

EVERYONE IS AN EXPERT:  
RHIZOMATIC LEARNING IN PROFESSIONAL LEARNING CONTEXTS  
(DRAFT COPY)

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### The context

A key issue in introducing digital technologies into learning has always been the lack of adequately trained teachers. Although the 2020 global pandemic has created high levels of interest in online learning, we do not yet know how much the actual training for teachers in all phases has been increased.

A key means of training teachers to work online in a way that limits training costs is to encourage teachers at schools, HE and VET levels to join a community of practice (Thompson et al., 2013) because teachers gain experience from each other in practical performance. This observation was made in a UK government agency evaluation of the first country-wide professional development programme in the world in Information and Communications Technology which was planned to make all teachers and assistant teachers across the curriculum proficient in digital technologies (Preston 2004). In fact, in 1992 Preston had already set up the MirandaNet Fellowship, the first online 'community of practice' (CoP), in which international teachers, teacher educators, researchers, policy makers and developers could support each other in figuring out the best ways to use computers to enhance learning in all phases of education (Preston 1995, 1999a, 1999b). An early example of a CoP is a medieval trade guild, but Wenger (1998, 2002) used the term to describe the processes by which professionals work together to further their skills and knowledge collaboratively in education and in business.

In the UK other professional development organisations in digital technologies in education, such as ITTE (now TPEA) and Naace were established in the 1980s and soon developed their own online

COPs. MESHGuides, established in 2016, had a particular remit to make the growing volume of research in this area more accessible to busy teachers who wanted to incorporate digital technologies into their practice. The authors of this chapter have been drawn from all these organisations to offer their collaborative perspectives on Rhizomatic Learning.

Some of the authors of this chapter are all longstanding members of the MirandaNet Fellowship, where the international members who join for free are all experts in teaching and learning through education technology. Others are members of TPEA, Naace and MESHGuides where there is further experience of the value of sharing knowledge and expertise. The development of the theory and practice of online learning by this professional CoP is the history we tackle in this chapter using rhizome metaphors.

## The UK government policy towards professional organisations

Many of us undertook research up until 2010 under the remit of Becta, the government agency, often cited in our reference list. Its website was an importance resource for educators across the world who were struggling with the impact of digital technologies, but without the government support that was available in the UK. (<https://mirandanet.ac.uk/becta-reassembled/>) In fact, much of the research we cite up until the present day has involved the participation of almost 2,000 professionals as action researchers who belong to these organisations. However, the UK research scene in this field changed dramatically in 2010.

The change of government in 2010 led to the closure of Becta as part of a series of austerity measures. It removed the guidance and advice in education technology previously offered by Becta personnel. Becta's research website was relocated to a government repository. These austerity measures removed funding for digital devices, for research, guidance, training and recommendations around the use of technology. There was also a move away from building strong relationships with organisations such as Naace, ITTE, MeshGuides and the MirandaNet fellowship, who had previously worked to provide support and guidance on the use of technology in schools and universities. Twelve years later, in 2022 there has still been no effective contact between civil servants and these expert professionals.

With the closure of educational institutions following the Covid-19 pandemic the importance of equipping institutions and practitioners with knowledge and resources on applications of digital technology in education became apparent. The demands of online learning exposed the lack of a plan for the continuity of teaching and learning. Without readily available technology-related guidance and support, schools, colleges and universities were unable to provide efficient and immediate resources to facilitate teaching and learning online. If schools already had the resources

beforehand, if the government had engaged in better preparedness for situations like this, then it may have been the case that a smooth transition to online learning could have taken place. The government did however, provide money to fund initiatives such as the Oak National Academy and ResearchED whose personnel lacked knowledge and expertise in online learning. The UK government did, however, later go on to provide 1.3 million laptops and other digital devices. This acknowledgement of the importance of technology will undoubtedly have a positive impact on schools in the future but Covid has made it difficult to assess the results so far. There is no funding for government research to assess the value for money of this distribution of technology. Government research pre-2010 that is still relevant on this topic cannot be easily accessed and is not being referenced in this deployment of government funds.

## Rhizomatic Learning

In the background all these organisations have been realising that “the prediction by the futurists and visionaries that learning in the 21st century will be radically different is not an overstatement. Learning can occur anywhere, anytime, and anyhow in the universally interconnected world. Technology afforded educators to provide flexible learning experiences whenever learners are ready. Knowledge transfer is no longer a fixed process but somewhat divergent and non-linear” (Swe Khine 2022). In their previous research members of all these organisations have given this learning phenomenon different names: Braided Learning, Communal Constructivism, Liminal Learning are some of the terms we discuss here. However, the term Rhizomatic Learning can be applied to all of these as an over-arching metaphor.

Swe Khine goes on to say that the rhizomes learning metaphor was first coined by the poststructural philosophers Deleuze and Guattari. Cormier's notion of rhizomatic learning allows educators to explore the process of learning with the rhizomatic lens. Rhizomatic learning posits that learning is a continuous, dynamic process, making connections, using multiple paths, without beginnings and which ends in a nomadic style. Here our authors bring together their research to illustrate this concept.

Indeed, since the 1980s when the use of digital technology began to develop across the world, educators with vision have been experimenting with the new approaches to learning that have been made possible. Initial applications of this software such as Blackboard tended to replicate information transmission pedagogical models, where the model was that of students learning from lectures and from accompanying materials. Little opportunity was created for students to communicate with the teacher or one another. But these limitations were soon addressed by software such as Moodle that encouraged more intercommunication about the topic under review.

At the same time educators were also seeing ways of combining different kinds of software so that other forms of learning were enhanced as well. In this chapter, we are referring particularly to the innovative uses of digital technologies for learning that were employed by professional organisations in online COPs and in an unconference mode that MirandaNet Fellows called a MirandaMod (Preston and Cuthell 2012). The use of social media in professions enhanced the ways in which professionals could learn from each other all through the year, nationally and internationally. Face to face conferences were also improved as the delegates could comment on Twitter Walls in real time, develop collaborative concept maps (Cuthell, J., Cych, L. and Preston, C., 2011) and participate in these activities even if they could not attend in person (Preston, Younie and Hamriak, 2021). More supporting products have been explored by a member of TPEA and MirandaNet. For example, Caldwell concludes that Covid has encouraged even more collaborative work amongst her students, including the production of learning artefacts ( 2022). What is pleasing is the positives that some teachers have derived from the experiences they and their students have had online in the pandemic (Hordatt G. C., Younie, S., Leask, M. & Caldwell, H. 2022). A typical comment from this study is by a student who said, 'The online option was perfect for me and my situation'.

Indeed, it appears from the experiences and practices of teachers during the COVID-19 pandemic, that stakeholders need to respect the expertise and professionalism of teachers and their ability to learn from experience. Caldwell (2022) illustrates this view by explaining the findings of the Northampton University Active Distance Learning (ADL) research and development project in which the practitioners highlight the process of transitioning to online delivery and finding creative offline ways of reaching students. During this process teachers at all levels demonstrated their capacity to be innovative and to take ownership of accelerating changes in how they think and work. It will be a triumph for the profession if, at last, we are trusted to learn from experience and implement appropriate solutions.

### The development of Rhizomatic Learning theory by COPs

For many years, discussion of online learning, or e-learning, has been pre-occupied with the practice of teaching online and the debate about whether being online is 'as good as' being offline. The authors contributing to this paper, members of the MirandaNet Fellowship, Naace, TPEA and MESHGUIDES professional COPS, describe an incubation period since 1992 through which they trace the emergence of new teaching and learning theories and practices based on their varied e-learning projects.

Here, we describe the findings from our research projects in our communities identifying five interweaving strands: technologies for knowledge sharing; pedagogical theories underpinning

collaborative online learning; roles for Communities of Practice (CoP) members in online debate; the impact of MOOCs on elearning; and, the role of MOOCs in schools. It will be observed there are not necessarily boundaries between these strands: indeed, participants contribute their knowledge and experiences drawn from all of these.

A key conclusion looking across all the findings is that professional collaboration and knowledge sharing is powerfully supported when the teachers, as learners, belong to a community of practice. Mentoring between peers who are all learners is key to these findings overall (Preston, Younie and Hamriak, 2021). In addition, evidence of the production of artefacts by the members of the learning group has grown during Covid (Hordatt et al., 2022). In the research findings, this article cites newly developed software that supports the Rhizomatic concept: Padlet, Jamboard, Book creator, Kahoot, Mentimeter, Adobe Spark and Powtoon. This is an extension of the work that Leask and Preston conducted in a Becta funded research project called ICT Tools for future teachers (Leask, M. & C. Preston. 2009).

At the end of this chapter we are experimenting with a potentially new dimension to rhizomatic presentation, which challenges the linear representation of knowledge. This visual approach called a MESHGuide is designed to help busy teachers absorb relevant findings they can quickly implement into teaching and learning practice.

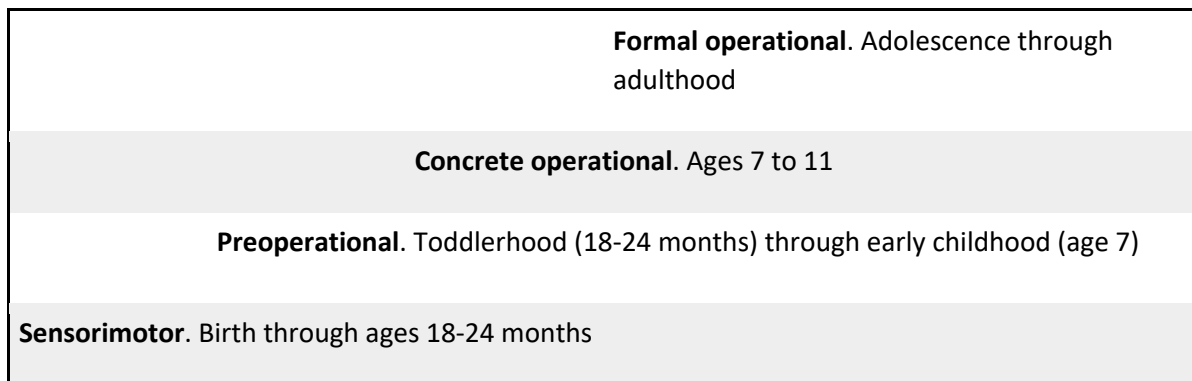
## The underpinning theories of collaborative learning

When we conceptualise the process of learning it is usually twinned with teaching - whether in behaviourist terms of stimulus and response, or in its empty vessel formulation of information transmission. The metaphors we choose almost always move through the iterative cycle of unconscious incompetence to unconscious competence (Cuthell 2022). These stages of learning are grounded in Piaget's work (1953, 1972), which led to the 'developmental folk myth' that informs many teachers' praxis. This expects learners to pass through a series of stages, each predicating its successor. This praxis contains two pillars of received wisdom: learner readiness, and stage competence. What this means for students is that, first, they are not expected to be able to cope with concepts and applications which have been determined to lie outside the bounds of their developmental stage: second, that each stage needs to be consolidated by practice.

Much of Piaget's research took as its focus the growth of mathematical and scientific concepts. Children's ability to understand the tasks which they were set, and to explain them in appropriate terms, was taken as a demonstration of their competence: the language encoded the 'scientific' expectations imposed on the children. The methodology and findings have been questioned

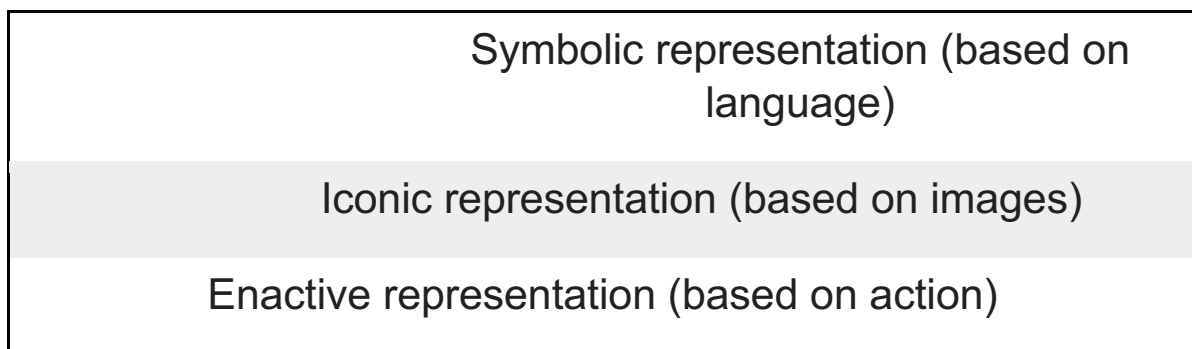
(Donaldson, 1978; Gardner, 1983, 1993; Seigel & Brainerd, 1978) but the original thesis still retains its power over pedagogy, teacher attitudes and the curriculum.

Figure 1 Piaget's four stages of intellectual (or cognitive) development



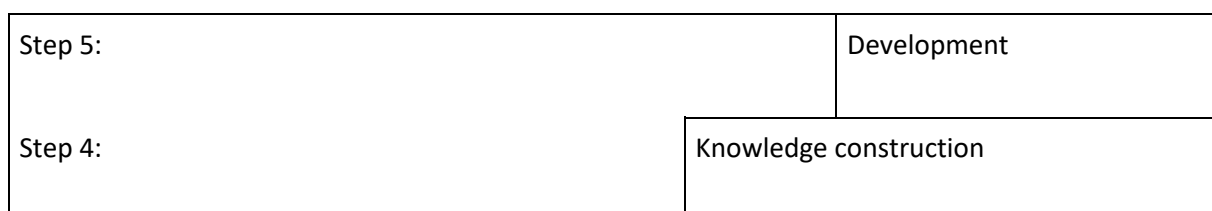
If we consider these stages as parts of the learning process we can apply them to the ways in which we learn and gain competence, rather than being tied to a specific chronology. We can see its development in the work of Bruner (1966; 1974).

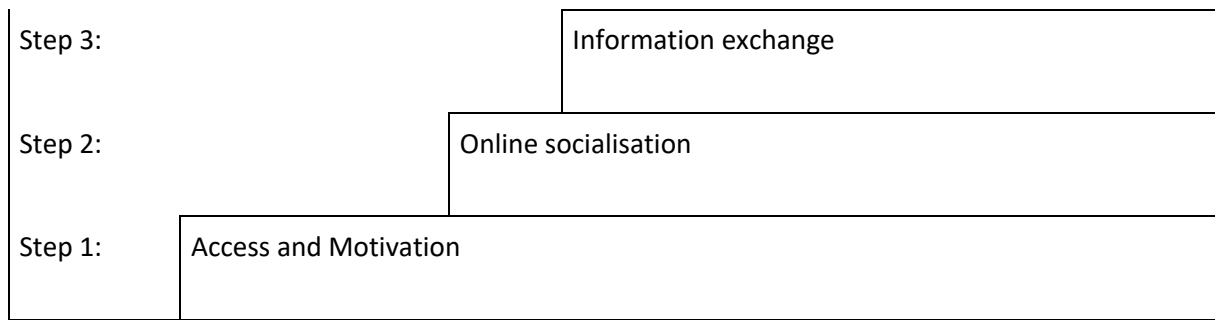
Figure 2 Bruner's Stages Of Learning: 'modes of representation' Learning with, and through, technology



Salmon's work on e-learning produced a competence sequence of learning acquisition in an online environment, in which learning is enhanced and changed through the use of communications technologies. Salmon's work lead to other developments. Best be described as grounded theory, in that they are based on observation and experience of learning in technology-based environments, these models are Salmon's 5-Step Theory; Braided Learning and Learning in Liminality.

Figure 3 Salmon's 5-Step Theory





These collaborative technologies create a liminal space – a term drawn from anthropology that describes a rite of passage, in which a person moves from one state of being to another. Participants are observed to be transformed in this liminal space by acquiring new knowledge, a new status and a new identity in the community. If learning is to be successful, this change is of critical importance. Whilst remote and informal learning is largely what has been understood about mobile learning, the concept can now be extended to include these informal spaces in which learning takes place – the liminal spaces that those who push the boundaries of digital possibilities now inhabit intellectually (Preston et al., 2009; Cuthell et al., 2011). The processes can be described as a form of Bricolage (Gardner, 1993), in which people build new knowledge from what is at hand.

Current models for e-learning and the construction of knowledge through online communities tend to be predicated on stages that move from access and motivation, through information exchange and the construction of knowledge, to the development of links with other communities. These were described by Salmon (2002) in her five stage model. Preece (2000) similarly identified five components of online community activities.

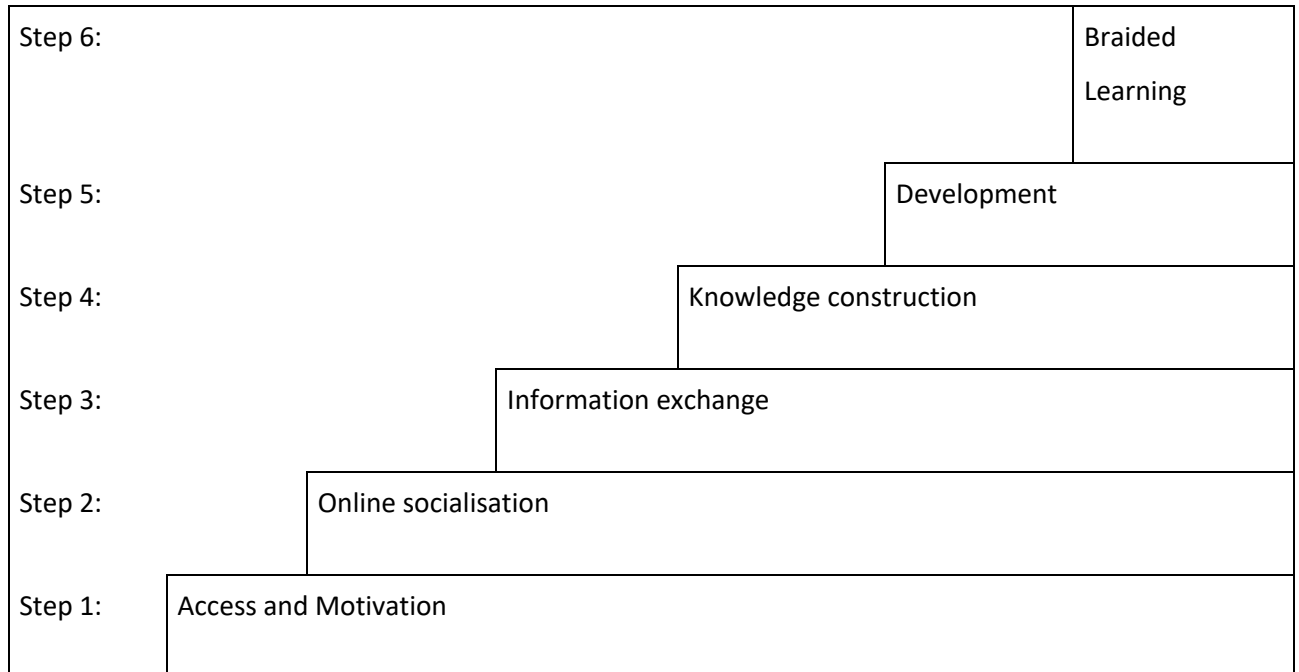
Braided Learning Theory (Haythornthwaite et al., 2007; Preston, 2008; Preston & Cuthell, 2012) tracks the informal dynamic knowledge creation in a number of collaborative contexts such as MirandaNet and MirandaMods, in which participants move from the textual debate of a conventional mailing list, through to video conferencing, micro blogging contributions and collaborative concept maps. This collaborative technology creates a liminal space in which participants can be observed to be transformed by acquiring new knowledge, a new status and a new identity in the community. If learning is to be successful, this change is of critical importance. Whilst remote and informal learning is largely what has been understood about mobile learning, the concept can now be extended to include these informal spaces in which learning takes place – the liminal spaces in which those who push the boundaries of digital possibilities now inhabit intellectually (Cuthell et al., 2009).



## Braided Learning

Figure 4: Towards Collaboration: the construction of knowledge in an online environment

Adapted from: Salmon (2002) 5-Step Theory [9]; Cuthell & Preston (2007) Braided Learning



In Cuthell's latest consideration of liminal learning he explains that affordances of Web 2.0 technologies have been explored by education professionals in the MirandaNet Community (MirandaNet, 2012) for a number of years (Cuthell, 2008; 2009a; 2009b; Cuthell et al., 2009; 2011; Preston & Cuthell, 2012), and have been combined to produce an approach to professional development that has enabled innovative developments to be evaluated in terms of their effectiveness for learning. Devices ranging from conventional desktop and laptop computers, through netbooks and tablets to smartphones, coupled with web-based applications – collaborative concept mapping; wikis; video streaming; web conferencing – have supported collaboration and community across a diverse range of settings, geographical locations and time zones.

The informal dynamic knowledge creation in collaborative digital contexts occurs as participants move from textual communication to blogging, web creation, online video conferencing and other such collaborative environments. Interactive and collaborative technology can be seen as creating a liminal space – a passage through which a person moves from one state of being to another. Participants in this liminal space are transformed by acquiring new knowledge, a new status and a new identity in the community, a change that is of critical importance if learning is to be successful.

Cuthell (2022) concludes that as participants have expanded and developed the range of technologies and affordances provided by digital technologies, so the concept of social constructivism has accommodated these and expanded into the liminal spaces that are no longer constrained by temporal or physical boundaries, and are therefore truly mobile.

The extension of social constructivism theory builds on evidence that the praxis of those participants in liminal space is one that constructs knowledge: “the working heuristic of discovery” (Bruner, 1974). They take for granted the constraints and difficulties within which they work. What they produce is a result of their discovery of the ways in which the information given, created and found, with the tools in their hands and the time available – all transmuted into their knowledge creation. The existential reality of learning is very different from the functionalist expectations of learning, yet so much policy is predicated on limited functionalist outcomes.

In this context, many young people’s transformational learning experiences outside school are now significantly different from the traditional routes practiced in school. They use social networking sites to build a range of identities important to them, but their experience in this field rarely takes them into deeper learning stages. The ideas, concepts and attitudes create the knowledge they absorb: these diverse palimpsests are incorporated into their own truths that can lead to magical thinking. And, as each layer of their conceptual rhizome builds and extends, so these false concepts become more deeply embedded .

## Asking questions about learning theory and practice

MirandaNet research has drawn on members’ perceptions about how theory has developed in the community. This online research and development in teaching and learning has been funded over three decades through Fellows’ research and development for: multinational companies; single schools, regional schools and academy chains; foreign governments impressed by UK’s achievements in this area in the 1990s and 2000s; the European Union; and, by government agencies like The Teacher Training Agency and Becta that were closed in 2010.

During those years from 1994 – 2010 the education system was funded to experiment with learning platforms that later became compulsory in schools. MirandaNet members were engaged in a variety of funded projects about learning, but they were also propelled by a professional interest in how digital techniques might expand learning in all phases. Members of TPEA and MESHGuides were also involved in these projects. The authors have viewed the projects that have been undertaken to identify some overarching questions about elearning under these five topics:

Which technologies facilitate effective knowledge sharing?

Which pedagogical theories underpin collaborative online learning?

What roles should a CoP adopt in knowledge sharing and theory creation?

How do MOOCS change the online learning landscape?

How can a MESHGuide help teachers grasp significant findings quickly?

## Methodology

The MirandaNet Fellows have always been advocates of ethnography, a specific kind of qualitative observational research which provides an account of a particular culture, society, or community. An example is where fieldwork involves spending a year or more in another society, living with the local people and learning about their ways of life (Denzin & Lincoln, 2000). In this case, Fellows have evolved this methodology to observe their own practice online and draw out the theoretical stance. As part of this process Fellows advocated practice-based research as a professional learning method that we call iCatalyst. This contrasts with the traditional research approach, in which the teachers are observed by researchers who then go away and write a report that the teachers often do not see: in this way no change in practice is achieved. In the iCatalyst programme, the participants become the co-researchers commenting on their own practice and agreeing change within their sphere of influence. This is variously called Action Research or Practice Based research (Preston, 1995; 1999; 2007).

Working with all key stakeholders, the participants identify what they want to gain from their investment in digital technologies. Crucial to success is the methodology of collecting evidence of learning online and the ability to measure the impact of implementation. As co-researchers the participants build a professional community in order to amass the evidence they need to underpin the changes they want to make. This may be just a small group of e-mentors within a school or a region. Publishing case studies on the MirandaNet website continues to build the knowledge hub, where professionals can share and drive knowledge to a global audience of like-minded professionals

## Findings and discussion

The MirandaNet CoP has been experimenting with online learning since 1994 when the CoP had its first email listserv: the first virtual debating forum, accessible only to members, that was limited to text. Later, Fellows looked at video conferencing and the potential of Second Life, a virtual platform that could also be used for conferences, in which each participant designed an avatar to represent them in the virtual space. The use of appropriate technologies has been expanded as the membership has grown to more than one and a half thousand world-wide.

Language to describe the processes of teaching and learning online in these different media increased and eventually new terms emerged for the techniques that MirandaNet Fellows were developing. The context was that of a European project focused around a Massive Open Online Course (MOOC), the general term for increased cohorts in online learning. During this project with five other European countries, Fellows refined their own approach, which had been built up over two decades, as a Community Online Open Course (COOC).

During this period, we have developed theory and practice in a range of projects that we have collated under five interlinked areas: technologies for knowledge sharing; pedagogical theories underpinning collaborative online learning; roles for CoP members in online debate; the impact of MOOCs on learning; and, the role of MOOCs in schools.

### Which technologies facilitate effective knowledge sharing?

In universities in the 1990s and 2000s across the world, online learning was mainly thought of as a means of storing resources and papers online so that students could access them and learn from them as they would notes from a lecture. The pedagogical approaches of collaboration and mentoring was not central to the design. There was no question that the first Virtual Learning Environments (VLE) such as Blackboard reinforced traditional information transmission pedagogy. The obvious development from this has been Specialist Online Open Courses (SPOCs) where teachers lecture and point their students to resources that will help them learn. Indeed, some SPOCs just provide routes through resources for learners. SPOCs can be very important in situations where the learner's location is remote, they have to learn from home or funds do not exist for mentors and teachers.

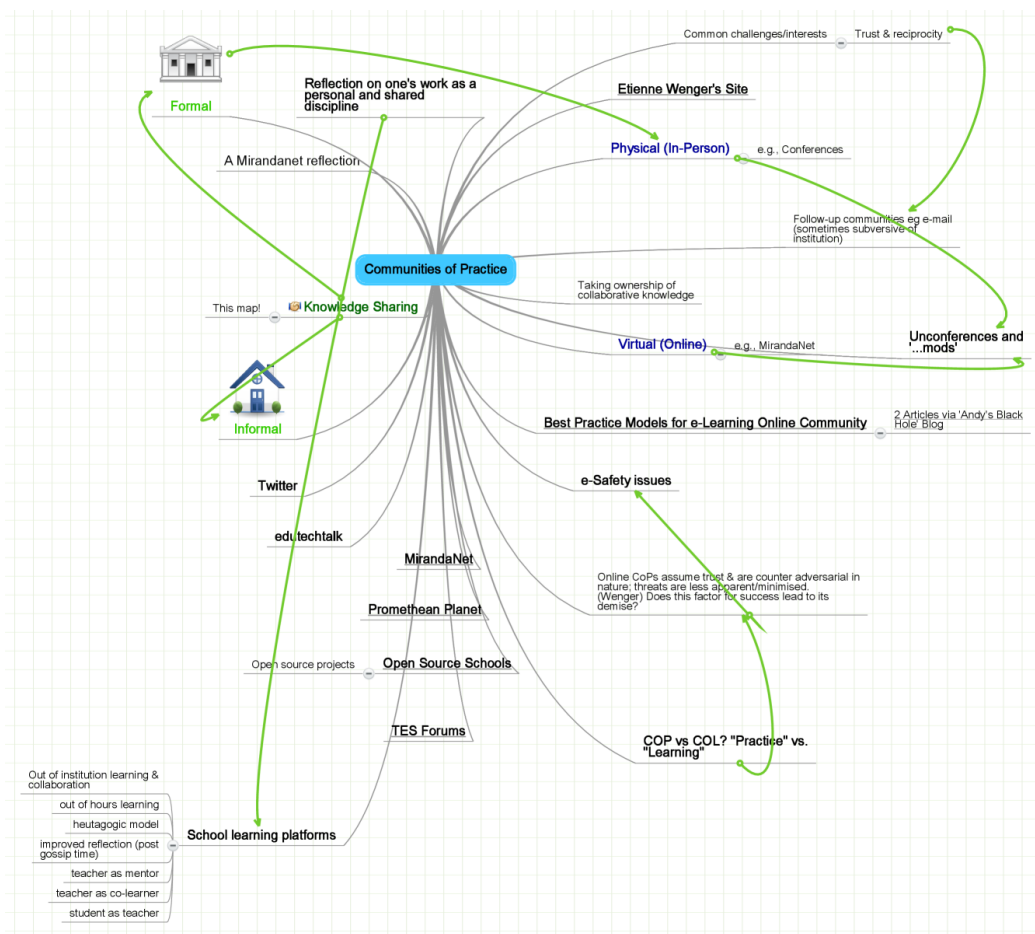
Over these early years the MirandaNet Fellows used their web spaces to research the innovative use of digital technologies in collaborative learning, knowledge creation and analysis of current professional knowledge; an approach that combines online learning and social connections. These ideas relate to; emerging practice in collaborative games (players engaging remotely in virtual worlds); remotely authored concept maps; social networking; and micro-blogging. These democratic, collaborative knowledge creation opportunities are causing ripples in social and cultural contexts although they not widely exploited for learning yet. Nevertheless MirandaNet, like many CoPs, would find it difficult to operate without wikis, micro-blogging, social networking, video-conferencing tools and remotely authored digital concept maps listservs, TwitterWalls, Second Life and the latest virtual conferencing software.

Figure 5 MirandaMods held in a variety of professional development contexts



As the years progressed, MirandaNet Fellows knitted together several different technologies so that members in a physical room could debate with members who were unable to travel. The generic term, ‘unconference’ is one in which the input of all the participants has equal weight. This contrasts with a conventional conference with nominated speakers who take questions at the end of their talk. A ‘Mod’ is a Scottish word for a meeting and one of the members, Drew Buddy, coined the term MirandaMod for our debates using collation technologies that could be used to capture notes from which to publish articles, papers, and case studies to inform educators globally.

Figure 6 A remotely authored concept map on Mobile learning developed by MirandaNet members



One method that has been adopted to share a growing body of knowledge is the collaborative digital concept map in which each participant in the debate can help to build the picture. The URL for this has been provided in the references as well as this image of the map as conventional A4 paper reproductions of knowledge building are inadequate for this kind of collaborative work.

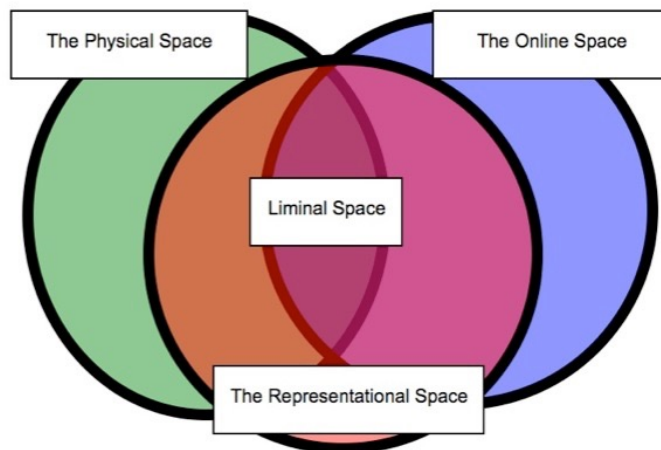
### Which pedagogical theories underpin collaborative online learning?

MirandaNet Fellows are now relating their practice to the emergent term, Community Online Open Course (COOC). In this context, a MirandaMod creates a shared liminal space (see Figure 3) that is important to building on professional knowledge: inchoate and chaotic as learners' misconceptions, misunderstandings or simply lack of knowledge clash and co-mingle. 'Liminal space' is a term used generally to describe the dissolution of order in the individual brain during liminality that creates a fluid, malleable situation that enables new institutions, new customs and new expressions of commonality to become established, thus changing existing practice.

MirandaNet Fellows, Cuthell, Preston, Cych and Kuechel (2005, 2009) argue that social liminal space can be conceptualised as anthropological and contains semiotic elements that can be visual as well

as written. In the public sphere created at the interface of face-to-face and virtual communicative action, all learners, professional or otherwise, could act in the Brunerian sense (Bruner, 1974) as scaffolds to support each other as they traverse liminal space together to reach shared and individual enlightenment and transformation.

Figure 7 Liminal space theory adapted to include shared online spaces

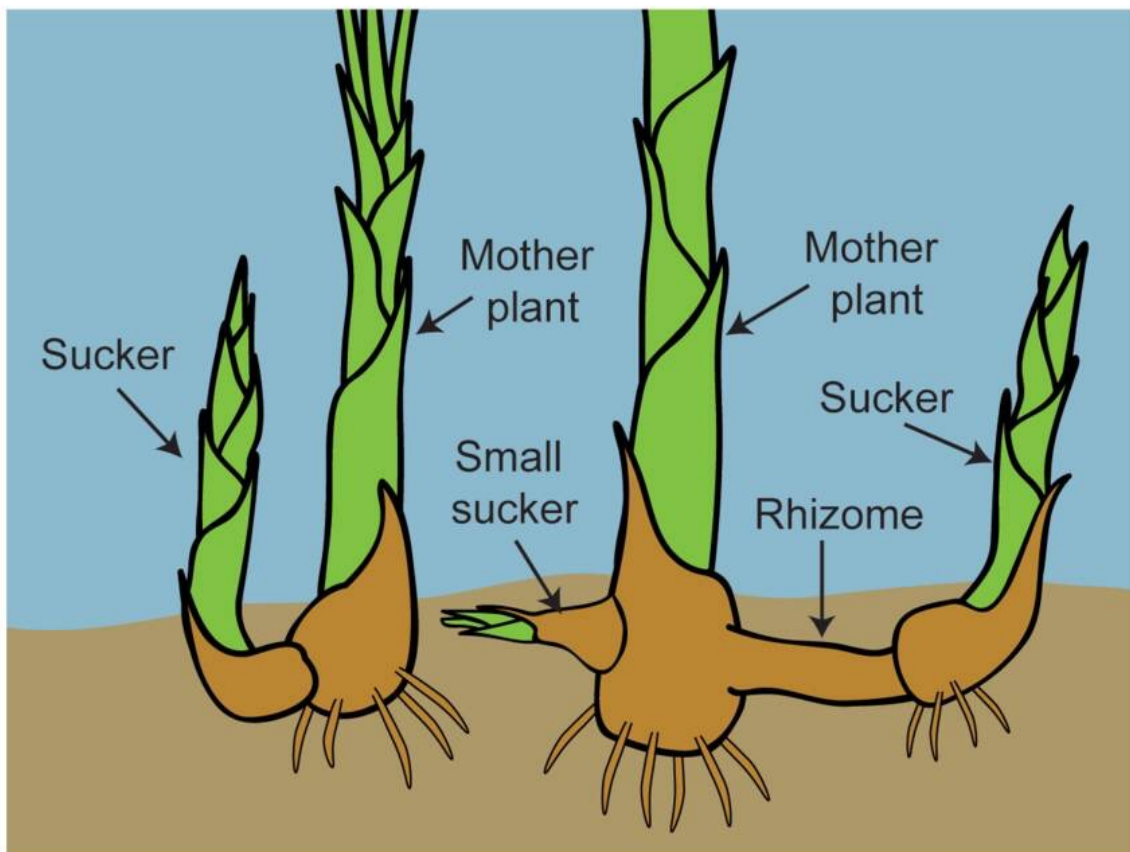


MirandaNet Fellows have adopted a metaphor to describe the theory underlying this collaborative knowledge creation that we call Braided Learning, (Preston 2007a) the notion of plaiting ideas together. Professor Mike Sharples, a MirandaNet Senior Fellow, has also been working in the area of innovation in collaborative learning in annual reports that capture the latest developments (Sharples, 2012-2018). His Open University team offers two terms that help to describe the learning conditions demonstrated in a MirandaMod: 'seamless learning' and 'rhizomatic learning'. Seamless learning defines the experience of continuity of learning across a combination of locations, times, technologies or social settings. This can be seen as learning journeys that can be accessed on multiple devices, flow across boundaries between formal and informal settings, and continue over life transitions such as school to university and workplace.

Rhizomatic learning is derived from the metaphor of a plant stem that sends out roots and shoots that allows the plant to propagate itself through organic growth into the surrounding habitat (see Figure 8). Seen as a model for the construction of knowledge, rhizomatic processes suggest the interconnectedness of ideas as well as boundless exploration across many fronts from different starting points. An educator reproduced this effect by creating a context within which the curriculum and knowledge are constructed by members of a learning community and which can be reshaped in

a dynamic manner in response to environmental conditions. Sharples (2020) has now pulled together the key pedagogical ideas from the Open University Innovative Pedagogy annual reports into a comprehensive book.

Figure 8 A rhizome providing a visual image for the way in which knowledge is constructed and emerges by adapting to environmental conditions (Source: <https://propg.ifas.ufl.edu>)



This community approach to professional development for teachers has been endorsed in a New Zealand review of how teachers move towards computing science in the new school curriculum (Thompson et al., 2013); a curriculum and professional development programme that has been widely praised (Clear & Bidois, 2005).

### What roles should a CoP adopt in knowledge sharing and theory creation?

These social, conversational processes, as well as personal knowledge creation, can be linked into unbounded personal learning networks, that merge formal and informal media. Working with communities of teachers Leask, Preston and Younie, three more MirandaNet Fellows, have shown



that teachers in communities can develop new theories and practice that are valuable for influencing policy at many levels (Leask and Younie, 2001; Leask and Preston, 2009).

What we found is that these knowledge sharing events had to be well prepared and the stages well understood by the mentors, as can be seen in Figure 9. In addition to this, a series of key roles that began to emerge as the CoP became more e-mature which is shown in Figure 10 (Preston, 2007). Mentors have found that these roles which focus on performance are helpful in encouraging debate.

Figure 9. Collaborative knowledge creation stages

Life cycle of an online discussion
Presenting a lively and engaging title
Setting the context and timeline
Invite the appropriate potential audience
Agreeing objectives
Deciding the timelines
Introductions
Welcoming newcomers
Eliciting permission to use the material generated in follow up reports
Acknowledgements of conflicting points of view
Posing stimulating questions
Interim summaries to include opposing arguments
Requests for information and references for different reporting exercises

Closure statements
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Figure 10 Debating roles in evidence in the Mirandalink/Naace debate

Provokers	Conciliators
Practitioners	Theorists
Contemptuous debaters	Respectful arguers
Lurkers	Limited female input
Generous purveyors of knowledge	Humourists
Strategists	Poets
Pessimists	Optimists
Stream of consciousness writers	Minimalists

One of the challenges for the CoP is to find the right balance between formal and informal communication. These are much the same roles that might be found in face-to-face debate. However, quick responses without eye-to-eye communication and body language can seem raw and confrontational. This is not, of course, an exhaustive list of potential roles, as these are likely to be varied at the participants' characters. The roles will also be different in different kinds of CoP although some will occur in every successful debate. Seeing these characters online is one of the appeals of online working. Nor are these roles or characters mutually exclusive. This environment is also a space where people who are shy, or who like to have time to answer, begin to display their in-depth knowledge in a way which would not be possible in a conference - an advantage that face to face communication cannot confer.

## How do MOOCS change the learning landscape?

This growing body of MirandaNet theory and practice, called Braided Learning, has been challenged by the advent of the Massive Open Online Course (MOOC) that can attract 45 – 50,000 participants who have no past history with each other. MOOCs seem to transform the ways in which adult learning is delivered, particularly informal and self-directed learning for those who cannot learn hope to learn in august institutions like Stanford University for reasons of access. In these circumstances the role of the e-mentor becomes problematic because of the number of mentors needed to cover the numbers of students and the cost of that model (Laurillard, 2014).

The questions of e-mentoring has come up, in the first pilot of the EU LLL programme funded Hands-On ICT. MirandaNet is one of the partners charged with explore the value of Massive Online Open Courses (MOOCs) and Community Online Open Courses (COOCs) in professional learning. In essence, Hands-On ICT was a holistic environment that provided teachers from higher education, vocational education and schools with everything they need to learn about making the right choice of ICT tools for a given pedagogical activity. The Hands-On ICT team from England, Greece, Slovenia, Spain and the Netherlands based the design of the MOOC on the contexts and practices that were identified in a report about existing e-learning projects already underway in Europe (Riviou, Barrera & Domingo, 2014). The participants questioned the underpinning e-mentoring principle of the course as well as perceiving a lack of clarity about the role of an e-mentor, because each student had different views. Also, the mentoring role implies responsibility for other students and a generosity with time that cannot always be relied on. Questions were raised about whether there should be tangible rewards for mentoring effort other than personal satisfaction like accreditation. Since no payment would be involved, qualifications in e-mentoring were mooted. But how would success in mentoring be judged: test scores; ICT competence; the quality of responses in a forum or whether the teachers have implemented these ideas in the classroom? Tests can validate knowledge as evidence: however, there should also be a way to validate performative evidence. One way is for the participant to upload an ICT artefact used to support learning and teaching, together with a commentary and evaluation. In this context the Hands-On team explored partnerships with teams from Learning Designer and Ingots. Global publication was another route that was expected to motivate the teachers to develop artefacts to share more widely with others like the Mapping Educational Specialist KnowHow (MESH) initiative.

The major conclusion from the participants was that the designers of the Handson ICT MOOC needed to engage in some significant rethinking because the underlying theory that all students are the drivers in their education and will self-organise and network, is not necessarily the case. Some will only want an academic course focusing on information transmission.

## How can a MESHGuide help teachers grasp significant findings quickly?

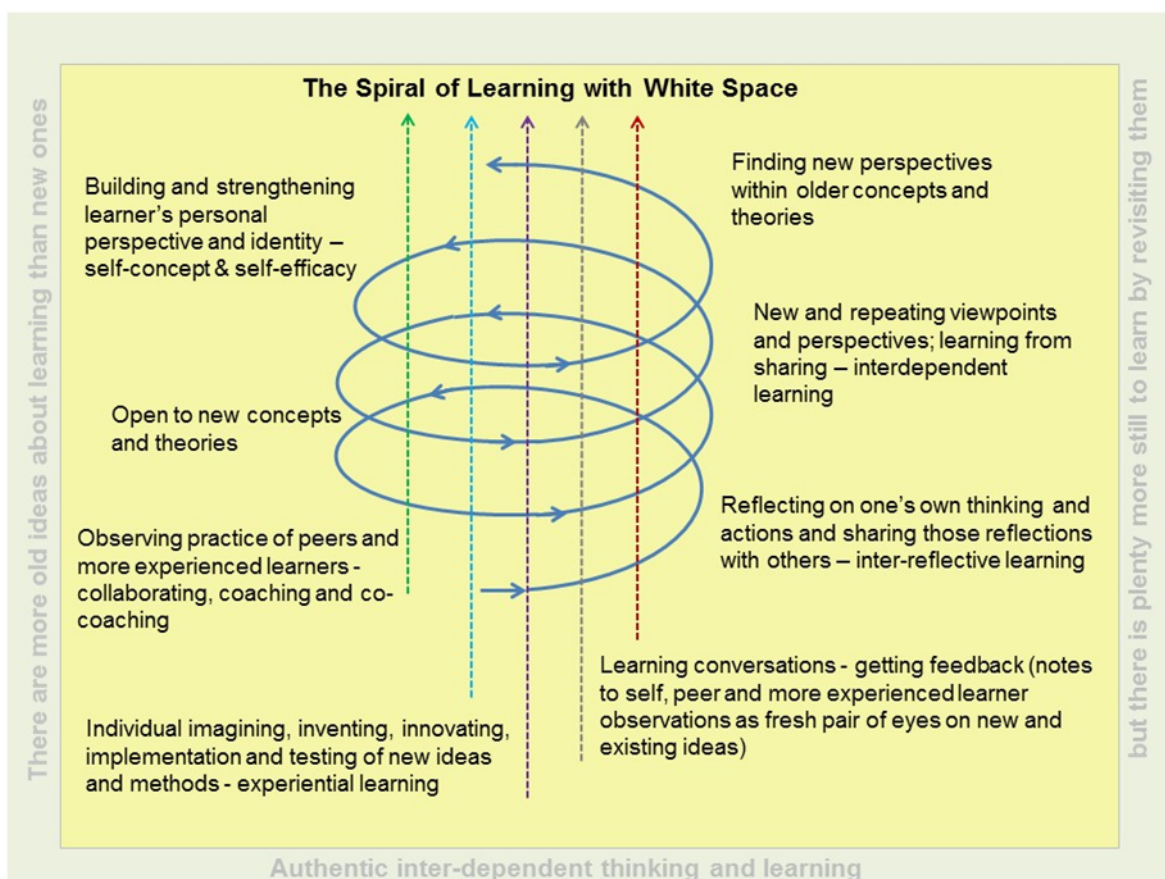
These findings raise again the difference between those who just want to learn what is necessary and those who want to join a professional CoP and contribute to new knowledge. Each position is valid, but learning in a MOOC can be a lonely affair if mentors are not there to support (Preston & Younie, 2014a; 2014b, 2014c).

The process is explored through a project called Back to the Future. In this exemplar four professional organisations, TPEA, MirandaNet Fellowship, Naace and MESHGuides have been working together on a MESHGuide to establish the most important research findings in digital technologies that teachers will find useful today. Surprisingly several international reports published between 1990 and 2010, especially funded by Becta, the UK Government agency, have been cited by members. Since the incoming UK government closed Becta in 2010 members note that the quality and relevance of research is generally not of the same standard. The pandemic has increased the impact of these new methods of learning: face to face became difficult if not impossible possible. Every effort has been made to seek out the findings of innovative teachers and researchers during this period, even though they have been working under great difficulties.

## New ways forward for collaborative learning

Often in learning, if not in education as we know it in the Western world, we can see the future by looking back, reflecting and then projecting forward. This concept of learning as a spiral experience where previous learning is adapted and built on with new perspectives reshaping old concepts but in a more modern context, such as through the influence of new technologies, can be imagined in a similar way to the following diagram.

This idea of



revisiting old learning to explore it in greater depth adds value to the idea of liminal space as raised earlier in this chapter, where 'participants are observed to be transformed by acquiring new knowledge, a new status and a new identity in the community. If learning is to be successful, this change is of critical importance'. This also links closely with the concept of learning as praxis and communities creating their own curriculum based on need, interest and experience.

What the concept of rhizomatic learning provides us is with new ways of looking at and deepening learning in this sustainable way, particularly where learning is shared through collaborative communities and enterprises. The role of collaborative technologies is therefore crucial to the open access of learning where ownership is well and truly in the hands of participants in the collaborative process.

This is where collaborative programmes and initiatives such as MESHGuides provide illustrative examples of the process of rhizomatic learning and demonstrate the power of participant collaboration. In explanation, MESHGuides may initially be produced by a community of practice or interest made up of people with experience and expertise within a specific area of learning but they are open and dynamic processes which can be adapted, added to and developed by new participants in the community who can contribute to the knowledge transfer process by bringing in their own ideas and learning to share with others. To illustrate the process we have developed a MESHGuide about Rhizomatic Learning. This guide is too big to publish in a conventional book so we have mounted it on the MESHGuides website<sup>1</sup>. In fact, one of the problems about Rhizomatic Learning for academics is that much of this branching collaborative work is hard to illustrate because it draws on the new affordances of technology that allow us to build models, experiment and

<sup>1</sup> [Meshguides.org](http://Meshguides.org) (We will have a specific url soon)

grow. Technology also gives us the option to change our minds as we learn from others whereas a published book is unalterable except as a revised edition. In essence although books have been and remain valuable in the knowledge creation process they no longer as the only way we can share. In addition the book tends to accentuate the linear process. However, in honour of this book, we have produced a snapshot of the Rhizomatic Learning MeshGuide which is intended to make assimilation quicker for busy teachers (Figure 11). We are also experimenting in MESHGuides in the use of concept maps that can be collaboratively produced. This one was created during a face to face MirandaMod in Bath in June 2022<sup>2</sup> (Figure 12). This was challenging to produce because an academic book is usually in A4 portrait mode whereas concept maps like many other illustrations need to be landscape mounted. The concept map not only allows participants within a community of practice (CoP) to share and develop ideas but to also share the process of their thinking and reasoning in making connections between one idea and another. They are a visual representation of a learning conversation about taking an idea and developing it in a collaborative and dynamic way.

The CoP model of Rhizomatic Learning that we describe here, exemplifies what Dave Cormier exposed as being a critical aspect of rhizomatic learning and which represents a dynamic future for both formal and informal learning in which ‘students have the opportunity to enter the community themselves and impact the shape of its curriculum as well as their own learning’. Writing in his article Rhizomatic Education: Community as Curriculum (2008) Cormier (2008) goes on to say ‘The role of the instructor in all of this is to provide an introduction to an existing professional community in which students may participate—to offer not just a window, but an entry point into an existing learning community’. His comments explain the idea that rhizomatic learning not only offers a model of future learning but also explains how learners can participate and dynamically contribute to the learning by choosing their own entry point to a learning community, shaping its direction of learning and in so doing influence their own learning too. It is a dynamic and exciting future for learning when viewed in this way.

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<sup>2</sup> [https://www.icet4u.org/upcoming\\_world\\_assembly.php](https://www.icet4u.org/upcoming_world_assembly.php)

## Conclusions

### Walled garden, or waste land?

*“What are the roots that clutch, what branches grow  
Out of this stony rubbish? Son of man,  
You cannot say, or guess, for you know only  
A heap of broken images, where the sun beats,  
And the dead tree gives no shelter, the cricket no relief,  
And the dry stone no sound of water. Only  
There is shadow under this red rock,  
(Come in under the shadow of this red rock),  
And I will show you something different from either  
Your shadow at morning striding behind you  
Or your shadow at evening rising to meet you;  
I will show you fear in a handful of dust.”*

The Waste Land, lines 19-30. T.S. Eliot

In our treatment of rhizomatic learning, if we consider the metaphor and its initial assumptions of connection and heterogeneity, with any point being connected to any other, then the collaborative activities of the professional Communities of Practice detailed above have connected, and continue to connect, with one another and work to develop new ideas and cross-fertilise existing ones. Members link to other communities across national barriers and time zones. The underlying knowledge of these CoPs is used to generate new ideas and practice, with new shoots emerging in new places. It is an existential state of professional awareness that precludes stasis.

At the same time as welcoming this new knowledge terrain, in which a constantly changing series of networks throws up emerging shoots in new places, it would be politic to tread carefully, warily. Without cartographic guidelines it is easy to connect the wrong nodes, cultivate the wrong shoots. In the same way as an invasive species can burst through a fence and over-run our intellectual patch, so the false concepts and fake news that have overrun parts of our world and our understanding of it must be guarded against.

A number of plants that spread by rhizomes are invasive weeds. The rhizomes make these plants aggressive and vigorous: new plants emerge from a tiny piece of rhizome. Getting rid of them is difficult and problematic. Unless every little piece is removed the plant will spring up once more, unbidden.

In this way a rhizome may be broken, but will start up again on one of its old lines, or on new lines. As will fake news, false concepts and conspiracy theories.

Fear, in a handful of dust.

## References for the Chapter and the MESHGuide on Rhizomatic Learning

- Bruner, J. S. (1966). *Towards a Theory of Instruction*. MIT Press.
- Bruner, J. S. (1974). *Beyond the Information Given*. George Allen and Unwin Ltd.
- Clear, T., & Bidois, G. (2005). Fluency in Information Technology – FITNZ: An ICT Curriculum Meta-Framework for New Zealand High Schools. *Bulletin of Applied Computing and IT*, 3(3).
- Cuthell, J. (2008). The Role of a Web-based Community in Teacher Professional Development. *International Journal of Web Based Communities*, 2(8), 115–139.
- Cuthell, J. (2009). Thinking and changing practice: Collaborative online professional development. In R. Carlsen, K. McFerrin, R. Weber, & D. A. Willis (Eds.), *Proceedings of SITE 2009* (pp. 2264–2269). VA: Association for the Advancement of Computing in Education.
- Cuthell, J. (2009). Thinking things through. Collaborative online professional development. In J. O. Lindberg & A. D. Olofsson (Eds.), *Online Learning Communities and Teacher Professional Development: Methods for Improved Education Delivery* (pp. 154 – 167). Information Science Reference.
- Cuthell, J. P., & Preston, C. (2005). Teaching in ICT-rich environments – using e-learning to create a knowledge base for 21st century teachers. In M. Leask & N. Pachler *Learning to teach using ICT in the Secondary School* (2nd ed., Vol. 1, pp. 320-332). London Routledge Communities.
- Cuthell, J., Cych, L. & Preston, C. (2011). *Learning in Liminal Spaces*. In K. Rummier, J. Seipold, E. Lübcke, P. Norbert & G. Attwell (Eds.). *Mobile learning: Crossing Boundaries in Convergent Environments*. [https://www.londonmobilelearning.net/downloads/MLCB\\_BOA\\_Bremen-2011\\_Crossing-Boundaries-full\\_2011-03-18.pdf](https://www.londonmobilelearning.net/downloads/MLCB_BOA_Bremen-2011_Crossing-Boundaries-full_2011-03-18.pdf)
- Cuthell, J., Cych, L., & Preston, C. (2011). *Learning in Liminal Spaces* [Presentation]. *Mobile Learning: Crossing boundaries in convergent environments Conference*, University of Bremen. <http://www.virtuallearning.org.uk/wp-content/uploads/2011/03/Liminal-Spaces-Bremen.pdf>
- Cuthell, J., Preston, C., Cych, L. & Keuchel, T. (2009). *iGatherings: from professional theory and practice to praxis in work based teaching and learning*. WLE Centre, Institute of Education, University of London. [http://www.wlecentre.ac.uk/cms/index.php?option=com\\_content&task=view&id=343&Itemid=85](http://www.wlecentre.ac.uk/cms/index.php?option=com_content&task=view&id=343&Itemid=85)
- Cuthell, J. (2022). *Liminal Learning, Advancing Education*. Naace Journal Spring Edition. <https://www.naace.co.uk/pub-adveducationjournal.html>



- Denzin, N., & Lincoln, Y. S. (2000). *The Handbook of Qualitative Research* (2nd ed). Sage publications.
- Donaldson, M. (1987). *Children's Minds*. Fontana.
- Dorner, J., Field, J., Sparrowhawk, A., & Preston, C. (2002). *How to Think.com*. Oracle Education Foundation. [https://www.mirandanet.org.uk/associates/oracle\\_think.htm](https://www.mirandanet.org.uk/associates/oracle_think.htm))
- Gardner, H. (1983). *Frames of Mind, The Theory of Multiple Intelligences*. Heinemann.
- Gardner, H. (1993). *The Unschooled Mind, How Children Think and How Schools Should Teach*. Fontana.
- Haythornthwaite, C., Andrews, R., Kazmer, M. M., Bruce, B. C., Montague, R. A., & Preston, C. (2007). Theories and models of and for online learning. *First Monday*, 12(8). <https://doi.org/10.5210/fm.v12i8.1976>
- Hordatt G. C., Younie, S., Leask, M. & Caldwell, H. (2022). "The precious silver lining in this crisis": positives that have emerged from teaching during Covid. *Advancing Education, Naace Journal*, Spring Edition, <https://www.naace.co.uk/pub-adveducationjournal.html>
- Laurillard, D. (2014, 16 January). Hits and myths: moocs may be a wonderful idea but they are not viable. *The Times Education Supplement*.
- Leask, M. & C. Preston. (2009). *ICT tools for future teachers*. Brunel University for BECTA <http://www.beds.ac.uk/research/ired/groups/marilyn-leask/publications>
- Leask, M., & Younie, S. (2001). Building On-Line Communities for Teachers: Ideas Emerging from Research. In M. Leask (Ed.), *Issues in Teaching Using ICT* (pp. 223-232). Routledge.
- Piaget, J. (1953). *The Origin of Intelligence in the Child*. Routledge and Kegan Paul.
- Piaget, J. (1972). *The Principles of Genetic Epistemology*. Routledge and Kegan Paul.
- Preece, J. (2000). *Online Communities: Designing Usability, Supporting Sociability*. John Wiley & Sons.
- Preston, C. (1995, 14 July). Not just a load of old Tosh: a ground breaking inservice training alliance between teachers and industry. *Times Higher Education Supplement*.
- Preston, C. (1999a). Building Online Professional Development Communities for Schools, Professional Associations or LEAs. In M. Leask & N. Pachler (Eds.), *Learning to Teach ICT in Secondary Schools* (pp. 210-225). Routledge.
- Preston, C. (1999b). *On-line Teacher Communities*. TeacherNet Journal, Hobsons Educational.

Preston, C. (2007a). Braided Learning: promoting active professionals in education. In: Haythornthwaite, C., Andrews, R., Kazmer, M. M., Bruce, B. C., Montague, R.-A., & Preston, C. (2007). Theories and models of and for online learning. *First Monday*, 12(8). <https://doi.org/10.5210/fm.v12i8.1976>

Access several publications on Braided learning and associated topics on <http://www.mirandanet.ac.uk/researchexchange/publications/> Last accessed 050614

Preston, C. (2007b). *Social networking between professionals: what is the point?* [Presentation]. Self-regulated Learning in Technology Enhanced Learning Environments: Individual Learning and Communities of Learners, Amsterdam, Shaker Verlag.

Preston, C. (2008). Braided Learning; an emerging process observed in e-communities of practice. *International Journal of Web Based Communities*, 4(2), 220-243.

Preston, C., & Cuthell, J. (2012). MirandaMods: From Practice to Praxis in Informal Professional Learning Contexts. In C. Jimoyiannis (Ed.), *Research on e-Learning and ICT in Education*, (pp. 17-28). Springer.

Preston, C., & Younie, S. (2014a, June 27). *When the Funding Ends: Using the Handson ICT MOOC as a Key Element in Research and Development Projects* [Presentation]. Make Learn conference, Human Capital without Borders: Knowledge and Learning for Quality of Funded by the EU ICT Industry, Portoroc, Slovenia. <http://mirandanet.org.uk/researchexchange/eu-handson-ict/>

Preston, C., & Younie, S. (2014b, June 27). *From a community of practice perspective learning in a MOOC can be a lonely business* [Presentation]. MoodleMoot conference, Korper, Slovenia. <http://mirandanet.org.uk/researchexchange/eu-handson-ict/>

Preston, C., & Younie, S. (2014c, July 1-4). *Mentoring in a Digital World: what are the issues?* [Presentation]. Key Competencies in Informatics and ICT (KEYCIT 2014) Conference Proceedings. <https://publishup.uni-potsdam.de/opus4-ubp/frontdoor/index/index/docId/7032>.

Preston, C., Younie, S., & Hramiak, A. (2021). Learning Alone or Learning Together? How Can Teachers Use Online Technologies to Innovate Pedagogy? In A. Marcus-Quinn & T. Hourigan (Eds.), *Handbook for Online Learning Contexts: Digital, Mobile and Open* (pp. 257-273). Springer. <https://www.springer.com/gp/book/9783030673482>

Riviou K., Barrera C. F., & Domingo M. F. (2014, July 7-10). *Design principles for the online continuous professional development of teachers* [Presentation]. 14th IEEE International conference on advanced learning technologies (ICALT 2014), IEEE Computer Society, Athens, Greece.

Salmon, G. (2002). *E-tivities: The Key to Active Online Learning*. Kogan Page.

Seigel, L., & Brainerd, C. (Eds.). (1978). *Alternatives to Piaget, Critical Essays on the Theory*. Academic Press.

Sharples, M. (2012-2018). *Innovating pedagogy 2012*. The Open University.  
[www.open.ac.uk/blogs/innovating/](http://www.open.ac.uk/blogs/innovating/)

Sharples, M. (2019). *Practical Pedagogy: 40 new ways to teach and learn*. Routledge.

Thompson, D., Bell, T., Andreae, P., & Robins, A. (2013, March 6-9). *The role of teachers in implementing curriculum changes* [Presentation]. Proceeding of the 44th ACM technical symposium on Computer science education, ACM, Denver, Colorado, USA.

Turvey, K., & Pachler, N. (2020a, July 21). Teachers have been let down by a decade of inaction on digital technologies. The conversation. <https://theconversation.com/teachers-have-been-let-down-by-a-decade-of-inaction-on-digital-technologies-142938>

Turvey, K., & Pachler, N. (2020b). Design principles for fostering pedagogical provenance through research in technology supported learning. *Computers & Education*, 146, 1-14.  
<http://doi.org/10.1016/j.compedu.2019.103736>

Wenger, E. (1998). *Communities of Practice: Learning, Meaning and Identity*. Cambridge University Press.

Wenger, E., McDermott, R., & Snyder, W. M. (2002). *Cultivating Communities of Practice: A Guide to Managing Knowledge*. Harvard Business School Press.

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## Reference websites

Collaborative Digital Concept Map One. at:

<http://www.mirandanet.ac.uk/mirandamods/archive/the-role-of-communities-of-practice-in-teaching-and-learning/>

Hands-On ICT Project at: <http://project.handsonict.eu/project/>

iCatalyst Practice based research programme at: <https://mirandanet.ac.uk/professional-development-approach/>

INGOTS at: <http://theingots.org/community/about>

Learning Design support Environment at: <https://sites.google.com/a/lkl.ac.uk/ldse/>

Mapping Educational Specialist knowHow MESH at: <http://www.meshguides.org/>

MirandaNet Fellowship at: [www.mirandanet.ac.uk](http://www.mirandanet.ac.uk)

MirandaMods at: <https://mirandanet.ac.uk/what-is-a-mirandamod/>

Naace at: [naace.co.uk](http://naace.co.uk)

Technology Pedagogy and Education at: [tpea.ac.uk](http://tpea.ac.uk)

Becta Reassembled. MirandaNet at: <https://mirandanet.ac.uk/becta-reassembled/>

Wider reading

Communities of Practice in Lockdown see:

Keddell, E. & Beddoe, L. (2020). The tyranny of distance: The social effects practice adaptations resulting from covid-19 lockdown rules. *Aotearoa New Zealand Social Work*, 32(2), 41-45.

MOOCs in schools see:

Beutner, M. (2020). Media in Times of Corona- The Use of MOOCs by Teachers and Trainers. In *Proceedings of EdMedia + Innovate Learning* (pp, 1109-1115). Online, The Netherlands: Association for the Advancement of Computing in Education (AACE).

<https://www.learntechlib.org/primary/p/217425/>

SPOCs in Higher Education see:

Huang, R., Tlili, A., Chang, T., Zhang, X., Nascimbeni, F., & Burgos, D. (2020). Disrupted classes, undisrupted learning during COVID-19 outbreak in China: application of open educational practices and resources. *Smart Learning Environments*, 19(10), 1-15. <https://doi.org/10.1186/s40561-020-00125-8>

Liminal spaces in organisations see:

Zundel, M., Mackay, D., Macintosh, R., & Mckenzie, C. (2020). Between the Bridge and the Door: Exploring Liminal Spaces of Identity Formation Through Video Diaries. In M. Brown (Ed.), *The Oxford Handbook of Identities in Organizations* (pp. 340-357). Oxford University Press.

E-Mentoring see:

Tinoco-Giraldo, H., Sánchez, E. M. T., & García-Peñalvo, F. (2020). E-Mentoring in Higher Education: A Structured Literature Review and Implications for Future Research. *Sustainability*, 12(11), 2-23.

MOOCs in schools and universities see a range of high impact research from the British Journal of Educational Technology, focusing on various aspects of online learning and teaching in COVID-19: Online Teaching and Learning Virtual Collection related articles at:

[https://onlinelibrary.wiley.com/doi/toc/10.1002/\(ISSN\)1469-3518.online.teaching.and.learning.covid19](https://onlinelibrary.wiley.com/doi/toc/10.1002/(ISSN)1469-3518.online.teaching.and.learning.covid19)

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For a number of years John was the Research and Implementation Director for the MirandaNet Academy, developing practice based research accreditation for teachers. International MirandaNet action research projects evaluated the global impact of interactive whiteboards on teaching and learning and the role of CPD in professional development.

Overall John researched and evaluated the impact of new communications technologies on teaching, learning and working. With a background in Language, Communication Studies and Cognitive Psychology, his main focus was the extension of a long-term PhD research project on the impact of ICT on thinking, learning and working, published as 'Virtual Learning' (2001, Ashgate, Aldershot).

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Latest book chapter: Chapter 21 - Education in Emergencies (Leask, M., Younie, S. and Hall, S.) from the book 'Education System and Design; Foundations, Policy Options and Consequences' (2021), Routledge, Oxford. ISBN: 978-0-367-20377-1

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