning design was used which evolved from the design developed for the open course Flexible, Distance and Online Learning (FDOL). In FDOL a Problem-Based Learning (PBL) approach had been used and the FISh model (**F**ocus – **I**nvestigate – **Sh**are, see Figure 1) developed by Nerantzi and Uhlin (Nerantzi, 2014).
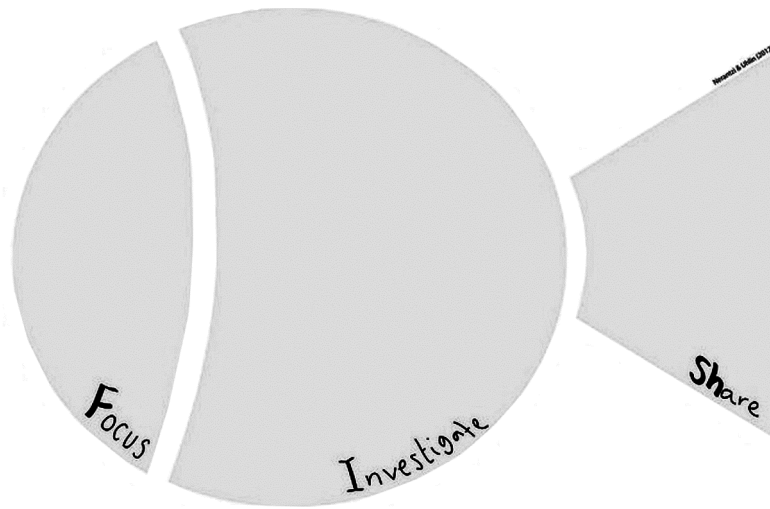
FISh

Figure 1. FISh (Focus - Investigate -Share)

Building upon this, BYOD4L used short video scenarios to trigger personal and collaborative learning. In addition a short set of varied activities were suggested for each of the five 'C' topics (described below). Each provided opportunities for personal and group learning.

Running BYOD4L

BYOD4L was offered over five days in January 2014 for the first time and was targeted at students and teachers in Higher Education, but was open to anyone else interested in learning more about using smart devices for learning or professional development. During the first week-long iteration we estimate about 100 individuals took part from 26 countries globally. As BYOD4L is registration-free, the quantitative data we hold is based on social media participation.

BYOD4L was offered again in July 2014, this time working more closely together as a cross-institutional collaboration involving five UK higher education institutions. About 100 individuals took part this time. There were similar numbers of participants in the third iteration which was offered in January 2015. The numbers are based on participation in the Google+, Facebook and Twitter. In this second iteration we encouraged participating institutions to also arrange local events to bring local

communities together and extend the learning activities into face-to-face situations during the week.

January 2014, July 2014 and January 2015 were chosen to offer BYOD4L by organisers responding to facilitators' availability and when it would be best for participating institutions to maximise local engagement.

Learning together

The majority of activities were based on asynchronous engagement. However, daily tweetchats were organised to bring the BYOD4L community together synchronously for an hour. A Google + Hangout was also offered. Further opportunities to engage together were arranged in collaborators' institutions through local informal face-to-face gatherings.

The creation of a facilitation and learning community was an important part of the BYOD4L concept. The facilitators played a key role in laying the foundations for this. Participants were encouraged to actively experiment, reflect on their experience and share their thoughts, ideas and reservations openly with others. Some of these were openly shared in the form of recorded discussions and shared via blog posts and Twitter.

The 5Cs

The 5C framework was used to scaffold learning and provide a thematic focus for each of the five days, as well as creating a pedagogical rationale. This is described in more detail below. The idea for the 5Cs developed when the authors discussed how learning and development of practice in the area of smart social learning during BYOD4L could be scaffolded and supported within an open learning community (Nerantzi & Beckingham, 2014) to foster what Megele (2014, p.47) calls multilogues, "a many-to-many communication, where each message is addressed to more than one potential receiver and may be answered by more than one potential replier."

From the outset, it was intended that BYOD4L would be a bite-size open learning event offered over five days, which could also be seen as a facilitated block as used in many professional courses. Five days could potentially provide a more focused and more intensified engagement

opportunity, creating suspense and excitement. It could also be seen as the starting point for the formation of an ongoing community of practitioners.

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It was coincidental that the five sections of the 5C framework begin with the letter 'C'. This came from looking for a way to conceptualise a framework that would enable participants to immerse themselves in a valuable learning experience around a continuum of learning from the known to the unknown. The 5C Framework fosters critical and creative thinking and actions. It is focused around human interactions and the important role they play for learning and development more generally in a complex world. The 5Cs of Connecting, Communicating, Curating, Collaborating, Creating created such an immersive pedagogical as well as thematic structure.

Specifically the 5C framework aims to:

- enable and support opening-up and sharing of thoughts, ideas, practices with others that would lead to active participation, sharing and reciprocity (Weller, 2011);
- boost confidence and progressively develop competence in participants leading to transformative practices and behaviours (Beetham & Sharpe, 2011);
- recognise the value of smart learning by learners reflecting on their own practice and actively experimenting and exploring what can be achieved.

The 5Cs present therefore, a scaffold for learning, a stepped approach to engage with smart learning that usually starts with the more familiar and leads progressively to the more advanced or complex concepts and applications of using smart devices for learning.

While the 5Cs at first glance might look like a linear framework (Figure 2), it is important to highlight how it also can be used in a non-linear 'pick 'n' mix' way and provides further flexibility for use and application (Figure 3).
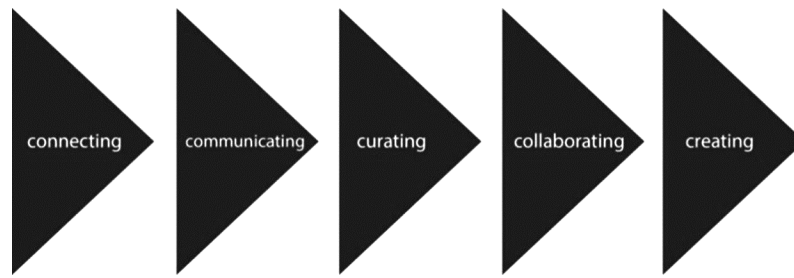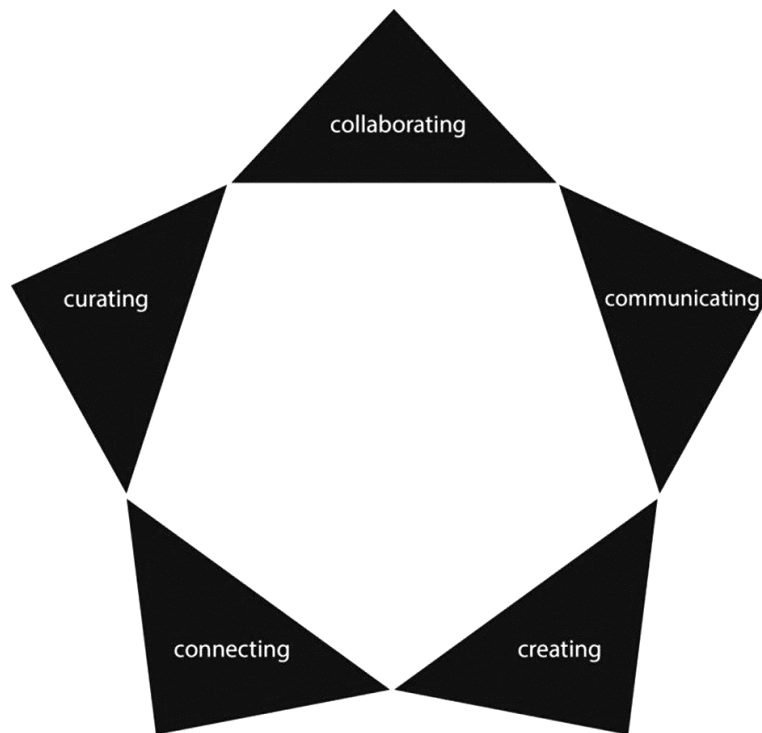
Figure 2. 5Cs linear

Figure 3. The 5Cs non-linear

Frameworks and taxonomies used in this way establish a manageable outline structure which help to describe the scope of the conceptual domain. It can be difficult to really understand in any great depth something that is conceptually unfamiliar without such an outline description and to analyse

its validity. For the academic and learner a framework like the 5Cs might provide a reliable starting point for enquiry.

Anderson & Krathwohl (2001) **Revision of Bloom's Taxonomy**	▶ Creating ▶ Evaluating ▶ Analysing ▶ Applying ▶ Understanding ▶ Remembering
Salmon (2002; 2013) **The 5 stage model of learning and teaching online**	▶ Development ▶ Knowledge construction ▶ Information exchange ▶ Online socialisation ▶ Access and motivation
Belshaw (2011) **8Cs Digital Literacies**	▶ Cultural ▶ Cognitive ▶ Constructive ▶ Communicative ▶ Confident ▶ Creative ▶ Critical ▶ Civic
Beetham & Sharpe (2011) **Model of students' digital literacies, a developmental model**	▶ Attributes and identity (I am...) ▶ Situated practices (I do...) ▶ Functional skills (I can...) ▶ Access and awareness (I have...)
Smyth *et al.* (2011) **3E Framework**	▶ Empower ▶ Extend ▶ Enhance
Bennett (2012) **Digital Practitioner Framework**	▶ Attributes ▶ Practices ▶ Skills ▶ Access

Figure 4 A Selection of pedagogical frameworks presented in chronological order

Looking closer at the 5Cs, we retrospectively identified similarities to other pedagogical frameworks including Salmon's e-tivities (2002, 2013), Beetham's and Sharpe's (2011) digital literacy model for students, Belshaw's (2011) 8Cs of digital literacies, Anderson and Krathwohl's Revision of Bloom's Taxonomy (2001), Smyth's 3E Framework as well as Bennett's (2012) Digital Practitioner Framework (see Figure 4).

Each of these frameworks attempts to present innovative thinking about learning and teaching concepts or logics by describing a clear, high level structure. The structure enables initial conceptualisation without requiring the learner to fully appreciate what is yet to be learnt. Such frameworks establish a trust that is essential to engagement with a theoretical model. The 5Cs offers such a logic, and it is one that may have wider application.

In the following section, the rationale behind the 5Cs will be illustrated. Authentic voices of participants linked to these have been included to present insight into how individual elements of the framework worked for the learners.

The 5Cs pedagogical rationale

The 5C Framework (Nerantzi & Beckingham, 2014) has already led to successful engagement with BYOD4L through two iterations in 2014 and one in 2015. Anecdotal evidence indicates that it is changing practices while also leading to the development of a collaborative model that makes scaling-up open cross-institutional CPD possible and perhaps more manageable and sustainable (Nerantzi & Beckingham, under review).

In this section we discuss the underpinning pedagogical rationale for creating this framework to engage not only early adopters (Rogers, 1963) or digital practitioners (Bennett, 2012), but also all those who are less confident in using social media and mobile technologies, or digital technologies more generally, for learning and teaching. Practitioners might not know why and how these could be used in their professional context to enhance student learning but also for their own professional development. The 5Cs therefore present a scaffold for pedagogical engagement and development of novices and experts alike as it builds and extends confidence, competence and capacity in the context of BYOD4L. The 5Cs help to normalise the use of social and mobile media in an educational context through experiential and immersive learning and development. This helps to close the gap between everyday life and education or as Wiley & Hilton (2009) call it the daily divide where education appears to be analogue, tethered, isolated, generic,

closed and people consumers in contrast to everyday life that is digital, mobile, connected, personal, creators and open.

We also hypothesise that the 5C Framework offers a useful, reusable approach to structuring further pedagogical contexts and activities which is underpinned by critical and creative thinking. The 5Cs might also provide a useful framework for developing competence, confidence and capability among practitioners in the digital age leading to the enhancement of practices more widely. It also opens up the opportunity to challenge the very culture of CPD and the way we may traditionally approach this.

Connecting

In the 5Cs the first step to learning together is connecting. This is partly about the learner gaining confidence in making connections with the event but also others; more importantly, however, it is about developing the learners' understanding of the importance of social networking, peer support and community building in forming a resilient and lasting learning network.

Wiley and Hilton (2009) note that there are multiple connections between people, information and systems today using digital technologies and acknowledge that there seems to be a connectivity gap between everyday life and education. They claim that formal education is still less connected and often operated in isolation. Siemens (2005; 2006, 29-30) introduced Connectivism as "a theory describing how learning happens in the digital age. [...] Connectivism is the integration of principles explored by chaos, network, complexity and self-organisation theories." For Siemens (2006) Connectivism enables uninterrupted knowledge creation in networks, while Downes (2005) defines it as connective knowledge. Learning based on the above is seen as a process based on connections. The connections become the enablers of social learning defined by our connectedness (Dron and Anderson, 2007). However, the notions of autonomy versus belonging linked to groups in networks is debated by some scholars. Downes (2007) for example dismisses the notion of groups in networks altogether but supports the notion of communities, while Dron and Anderson (2007) recognise that there is a place for groups in networks. Wenger *et al.* (2011, 12) on the other hand, compare connections to hooks that help individuals become part of a community. They state "being more interconnected often increases the sense of community, and a desire to learn about a shared concern often motivates people to seek connections."

This is the stage in 5Cs where technological challenges are broken down and the learners have the time to trial different approaches for connecting with others in different social spaces, on and offline; a useful reminder that learning happens everywhere. Learners take steps to connect with the event, peers, facilitators and the wider community and their little successes in this area make their experience more personal and meaningful. This starts to create a sense of belonging that can boost their motivation for engagement and participation.

The notion of interconnectedness also extends to the signposting between social spaces and the profiles people share. This can be of great value to those new to using such spaces, providing a guiding path between the spaces through the inclusion of hyperlinks within their profile, linking a blog to Twitter, Twitter to LinkedIn for example. It also serves to contextualise how different spaces can be used and the value of connecting in these different spaces.

Communicating

At this stage learners begin to use the connections they have made and reach out to others. Initially, this communication may be mostly social in nature and linked to course details or technologies used (Salmon, 2002, 2013) but conversations become progressively more focused around specific learning points and activities.

By communication we mean a two-way process and an exchange and sharing of ideas, thoughts and experiences through conversations among peers and tutors to construct meaning and learning. While Vygotsky (1978) has done extensive work in this area in the context of children's learning, Laurillard (2012, 143) notes that conversation is also valuable for adult learning as it is "powerful for stimulating the productive internal conversation that leads to learning." However, equally important is the opportunity to learn by 'listening' and developing confidence in communicating within what are, for some, new channels and spaces for dialogue.

Communication channels are determined mostly by the learners and will be characterised by their capacity to accommodate multi-directional conversations involving a plethora of voices and their perspectives, or what Megele (2014) calls multilogues. Respecting each other's voice is paramount for promoting academic debate and becoming open to new ways of

thinking and new perspectives. Communication supported by social media can be asynchronous (enabling flexible engagement and deep reflection) or synchronous (just in-time communication, conversation and debate, to make personal connection with other learners, build community as well as quick decision making), using text or other media and can be among peers, tutors, and mentors, as well as in small groups and in the wider learning community or network as learning happens socially in the open.

Communication could also be seen as the first step to sharing and social curation from sharing information, resources or viewpoints that might be useful to the wider community, while others would also see conversation as a form of collaboration where the emphasis is on collaboration as a process of learning and co-construction of meaning (Dillenbourg, 1999; Stahl *et al.*, 2006) and not a shared product or output (Roschelle & Teasley, 1995; Laurillard, 2012).

Curating

At this stage, learners develop the capacity to select useful information for themselves and others in a way that can be openly shared. Curation can be used as a means to organise information by topic, but during the process of doing so the curator will review and filter out what is considered to be inferior. Care is taken to honour authorship of the items curated by citing correctly. The opportunity to add your own perspective and opinions can be seen as adding additional value, and this also opens up the opportunity for open discussion. It is another way for active participation. In a way a curator moves beyond collecting artefacts, resources or ideas (which could be seen as a more inward facing, individual or group activity), towards curating, which is a dynamic, collaborative and open activity based on mutual sharing and reciprocity.

We see the act of sharing itself as a form of curating, while Rother *et al.* (2014) note that for them sharing is actually the most important part of curating. The 5 Resources Framework for Critical Digital Literacy developed by Hinrichsen and Coombs (2010, online), for example, incorporates the dimension of "Using". Under this, finding is defined as,

> *The ability to gather appropriate information, resources and tools for a given purpose and to recognise and exploit the potential in communities, information, resources and tools encountered. This involves processes of asking, searching, filtering, curation and sharing.*

While in Hague & Payton (2010, online) one of the components of their digital literacy model developed for schools is, "the ability to find and select information." It is our understanding that Belshaw's (2011) *8 Essential Elements of Digital Literacies* makes indirect reference to curation via the element Critical (Ct), as in applying critical thinking when evaluating technologies. This could be extended to being critical also when accessing resources, information and when connecting with others. The perspectives included here, make it clear that curation is a filtering process of information, connections, etc. These authors present curation less as a multi-directional process in a social context, which in our view are important features of curation that distinguishes it from other forms of collecting or filtering.

Participants take part in sharing information openly with the wider community using specific tools and contributing to collections started by others. At the same time they start to select and value curated artefacts shared by peers and thought leaders in their area of interest, which may be a topic, an approach to learning, a subject specialism or other focus that is meaningful to them.

The discerning identification and selection of relevant and useful knowledge and artefacts, therefore, is at the heart of curation. Learners develop a clearer understanding of the usefulness of curating for themselves and others and how to filter what they find. The act of filtering is a metacognitive act that develops with practice. Rheingold (2012, p.5) refers to the importance of '"critical consumption of information (aka crap detection)'." The learners develop a sophisticated strategy for making use of the relevant curated resources that are available while also being responsible for giving something back to their community by sharing what they have selected. Stodd (2014) discusses how social media are helping us to develop valuable skills in curation and publishing. The very process creates its own 4Cs as it commences with collecting, critical filtering, the art of curating in a chosen space and finally communicating. Of course curating can also be an activity that that is done solely for the benefit of the individual and indeed curated collections of information may be stored away for personal use alone.

Collaborating

Building upon the co-operative spirit of curating, the learners are ready to move towards a more collaborative learning relationship by utilising what

they have learnt through conversations with others. At this stage, learners co-construct meaning and work together on problems and ideas to construct shared outputs or products (Roschelle & Teasley, 1995; Laurillard, 2012) or simply share the process of meaning making and learning (Dillenbourg, 1999; Stahl *et al.*, 2006).

While in co-operative learning the focus is on the individual (Slavin, 1980; Stahl, *et al.*, 2006; Johnson *et al.*, 2007). Collaboration, however, is a move towards the collective (Dillenbourg, 1999) and requires familiarity, competence and confidence based upon the previous stages. It also requires a good understanding of what can be achieved through collaboration, how collaboration works and which tools aid collaboration in open and social learning contexts and this stage provides these opportunities supported by social and mobile media. Social skills and networking are prerequisites for this to happen, as is the willingness to open-up and share with others (Weller, 2011; Stodd, 2014). The value of collaborative learning especially to construct higher order knowledge has been widely recognised, for example see Goodyear and Zenios (2007).

Computer-supported collaborative learning (CSCL) was born in the 90s (Batson, 1988) out of a small number of projects, including the Computer Supported Intentional Learning Environment (CSILE) project by Scardamalia & Bereiter (1991) which aimed to bring learners together and help them learn collaboratively supported by peers and tutors in ways that were not possible before (Dwyer & Suthers, 2005; Stahl *et al.*, 2006). Today we have a plethora of social media at our fingertips that make this idea happen more easily and quickly as the technology has become much more user and learner friendly in ways that no longer require advanced technical expertise ensuring we can all become collaborators. Stodd (2014, 5) stresses the importance of social learning to survive and thrive with change. For him learning in the social age is social. He reminds us that, "It's no longer about providing materials for people to learn and be tested on like parrots, more about creating spaces and a matrix of resources for people to engage with to create meaning. It's about scaffolded social learning environments where we facilitate, nurture and support."

Learners reflect on their practice and explore the specific digital tools and platforms that are useful for collaboration. They are encouraged to identify opportunities for small-scale collaboration so that they can practise working and learning collaboratively and are able to reflect on and learn from this experience.

Creating

In this fifth stage, learners are confident and able to be more playful, experimental and creative. They have come to recognise the value of play for learning and are prepared to explore and play with ideas to make learning happen. Learners are encouraged to use some of the suggested digital and social media tools and explore other ones they have discovered and express themselves creatively. They learn through playful making on their own or with others. Gauntlett (2011) claims that social media are turning us all into digital creators and describes how this can be a powerful tool to engage us in meaningful learning activities. Seely Brown (2013) takes it further and notes that it is more than just making and proposes the notion of playful tinkering as an act of opening-up and being open and engaging in constant reframing of contexts to thrive in change. For him Home Sapiens (Knowledge), Homo Faber (Maker) and Home Luden (Play) are three dimensions in one that are vital for the 21st century learning.

This is the stage where learners use their curiosity to become much more adventurous and play with pedagogical ideas. They synthesise old and new ideas; both their own and these of others. They are prepared to take risks and learn from failure. Craft (2000), discusses possibility thinking: this "what if" is the question learners ask themselves and others, but the same approach to thinking also encourages them to see problems as opportunities for exploration and discovery (Jackson, 1996). This becomes the force, not just for thinking and reflection, but also for play and experimentation. The community's engagement in such activities boosts the confidence of individual learners who feel safe and supported, despite the openness. Many of the learners who engage actively with creating will perhaps have moved closer to towards the digital residents spectrum (White & Le Cornu, 2011) as they feel comfortable about sharing their unpolished creations with others as work-in-progress and are prepared to engage in meaningful conversation around their work with their peers as well as activities of (co-)creation.

Reflecting on the 5Cs and next steps

The 5Cs Framework has been developed to provide a scaffold for learning and development for a wide range of participants. The linear and non-linear application of the 5Cs provided further flexibility for engagement and scaffolded learning that can be tailored to different learning contexts to develop confidence, competence and capability. The 5Cs provides a new

way to engage in academic open and collaborative CPD. Further research is required to explore the learners' experiences linked to the 5Cs in the context of BYOD4L and in other pedagogical contexts, such as online, face-to-face, blended and open learning situations as it is emerging that the 5Cs can be a useful pedagogical framework that fosters critical and creative thinking and actions in the context of CPD as well as learning more widely.

BYOD4L as a topic, the open CPD model that is evolving through this as well as the 5Cs model all continue to intrigue us. Each of these facets signals a new way of thinking, action and practice; a view of learning echoed throughout this book.

Acknowledgements

References

Anderson, L. W. and Krathwohl D. R., eds. (2001). A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives. New York: Longman.

Batson, T.W. (1988). The ENFI project: A networked classroom approach to writing instruction. In: Academic Computing. Vol. 2 Iss. 5. pp. 32-33, 55−56.

Beetham, H. and Sharpe, R. (2013). Rethinking pedagogy for a digital age: Designing for 21st Century learning, 2nd edition, Oxon: Routledge.

Beetham, H. and Sharpe, R. (2011). Digital literacies workshop. Paper presented at the JISC Learning Literacies Workshop, Birmingham. Online at: http://jiscdesignstudio. pbworks.com/w/page/40474566/JISC Digital Literacy Workshop materials

Belshaw, D. (2011). "What is digital literacy?" A pragmatic investigation, doctoral thesis, Durham: University of Durham. Online at: http://etheses.dur.ac.uk/ 3446/1/Ed.D._thesis_(FINAL_TO_UPLOAD).pdf?DDD29+

Bennett, L. (2012). Learning from the early adopters: Web2.0 tools, pedagogic patters and the development of the digital practitioner. Doctoral thesis, University of Huddersfield.

Craft, A. (2000). Creativity across the primary curriculum, Oxon: Routledge

Dillenbourg P. (1999) What do you mean by collaborative learning? In: P. Dillenbourg (ed.) Collaborative-learning: Cognitive and computational approaches, 1—19. Oxford: Elsevier Online at: http://halshs.archives-ouvertes.fr/docs/00/19/02/40/PDF/Dillenbourg-Pierre-1999.pdf

Downes, S. (2007). Groups vs networks, November 24. Online at: http://www.downes.ca/post/42521

Downes, S. (2005). An Introduction to Connective knowledge, 22 Dec 2005. Online at: http://www.downes.ca/post/33034

Dron, J. and T. Anderson (2007). Collectives, networks and groups in social software for e-Learning. Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education Quebec. Retrieved Feb. 16: 2008.

Dwyer, N. and Suthers, D. (2005). A study of the foundations of artifact-mediated collaboration. In: T. Koschmann, D. Suthers & T. W. Chan, eds., "Computer supported collaborative learning 2005: The Next 10 Years!", Mahwah, NJ: Lawrence Erlbaum Associates. 135-144. Online at: http://lilt.ics.hawaii.edu/papers/2005/Dwyer-Suthers-CSCL-2005.pdf

Gauntlett, D. (2011). Making is connecting: The social meaning of creativity, from DIY and knitting to YouTube and Web2.0. Cambridge: Polity Press.

Goodyear, P. and Zenios, M. (2007). Discussion, collaborative knowledge work and epistemic fluency. British Journal of Educational Studies, 55 (4), 351—368.

Hague, C. and Payton, S. (2010). Digital literacy across the curriculum. Futurelab. Online at: http://www.futurelab.org.uk/sites/default/files/ Digital_Literacy_handbook_0.pdf

Hinrichsen, J. and Coombs, A. (2011). The 5 resources model of critical digital literacy. JISC, Greenwich: University of Greenwich. Online at: https://sites.google.com/site/dlframework/home

Jackson, N. (1996). Imagining a different world. In: Jackson, N., Oliver, M., Shaw, M. and Wisdom, J. (1996) "Developing Creativity in Higher Education", 1—9.

Johnson, W., Johnson, R. and Smith, K. (2007). The State of cooperative learning in postsecondary and professional settings. In: Educational Psychology Review, 19(15), 15—29.

Laurillard, D. (2012). Teaching as a design science: Building pedagogical patterns for learning and technology. Oxon: Routledge.

Megele, C. (2014). Theorizing Twitter chat. In: Journal of Perspectives in Applied Academic Practice, 2 (2), 46—51. Online at: http://jpaap.napier.ac.uk/ index.php/JPAAP/article/view/106

Nerantzi, C. (2014). A personal journey of discoveries through a DIY open course development for professional development of teachers in higher education. Invited paper in: Journal of Pedagogic Development, University of Bedfordshire, 42—58. Online at: http://www.beds.ac.uk/jpd

Nerantzi, C. & Beckingham, S. (under review). Scaling-up open CPD for teachers in higher education using a snowballing approach.

Nerantzi, C. & Beckingham, S. (2014). BYOD4L: Our magical open box to enhance individuals' learning ecologies. In: Jackson, N. & Willis, J., eds., "Life-wide Learning and Education in Universities and Colleges". e-Book, online at: http://www.learninglives.co.uk/e-book.html

Rheingold, H. (2012). Net smart: How to thrive online. Cambridge: MIT Press.

Rogers, E. M. (1983). Diffusion of innovation (3rd ed.), London: Free Press.

Roschelle, J. and Teasley, S. (1995). The construction of shared knowledge in collaborative problem solving. In: O'Malley, C., eds., "Computer-supported collaborative learning", Berlin, Germany: Springer Verlag, 69−197.

Rother, K., Goodier, S., Nyahodza, L. and Czerniewicz, L. (2014). Curation for participation: An 8-step guide to curating open scholarly content. OpenUCT Initiative, Cape Town: OpenUCT Initiative, available at https://open.uct.ac.za/bitstream/handle/11427/8431/ openuct_guide_curation_for_participation_WORKING_VERSION_151014.pdf ?sequence=1

Salmon, G. (2013). E-tivities: The key to active online learning. 2nd edition, Oxon: Routledge.

Salmon, G. (2002). E-tivities: The key to active online learning. Oxon: Routledge.

Scardamalia, M. and Bereiter, C. (1991). Higher levels of agency in knowledge building communities: A challenge for the design of new knowledge media. Journal of the Learning Sciences, 1, 37−68.

Seely-Brown, J. (2013). Learning in and for the 21st century. Public Lecture and Answer Session. In: C.J. Koh Professorial Lecture Series No.4, Singapore: Office of Education Research,NIE/NTU.

Siemens, G. (2006). Knowing knowledge. Online at: www.knowingknowledge.com

Siemens, G. (2005). Connectivism: A learning theory for the digital age. International Journal of Instructional Technology and Distance Learning, 2 (10).

Simkins, S. and Maier, M. (2010). Just-in-time teaching. Stylus Publishing, LLC.

Slavin, R. E. (1980). Cooperative Learning. In: Review of Educational Research, Summer 1980, 50 (2), 315−342.

Smyth, K., Bruce, S., Fotheringham, S. and Mainka, C. (2011). Benchmark for the use of technology modules. Edinburgh: Edinburgh Napier University. Online at: http://staff.napier.ac.uk/services/vice-principal-academic/academic/TEL/ TechBenchmark/Documents/3E%20Framework.pdf

Stahl, G., Koschmann, T. and Suthers, D. (2006). Computer-supported collaborative learning: An historical perspective. In: Sawyer, R. K., ed., Cambridge handbook of the learning sciences, Cambridge: UK: Cambridge University Press, 409−426. Online at: http://gerrystahl.net/cscl/CSCL_English.htm

Stodd, J. (2014). We all need to know about the Social Age. In Stodd, J., ed., Exploring the social age & the new culture of learning, Life-wide Magazine, Issue 11, September, 4−7.

Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Cambridge, MA: Harvard University Press.

Weller, M. (2011). The digital scholar: How technology is transforming scholarly practice. London: Bloomsbury.

Wenger, E., Trayer, B. and de Laat, M. (2011). Promoting and assessing value creation in communities and networks: A conceptual framework. Rapport 18, Ruud de Moor Centrum, Open Universiteit. Online at: http://www.social-learning-strategies.com/documents/Wenger_Trayner_DeLaat _Value_creation.pdf

White, D. and Le Cornu, A. (2011). Visitors and residents: A new typology for online engagement. First Monday, 16(9).

Wiley, D. and Hilton, J. (2009). Openness, dynamic specialization, and the disaggregated future of higher education. International Review of Research in Open and Distance Learning, 10(5), 1-16. Online at: http://www.irrodl.org/index.php/irrodl/article/view/768