

A selective analysis of empirical findings in networked learning research in higher education: Questing for coherence

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Abstract

In this paper, we have attempted two ambitious tasks. We have undertaken a wide-ranging survey of the Network learning (NL) literature, and tried to identify the emerging themes of this work. We have selected three of these themes, and in each case tried to identify the main theoretical perspectives in use, the main directions of the studies, and the key ideas being addressed and researched. We have also tried to indicate where the main research effort might be directed in order to help to 'fill in the gaps' and achieve some coherence for the theme. Our second major task has arisen from our assertion that the field of Networked Learning research is theoretically fragmented. We have argued that this situation arises because Networked Learning research is a new field, and is drawing upon a wide range of theoretical perspectives. However, unless we can achieve some synthesis of these perspectives we may find it difficult to establish a coherent research programme in the field. We argue that one way of developing some coherence is to make theory and praxis interact explicitly, in other words, to 'converse' with each other in our research. By this we mean, to use theory to interrogate praxis, and use praxis to modify and develop theory, thus moving towards perspectives that are changing theory, modifying and improving it. As part of this argument, we have briefly surveyed the current level of Theory–Praxis Conversation, either explicit, or implicit, in the thematic research we have described. It is clear that some outstanding work is being done to make theory work, and to modify it in the light of research into praxis. However, it is also the case that much current Networked Learning research does not interrogate the theory that it uses to contextualise it. We see Theory–Praxis Conversation as a way of thinking explicitly about how we might make the work of interrogating theory in our research more explicit and systematic. In this way, our 'Quest for Coherence' may, we hope, help Networked Learning research to climb up to the higher ground, and give us a wider ranging view of learning in networked environments.

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1. Introduction

The aim of this paper is to provide a selective critical analysis of research findings on asynchronous learning and teaching in the field of Networked Learning (NL). We examine findings from studies on learning and teaching processes

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in NL; we do not focus on platform (VLE—Virtual Learning Environment) design or other technical issues. Therefore, this paper has a specific focus on NL research that features pedagogies for asynchronous learning and working in Higher Education (HE) because ‘asynchronicity’ is currently the principal mode of working (Hara, Bonk, & Angeli, 2000), and Higher Education is a principal domain of NL activity. In research and theoretical terms the field of NL is fragmented, and shows characteristics of a field in its early stage of empirical and conceptual work (Plass & Whelan, 2005). Research in NL is often based on small-scale case studies, and draws upon a range of theoretical perspectives. In this review, we are attempting to undertake two levels of analysis. Using these, we attempt to build some coherence that may be of value to those researching in the field, as well as those drawing upon research in the field in order to assist their pedagogical designs.

Firstly, we identify key themes in current NL research. These are:

- Collaborative learning
- The role of the teacher
- Teacher–student relationships
- Group regulation and pedagogical orientation
- Participation in Networked Learning communities

This has pragmatic value because it enables us to formulate a more coherent picture of research on teaching and learning processes in NL. In this review, we have selected the first three of these themes as a focus for analysis and discussion. The themes of ‘Group Regulation and Pedagogical Orientation’ and ‘Participation in Networked Learning Communities’ will be the focus of future publications. This thematic approach will help us to reflect on common foci for NL research and suggest research ‘clusters’ that might synergise research efforts. Secondly, we examine the use of theoretical models and theorising in the research process in NL. We have argued elsewhere (De Laat & Lally, 2003) that NL is a new discipline that is drawing on theoretical perspectives from cognitive and social psychology, sociology, education, computing, applied linguistics, and others.

In this review, we use the term ‘inter-discipline’ to describe NL because it exhibits this multi-theoretical character. Johnston (1998) has argued that the rate of change in the evolution of universities is now exponential, and that we are in an age of ‘integration’. Disciplines, she argues, are under enormous pressure to cross boundaries and integrate in order to move forward their research agendas. For NL research, and other new inter-disciplines, drawing upon multiple theoretical perspectives, is both a creative and a problematic process. It is creative because researchers and practitioners are bringing a range of exciting theoretical perspectives to bear upon and illuminate the field, and stimulated to engage in a wide range of new pedagogical approaches and designs. It is problematic because these perspectives and designs are, as yet, partial, fragmented and weakened by lack of ‘synthesis’. In the simplest terms, they are not joined up, they overlap, contradict and duplicate each other. We propose that synthesis is currently one of the key challenges for NL as an inter-discipline. This paper, therefore, is partly concerned with what we refer to as ‘Theory–Praxis Conversations’ (‘T–P Cs’). In particular, how these conversations may be used to address this challenge of synthesis, and enhance the research evidence base for NL. We are attempting a further development of our argument that theories that inform NL and the praxis of NL (by praxis we mean practical activity in real NL courses that is in some way informed by theoretical perspectives) can ‘converse’ in important ways with praxis. This, we argue, may be used to enhance the quality of our ‘evidence base’ for NL. These conversations may take place in research and practitioner communities.

We contend that they may serve three ‘purposes’:

- Assist in the synthesis of multi-theoretical perspectives and thereby increase their power as a theoretical tool in the research process (Halverson, 2002), and as a guide to the design of praxis.
- Assist in the elucidation of the richness and complexity of praxis and highlight the extent to which it is currently ‘beyond theory’ in any case or context.
- Support in the creative interaction of theory and praxis, and the development of research methodologies to facilitate this.

This idea of a theory–praxis ‘conversation’ or interaction was originally developed by Stenhouse (1983). He argued that the development of a theoretical understanding of *educational* action and the doing of *educational* research into the practical problems of education are inseparable. Educational research, according to Stenhouse, is a process, which

involves the joint development of educational praxis and theory in interaction. The notion of a ‘Theory–Praxis Conversation’ has been developed in other disciplines. For example, in teachers’ professional development by [Korthagen and Lagerwerf \(2001\)](#).

The layout of this paper is as follows. We will start with defining the scope of the area of educational research with which we are primarily concerned: Networked Learning in higher education. In defining NL we build up a framework that will be used as a guideline to select and synthesise the studies included in this paper. The aim of the synthesis is to describe and generate a coherent overview of current themes or clusters of NL research, and, following our argument about theory–praxis conversations, to undertake a critical reflection on how theoretical frameworks are used to support research carried out in the area of NL. We will undertake this, within the limits of this paper, for three of the five themes we have identified (see above).

2. Networked learning in higher education

By NL we mean the use of internet-based information and communication technologies to promote collaborative and co-operative connections: between one learner and other learners; between learners and tutors; between a learning community and its learning resources, so that participants can extend and develop their understanding and capabilities in ways that are important to them, and over which they have significant control ([Goodyear, Banks, Hodgson, & McConnell, 2004](#)). In the USA, this is referred to as Computer Supported Collaborative Learning (CSCL). It is a relatively new field of research endeavour ([Goodyear et al., 2004](#)) in which there is a relatively small body of empirical research. This work is based upon a range of theoretical perspectives, such as social constructivism and social learning ([Kirschner, Martens, & Strijbos, 2004](#); [Paavola, Lipponen, & Hakkarainen, 2002](#); [Simons, Van der Linden, & Duffy, 2000](#)).

Another theoretical approach frequently drawn upon in NL research is the notion of communities of practice and the situated learning perspective. This builds on the idea that knowledge is rooted in actions. The process of meaning-making is embedded in the social context where concepts and skills are defined through their use. [Lave and Wenger \(1991\)](#) describe situated learning as a process of participating in the socio-cultural practices of communities.

Many of the articles presented here (see [Table 1](#) in the method section) share a pedagogical orientation based on social constructivist and community learning principles aimed at designing a learning task where students are required to participate in active knowledge construction activities through a process of dialogue with their fellow students, with or without direct support and guidance of their teacher.

Recent reviews in the field have focused on the technology platforms available for NL ([Eseryel, Ganesan, & Edmonds, 2002](#); [Jermann, Soller, & Muehlenbrock, 2001](#)), or on specific disciplines (for example, Management Learning: [Kimber, 1996](#)). Other significant reviews have had a very broad focus, covering learning outcomes, platforms

Table 1
Pedagogical orientation and methods used by the papers included in this synthesis

Pedagogical orientation	Articles/conference papers
Community learning	11
Social constructivist	13
Collaboration	3
Problem-based learning	4
Conversational theory	1
Situated learning	4
Methods applied	
Content analysis	16
Interviews	14
Questionnaire	11
Student feedback/course evaluation	4
Social network analysis	2
Action research approach	1
Grounded theory approach	1

Note that some overlap is possible since some papers used multiple theories and/or methods in their research.

and theoretical underpinnings in general (Lehtinen, Hakkarainen, Lipponen, Rahikainen, & Muukkonen, 1999) and the use of the internet to deliver web-based learning (Plass & Whelan, 2005). However, none of these reviews has attempted to focus on particular elements of NL, here teaching and learning processes in asynchronous networked learning communities to cluster research findings.

It is our intention that by providing an analysis of some of the emerging themes in the field, and commencing the task of developing some theoretical coherence by understanding the extent of theoretical engagement, using our Theory–Praxis Conversation model, this review will assist in the advancement of NL research.

3. Method and criteria

In this paper, we synthesise and reflect on current findings of NL research with a particular focus on the processes in which students and teachers engage while working in groups on collaborative tasks. In order to undertake this synthesis we employed a set of ‘ground rules’ to guide our search for relevant studies in NL and make the appropriate selection. First of all our study is entirely focused on Networked Learning in higher education. Secondly, our synthesis is based on Networked Learning environments (using asynchronous conversation) where threaded discussion forums (like those commonly used in WebCT, Blackboard, etc.) are the main means by which the participants exchange messages over a pre-defined period of time. This is because, as we previously stated, this is currently the principal mode of NL in higher education (Hara et al., 2000). Thirdly, we focused on reports of research on courses that are part of an institutional HE programme resulting in a recognised qualification, where there is evidence of significant supervision or tutoring by a teacher. Fourthly, the studies we explored have a pedagogical orientation aimed at describing teaching and learning processes or activities occurring in these collaborative asynchronous learning tasks. For this reason we excluded studies evaluating the development or design of courses or platforms, studies comparing online with face-to-face learning (including blended learning), and studies that focus principally on learning outcomes rather than learning processes.

Since our aim is to analyse current research findings, we included not only peer-reviewed articles, but also conference papers published over the last 7 years. We used Endnote to carry out our search for articles, using the ERIC, Psychlit, and NCC online databases. The selection of conference papers was based on leading conferences on research in NL that uses a full paper submission policy with a peer-reviewed selection procedure. The reason to include conference papers was to include more recent findings in this synthesis (this explains why conference papers cover most of papers found in 2004). Based on the keywords ‘higher education’, ‘asynchronous’, ‘networked learning’ (or, ‘online learning’, ‘collaborative learning’, ‘computer-mediated communication’ or ‘discussion forum’) a first selection of papers was gathered. We reviewed the abstracts or conducted a more general examination of the paper to see if the ground rules apply, in order to decide whether or not to include the paper in this synthesis. As a result of this process a total of 32 papers were included. The findings of each paper will be synthesised according to the main themes expressed earlier. As such it is possible for some papers to appear more than once during this exercise.

4. Selected key themes in networked learning research, and their theory–praxis conversations

In this section, we will present the two components of our analysis. The thematic analysis of research into learning and teaching processes in NL will be clustered around the three themes presented above. We will use these themes to provide the organising structure of the analysis. The second part of this review, presented under these themes, analyses with the way researchers apply theories to their work. More particularly, our principal questions are:

- Do researchers use theory explicitly to contextualise their work?
- Is the work focused by theory?
- Is theory used to design the study?
- Are researchers using the results of their work to interrogate and inform theory, to generate and synthesise theory?
- Do researchers use their results to inform pedagogical practice or educational design?

Answers to these central questions may help us to elaborate our understanding of the extent to which there is an ongoing ‘conversation’ in current research between theory and praxis that is being investigated. In other words, this is how we are seeking evidence of a ‘Theory–Praxis Conversation’ in each paper of this review. We have amalgamated and summarised our findings for each of the three themes in the following sections.

4.1. Collaborative learning

In the literature there is disagreement over the meaning of the term ‘collaborative learning’. This term seems to range from applying a division of labour in groups that learn together, to joint problem-solving and knowledge construction with equal contribution from all participants (Dillenbourg, 1999). However, collaborative learning is used predominantly to describe a setting in which students are working in groups on a shared task or problem, in which they are expected to have equal contributions and participation.

Ten of the studies presented make explicit references to the term ‘collaborative learning’. Three of these studies investigated the fundamental question: is collaborative learning taking place? Two studies focus on the motivational benefits for students participating in collaborative learning events; six studies present findings on the detailed processes of student collaboration and the learning strategies they employed. Below we present the key findings on these aspects of this theme.

The studies examined the claim that participants in NL environments are learning and constructing knowledge together. McConnell (1999) described networked ‘collaborative’ learning as an activity in which learners are brought together using the Internet, with a focus on them working as a learning community, sharing resources, knowledge, experience and responsibility. In his case study on a university course, where small groups of students (up to eight) and a tutor work together to study the use of the internet and electronic communications in learning, McConnell reported that through analysis of transcripts it is possible to see participants’ ideas and knowledge developing, to see them picking up other participants’ and tutor’s points and using them” (p. 235). This evidence is supported by Vonderwell (2003) in her case study on exploring student learning experiences and the implications of asynchronous communication in an online discourse. She reported that asynchronous environments appear to help students to construct and express their ideas and that collaborative work helps them to reflect on the issues being discussed. It is also a way for students to learn from each other. Hammond and Wiriyaipinit (2004) reported that the groups in their study were active, the participants communicated with each other and commented on each other’s work, but they also mention that the participants were reluctant to express disagreements.

Kear (2004) and McAlpine, Koppi, McLean, and Pearson (2004) investigated students’ motivation for collaboration, participation, collaborative learning, and tutor intervention. Kear concluded that a key reason for students to participate in collaborative work is to obtain help, information and guidance from others, in order to support their own learning. Students who use the conferencing system report that input from other students is more important to them than input from staff; that most of the help and guidance is provided by fellow students; and that both giving and receiving peer feedback was useful for their learning. McAlpine et al. (2004) contrasted research literature with user experiences in their study on NL as a way to understand and improve online courses. Based on reflective diaries, surveys and a focus group of students, they concluded that students are motivated to collaborate when they find it rewarding, when it leads to a process of sharing ideas among the group, and when it is possible to reach a deeper understanding of the topic together.

Most of the studies are concerned with describing collaborative learning processes and activities to build up an account of what students were actually doing, and what is successful. One study, for instance, suggested that collaborative learning works better when students focus on solving practical problems rather than having a theoretical debate (Ronteltrap & Eurelings, 2002). This study described collaborative learning as a way of creating a situation in which productive interactions between learners can be generated. In their study, they explored the relationship between the learning environment (e.g., goals of collaboration, tasks), and learning behaviour (interactions), and reported that practical learning tasks result in deeper processing of information than theoretical learning tasks because they encourage more interactions between the participants. They argued that if cognitive activity and interaction are goals for a learning environment or an online course, it is advisable to design relevant tasks in the context of professional activities (Ronteltrap & Eurelings, 2002).

Hammond and Wiriyaipinit (2004) found that although the students were actively communicating, the most common learning activities (mentioned by the students) were associated with representing personal positions such as introducing, stating, reporting, analysing, clarifying, and agreeing; there was a marked lack of open interactive discussion. In their study on the use of learning strategies in discussion groups, Stefanou and Salisbury-Glennon (2002), indicated that students showed an increase in the use of rehearsal strategies, organisation strategies, critical thinking, time management, and use of peer-learning and help-seeking behaviours in collaborative tasks. This is supported by Light, Nesbitt, Light, and Burns (2000), they found that collaborative communication was task-focused and geared towards

the production of final reports. The communication was structured around interpreting an activity, planning, drafting and collating a group response.

Overall, these studies focus, to some extent, on gathering evidence for collaborative learning processes. Most of the results are interpreted in terms of the individual benefits of collaborative learning and not so much on a group level. The studies indicate that student motivation for collaborative NL seems to be driven by the possibility of receiving peer-feedback and help from others as a way to support one's own learning. The learning activities investigated are mainly task-focused, mostly discussion-based, and aimed at sharing knowledge, some critical thinking and reaching agreement, in order to solve the problem and produce a report. However, some studies suggest that working in groups on cases, or more practically oriented learning tasks, seems to enhance learning processes and outcomes.

In terms of the use of theory (the 'T-P C'), three of these studies use an explicit theoretical basis for their investigations. A further three studies used rich descriptions of praxis to perform this function. Three studies draw on both theory and praxis to contextualise the study. In all except one study, theory is used to some extent to inform the focus of the research and the design of the study. However, in only one study did the authors engage extensively with this theoretical basis in their conclusions, and in only two cases was an attempt made to re-interpret it or use it explicitly as a basis for rethinking NL design. In these studies of collaborative learning it is clear that researchers engage with the theoretical basis of understanding in the field. However, this is mostly at the level of using theory to contextualise their studies and the praxis in which it was embedded. At the same time, there is little discussion of how new understandings may be used to explicitly inform the improvement of NL design.

4.2. *The role of the teacher*

If design for NL has not only changed the environment in which students learn, it has also generated implications for the ways in which courses are being taught. For example, this is evident in the role, attitudes and responsibilities of the teacher. In general, the teacher's role, in the studies we looked at, was to design the course, set the task goals and to be responsible for the overall quality of the course and its coordination. The teacher's presence during the interaction in the discussion forum varied from being an active moderator throughout (Salmon, 2000) to providing some instructions in advance on how to work in asynchronous discussion forums. Many of the studies we investigated include the theme of the role of the teacher. Most of them are concerned with the general behaviour and the role of the teacher (in asynchronous learning environments). In some cases, teacher behaviour is analysed on a timeline perspective to give a more detailed account for different phases in an overall discussion. Some studies are interested in the differences between teacher presence and absence. However, in general, one can say that these studies are concerned with trying to describe teaching practice and needs in NL.

Six studies offer some general insights on teachers' involvement in online collaborative discussions. In the study by Vonderwell (2003), it was found that students perceived the communication with the teacher as constructive and encouraging, and they wanted the teacher to be involved throughout the course, not just at the beginning. Rimmershaw (1999) concluded that the teacher's active participation might have been critical in setting the right tone for the more successful courses. Veldhuis-Diermanse (2001), in a study on the role of teachers in a CSCL environments, studied the effects of social moderation (stimulating social aspects of the group) and content moderation (to help students focus on the task) compared with a self-regulated group of student. Social moderation seemed to have no distinctive effect on the group interaction, but the group that received content moderation seemed to debate more, included more external information in their discussion and made more references to ideas and remarks presented by fellow students in the group compared to the students of the self-regulated group. According to Kear's study (2004), moderator inputs are needed when the discussions become confused or misleading, or when students ask for an 'official' response. Rovai (2002) stressed that it is the teacher's challenge to create appropriate conditions that support a positive learning experience, and according to him developing a sense of community in the group is one of these challenges. Browne (2003) emphasised the importance of the availability of a personal tutor, and the need for a clear role definition in relation to tasks in the learning and teaching environment. Teacher interventions are generally needed, although postings from teachers, their frequency and their nature, can affect students' reliance on peers for knowledge-building (Clouder & Deepwell, 2004).

Several of the studies look at teachers' behaviour in asynchronous learning networks at various stages of the discussion. Lim and Cheah (2003) conducted a study on the role of the teacher in asynchronous discussion boards, as perceived and experienced by the students. As an overall conclusion, they found a discrepancy between the role teachers play and the expectation of their role among the students. For instance, the students seemed to put more

weight on the roles of the teacher (administrative, facilitation, and pedagogical roles) than they actually experienced during the online learning event. Based on a study of the literature, Lim and Cheah (2003) made a distinction between three stages of online discussion and corresponding teaching roles. In the pre-discussion stage, setting a meaningful task (a pedagogical role) was perceived to be the most important role, by the participants, but this role was the least observed in their study. This was also expressed with respect to setting clear goals. The students reported a need for basic guidelines and an indication of the expectations prior to the online discussion (administrative role). Responding to queries, during the discussion, was found to be the most important teacher role (facilitation). This was also the most frequently observed teacher role. Summarising, which is another facilitating role, was not observed frequently, but rated as almost equally valuable to students as responding. The students thought that this would assist them to stay focused on the topic, and help to ‘clean up’ the discussion. In this stage the gap between observed and perceived roles was most noticeable. Teacher roles were seldom observed during the post-discussion stage. Except for the facilitative role of drawing appropriate conclusions, they were not found to be so important. According to Lim and Cheah (2003) there are a number of roles that teachers should play during asynchronous learning; these are: setting meaningful tasks, providing technical guidance, participating actively, keeping the discussion focused, drawing conclusions, providing content expertise, and recommending resources for extension of learning. At the same time, they argued that teachers need more specific guidelines on how to execute their roles in asynchronous discussion boards. Levy (2003, 2004) reported similar findings in her study on experiences of students engaged in an NL community. There was a need for more intensive and direct personal contact between tutors and participants, especially at the early stages of the course. In particular, this was needed to monitor and support individual participants’ awareness of specific features of the learning design and more general understanding of learning issues.

In another study, conducted by Ferry, Kiggins, Hoban, and Lockyer (2000), the aim was to explore the role of the teacher when mediating an online discussion of an NL community. Based on interviews and content analysis, they concluded that it is the task of the moderator to set the scene at the beginning of the course, and to keep the conference constructive throughout. This needs skilful crafting of messages, and thoughtful judgements on when and how to intervene. They argued that teachers constantly need to monitor the discussion and provide input at appropriate moments. On the other hand, however, Mazzolini and Maddison (2003) pointed out that frequent posting by teachers to discussion forums did not lead to more student postings, on average. And the more the instructors posted, the shorter were the discussion threads (on average). Yet, in their study on teacher intervention in NL, they concluded that the number of postings is not a simple indicator of the quality of discussion forums—more subtle methods are necessary.

Five studies describe the effects of teacher presence or absence in online discussions. Light et al. (2000) conducted a study to explore the effects of the absence of a tutor on students’ learning experiences. Their case was based on a university course in which the teacher set up the group-based discussion but did not participate during the student-led discussion. Their aim was to explore the student perceptions and perspectives of online learning. They reported, based on interviews and content analysis that students started to develop leadership roles within their group. These roles emerged from the strong feeling that a leader was needed to actively monitor and direct activities from time to time, as well as to keep the discussion focused. However, the students indicated they also welcomed greater tutor engagement (Light et al., 2000).

Martinez, Dimitriadis, Rubia, Gomez, and De la Fuente (2003) constructed two social network graphs based on reading and writing behaviour of students in two groups in the asynchronous environment BSCW. One group included the teacher and the other excluded her, allowing exploration of the teacher’s overall influence on the use of BSCW. Both networks show that the density of the interactions decreases with time, but increased again in the last phase of the collaborative project, when the students had to produce a joint report. The network with the teacher showed a slightly higher density of interactions, with the teacher being the most central actor (contributions by the teacher were read more than any of the others), but some other students occupied central positions as well. The influence of the teacher’s presence is also reported by McAlpine et al. (2004). Their work suggested that students look for the teacher to provide a positive input or attitude, and that having a teacher’s active presence in the online discussions seems to be a critical issue. McAlpine et al., suggested a range of pro-active teacher activities, including posting instructions and expectations, and using dialogue as a process of inquiry, as well as providing feedback. However, most importantly, the teacher needs to ‘tune-in’ during the collaboration process to find out what kind of moderation behaviour a specific group may need. To assist teachers in developing these competencies, Kennedy and Duffy (2004), when reflecting on the role of collaboration in distance education, pointed out that creating teacher–teacher collaborations seems beneficial for sharing good practice derived from experience, and gives support to teachers as they develop their practice.

“The social and pedagogical presence of the instructor is essential for improved communication and learning. Yet, online instructors need to be careful in structuring a feedback mechanism to encourage students’ inquiry and collaboration rather than quick immediate answers to a question that can, itself, be a barrier for effective student learning.” (Vonderwell, 2003).

In general, research in this theme suggests that teacher involvement and active participation is appreciated by students. The research presented reports that students find communication with the teacher constructive and encouraging, especially where teachers support the students to set the right tone for the discussion. With respect to the roles that teachers should play, the studies suggest that students seem to need or appreciate active pedagogical guidance from the teacher in the beginning; this can gradually transform into a more facilitative role in the middle and end stages of the discussion. However, a constant monitoring (even if only at a distance) by the teacher throughout is required to enable her to tune-in when needed. There is some evidence for students picking up some roles or leadership tasks to compensate for the lack or absence of teachers’ input.

In terms of the use made of theory by the authors of the papers in this theme, six draw explicitly upon one or more theoretical perspectives to contextualise their work. A further three draw on rich descriptions of praxis to perform this function. Four studies draw upon both theory and praxis. Seven of these studies use this basis to focus their aims for research, and a further five make a partial attempt at this. Only one did not use either theory or praxis to help with this. Six of the thirteen studies use this focus to inform the design of the study. Only two studies use their findings to interrogate and inform theory. One of them makes a partial attempt to synthesise theory and none of the studies tried to generate new theory. However, they all (13) use their findings to inform practice.

4.3. Teacher–student relationships

The teacher’s involvement is appreciated by the students, though the teachers have not full control over the learning agenda anymore. In networked learning environments where everybody’s contribution is ‘out in the open’ and can be challenged by every participant in the group, one can expect that the traditional more vertically oriented teacher–student relationship is changing. The teacher is no longer in full control; learners are actively taking responsibility and start to coordinate as well as regulate their own (collaborative) learning by performing a substantial part of the teaching presence role (Anderson, Rourke, Garrison, & Archer, 2001; Jones, Asensio, & Goodyear, 2000). This change is picked up by some of the studies included in this synthesis.

Eight of the studies assert that in NL environments the status, roles and expectations of the ‘traditional’ teacher–student relationship is changing, or at least being renegotiated. However, this is not unequivocal. For example, McAteer, Tolmie, Duffy, and Corbett (1997) suggested that the social context changes when teachers get involved. Yet they may find it difficult to avoid taking a directive role. Principally, this is because they are used to this form of communication and this is also what the students expect. McConnell (1999) pointed out that designing learning based on a community framework will, as a consequence, have an impact on how all the participants, including the teacher, relate to one another. Due to the high degree of openness that may be a feature of such communities, all the participants have equal access to the discussion including the comments made by the teacher, and therefore have the potential to respond and manage the learning process themselves. In this way the teacher may be challenged on certain issues by other participants. However, McConnell observed no sign of the teacher resorting to a differential power relationship in order to retain her status. According to McConnell, participants were all engaged in a ‘learning relationship’. Though people participated in different ways, and to varying degrees, the sharing of power did become something that was real to them all. Something similar was found by Rimmershaw (1999), who concluded that the teacher may become one of the ‘participants’ in a broader sense. According to her findings, the students responded better when the teacher actively participated in the discussion and valued the contributed ideas and experiences seriously. Vonderwell (2003) also reported that the teacher may sometimes contribute to the group discussions. However, she concluded that the teacher should be consistent with the amount of time they spend, during the course, in the discussion forum because inconsistency can cause frustration and decreased motivation.

However, more recent studies, point out that this different relationship have to be carefully planned because it has implications for the expectations and behaviour of the participants in an NL environment. Kennedy and Duffy (2004) spoke of NL encouraging a shift in the balance of power, or a levelling relationship between teachers and students—a shift towards facilitating students’ critical questioning of authoritative sources. “Teachers who are choosing to be a

guide on the side are empowering students by establishing an educational climate that contributes to a feeling of student empowerment” (Nulden, 2001, p. 369). A study carried out by Cook and Jacobs (2004) indicated that mutual expectations should not only be clear but also appropriate for the planned learning activities. In a case study, they used content analysis to identify approaches to teaching and learning in an online discussion board. Their particular focus was on how rules and roles were defined within the interactions that took place. They concluded that, where teachers and learners participate together in NL activities, discussion is not always appropriate to the task. They concluded that when discussion is used it should be clear and explicit how it will support that task, and what teacher expectations are in place. Hara et al. (2000) purposefully designed an NL environment where the students were in charge of their own learning and assigned roles (starter and wrapper) to help the groups to foster student responsibility. They found that the students with roles dominated the discussion and that the design provides opportunities to develop common ground or inter-subjectivity with their peers and teachers.

The studies presented reveal a tension between the traditional role of the teacher and the new social settings in NL contexts. For example, the teacher’s input to the online discussion can be challenged and openly discussed by students. Both the teacher’s style and the content of her contributions to the learning of the community may be scrutinised. The traditional boundaries between the teacher and the learner appear to be diminishing; a shift in the balance of power is apparent as teachers and students actively engage in a learning relationship. However, clarity about the rules of engagement is needed to inform the pedagogical design of these relationships.

In terms of the use made of theory by these authors, two of these studies draw explicitly on theory as a way of contextualising their work. Two draw on both theory and praxis for this purpose. Only two studies use this to focus the research aims of the study, and three use it to inform the design of the study. They all use results to inform pedagogical practice. Two studies use their findings to inform theory and only one to interrogate theory.

5. Conclusion and discussion

Studies included in this synthesis are mostly inspired by constructivism and social learning principles in which the community perspective was commonly used (see Table 1 in the method section). In this section, we will attempt to synthesise and summarise our thematic analysis. We will also attempt to make some general comments on the T–P C analysis that we undertook alongside the thematic work.

Students, as we have seen in the collaborative learning theme, are stimulated to construct knowledge together. In this way they are required to solve group tasks together, preferably in the context of a professional practice. At the same time, students are guided by task content, structure and goals that leads to an end product submitted for evaluation and assessment. Most of the time students are neither actually connected to real-life contexts, nor are they assisted by outside experts. The teacher, therefore, is required to take on the role of a domain expert, coaching students (apprentices) into becoming active participants within the practice of their subject. This might explain why several studies conclude, in the theme on the role of the teacher, that teacher involvement and active participation is appreciated and often seen as constructive. To a certain extent, however, one can argue that this ‘situated’ experience is limited. This situated experience may be too demanding to be realised in an educational context and needs to be ‘down-sized’ to operate within an actual educational context. This creates a tension around the role of the teacher, creating and limiting the learning context. More theory and design-driven research into the development of situated, open and authentic learning spaces, can be undertaken to challenge the traditional boundaries of the educational context. We need to rethink the roles and responsibilities of both the teacher and students in NL settings, as well as to think about how to invite other parties into the learning process. Which members and roles are needed and appropriated for engagement in learning activities? Who is responsible and when? Is it possible to open up this collaboration beyond the educational programs to connect to (or become) authentic learning communities? (Sergiovanni, 1999).

Another tension relates to teacher’s presence. Research presented here, on the one hand, indicates that the teacher’s presence is essential to improve learning and that students are in need of support for preparation and regulation (especially at the beginning). On the other hand, we see that students are capable of taking over some of the teacher roles, and starting to develop leadership roles themselves within the group (as a way to guide and support each other to participate in their activity). They are also acting as active learners, questioning and discussing the knowledge representing the knowledge domain they are studying. Therefore, when employing NL it seems important to carefully introduce students into taking over these responsibilities (Simons et al., 2000). In this process-oriented teaching there is a need to manage the interplay between self-regulation and external regulation (Vermunt & Verschaffel, 2000).

This gradually changes the teacher–student relationship. When students take over teaching roles and start to act as peer-tutors, they require an awareness of each others' learning styles and strategies, a process of developing 'inter-metacognitive' knowledge and skills in relation to the other members of the community. They need to relate this to the 'intra-metacognitive' knowledge they possess about their own personal learning behaviour to balance between their personal needs and desires, and the direction of the group. Developing inter-metacognitive knowledge and skills, we believe, needs more attention in NL. Some of the articles argued the need for participants to familiarise themselves with NL environments and to learn how to use them successfully. The fact that participants themselves develop strategies to structure and regulate group learning indicates that we need to study more carefully what inter-metacognitive knowledge and skills participants practice or desire. Also, during which stage of the NL process, as well as how to embed support for this in the design of NL environments.

Some of the papers study collaborative learning (explicit or implicit) as a way for students to participate in community-based activities. Participation is mostly described as a way for students to create and share knowledge together in order to solve pre-defined problems in an educational context, making use of the expertise, competence and tools available in existing cultural practices. This does not mean they don't create knowledge but that it remains within the sphere of individual/group knowledge structures.

If the aim is to have students learn through participation, then in most cases, as we have seen, the teacher will play the role of the full participant in her domain. The role of the teacher in this setting is one of a more competent participant who will act as a guide to model processes and skills; to model learning, thinking, and regulation of activities. The teacher will also provide metacognitive guidance and stimulate students to reflect on their own learning (Simons et al., 2000). If the aim is to create or build new knowledge through collaboration, however, we need to go beyond the participation metaphor (Sfard, 1998). Lipponen, Hakkarainen, and Paavola (2004) argue that knowledge creation goes further than participation because there is a distinction between knowledge used in productive work practices, and knowledge that is the object and product of the collaborative activity. This (latter) process requires participants who are well-connected to their practice and act as experts (at least to some extent) themselves. In this case more advanced learning can take place. The roles and expectations of all the members of an advanced NL community become aligned and deep learning relationships may form. Such a community may move beyond its current understandings of the domain and become creative, engaging in the re-negotiation of the knowledge in their domain (Wenger, 1998). These forms of community learning are reflection-based (Kirschner et al., 2004; Korthagen & Lagerwerf, 2001; Lipponen et al., 2004; Sergiovanni, 1999; Simons et al., 2000) and are more likely to be found in more advanced courses or within professional education, lifelong learning and in workplaces where communities of practice are constantly renegotiating their meaning. However, this process of reflection, abstraction and conceptual thinking is a longer-term process. This may be the reason why the higher levels of knowledge construction are less frequently observed in most learning communities (De Laat, 2001; De Wever, Valcke, Van Winckel, & Kerkhof, 2002; Gunawardena, Lowe, & Anderson, 1997; Veldhuis-Diermanse, 2002). Connecting subjects (knowledge domains) and practices over a longer period of time could be a way to transform communities of participation into creative communities or knowledge-building communities (Bereiter, 2002).

Based upon these thematic analyses what can we say in more general terms about the status of the T-PCs occurring in this work? What implications do this have for the future of NL research? It is clear that the majority of authors in the reviewed studies do use theory and praxis to contextualise their work. There is clearly evidence of engagement with the published literature. Authors want to locate their studies within what is already published. This indicates to us that they are beginning a 'conversation' with existing bodies of understanding. However, fewer studies actually used the theory or praxis to which they referred in their introduction as a basis for focusing or designing the research reported in their studies. After 'connecting' with the public conversation in their introductions, it is not common to continue the conversation into the design of their own research. Very few studies used their own findings to inform or interrogate the theory to which they have referred. Similarly, very few studies attempted to synthesize new theory from existing theory using their own findings. This means that currently few researchers engage through their research with T-PCs. This is the most significant finding about the current status of the T-PC, in our view. Theoretical perspectives are not being extensively integrated or synthesized by authors currently engaged in research in the field. Furthermore, there is little evidence that new theory is being generated from current empirical studies. This has significant implications for the future of NL research, in our view. Clearly, if the field of NL is to advance in terms of the theoretical base with which it engages, then researchers must use their own findings as a basis for interrogating, synthesising and generating theory. This can be done through testing theory through the design of NL environments or through finding explanations

for effects observed in existing practice. It is currently this aspect of the conversation that is least well developed in the studies we have reviewed. More studies have attempted to use their findings to inform NL praxis and this indicates to us some evidence of an ongoing relationship between researchers' findings and praxis. However, this is an asymmetric relationship at present because research into praxis is not being used extensively to build theory. We do, however, sound a note of caution here. Due to the ground rules used to select the articles to be included in this review, our focus was mainly at studying NL practice, and not for example on the development of courses and platforms. The T-PC analysis suggests that NL research is complex, with researchers drawing upon multiple theories to inform their investigations into NL. At the moment the field remains very fragmented. We argue that more researcher engagement with T-PCs is needed in order to generate integrated theory and support a more coherent programme of research.

6. Concluding comments and directions for future research

In this final section, we propose some ideas for further research in relation to the themes of our synthesis.

We saw that collaborative learning principles are strongly represented in NL design, but within the collaborative learning theme the most prominent conclusion is that the focus is predominantly on individuals using collective resources for their own purposes. Future research might focus on the possibilities for supporting a more genuinely collaborative focus in NL. This might, for instance, be through tasks or reward structures affording common interests. The presented research also suggests that some practically oriented learning tasks are more supportive of collaboration in NL than others. Future research should, in our view, study more systematically which task characteristics lead to more effective and collective collaboration. The general literature on collaborative learning may be of help in devising these research studies and guiding research on more pedagogy-driven design of NL tools to support collaborative learning processes in action.

Similarly most studies try to set up learning processes in a community framework that draw heavily on the social aspects of learning and social theories of learning. One challenge is to take these theories actively into account when designing and researching HE courses. What does social learning mean, how is it organised and supported? What is the position of the individual in this context? How do we change as persons as a consequence of this? What is group learning and how do we study its processes and outcomes? What are the key social learning competencies and skills, and how do these change the teacher-student, student-student relationship and experience? Do we need teachers or the traditional educational boundaries at all? In our view, these questions need to be addressed in order to move the NL domain forward.

In view of the changing pedagogical approaches in NL the main outcome of studies done so far appears to be that there are tensions between the roles of teachers in NL, and the leadership roles of students. How can teachers escape from their traditional roles and give room for new learning? How can teachers gradually withdraw their leadership and hand it over to students in process-oriented settings? How should the teacher's role develop in the various stages of development of an NL community? These are the central research questions to be addressed within this theme.

The main finding of our synthesis of teacher-student relationship studies is that teacher-student relationships may change during NL. More research is needed to understand this process. A further research question is: what is the most effective way to communicate the expectations of participants needed to understand their roles in NL?

In this paper we have attempted two ambitious tasks. We have undertaken a wide-ranging survey of the NL literature, and tried to identify the emerging themes of this work. We have selected three of these themes, and in each case tried to identify the main theoretical perspectives in use, the main directions of the studies, and the key ideas being addressed and researched. We have also tried to indicate where the main research effort might be directed in order to help to 'fill in the gaps' and achieve some coherence for the theme. Our second major task has arisen from our assertion that the field of Networked Learning research is theoretically fragmented. We have argued that this situation arises because NL research is a new field, and is drawing upon a wide range of theoretical perspectives. However, unless we can achieve some synthesis of these perspectives we may find it difficult to establish a coherent research programme in the field. We argue that one way of developing some coherence is to make theory and praxis interact explicitly, in other words, to 'converse' with each other in our research. By this we mean, to use theory to interrogate praxis, and use praxis to modify and develop theory, thus moving towards perspectives that are changing theory, modifying and improving it. As part of this argument, we have briefly surveyed the current level of T-PC, either explicit, or implicit, in the thematic research we have described. It is clear that some outstanding work is being done to make theory work, and to modify it in the light of research into praxis. However, it is also the case that much current NL research does not interrogate the

theory that it uses to contextualise it. We see T-PC as a way of thinking explicitly about how we might make the work of interrogating theory in our research more explicit and systematic. In this way, our ‘Quest for Coherence’ may, we hope, help NL research to climb up to the higher ground, and give us a wider ranging view of learning in networked environments.

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