

# ***Design and the functioning of a productive learning network***

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## **Abstract**

In our networked society, formal and informal networks (or a combination of the two) can open up powerful learning opportunities for lifelong learning. However, designing such networks conducive to learning is very complex. It involves the intertwining of learning tasks, physical and digital resources, and divisions of labour, traversing many different layers and scales. Educational design research is continuously searching for effective methods and tools to support design. This paper reports outcomes from a PhD project being undertaken as part of a broader program of research into the analysis and design of productive learning networks. The paper introduces key concepts from research on design for networked learning and offers a novel perspective on analysing learning networks, based on a framework that integrates ideas and methods from pedagogy, design and architecture. This perspective explores the structural elements in complex learning environments, and their influence on emergent activity. A number of different entities (human and non-human, material and immaterial) become assembled together in emerging technological arrangements. The analytical framework allows the researcher to get ‘behind the screen’ to reconstruct the deeper architecture of what has been created for, and by, the participants in the network. The study also draws on ideas from urban and architectural design, especially the work of Christopher Alexander on pattern language theory. Alexander’s work is concerned with sharing good design ideas that take into consideration human emotion and values. In our broader program of work, we aim to develop patterns and pattern languages which (a) show how deep values, including pedagogical values, can imbue designs, and (b) are reusable by others – such that they can be adapted to meet new needs in other places. This paper discusses the application of these analytical ideas in an existing example of a productive network as a means to extract useful, reusable design ideas. More specifically, it explores how designed features in a complex network were combined to support learning. The preliminary outcomes from this study suggest that connections can be drawn between some of the key qualities of what has been designed, and the fundamental values that are meant to guide activity and shape experience within the network.

## **Keywords**

Networked learning; design; lifelong learning; learning networks; 21<sup>st</sup> century literacies; PD.

## **New literacies and networked learning: A social practice perspective**

In contemporary society, new information and communication technologies have significantly changed the materiality of literacy and learning. Literacy is best defined as the ‘flexible and sustainable mastery of a repertoire of practices with the texts of traditional and new communications technologies via spoken, print, and multimedia’ (Luke & Freebody, 2000, p.9). As such, literacy is seen as a social practice and part of everyday culturally and historically situated activities (Barton, Hamilton & Ivanic, 1999). As new technologies become part of everyday literacy practices and get embedded in the processes of living, networked learning can play a vital role. An important strand of work in networked learning can be seen as part of the humanistic and critical traditions of radical pedagogy and aligns it with issues of power, voice, access, and inclusion (Hodgson et al., 2011; McConnell et al., 2011). Human learning is not limited to formal education and informal online learning networks can play a particularly important role in contexts in which opportunity for lifelong learning, including continuous professional development, is limited. From a social practice perspective, it is suggested that a

significant role of literacy (and networked learning) is to facilitate connections between members of the community so they can learn together and from each other. Thus, a social practice perspective on networked learning is useful for considering how networked technologies relate to contemporary literacies (Jones, 2008).

### **Networked learning: a social practice**

Networked learning refers to ‘learning in which information and communication technology is used to promote connections: between one learner and other learners, between learners and tutors; between a learning community and its learning resources’ (Goodyear, Banks, Hodgson, & McConnell, 2004). A networked learning environment is best defined as an infrastructure consisting of a complex set of nested structures that provide the physical setting, including digital tools, for learning. The concept of infrastructure is a good metaphor to illustrate that networked environments consist of socio-technical systems that rely on organisational practices involving complex development and maintenance processes (Dirckinck-Holmfeld & Jones, 2009). The concept of socio-technical systems is useful to emphasise the interplay between human and non-human aspects in ongoing dialectical processes in networked settings (Goodyear, Jones, Asensio, Hodgson & Steeples, 2001). An infrastructure is then best seen as a relational concept which shapes and is shaped by the dynamic and always evolving relations between users and other non-human agents. The infrastructure of a learning network is composed of the totality of resources put in place by a teacher or designer, as well as knowledge objects (reifications) produced through ongoing interactions between members. The concept of reification refers to ‘the process of giving form to our experience by producing objects that congeal this experience into ‘thingness’ (Wenger, 1998, p. 58). The concept of reification is useful for understanding networked learning as a contemporary social practice through which meanings are created and organised. Network analysis needs to focus on the relations between participants and the ‘objective forms through which mediation takes place, either the device connecting the person to the network or the resources through which the relationship between persons become reified’ (Jones, Ferreday & Hodgson, 2008, p.91). The structure put in place by a teacher/designer only forms the initial infrastructure: it is only when the design is enacted by the participants that a network comes into being.

Interactions between people and other resources are fluid. While a ‘community of practice’ model relies on stronger ties (Wenger, 1988), a ‘network model’ often relies on more diffuse interactions with varying degrees of proximity of relationships (Jones & Esnault, 2008). Weaker or stronger ties vary according to specific contexts, but the strength of weak ties should not be overlooked (Granovetter, 1973; Ryberg & Larsen, 2008; Jones, 2008). A network model does not emphasise one particular view of relationships between nodes – any node can itself become a network. Networked learning can occur within formal educational contexts, but very often it transcends formal arrangements and involves informal, or even self-organised learning of various kinds. In all cases, it is essential to understand the way learners experience designed spaces and the influence of design in their learning. Naturally, learners have varied perceptions and understandings of the features of a setting and therefore they draw out significantly different affordances. A relational view of the affordances of the learning settings becomes essential to consider how learning takes place in relation to learning resources and other people (Jones, Ferreday & Hodgson, 2008; Dirckinck-Holmfeld & Jones, 2009). These complex and evolving spaces in which new computer technologies play a strong role in learning activity offer learners opportunities to create, identify, select and critically evaluate resources.

The next section of this paper introduces some key ideas from educational design for networked learning. In the following section, a brief explanation of the analytical framework is provided. Then, a learning network is presented as a case study. Finally, a brief discussion of a couple of design features aims to illustrate how the type of analytic work presented in this paper can be useful to inform design for networked learning.

### **Educational Design: Supporting design for networked learning**

Educational design refers to a set of practices involved in constructing representations of the most effective ways learning is supported in specific cases (Goodyear, 2005). The term ‘educational design’ has intentionally been adopted in place of the term ‘learning design’ to emphasise that learning itself cannot be designed, only ‘designed for’ (Wenger, 1998). Designing technology enhanced learning settings requires deep understandings

of the intertwining of human and non-human events and their relations to places, tools and artefacts in the physical and digital worlds (Goodyear, 2008; Steeples & Jones, 2002). In most cases, learning spaces spread across a number of formal or informal settings and multiple platforms - through virtual learning environments, face-to-face, web-based activities, online discussions, blogs, videoconferencing, chats, social networking, wikis, YouTube, etc. The work of designers is both facilitated and challenged by the plethora of possibilities and resources available (Conole & Oliver, 2007; Goodyear, 2004, 2008; de Laat, 2006; Hodgson et al., 2011). Educational design for networked learning has successfully been using methods of analysis and representation borrowed from architecture, particularly, pattern language theory.

Pattern language theory (Alexander et al., 1977; Alexander, 1979; Alexander, 2006), which originated in the field of architecture, is concerned with abstracting, capturing and sharing good design ideas so that other people can use them. A pattern describes a solution to a problem 'in such a way that you can use this solution a million times over without ever doing it the same way twice' (Alexander et al., 1977, p. x). Alexander's search entailed an extraordinary effort to identify patterns which could be re-used for the creation of 'living structures'. For him, a place acquires its 'character by certain patterns of events that keep on happening' in a space. Further, there is a 'Quality Without a Name' that manifests itself when the patterns of events happening in a space allow a person to feel 'most alive and whole' (Alexander, 1979, p. 41-55). These patterns of events involve both humans and non-humans. If one considers architectural thinking as concerned with the crafting of affordances rather than strict determination of human behaviour, then Alexander's ideas of 'aliveness, 'place' and 'quality that makes one feel whole' may offer a way to think about design for networked learning.

In the context of educational design, design pattern and pattern languages represent a useful and efficient pedagogical model for sharing design knowledge and expertise. Increasingly, a teacher's role is like that of a designer (Ellis & Goodyear, 2009; Goodyear & Retalis, 2010). Laurillard (2012) even proposes seeing 'teaching as a design science' (p. 1). In this context, design patterns and pattern languages are intended to support teachers/designers. Design patterns provide clear instructions about the way to address a specific educational problem, without constraining the designer/teacher's creativity (McAndrew et al., 2006; Goodyear & Retalis, 2010). Each learning pattern presents the core of the solution to a recurring teaching problem as well as guidance on when and in which context the solution is applicable. The lifecycle of a pattern usually consists of drafting, sharing, critiquing and refinement through collaborative processes within the educational design community. Another advantage is the addition of a rationale that links theory and practice to specific design solutions. This facilitates a more holistic understanding of the solution and it serves to provide grounded guidance for the design activity.

## **An architectural framework for analysing learning networks**

This study drew on an analytical framework (Goodyear & Carvalho, 2013; Carvalho & Goodyear, in press) that integrates ideas and methods from pedagogy, design and architecture. The analytical framework focuses on the designed elements and their relationships to context, approaches to knowledge and knowing, and emergent activities. According to the framework, the architecture of networked learning involves three designable dimensions: a) physical architecture (set design) involves the digital and material spaces, both local and remote, as well as digital and physical resources that may constitute online networks; b) epistemic architecture (epistemic design) involves the design of tasks that need to be considered in relation to nested structures of sub-tasks and supra-tasks, as well as broader conceptualisations of knowledge and ways of knowing; c) social architecture (social design) involves interpersonal relationships and divisions of labour. This framework also draws attention to the importance of co-creation and co-configuration, that is, how participants' activities re-shape and re-organize the environment.

The next section discusses how the architectural framework proposed by Goodyear and Carvalho was applied in the case study of a learning network involving professional development and lifelong learning. After some background information about the network, a diagrammatic representation of the overall design of the network is offered, followed by a discussion of the case study based on the analytical framework.

## **AlphaPlus case study**

The set of case studies from which this case is drawn explain some of the key design features of productive

networked learning environments. The main practical goal of each case study is to examine a learning network with a focus on understanding the relations between its structural qualities, the practices members engage in, the forms of knowledge they produce, and the nature of the context. In this paper we discuss the analysis of AlphaPlus, a learning network for Adult Literacy Educators, physically based in Ontario, Canada but with a worldwide web presence. Data sources included screenshots of web pages, and other online artefacts, data logs, and semi-structured interviews with designers.

## An overview

AlphaPlus focuses on helping educators and organisations to become digitally enabled. Funded by the province of Ontario, its main mandate is to provide free professional development for local adult literacy educators. Despite being originally created for local educators (and still primarily catering for them), the network attracts users worldwide. For instance, its LinkedIn group - Adult Literacy Network - has about 2,500 members from 142 countries, and over the past year alone the network had 25,293 visits to its main website (Figure 1) (AlphaPlus, 2013). AlphaPlus has an interesting design that combines open and password-protected spaces, and that brings together practitioners, researchers, coordinators, organisations, and in some cases, adult literacy learners. Learning in this network can vary along a continuum between informal and formal, depending on whether the participant has the right to take part in training. Even though trainees are mostly from Ontario, educators from other provinces, or in rare cases even from outside Canada, can take part in training whenever there are spaces available.



Figure 1: AlphaPlus homepage

The AlphaPlus design anticipates that participants have diverse interests, needs and rights of access. The AlphaPlus homepage (Figure 1) is the primary point of entry into the network. On the top of the homepage, the navigational menu contains links to both private and public sections. The ‘Training’ option links to restricted environments (more on this below). Under the option ‘Tools & Resources’ one finds links to a plethora of readily available items classified as tools, publications and reports, or podcasts. Another interesting option in the menu bar is ‘Community’, which links to successful stories created by learners, educators and organisations. The other main sections in the homepage are: ‘E-Bulletins’, ‘Featured Technology’, ‘News’ and ‘Blog’ highlights. Additionally, links to the network social media sites - Delicious, Diigo, Facebook, Twitter, and YouTube, are also found in the homepage. Funders, a subscription form for an e-news magazine, Just Ask online/offline, and events calendar, as well as the latest additions to the Web Index, visitors’ comments, and the number of visitors online are the other sections in the homepage.

As mentioned above, the ‘Training’ option available on the navigation bar links to password-protected environments (Figure 2: a, b, c). These consist of three Moodle based environments: the Moodle training site, the Virtual Classroom for Adult Educators (VCAE), and the Virtual Classroom for Adult Learners (VCAL). These learning environments are reserved to Ontario residents only. While in the Moodle training site educators take part in facilitated training, within the other two environments they can create, participate and/or deliver courses for their peers and/or adult learners. The three environments are interconnected to facilitate navigation for Moodle trainee graduates.



**Figure 2: (a) Moodle training; (b) VCAE; (c) VCAL**

*(a). The Moodle training site*

The Moodle training site (Figure 2, a) aims to teach practitioners to develop learning content in Moodle. The training itself is designed within Moodle, with all the regular features: forum, chat, messaging, etc. The training provides guided weekly resources and instructions, live/recorded webinars, sample courses, and access to archived sandboxes. Each trainee is provided with a workspace (a sandbox) to facilitate practising new acquired Moodle skills by designing tasks, which are later peer reviewed. These tasks/courses when archived on the site become part of the *setting* as models for future participants or they can actually be delivered in the VCAE or VCAL (see below). It is also worth noting that many of the skills learned within the Moodle training are likely to be transferable to other learning management systems as well.

*(b). The Virtual Classroom for Adult Educators (VCAE)*

The Virtual Classroom for Adult Educators site (Figure 2, b) contains courses created by Moodle graduates for their colleagues. This VCAE also allows for the creation of a community of practice for sharing teaching ideas and engaging in general discussions through messaging or dedicated forums. The VCAE site is for Anglo and Native educators but AlphaPlus has also a separate hosted Moodle site for Deaf and Deaf/blind educators. That is, the VCAE site provides a training delivery/development site to a range of educators based on their needs and intentions. Moreover, as part of AlphaPlus collaboration with other local and national networks, occasionally the Virtual Classroom for Educators becomes the channel for external forums as well (e.g., CLLN Forum).

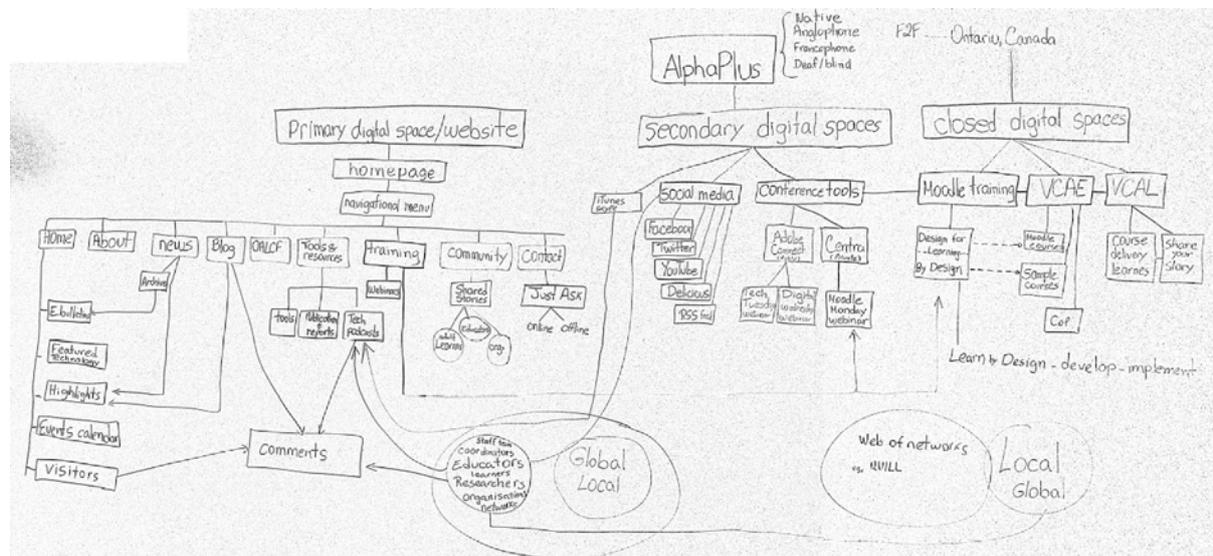
*(c). The Virtual Classroom for Adult Learners (VCAL)*

The VCAL (Figure 2, c) is a space where adult literacy learners take part in courses created for them by their teachers. Other than taking these online courses (e.g., writing, citizenship, arts, parenting, etc.), the adult literacy learners can also create and add resources to the VCAL. For instance, they can ‘tell their stories’ using video recordings. In this case, these adult learners benefit from networked practices while at the same time making their voices heard by the wider community – not a simple endeavour considering the context of disadvantaged adult learners.

## **Analysing the deeper architecture**

Reconstructing the deeper architecture of the network takes time and care. By studying screens, following links, mapping out information from interviews and so on, one can begin to map the network infrastructure. We have found one productive way to do this is to sketch the emerging network architecture on a large ‘writable wall’ – see Figure 3. The diagram shown as Figure 3 helps our understanding of how the designed features relate to one another within the overall architecture. It also makes it easier to trace resources created as the result of

interactions between participants. These reified products constitute essential features that make the activities within the network less ephemeral.



**Figure 3: Representing the General Architecture**

The features, tools and resources compose the infrastructure of the network, that is, its ‘set design’. An analysis of the diagram in Figure 3 brings insights into how the primary learning space (main website), secondary digital spaces (e.g., social media sites), closed online learning environments, as well as other physical and digital spaces relate to one another. Regarding ‘epistemic design’, knowledge in this learning network is of two kinds: (i) specialist knowledge involving digital literacies, and (ii) tacit, everyday knowledge. In this regard, it is coherent with a social practice perspective, which always includes both the explicit and the tacit. Within a social practice perspective, activity is always local and situated but it has relations with the rest of the world - local and global are intrinsically connected. The AphaPlus design seeks to integrate open learning and training and the local and the global while bridging public and private spaces. Yet, these boundaries are not always clear-cut in the network. In many circumstances they become blurred as activity takes place. For instance, some webinars attended live by local professionals, later become publicly available in the website as recordings. In other cases, general public and local professionals interact within live webinars (e.g., TechTuesdays) or asynchronously through blogging or comments on tech podcasts.

In all cases, the ‘social design’ plays a vital role as practitioners, learners, researchers, coordinators, and organisations are brought together in the network. AlphaPlus has a small but very active team, responsible for a wide range of initiatives: creating and delivering training programs, facilitating live webinars, writing research reports, networking with researchers, trainees and visitors to the sites, liaising with local organisations and educational authorities, conducting surveys, updating/redesigning the main website and social media sites, etc. This team orchestrates interactions within and beyond the digital sites, managing relationships with a variety of strengths. While connections across the open network mostly involve weak ties, in the VCAE (and other password protected learning environments) stronger ties are commonly reinforced. For instance, ‘introduce yourself in the Introduction to Moodle course Community Forum’ is the first task educators need to complete in that Moodle training. However, even though one of the purposes of the Moodle training is to facilitate and foster ongoing interactions among trainees and graduates, interview data reveal that is not always the case. Moodle graduates do not stay as active as the team would hope, despite the design emphasis on social learning (e.g., provide/receive peer feedback during Moodle learning by design training). In this context, designed-in features are harnessed to promote stronger ties. A case in point is the image of a ‘key’ added to some courses within the virtual classrooms. The key icon signals that a course is not open and a password is needed to ‘unlock its door’. While this Moodle design element is primarily concerned with controlling access to courses, within AlphaPlus social learning environment it may simultaneously work as a powerful trigger for closer collaboration. Any participant can more easily feel stimulated to contact a former trainee (the course designer) and explain why he/she (or their students) should gain access to that specific course. In this scenario, a fairly small item in the set design (the image of a key) may lead to collaboration and/or ongoing interactions around a common area of

interest. This type of visualisation that condenses meaning (in this case, a designer's ownership) can play powerful roles in mediating networked learning (see e.g., Pinto et al., in press; Thompson et al., 2013). Furthermore, this is a good example of how distinct designed elements combine to positively influence activity across a learning network.

The use of different modalities such as images (e.g., key), video and sound is coherent with an epistemic design intended to promote new literacies within a social practice perspective. In this context, tech podcasts constitute another interesting design feature that integrates different modalities while playing a role in reifying activities. Podcasts are sound files containing interviews conducted by a staff member with participants representing the whole range of stakeholders. For instance, leading researchers in the field of adult basic education are recorded answering questions posed by a staff member about their studies, previously made available in the network for download as PDFs or Word documents. Other podcasts feature educators, coordinators, etc. sharing their practices and insights. That is, podcasts are harnessed in a way that values and integrates perspectives and experiences from all stakeholders. Also interesting to note is that any participant in the network can add comments to these podcasts thereby possibly generating new discussions. It seems that resources such as this, which reify knowledge and experiences, are the result of an efficient design that helps to hold AlphaPlus together as a cohesive productive network, despite its dual open/closed, local/global status. Also worth noting, in regards to the social design, are the roles of the staff team in coordinating and re-negotiating meanings across the network. The chosen interviewees and the questions asked are the result of their ongoing connections within and beyond the AlphaPlus setting. They are all actively engaged with both the participants in the AlphaPlus network and the wider field of adult literacy, including a web of networks.

## Conclusion

While educational design research has been building a significant body of knowledge to support the design of networked learning in formal settings, informal networks have not received as much attention. This study has shown a productive way of analyzing a less conventional type of network in ways to support design of both formal and informal learning settings, or a combination of the two. AlphaPlus deals with a complex context involving professional development, digital literacies and lifelong learning in the rather neglected field of adult basic education. Yet, it manages to create a productive learning network that opens up learning opportunities for people with different needs, including varying levels of literacy proficiency in both traditional and contemporary literacies. Its design offers some insights for dealing successfully with competing forces such as funding and mandate versus openness, open learning versus training, formal versus informal, and local versus global. By having a supportive team orchestrating formal training and professional development with open networking, the AlphaPlus design manages to successfully balance some tensions and constraints which otherwise would prevent learning. It is worth noting that, despite being partly closed, the network attracts participants beyond its primary audience and manages to run smoothly. There seems to be some 'pattern of events' that reinforces interactions and contributes to the creation of a living structure.

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