
But the Learning Has Already Passed: rethinking the role of time in e-mediated learning settings

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ABSTRACT Time takes on a different character when online teachers take advantage of the possibilities for interactions occurring over different scales of time. Online teachers' pedagogical link-making can help students see links between ideas across individual postings so that meaning making becomes cumulative and progressive. This article reports on a qualitative case study of a fully online postgraduate course in Educational Research Methods within a New Zealand tertiary institution where the intention was to develop a learning community. The study was framed within a lecturer-researcher collaborative approach to facilitate online lecturer development. Data collected from the online postings between lecturers and students, and among students and lecturer and student interviews, revealed how postings that point towards previous group ideas, current developing ideas and forward-focused ideas at pivotal points in the course supported student reflection, collaboration, and provided for socio-emotional support albeit in different ways and means. The authors argue that there is value in explicitly considering the mediating role of time when learning is understood as multidimensional and cumulative and provide implications for further research and practice.

Introduction

Online learning as a form of distance education is increasingly being accepted as of educational interest and importance in mainstream tertiary education. For the purposes of this article, online learning is defined as activities and accompanying resources that use the Internet and the World Wide Web (web) to support teaching and learning. It is essential to note that the technology involved in supporting online learning by itself is insufficient to promote learning. Rather, the technologies support learning online by adding opportunities and possibilities for interaction between all participants in the teaching and learning process. From this perspective it has been observed that the online environment opens up new and different spaces and times for teaching and learning, especially when students and teachers come together as a learning community to engage in authentic and accountable learning experiences (Oren et al, 2002).

Investigations of time or temporal issues and how they impact on online learning environments have received little consideration despite the proliferation of online courses and programmes in comparison to investigations in face-to-face teaching contexts (Barbera & Clarà, 2012). Additionally, very little research has been conducted into the nature of online interactions in support of student intellectual, social and emotional development across different learning spaces and times of learning. This is essential if tertiary institutions are to continue to pursue online learning opportunities as a means of engaging and motivating students, of providing additional support for lecturers, and of extending learning opportunities beyond the classroom walls (Johnson et al, 2011).

Our article draws from current investigations and conceptualisations of time and temporal issues in face-to-face contexts and online learning environments relevant to the development of

learning communities. In the following sections, we firstly provide an overview of the theoretical basis for our study. Next, we report on a case study of a fully online postgraduate course within a New Zealand tertiary institution that was taught by a novice online lecturer. An online discussion forum was used for the crux of the course's teaching-learning interactions. Findings from the study revealed how postings that point towards previous group ideas and agendas, to current developing ideas and agendas, and to future-focused ideas and agendas, can support student reflection and collaboration and provide socio-emotional support for learning. Over the duration of the study, the lecturer came to appreciate the nature of effective online pedagogy and how learning in online contexts can be supported within and beyond the immediate teaching activity. Our article concludes with a discussion of the findings. We make the case for the value of explicitly considering the mediating role of time when learning is understood as multidimensional and cumulative (Haneda, 2009) and provide implications for further research and practice.

Theoretical Background

The Role of Time in Educational Contexts

There is an emerging trend for researchers who are investigating classrooms from within a sociocultural orientation to consider the implication of time and temporal matters on teaching and learning (Barab et al, 2001; Lemke, 2001a; Roth, 2001, 2009; Compton-Lilly, 2010). These studies acknowledge that learning plays out over multiple timescales (Lemke, 2000) – an interaction in-the-moment is nested within and made possible by patterns of participation that have been established over time (Lampert, 2001). In Lemke's (2001a) terms, longer timescale constancies 'constrain, afford, and intrude into moment-to-moment activity' (p. 19). Put another way, talk in the moment draws meaning from earlier lessons and tasks so that what happens depends on what had already happened including the 'now-in-progress' (Lemke, 2001a). In thinking about what this means, we were drawn to Mercer's (1995) suggestion that teacher and student talk and actions at any particular time can be thought of as part of 'a long conversation' (p. 284). He points out that, 'all conversations have a history and a future and take place between particular people in a specific place and time' (p. 30). Student responses draw meaning from 'the totality of their experiences of learning and being assessed' (Boud, 1995, p. 37), and the future they anticipate together. This said, often students experience their classroom learning as lacking in coherence and continuity due to the pace of instruction being too fast or slow to maintain their interest and attention or their being absent at crucial times (Mercer & Littleton, 2007; Compton-Lilly, 2010). This means, as Mercer (2008) points out, 'coherent knowledge and purposeful understanding will not naturally emerge for students from their continuous immersion in classroom life; they have to be pursued as a pedagogic goal through the use of appropriate teaching strategies' (p. 4). Talk is the main tool teachers have available to them to help students experience their learning as coherent and cumulative (Wells, 2001). Students' classroom experience is significantly influenced by the degree to which their dialogue with the teacher gives what they are doing 'a continuity of meaning and a comprehensible and worthwhile purpose' (Mercer, 2002, p. 145; see also Leinhardt & Steele, 2005; Mercer et al, 2009).

Writing about science classrooms, Phil Scott and his colleagues (Scott et al, 2006) point out that in order to understand the purpose and impact of any particular teaching activity, it is necessary to determine how the particular activity 'fits within the whole sequence of the lesson/lessons' (p. 26). Scott et al (2011) coined the term 'pedagogical link-making' to describe teacher practices that support students in making links and experiencing their learning as cumulative. They identified three forms of pedagogical link-making as fundamental to teaching science. The first form, knowledge building, entails making connections between different kinds of knowledge to support students in developing a deep understanding of subject matter. The second form of link-making concerns the need to make links between teaching and learning events occurring at different points in time in order to promote a sense of intellectual continuity (Mercer, 2008). The third form of link-making which Scott et al (2011) identified, relates to the ways in which a teacher makes links to encourage a positive emotional response from students to the ongoing teaching and learning process. They refer to this as pedagogical link-making to encourage emotional engagement. Scott et al emphasise that pedagogical link-making is important in science

because deep understanding of 'big' ideas and complex concepts is built up through a synthesis of a number of different smaller ideas and experiences. Engle (2006) expands on this notion, arguing that in teaching for transfer it is important to signal early on that ideas are built up across a range of experiences and that the ideas being developed have an application and are of interest in the wider community. More generally a sociocultural approach highlights the need to build coherence and continuity beyond the classroom (Lemke, 2001b; Haneda, 2009). What is co-constructed by teachers and students over their time together is recognised as drawing meaning from being tied to their experiences outside the school in their families and communities.

The Role of Time in Online Learning Community Development

Time and interaction take on a different character in online environments. Online learning environments support *self-paced learning*, offline or online, and *group-based learning*, asynchronously or synchronously (Naidu, 2008). Online interactions can be synchronous or asynchronous, and those interacting do not need to be in the same physical space. In the online environment, past interactions are kept fully in the present through the persistent record of the entity of what has been communicated. Moreover, online learning offers the ability to access experts and wider communities for just-in-time learning purposes, or for communicating one's learning process and outcomes to an authentic audience (Oliver & Herrington, 2000; Anderson, 2004). This said, Dennen and Wieland (2007) point out that the mere posting of ideas does not constitute a learning interaction. The negotiation of meaning in an online forum is dependent on multiple articulated viewpoints, and may be tied in part to the design of the learning activity (Häkkinen & Järvelä, 2006). Effective activities therefore are those that foster the contribution of student ideas and experiences and provide a context for the negotiation of shared meaning.

Some researchers argue that the development of a class as a learning community is fundamental to the success of online learning (Palloff & Pratt, 2001; Haythornthwaite & Kazmer, 2004). However, there is ample evidence that the development of online learning communities' focus on a shared project or product takes time (Johnson et al, 2002; Wheelan et al, 2003; Veletsianos & Doering, 2010; Jahng, 2012). Time is implicated in the development of online learning communities because community members need to establish a shared language, practices, customs and resources for learning (Johnson, 2001; Palloff & Pratt, 2001). Sewell and George (2008) found evidence that interactions need to combine an intellectual, social and emotional focus in order to establish and sustain a learning community in the class (Brown, 2001; Schwier & Dykes, 2004; Conrad, 2005). Essential here is the idea that interactions need to be responsive, reciprocal and authentic if they are to support members of a community to take responsibility for their own and others' learning. On the whole however time for such community building is usually accorded low priority in online course design.

In this article, we illustrate the role of time in the development of an online learning community as demonstrated by interactions that make links between ideas and agendas in the past, present and future, and attend to the intellectual, social and emotional dimensions of the learning process.

The Research Context

We report on a case study of a fully online education research methods graduate course within a New Zealand tertiary institution. The lecturer, Adrian (pseudonyms are used in this article) was a novice online but experienced face-to-face lecturer of educational research methods. Adrian was keen to adopt online learning tools to support and develop his online teaching and his students' learning. In order to support his development the study was framed as a lecturer-researcher collaboration involving a process of negotiated intervention (Khoo & Cowie, 2011). The negotiations were informed by a review of the literature triangulated against the findings of a baseline study of the views of online lecturers and students from the study site (Khoo, 2010). The intervention aimed to develop a learning community amongst the course participants.

The fully online course taught by Adrian, the Education Research Methods course, is a compulsory paper within the graduate education programme at the university. The course focuses

mainly on qualitative research methodologies and methods and includes discussion of validity or quality and ethical issues. It lasts 12 weeks and is conducted three times a year – as a summer school course and in semesters A and B. The online version of the course initially mirrored the face-to-face version of the course.

As part of the researcher–lecturer collaboration and intervention, the course curriculum, teaching and assessment activities were redesigned. The final course consisted of four modules: conceptual issues in research, data-collection methods, multiple approaches to research, and research design and course summary. The modules were planned to build upon one another in a coherent manner to provide a holistic overview of educational research. Teaching activities were designed to encourage collaboration and student engagement with one another's ideas in order to foster a sense of belonging to a community and to create shared knowledge. The entire course was offered via the ClassForum (which was eventually replaced by the Moodle Learning Management System). No marks were allocated for students' online contributions, but students had to participate online in order to pass the course.

Fourteen students from very diverse geographical locations, ages, backgrounds and experiences with studying online participated in the course. Students (local and overseas) were sent a course introductory pack two weeks before the course started. The online class was made available one week prior to the start of the course. Students were asked to log on to familiarise themselves with the features of the online class environment and the course structure. They were asked to post online a brief introduction, as well as their photograph, to help class members get to know them before the course started. Students were also randomly allocated into one of three discussion groups for online coursework. Groups could read each other's postings and messages but only contribute to their own discussion forum.

The Research Design

Research Methodology

A qualitative, interpretive methodology framed the collection and analysis of the data consistent with the intention of uncovering the significance of events as experienced by research participants (Maykut & Morehouse, 1994). The interpretive epistemology is congruent with a sociocultural view of learning that knowledge is co-constructed through dialogue and other forms of joint activity (Lave & Wenger, 1991).

Data Collection

Data were collected through student questionnaires, interviews and online postings to assess the extent to which the intervention was successful in facilitating meaningful learning experiences. Throughout the course, daily observations of the teaching-learning processes were conducted and weekly interviews held with Adrian. Eleven of the 14 students consented to participating in the research. At the end of the course, online questionnaires were distributed to students and 10 students responded. Follow-up interviews were conducted with four volunteers (Shaun, Sapphire, Shania and Melody).

Data Analyses

Descriptive statistics were used to analyse trends in the questionnaire data. A constant comparison approach was adopted to identify emergent themes from the interview, focus group and online postings data (Lincoln & Guba, 1985).

We analysed the data along three timescales that were an adaptation and synthesis of those proposed by Rogoff (1995) (based on research on children's learning) and Roth (2001) (based on ideas from science education research). In Roth's (2001) terminology these timescales were defined as being at the 'macro', 'meso', and 'micro' level. Although each timescale of analysis is presented separately it needs to be remembered that they influence and mediate each other (Rogoff, 1995; Lemke, 2001a; Roth, 2001). At the macro timescale we considered how learning and development

played out over the course as a whole. Our focus was on the overarching goals for the 12-week course. The meso level ‘zoomed’ in to investigate learning as occurring within the time frame of a course module. In this article, we focus on the second module in the course, which took place in weeks 4-6. At the micro level, and zooming further in, we analysed the sequence of online postings from week 5. At this timescale, we firstly analysed the postings according to the nature of the online interactions. Altogether 20 specific categories of interactions were identified. These were further organised into three general themes reflecting the purpose(s) for the interactions that were ‘Content or Intellectually’ (Intellectual) related; ‘Teamwork or Socially (Social) related; and ‘Supportive or Emotionally’ (Emotional) related (see Khoo, 2010 for details of this online analyses). Next, we paid attention to how the postings make implicit and explicit linkages to past personal experiences and shared events, to how postings describe actions related to the task at hand, and how postings signal future-oriented action that needs to take place. At each level of temporal analysis, we highlight key activities and their associated artefacts as tools for thinking and acting as part of the learning process (Saljo, 1999).

Findings

Teaching and learning is described along three levels of temporal foci – the macro, meso and micro.

The Macro Timescale: overarching goals and recommended approaches

The macro timescale focused attention on Adrian’s overarching goals for student learning over the course as a whole. These were that students develop a coherent and comparatively comprehensive overview of the educational research and that they come together as a learning community and learn from and with each other. Adrian used two artefacts to articulate his expectations for his content learning outcomes – a list of the course learning goals and the course ‘Overview Diagram’. He used the resource ‘Advice from Previous Students’ to communicate his expectations for the nature of student contributions and online interactions. These three resources acted as sources of continuity and coherence throughout the 12 weeks of the course.

The course goals and Overview Diagram artefacts. Adrian’s objectives for the course are detailed in Figure 1. We can see that they are high-level goals that direct student attention to the nature, principles and wider political and social location of educational research.

<p>Course Objectives:</p> <p>Upon the successful completion of the course, it is hoped that students will:</p> <ul style="list-style-type: none">– have an understanding of the nature of educational research;– understand the significance of the three research paradigms that have informed education research in New Zealand and internationally;– understand basic principles of research design;– understand a range of research methods and tools;– be able to select, and formulate a tentative research problem and develop it into a research proposal;– develop ideas about managing / conducting research in a way that is consistent with professional and normal principles of research ethics; and,– analyse and critique educational research conducted nationally and internationally.
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Figure 1. Refined course goals.

Adrian also posted an Overview Diagram on the class website. This was intended to encapsulate and provide an overview of the links between the key aspects of the educational research process. The Overview Diagram also indicated how these aspects were linked into the course modules (see Figure 2).

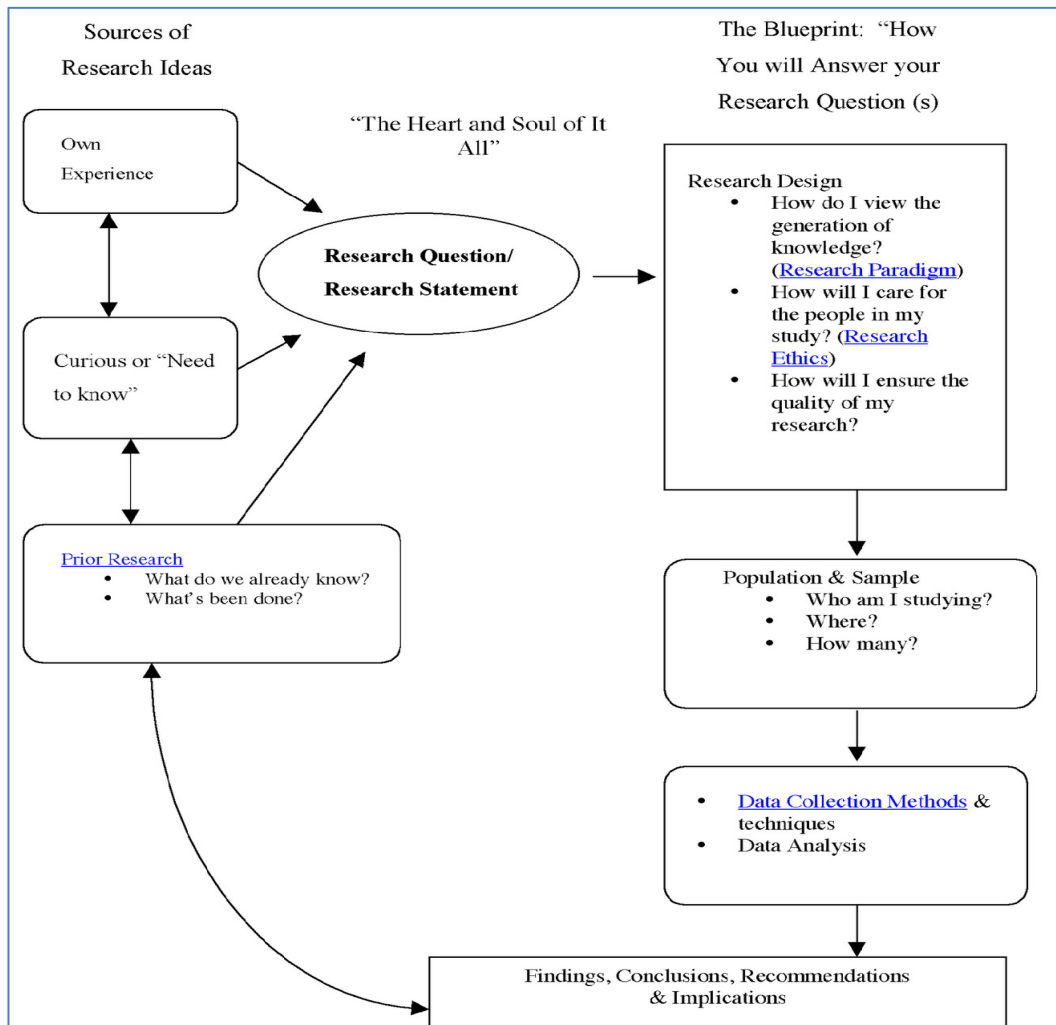


Figure 2. The course 'Overview Diagram'.

These two resources – the Course Objectives and Overview Diagram – built on from and encapsulated Adrian’s experience as an educational researcher and his experience over ten years of teaching research methods in a face-to-face setting that students could struggle to see the interconnections between different aspects of the research process. The resources were, in essence, a material representation of Adrian’s professional and pedagogical experience and his aspirations for student learning.

The Overview Diagram proved to be a pivotal pedagogical resource that helped create a sense of coherence across the various modules and activities. Adrian introduced the Overview Diagram in the first week so that the students had a visual map of how the course would unfold. Over the duration of the course it served as a point of reference that helped to create a sense of coherence and continuity of purpose between and within modules and activities that were distal in time and diverse in their apparent and foregrounded focus. Students could refer to ask how what they were doing at the moment fitted into the educational research process and the course as a whole. In the final week of the course, Adrian revisited the Overview Diagram with the students to highlight key aspects. He asked the students to reflect on and share the extent that their understanding of the educational research process had evolved over the period of the course. Results from the end of the course survey showed that over three quarters (80%) of students found the Overview Diagram useful in developing an overall understanding of educational research. Nearly all of them reported it was useful in making connections between the different parts of the

course (90%) and in relating their background experience to the educational research process (90%). The Overview Diagram also guided and focused researcher-lecturer negotiations and critical reflections as the course progressed (see Khoo & Cowie, 2011).

Advice from Previous Students artefact. To support the development of the class as a learning community it was decided to include an Advice from Previous Students (Khoo, 2010, p. 521) resource with this focus within the course website. Adrian alerted students to the resource section and this resource through a comment in his introduction in the ClassForum. See Figure 3 for an example of the advice.

Below are excerpts of advice given by previous students to give you an idea of what to expect and how to prepare for this course:

'Jump into the discussions early!'
'Learn to skim and scan for big ideas in the readings! Reading word by word is too slow.'
'Share your understanding or lack of understanding with others in your group. That's what the group is for – to support one another!'
'Don't just have your say and sit back and watch others interact.'
'Take the risk to share your thoughts, others could be thinking or feeling the same way too.'
'Be prepared to put in the time to learn.'
'Stop worrying about what other people think about your contributions.'
'Don't wait until the end to do the work – prepare for the course, do the readings, give yourself time to think through the ideas.'
'Regularly read and contribute to the online forum, don't wait until they pile up!'

Figure 3. 'Advice from Previous Students' in the course.

We can see from this selection of advice that there was a strong advocacy for students to contribute their ideas, providing a strong signal to students that learning online was an interactive process involving the sharing and development of ideas. The provision of advice such as this is consistent with research suggesting that experience of social learning both with and without technology can be supported by the articulation of ground rules about how to talk and learn together (Mercer & Littleton, 2007). It was intended to fast-track the development of the class as a learning community. We can see also that Adrian has positioned this advice as coming from previous students, thereby linking the current class and students with a wider community of interest: the implication is that other students have found the course challenging and that there is merit in sharing ideas and experiences. The overarching goals and processes that were expressed and articulated at this macro level were embedded in and realised through the course modules and activities.

Meso Timescale: course modules formative to teaching and learning

The meso timescale is important in identifying themes and patterns in interaction. It allows researchers to gain a 'feel' for how learning is progressing (Tobin et al, 2005). In this case we take the meso timescale as being to do with the course modules that Adrian developed to realise the course goals. Two modules were particularly formative to the teaching and learning in the course, albeit in different ways. The first module was an incidental learning experience for Adrian. A transformative moment for Adrian's understanding of the affordances of online pedagogy occurred at the end of Module 1 (from weeks 1 to 3). He noted that he had missed an opportunity to provide feedback to the student groups on their literature review postings, 'we missed the opportunity here [the learning has already passed]. Sometimes when things are online and you've got three groups, you tend to miss things and I missed that opportunity.' Following discussion with the researcher he realised that it was still possible to provide feedback. He decided to do this in each student's online portfolio (designed for students to communicate individually with him). The students responded very positively to his action of providing them with individual feedback even though the class learning focus had moved on to a new topic. Through this experience Adrian learned how to

exploit the disruption of the physical constraints of time that are afforded by the online setting whereby past postings can be brought to the present for further commentary and analysis.

The second module (Module 2, from weeks 4 to 6) was deliberately set up to engage students' active interaction and collaboration in a learning task. The second module focused on interviews, questionnaires and observations as data-collection methods. It was the first module to require group collaboration and it attracted a significant number of postings. Adrian used a scenario, drawn from his own experience, to stimulate and structure discussion. The scenario was that the Ministry of Education wanted to contract research into the use of computers in education and the task was for groups to decide on and prepare a report to justify how they would undertake the research to meet the contract requirements. This task design encouraged accountability, delegation, negotiation and group decision-making. The end-of-course student survey revealed that all the students thought the scenario was 'very' or 'somewhat' useful in providing an authentic context for them to discuss the course readings and ideas. However, to understand their learning and learning process in this task, we need to zoom down a timescale so that we can focus on their learning interactions.

Micro Timescale: supporting student learning in time

At the micro timescale student postings embodied and accomplished the learning that could be observed. In this section we present an analysis of a representative selection of the postings from week 5. These illustrate the nature and interplay of the interactional foci (intellectual, social and emotional) and temporal orientation (past, present or future oriented) of student postings. While they worked on the scenario, the students, with some lecturer input, interacted with one another to develop and extend their understanding of the three data-collection methods in a manner that construed learning as a social process that included an element of identity work linked to students' past lives and to their emerging identities as learners of and knowers about educational research methods (Haneda, 2009). Postings included consideration of the emotional work associated with establishing the mutual trust and respect needed for productive collaboration and with the learning of new, often challenging, ideas. Table I summarises the main foci for the interactions and postings in week 5.

Number of postings	Ways of interacting	Learning purpose served
33	Greetings or salutations	Emotional
26	Name addressing	Emotional
26	Thanking and/or encouraging one another	Emotional
21	Delegates/manages/organises group to increase group efficiency in task completion	Social
20	Agreement/disagreement with another's idea	Intellectual
18	Feedback on questions	Intellectual
17	Promises to contribute later	Social
16	Ask for other opinions	Intellectual
15	Sharing of information/resources	Intellectual
13	Gives opinion	Intellectual
12	Refocuses ideas when discussion becomes side-tracked	Intellectual
12	Apologises for late online contributions	Social
11	Joke or humour, social chit chat	Emotional
8	Sharing of feelings	Emotional
6	Ask questions to clear a doubt	Intellectual
4	Elaboration/restating position and possibly advancing arguments by referring to one's experience, literature, formal data or relevant metaphor or analogy	Intellectual
4	Summary or negotiation of ideas	Intellectual

Table I. Nature of students' key interactions in week 5.

As can be seen from the table, a majority of student interactions (greeting, name addressing, thanking and encouraging) focused on providing social and emotional support and on relationship building within the group in a manner congruent with an *emotional* purpose for interacting. Students sought to *coordinate* or *delegate tasks* amongst group members (21 postings); they made *promises* of a pending contribution (17 postings); and *apologised* for delayed contributions (12 postings). This set of postings evidenced a concern with a *social/teamwork* purpose associated with developing a sense of accountability and shared responsibility for one's own and the group's learning and task completion. Consistent with an academic focus and the need for negotiation of ideas among the group members, *agreement/disagreement* between students (20 postings) was evident. Students provided *feedback* on questions (18 postings), sought out each *others' opinions* (16 postings), *shared information and resources* (15 postings), *contributed an opinion* (13 postings) and acted to *refocus* the discussion (12 postings). These postings provide compelling evidence of the way students shared and negotiated ideas within a group in support of an *intellectual* purpose for interacting.

Turning to consider the temporal aspects of the postings, individual postings referenced prior contributions and ideas, contributed to the development of ideas under discussion at the time, or referred to future activities and ideas. The postings also had a temporal element associated with community building (a *social* purpose). For instance, *apologies* addressed social responsibilities that had not been met with regard to past or present task commitments whilst *promises to contribute* projected forward to anticipated action. Postings in support of *emotional* well-being were sometimes past focused, referencing previous postings where a group member had *shared feelings* of uncertainty about the course or commented on their personal life. They could also be present focused, such as *greeting* and *addressing* one another by name and more informal *social chitchat*.

Figure 4 is representative of the online contributions from one student discussion group. In this sequence, Vance initiates the group discussion on surveying as a data-collection approach by greeting the group in Maori and volunteering to compile the final proposal for the Scenario task for his group (see Figure 4, Posting #34). He then acknowledges the work Sapphire has done in the previous week, the consensus the group had reached, and contributes his own experience as part of providing a rationale for his proposal that a first focus for any survey should be to ascertain if schools have Internet access. In Posting #34.1, Sapphire builds on Vance's contribution by suggesting that principals be surveyed to access contextual information, then thanks him. We can see here that Vance references past shared events and experiences and both students attend to the demands of the present task.

Student participant	Online postings (week 5)	Temporal foci (past, present or future focused)	Ways of interacting	Themes (learning purpose served)
Vance (Posting # 34) [12.05pm August 12]	<i>Kia ora. He ra tino pai mo katoa.</i> (Maori greeting)*	Present focused	Greetings	Emotional
	I volunteer to 'do surveys' proposal this coming week:	Focusing to the future	Delegation of group work	Social
	Sapphire must be exhausted by now. Eh.	Linking back to previous week's task and the labour distribution in that task. This action brought Sapphire into the present task even though through it Vance implied that it would be reasonable for her to do less work this week.	Ask about one another	Emotional

	I think much of our preamble [written in the previous week] be retained and we need to look at suitability of surveys as data-gathering method re: Internet Usage.	Present focused	Refocus group's emerging ideas	Intellectual
	I think we all agreed that surveying would be the preliminary data-gathering approach – i.e. prior to interviewing of any type	Link to past discussion that reached a consensus.	Summary of ideas	Intellectual
	- and you all know my kaupapa: I <i>ad-nauseum</i> – know from experience that many learners especially have no access to Internet at school and at home. And yes – all too often they are my cousins. And my kids too actually!	Linking to his out of class funds of knowledge from his work/ family life to support his statement	Share personal experiences	Intellectual
	So maybe our first nationwide survey – over a sample range of diverse schools – should pose the initial question: do you have Internet access at all?; before we even decide how to go on from there.	Statement about action in the present	Giving opinion	Intellectual
Sapphire (Posting # 34.1) [12.12pm August 12]	Hi Vance	Linking to last posting – acknowledging previous contribution and signalling an intention to build on this	Name addressing	Emotional
	My first contribution to the survey section is, can we send a survey to all Principals establishing: school size, decile, number of computers, computer access to the Net, number of staff with Net access, student ethnicity, if students have Net access at school. All this data will enable us to sort out some coherence to the geographic locations and groups we would like to interview etc.	Present focused on the immediate task	Giving opinion Elaboration of an idea	Intellectual
	Thanks. Sapphire.		Thanking	Emotional

Note. *In New Zealand, both the English and Maori languages are recognised as accepted forms of communication.

Figure 4. Temporal and interactional analysis (student interactions) in week 5.

In the online postings that ensue, Vance continues to take a strong leadership role to coordinate the group's tasks and steer the discussion, with support from both Shaun and Sapphire. In the following sequence (see Figure 5), we see that Vance begins by identifying relevant literature to promote and justify a suggestion for a way forward. He reminds the group of the task requirements and signals to Shaun that he would welcome his input. He then signals the next decision the group needs to make (see Posting #42). Adrian responds to Vance's proposal in a way that affirms Vance's idea and the intellectual trajectory he is proposing (see Posting #43), drawing on his prior experience to justify his suggestion.

Figures 4 and 5 provide snapshots of group interactions that illustrate the development of intellectual ideas, social responsibility for the group's functioning and emotional well-being. The postings linked to individuals' past experiences and to previous postings, they addressed questions

of the moment and projected forward to signal what is needed to move the group forward as a collective in task completion and overall learning. These online sequences at the micro level of analysis between Vance, Shaun and Sapphire were representative of the range of interactions that occurred across all student discussion groups in the course. They served to construe learning as a cumulative and social process.

Student/ lecturer participant	Online postings (Week 5)	Temporal foci (past, present or future focused)	Ways of interacting	Themes (learning purpose served)
Vance (Posting # 42) [9.32pm August 13]	<i>Kia ora tatou katoa.</i> (Maori greeting)		Greetings	Emotional
	I reckon a probability sample of the stratified type is all we need ...: a sample covering a range of schools qua teachers and learners and beginning with formal questions about Internet capabilities and then moving onto less formal questions about usage.	Present focused on the immediate task but links to reading resources instead of his life experiences or previous experience in the course	Share resources	Intellectual
	Also forget about the Principals – they aren't part of the quota.	Linking to the earlier posting/question raised by Sapphire (see postings #34.1 in Figure 4)	Refocus ideas	Intellectual
	Shaun – <i>kia ora e hoa.</i> Any questionnaire questions would be fine.		Name addressing Greetings	Emotional
	The only thing we need to work out is how we will divide the sample into variables ensuring we cover all the wide range of schools in Aotearoa ... Weaknesses and strengths are enunciated fully in ... , by the way, whilst validity and reliability are covered on pages 128-129. The set text also claims the superiority of surveys and questionnaires over interviews, interestingly enough.	Present focused	Delegation	Social
Adrian [course lecturer] (Posting # 43) [9.28am August 14]	Vance,		Name addressing	Emotional
	you are right, forget the principals at this stage -you are looking essentially about the impact on teaching and learning ...	Linking to immediate past posting affirming Vance's ideas	Feedback Elaboration of ideas	Intellectual

I am trying to think of a case in the last ten years of operational research such as your scenario where we have not used interviews as part of an overall strategy. As you say stratified sampling is the best approach for what you are proposing.	Linking to past professional experience	Share experience	Intellectual
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Figure 5. Temporal and interactional analysis (teacher-student interactions) in week 5.

Discussion and Implications for Further Research and Practice

Time is a constitutive dimension of experience and explicit attention to its role in shaping and framing interactions and what is learned has the potential to help educators understand students' classroom (face-to-face and online) experiences in new ways. Through this article, we have illustrated the role of time in mediating learning when this is understood as both cumulative and multidimensional (there are conceptual, social and emotional aspects). To do this we have described and analysed how events and ideas operating along macro, meso and micro timescales contributed to the evolution of individual and collective understanding and linked to student and lecturer identities.

Implications for Lecturers and Their Learning

Conceptualising time as a resource within teaching and learning directs attention to the way these play out over social space and time (Tobin et al, 2005). It opens up new opportunities for pedagogical link-making that draws on and builds intellectual, social and emotional connections. It is essential that lecturers make these connections explicit if learners are to develop a coherent understanding of a topic and experience their learning as cumulative and transformative of their identity (Wells, 2001; Haneda, 2009). Research in both face-to-face and online settings identifies that curriculum agendas need to be articulated, become shared and, ideally, pursued as a joint endeavour (Smith et al, 2004). Productive learning relationships and ways of working need to be established (Dennen & Wieland, 2007). In addition, some account of what has been achieved or learned needs to be expressed for the benefit of students and lecturers. These aspects were evident in this case study – the lecturer made use of artefacts to articulate his goals for learning and expectations for interaction and he designed a set of linked course modules and activities to facilitate student interactive achievement of these goals. At the micro level, the students and the lecturer shared, critiqued and affirmed ideas in a process of collaborative sense-making. In designing online courses lecturers need to keep all three of these aspects and their associated timescales for development in mind.

A focus on time and temporality enabled us to consider and better understand how the lecturer's past knowledge and experience both contributed to and impeded his thinking and actions throughout the course, this being the first occasion that he had taught a fully online class. His experience of being part of a number of education research contracts informed his structuring of the course goals, the tasks he assigned and the feedback he provided. His experience in Module 1 of the value of feedback offered on past modules alerted him to the particular opportunities for interaction afforded by online discussions. Lecturers need to be made aware of such opportunities.

The horizontal and vertical connections and linkages of the different scales of time were important in anchoring and enacting student and lecturer learning processes. In an online setting the persistence of postings means that time takes on a different form as a resource in the pacing and sequencing of teaching and learning. A focus on time and temporality values student interactions across different spaces and over different scales of time. In the study students contributing their prior knowledge and out-of-school experiences to the learning process was an example of this crossover between different spaces and timescales. This point speaks to the notion that students bring the funds of knowledge and expertise (Lemke, 2001b; González et al, 2005) they have developed through their life experiences to the activities and ideas in formal education. These funds of knowledge pertain to: experiences with education and education-related matters; ways of

learning, particularly understandings of the value and nature of learning as a social process; and understandings of the emotional work involved in learning. Analysis of the postings and interactions in this study suggests that there is merit in lecturers drawing on students' funds of knowledge (Lemke, 2001b; González et al, 2005).

The need to build student communities of learners is well established (Palloff & Pratt, 2001). At the micro level, there exists a range of ways of interacting to accomplish the interconnected intellectual, social and emotional purposes of and for learning, especially when learning and development are accomplished as collaborative activities. The richness of the participation patterns observed in the case study (see also Sewell & George, 2008) conform with the characteristics of a thriving learning community (Rogoff, 1994). Importantly, peers rather than the lecturer were overtly the primary audience for any contribution as signalled by explicit naming and linking to a shared past (Dennen & Wieland, 2007). A temporal analysis adds an understanding of the extent that the linear sequence of contributions is informed by participants' experience of past events and interactions, the need to accomplish the task at hand, and by their anticipation of a shared future that is consequential for them as learners and students.

Concluding Comment

This study provides a snapshot of online distance learning. To the extent that other online learning contexts resemble the one described in this study, it is possible for this study to provide insights into the crucial issues related to the temporal development and analysis of online learning communities. By providing a detailed description of the research context and a critical analysis of participant experiences, we make the case for consideration of the multidimensional and temporal nature of learning. We propose that this approach is valuable and relevant to understanding the complexity and diversity of learning interactions in online learning communities.

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