Research in Networked Learning

Nina Bonderup Dohn
Petar Jandrić
Thomas Ryberg
Maarten de Laat *Editors*

Mobility, Data and Learner Agency in Networked Learning

Springer

Research in Networked Learning

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Dedicated to the memory of Gale Parchoma, a significant figure within the community of Networked Learning. Your contributions to the field and to the conference will be missed.

Foreword

This latest book in the Springer *Research in Networked Learning* series edited by Nina Bonderup Dohn, Petar Jandrić, Thomas Ryberg and Maarten de Laat is an excellent reflection of the state-of-the-art studies on researching networked learning. As the book editors point out, it brings in several new perspectives and research approaches seldom if at all previously adopted in the field. In their final chapter, they provide a rich overview of each of the chapters and carry on to discuss trends in thinking about networked learning within the Networked Learning Conference community.

What we find interesting is that while taking on new perspectives and approaches, many of the chapter authors remain close to the original ethos and understanding of the importance given to collaboration, critical reflection, dialogue and participation within networked learning. These characteristics figured as a significant dimension for many participants of the networked learning conferences in their explorations of the practice and theory of networked learning.

In Chap. 12 the book editors rightly, at the same time, raise the question of characterising the field at the domain level in terms of academic focus, methods, research questions or theories. It is certainly the case that, unlike 20 years ago when the conference first took place, all learning is now taking place in a networked world. However, that does not mean that all learning opportunities and courses can be labelled as being Networked Learning! Bennett and Folley in Chap. 5 aptly comment that we need, across the many pedagogical and technological developments, to *foster and develop students as active agents in their own learning*. Across many of the chapters, we see a focus on how to ensure agency and voice of the students in a postdigital educational landscape where, as Swinnerton, Coop, Ivancheva, Czerniewicz, Morris, Swartz, Walji and Cliff in Chap. 2 point out, many online *solutions, and the networks created to provide them, may echo offline disparities.* Critical and reflective pedagogy remains an integral aspect of networked learning in such reflections, as is indicated by the authors of other chapters also.

Furthermore, Kehrwald and Bentley (Chap. 7) suggest that the cognitive load of the potential changing roles required of learners in networked learning needs to be considered. Similarly, Carmichael and Tracy (Chap. 8) comment that pedagogies of

excess that rely on inquiry-led approaches, as is common in networked learning, require that *teachers need to reposition themselves as creators of spaces for fruitful encounters and generative inquiries, and enablers of the kinds of projects and lines of inquiry that students wish to pursue*.

Conversely, the focus on the use and misuse of data and algorithms in Part 2 of the book must be important if we are to heed the warnings of Whitworth and Webster (Chap. 9) and avoid *(assessment) regimes—that instil into higher education regimes of power and surveillance.*

It is not our intention to review all the chapters in this Foreword as the book editors have already done an excellent job of that in Chap. 12. We simply want to conclude by reiterating a couple of points from our own chapter and that of Sinclair (Chap. 11). In our chapter, we comment that *while we are not claiming networked learning to be a discipline, quite the reverse, we are suggesting there are identifiable patterns in the knowledge forms associated with it as a knowledge community.* However, these patterns and characteristics according to Tight (2012) when examined in detail and over time usually turn out to be about the development of new disciplines, sub-disciplines or specialisms. Networked learning on these grounds and as reflected in the chapters in the current and previous volumes could be claimed to be an identifiable specialism in its own right developed over 20+ years in part at least through the networked learning conferences. However, as Sinclair suggests while the conference is not about authoritarianism, *well-established practices inevitably set up tensions, contradictions and constraints that people might want to challenge, especially if they are interested in doing something new.*

The conference and the Springer Book series on Research in Networked Learning have always sought to bridge that delicate balance between established practices and thinking and new ideas and perspectives—something we believe the current book achieves very well.

Lancaster, UK — Vivien Hodgson
Perth, Australia — David McConnell

Introduction

This book is the seventh book in the Networked Learning Series dedicated to presenting chapters emerging out of selected papers from the biennial Networked Learning Conference (NLC). It is thus a contribution to the biennial setting of milestones indicating the state of the art within networked learning research. At the same time, the conference from which the papers were selected marked 20 years since the first Networked Learning Conference. This spurred quite a lot of reflection at the conference on what characterises the Networked Learning community and what demarcates networked learning from other research fields (if anything). We have chosen to represent these reflections with two papers which—with very different foci and methodologies—provide characterisations of Networked Learning, both as a field and as a community. These two chapters serve, respectively, as 'intro' and 'outro' chapters for the body of the book. In this sense, the present book also provides a status of networked learning research at this moment in time.

As editors, it is always a challenge to select 10–12 papers out of the many high-quality contributions that are presented at the conference. We have tried previously to include the views of the conference participants to get a wider opinion on topics and themes that might be interesting. In the past processes of choosing papers, we have for instance provided online forms for participants to suggest papers they thought were particularly interesting and thought provoking. These forms have always provided us with good suggestions and indications of what conference delegates found to be memorable papers and have provided good inputs for the editorial team's ultimate selection. The challenge of putting together a book with selected papers, however, is not only an issue of the quality of the individual papers. In that case we could just return to look at the review comments and scores that were provided for each paper (which is something we do take into account in the selection process). The task for us as editors, we believe, goes beyond merely selecting 'good papers'. It extends to drawing out wider themes and interests that cut across the papers and which emerge during the debates at the conference. In an effort to involve the conference participants more actively into the process of debating what were important topics emerging from the papers, workshops, posters and discussions during conference presentations, we organised a final event where we asked

participants to discuss in groups what they thought had been the most interesting debates and most pressing issues. Each group, apart from presenting their thoughts to others, then added their reflections to an online board (a padlet) highlighting themes and issues they found of particular interest. These reflections and discussions that participants entered have subsequently become very important, as the editors have looked closely at the inputs to choose the themes that structure this book.

The conference from which the chapters emerge was held in Zagreb, Croatia, in May 2018, as the 11th International Networked Learning Conference. We were very pleased to have Zagreb as our conference location in connection with the work on critical pedagogy that is at the core of research focus of the critical education group based at our host institution. Networked Learning has a longstanding tradition of critical reflection and engagement with the underpinning values and principles of networked learning pedagogy, and it seemed natural to bring this to the fore as a more central theme for this year's conference.

We want to thank the Department of Informatics and Computing at Zagreb University of Applied Sciences for organising NLC 2018. Locally organised by Petar Jandrić and Milan Bajić and supported by Dean Slavica Ćosović Bajić, the conference owes a debt of gratitude to many colleagues and students who volunteered their time and work to ensure its smooth operation. We are also thankful to Springer publishers, and our editor Melissa James, for publishing support through the *Research in Networked Learning* book series edited by Vivien Hodgson and David McConnell. We especially appreciate continuous sponsorship of the traditional Springer reception, at which we launched new books on networked learning and the new journal *Postdigital Science and Education* edited by Petar Jandrić. Most importantly, the heart of the networked learning community is its amazing group of researchers, partners and friends, who continuously invest their own time in activities such as peer review and who maintain networked learning at the highest quality of educational research. With this note, we need to acknowledge two very important people who have left the community after Networked Learning Conference 2018. Gale Parchoma, who made significant contributions to networked learning research and participated in many networked learning conferences, has recently lost her battle to mortal disease. We will miss you Gale! Alice Jesmont, conference administrator for the Networked Learning Conference for many years, has now handed over the position to Charlotte Hyldgaard and Morten Kattenhøj. We thank Alice for her contributions and incredible dedication to the networked learning community over the decades and wish a warm welcome to Charlotte and Morten!

The body of the book is structured into three main thematic sections, Parts I, II and III, 'flanked' (as indicated) by intro and outro chapters, which combine to characterise the field and community of Networked Learning. In our concluding Chap. 12, we present each chapter in more detail as the outset for reflecting on current and emerging issues. Here, we restrict ourselves to introducing the themes of the three parts, pointing also to how they connect to issues identified as emerging issues in the previous book of selected, revised conference papers (Dohn et al., 2018).

Part I is entitled *Aspects of Mobility for Networked Learning in a Global World*. It takes up the issue of *mobility, new forms of openness and learning in the public arena*, identified in Dohn et al. (2018) as an emerging trend concerned with the tensions and opportunities which boundary crossing leads to, given the somewhat counteracting significance of learners' anchorage in socio-material place. This is done through two chapters which investigate how aspects of mobility play out in Networked Learning on a global scale, as viewed from, respectively, a macro perspective of political economy and a micro perspective of individual negotiation of identity. The former focuses on (non-acknowledged) issues of inequality which ensue when university courses are provided as unbundled, independent modules in online education in order to allow learners increased flexibility and mobility. The latter analyses the case of a Nepalese woman studying in Europe and shows how her mobility across the diverse practices of her life requires her to negotiate a composite cosmopolitanism.

Part II is entitled *Use and Misuse of Algorithms and Learning Analytics*. Its three chapters work to remedy the somewhat surprising lack of focus on *learning analytics* which Dohn et al. (2018) point to as characteristic of Networked Learning research (at the time) in distinction to research and practice within higher education more broadly. The chapters included in Part II between them, on the one hand, illustrate research and learning potentials of algorithmic analysis and, on the other hand, discuss the risk involved in handing over too much power to such analyses. One chapter thus focuses on informal networked learning, in that it reports on a study where the analytical tools of social network analysis were employed to reveal ties and learning processes in a social media space. Two chapters centre on formal education and investigate, respectively, students' perception of data on their learning and the feedback practices that evolve as automatically generated feedback is instigated in higher education.

Part III, *Understanding and Empowering Learners*, provides further contributions to the issue of *differences between participants and in participant experiences—and the implications for the practice of online educators*—characterised by Dohn et al. (2018) as, deservedly, a recurrent and overarching theme within NLC. This part consists of four chapters. Two of them focus on learning opportunities (or lack of them), as afforded by technical aspects and their use in the networked learning environments. The first of these chapters investigates the cognitive load which key sources in networked learning place on the learner with a view to empowering students by reducing unnecessary load. The other chapter explores the empowerment of students resulting from their engagement as co-researchers in analysing and displaying a multitude of data with semantic web and linked data technologies. The last two chapters take a Communities of Practice approach. They investigate, respectively, issues of power and authority in developing student communities of practice and the role of boundary objects in students' transfer and transformation of knowledge between learning practices.

Reference

N.B. Dohn, J.-A. Sime, S. Cranmer, T. Ryberg, M. De Laat, Reflections and Challenges in Networked Learning, in *Networked Learning: Reflections and Challenges*, ed. by N. B. Dohn, S. Cranmer, J.-A. Sime, T. Ryberg, M. De Laat, (Springer, Cham, 2018), pp. 187–212

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Chapter 1
Becoming a Knowledge Community: The Epistemic Practice of Networked Learning

Vivien Hodgson and David McConnell

1.1 Introduction

It has been over 20 years since the first networked learning conference took place in Sheffield in 1998, and much has changed in that time. Not least, as many commentators have stated, digitalisation and the accompanying globalisation have dramatically impacted on the nature of work, society and education. Stiegler (2017) comments: 'Thinking is thoroughly conditioned by a technical milieu.' And Fenwick (2018) points out that there has been huge change as a result of social media and the emerging digital transformations of professional relations and knowledge; she goes on to comment:

> ….for me, a particularly compelling issue is the consequences of new digital technologies for professional practice and therefore for education (Fenwick 2018).

Alongside these changes, networked learning as an area of research and practice has developed. It could be suggested that networked learning 'reflects the tendencies of a new world still in the making; it is, after all, the only genre born of this new world and in total affinity with it' (Sinclair 2020 quoting Bakhtin 1981). Texts about and within networked learning are themselves carriers of its development.

An important aspect in the making or development of networked learning as a field of research and practice has been the networked learning conference. The purpose of the study reported here is consequently to consider the contribution that the networked learning conference has had to the development of or in the making of networked learning as an area of scholarship and research over the last 20 years.

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The study is based on a survey of contributors to the networked learning conference (NLC). In our analysis, we draw on two key concepts of 'epistemic practice' and the related concept of 'knowledge communities'.

We have already discussed elsewhere (Hodgson et al. 2012, 2014) the idea of networked learning as epistemic practice. Drawing on the work of Gherardi and Strati (2012) on practice based studies (PBS), we explained that it was important to recognise that practice is always epistemic. The designs we implement and the way we go about and do network learning are a performative accomplishment. As Gherardi and Strati (2012 p. ix) state, 'knowledge (therefore) does not reside in people's minds nor is it a commodity; rather it is an activity situated in social, working and organisational practice.' The shift is from seeing knowledge as an object to seeing knowing and indeed learning as a situated activity and something people 'do' together, collectively and socially.

Based on the replies we received in our survey, we argue that the responses suggest that the way participants interact and engage in dialogue about the theory and the practice of networked learning at the conference is in effect 'doing' networked learning in practice. As one regular attender to the conference explained:

> *I would probably try to get to the conference each time, almost irrespective of what participants ended up talking about. In a sense, networked learning is constructed and reproduced through their decisions about what to talk about, so it's also a way of moving along with a (loose) community* (r21).

While another more recent participant to the conference commented:

> *I guess what is different about the NLC is that it is not only an event that happens for three days biannually, but instead it is part of the way this community engages in conversations. As a relative novice to this field, I believe that these conferences enact the values of NL—bringing together people that are genuinely interested in connecting, participating, collaborating, and engaging in knowledge building processes—as such, the conference setting and the event itself becomes an opportunity to realise networked learning practices* (r15).

In both of the above responses, there is also the idea of a (NL) knowledge community being created at the conferences. In a not dissimilar way to what Tight (2015) explains with regard to different disciplines, quoting Becher's work on disciplinary difference and cultures, Becher claimed that 'there are identifiable patterns to be found within the relationship between knowledge forms and their associated knowledge communities' (1989, 150).

While we are not claiming networked learning to be a discipline, quite the reverse, we are suggesting that there are identifiable patterns in the knowledge forms associated with it as a knowledge community. NL is quite ecumenical in its allegiances and, if anything, probably interdisciplinary. Tight (op. cit.), however, also comments on the ideas of interdisciplinarity, saying:

> Interdisciplinarity, however, when examined in detail and over time, usually turns out to be about the development of new disciplines, sub-disciplines or specialisms, rather than some more fundamental and comprehensive change, and its proponents and their practices are similarly capable of characterisation (Tight 2015).

The idea of networked learning being capable of characterisation as a knowledge community through its epistemic practice(s) at the networked learning conference did have a certain resonance with the responses we received to our survey. Consequently, we believe that they offer us a view of networked learning as it stands in 2018.

This said, networked learning has come to be associated with certain concepts and underpinning values, including a broad definition that has become the standard definition used by the NL conference, as it appeared in the first book of papers based on the 2004 NLC (Goodyear et al. 2004):

> We define 'networked learning' as learning in which information and communications technology (ICT) is used to promote connections: between one learner and other learners, between learners and tutors; between a learning community and its learning resources (Goodyear et al. 2004).

What was emphasised or stressed in the definition and other early work presented at the conference, e.g. the *E-Quality in e-Learning Manifesto*, presented at NLC 2002, available at http://csalt.lancs.ac.uk/esrc/, were key ideas such as the following:

- Learning community
- Connections
- Reflexivity
- Criticality
- Collaboration
- Relational dialogue

1.2 Methodology

In the study, we used a short questionnaire to collect the views from regular attenders of the NL conference in order to understand the role that the conference has played in the development of their thinking and ideas over time. We e-mailed the questionnaire to 30 people who had participated in NL conferences and had attended and presented papers at a minimum of three conferences. In inviting this group of participants, we acknowledge that the people identified to participate were in a privileged position that enabled them to participate so fully over many years in some cases.

In addition, we included two more recent conference participants who had contributed a chapter based on their NLC paper to the Research in Networked Learning Springer book series. The lead institutional organisers from all the NLC conferences between 1998 and 2018 were also included. Thus, all survey respondents had a close, often-longstanding association with the networked learning conference and its 'knowledge community' and were therefore in our view able to comment on how they had experienced its contribution in developing the theory and practice of networked learning.

With the questionnaire, we sent a participant information sheet that explained that we were conducting this survey as the past co-chairs of the networked learning conference between 1998 and 2012 and co-editors of the Springer book series on researching networked learning. In addition, we explained that the focus of the study was on the purpose the conference has played for different people and how their thinking and ideas have developed and/or changed over time. Finally, we explained that we were inviting each of them to take part in the study as someone who has had either a long or an intermittent association or, in some cases, a significant more recent association with the conference.

We decided to ask several basic questions about their experience of the conference, plus one about their conference attendance. We piloted the questions with a couple of colleagues who were familiar with the conference and our work in networked learning, and they suggested that a key missing aspect of the conference was its sense of community. One of them commented: 'Seems ok as far as it goes but a significant aspect I don't see a question about has to do (ironically) with the sense of a community which I valued more than anything else. Meeting with kindred spirits, from different disciplines but likely to have common ground in terms of educational (centre-left to left) values.'

Consequently, they encouraged us to include a question that considered the conference as a forum or a community rather than one that was about respondents' purpose in presenting at the NLC. In addition to the survey questions, respondents were given a reminder list of the conferences they had attended and their themes and the papers they had presented. The five questions were as follows:

1. What attracts you to NLC as a forum/community in which to present your work?
2. Have you developed your thinking and ideas as a direct result of your attendance at NLC? If so, please describe how your thinking has developed.
3. In what ways—if any—have you seen a change in focus and key ideas/theories presented in the time you have been attending the Networked Learning Conference?
4. In what ways—if any—is Networked Learning contributing to the context of higher education learning and teaching practice in which you work and research?
5. Finally—and if you can remember—can you indicate when you first attended the NLC and how many conferences you have attended?

Twenty-one responses were received, and we included our own responses to the questions, making the total 23. Countries respondents were from or were currently working in the UK, Australia, New Zealand, Denmark, Sweden, Italy, the Netherlands, Croatia, South Africa and Canada. Fourteen respondents were female, and nine were male.

As well as showing how many conferences that the respondents had presented papers at, the first column of Table 1.1 in addition indicates how many of the respondents had edited a Research in Networked Learning (RNL) book series and/or written a chapter in the RNL book series. In summary, as indicated by the colour coding in column 1:

Table 1.1 Summarises the range of experiences of presenting papers at the conference of the all-23 respondents

Year	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016	2018
M	x	x	x	x	x	x	x	x	x	0	X
M	x	x	x	x	x	x	x	x	x	x	X
M	x	0	x	x	x	x	0	0	0	x	0
F	0	x	x	x	x	x	x	x	x	x	X
F	0	x	x	x	x	x	x	x	x	x	X
F	0	0	x	x	x	x	x	x	x	0	0
M	0	0	x	0	0	x	x	x	x	x	X
F	0	0	x	0	0	x	x	0	x	x	X
M	0	0	0	x	x	x	x	x	x	x	X
M	0	0	0	x	x	x	0	0	x	x	0
F	0	0	0	x	x	0	0	0	x	0	0
F	0	0	0	x	0	0	x	0	0	X	0
F	0	0	0	0	x	x	x	x	x	x	X
F	0	0	0	0	0	x	x	x	x	x	0
M	0	0	0	0	0	x	x	0	x	x	X
F	0	0	0	0	0	x	x	0	0	x	0
F	0	0	0	0	0	x	x	0	0	x	X
F	0	0	0	0	0	0	x	x	x	x	X
F	0	0	0	0	0	0	x	x	x	x	0
F	0	0	0	0	0	0	x	x	x	0	X
M	0	0	0	0	0	0	0	x	x	x	X
F	0	0	0	0	0	0	0	0	x	x	X
M	0	0	0	0	0	0	0	0	x	x	X

Responses and networked learning presentations

- Seventeen had edited an RNL series book and/or written a chapter in the RNL book series.
- Two considered themselves as relative outsiders to the NL community/network but had attended three conferences over a period of years between 2004 and 2014/2016.
- The remaining four had attended between three and seven conferences and indicated through their responses that they felt part of the NL community/network.

We each carried out an individual analysis of the respondents' returns, looking for patterns and themes in order to identify some areas to examine closer, in accord with qualitative data analysis approaches suggested by, for example, Lincoln and Guba (1985) and Miles and Huberman (1994). We shared our individual analysis and between us identified four main themes that had emerged across the responses received. In our description and analysis of the themes below, all quotes referred to from respondents have a numerical code to maintain their anonymity, and each respondent is referred to as r1 through to r23 throughout the paper. In using the quotes, we are trying not to include the full spread of respondents' replies but rather to use individual responses to illustrate recurring comments and the themes emerging from across the analysis of all responses. There were no clear differences in responses from participants based on how long they had been attending the conference.

In our role as researcher, we followed the tradition in qualitative research of locating ourselves as situated in the community of networked learning conference

respondents. We were trying not to be 'anonymous' researchers but rather to be participants in the research, which we wanted to be quite open about in our communications with respondents. In doing this, we cannot claim to be value free. As Denzin and Lincoln put it:

> Researching the native, the indigenous Other, while claiming to engage in value-free inquiry for the human disciplines is over (Denzin and Lincoln 2008).

1.3 Themes in the Responses

Every respondent had her or his own experience and story to tell about his/her participation in the NL conferences, and each experience varied. Nonetheless, we identified the following four recurring themes:

- Critical space in networked learning
- Community in networked learning
- Scholarship in networked learning
- Developing practice in networked learning

These four themes appeared to be consistent in respondents' understanding and experience of the core ideas of networked learning. To put it another way, many people felt that networked learning itself gives a frame of reference for how the conference enacts the values of networked learning as a knowledge community. Consequently, we believe that a closer examination of the experience and practice of the networked learning conference offers an interesting opportunity to re-evaluate key characteristics and values associated with networked learning. It offers an example of the 'doing' of networked learning as a social epistemic practice. Further, it allows us to consider what practices are produced and re-produced in the responses to our survey, which assist us to see how the characteristics of NL are institutionalised in the NL conference as taken-for-granted assumptions and beliefs.

Through the following descriptions of the four themes identified in our survey, we will consider the way these ideas were reflected and developed through respondents' comments and experiences of the NL conference.

1.4 Critical Space in Networked Learning

The editors in the final chapter of the most recent Research in Networked Learning book (Dohn et al. 2018), while reflecting on the NLC2016 papers, point out that there is a growing interest in the examination of learning spaces, particularly with respect to the way they are configured and produced within digital networks. They explain, however, that space often plays an important, if sometimes implicit, role for the issues discussed in the NLC book chapters. They comment:

> The focus on learning spaces further reflects at least two trends in the Networked Learning community and the field of learning and education in general. The first of these trends is the growing awareness of the significance of the socio-material place of learning in determining activities, interactions, and learning outcomes (Carvalho et al. 2017). The second trend concerns what might be viewed as the dialectical opposite of this focus, i.e. the significance of boundary crossing (Akkerman and Bakker 2011; Wenger 1998) for initiating and inspiring new cognitions and practices. These trends combine also in the first theme which we see emerging from the chapters of this book as an area of focus deserving further investigation in the future: mobility, new forms of openness and learning in the public arena (Dohn et al. 2018).

In raising this growing interest in the ideas of space at the NLC and for networked learning more widely, they infer but do not directly discuss the idea of 'critical spaces' that emerged in our analysis of responses to our survey. Criticality and more specifically, the importance of a critical space for dialogue and learning seemed to be an important aspect for respondents.

Reference to the strength of papers presented at the conference itself, supporting criticality and critical reflection was a recurring theme in many of the responses. However, a closer examination of the responses revealed that it was not just about criticality and reflection, as one respondent commented. Or as another wrote: *I think it has supported a more critical take on claims that might be made about technology* (r5).

It was as much about how this had been possible as a result of creating or making a space, from the very early conferences, where criticality and critical reflection could happen and were acceptable or, as one person commented, 'even required'.

While the idea of critical examination has always been clearly stated in the NLC calls for papers, what is not stated is what this means or how criticality is reflected in practice in the NL conference. However, some of the survey respondents revealed how and in what ways the conference provided a 'critical space', stating, for example, that from the beginning

> *Networked Learning seemed in those early days to open up the possibility of a more interesting, critical space where it was possible to take some risks in thinking* (r1),

a space that allowed the development of discussions and a 'critical' examination where

> *The NLC's critical, social justice-oriented approach to networked learning brought me 'home'* (r9).
>
> *I have always felt that NLC was interesting in that it invited more critical, theoretical, politically and social aware* (r7).

And also

> *It feels quite important to have a community beyond my immediate colleagues and students that I can claim as my own—and the NLC has been that for me over the years. Spaces for critical thought about interesting issues in relation to digital education, networked learning, and so on, are really vital for us in this field* (r4).

In these comments, we start to see that the NLC as a 'critical space' allows participants to

- Take risks
- Examine social justice and ethical and political concerns
- Consider and examine power relations from a critical perspective

What is more, according to comments under other themes, the work done in this critical space is (mostly) to a high academic and scholarly level and represents a range of different theoretical perspectives and interdisciplinary thinking. Importantly from a networked learning perspective, it is nourished by a supportive and interesting ongoing community/network of NL researchers. As one respondent aptly commented, the conference

> *Practices what it preaches—provides a supportive and critical on-going international learning network* (r6).

It is equally important to put a critical lens on the NLC as a critical space. As one respondent (r20) alluded, it does present potential social and economic barriers through being in a fixed physical location and the relative high cost of attending. In addition, as in any social situation (and as we will discuss shortly, in any community), hierarchies of authority and power have to be acknowledged. To this extent, control over what is deemed to be networked learning is maintained through mechanisms that operate both consciously and unconsciously through the conference organisers, the paper reviewers, the hot seat presenters, the keynotes, the participants themselves and the book series editors and publishers. While striving to operate in a flexible and open manner, all involved have a certain investment and contribution in retaining the above characteristics while still seeking to develop and extend the theory pedagogy and practice of networked learning. As Bayne and Ross (2013) point out, referencing Peters and Hume (2003), openness does not mean freedom.

There was a sense in the comments made by some of the respondents that this control is shared with and among the conference participants as we change/develop what NL is every time we come together. This was something commented on by Clara O'Shea in her NLC 2018 paper (O'Shea 2018). Respondents' experience of the networked learning conference community and its significance to our understanding of networked learning are discussed in more detail in the next section.

1.5 Community in Networked Learning

In their analysis, which forms the introductory chapter of the Research in Networked Learning book from NLC 2016, de Laat and Ryberg (2018) identify 'community' or 'community of practice' as one of the dominant perspectives discussed at NL conferences. They comment:

> The interest in community oriented and collaborative forms of learning has always been strong within networked learning; in fact, it is probably because the notion of Communities of Practice resonates well with the foundational ideas of Networked Learning that it has become so pervasive (de Laat and Ryberg 2018).

If then, as we have stated, we see the NL conference itself enacting the values of networked learning, what do we learn about the idea of community in networked learning from the responses to our questions? Many respondents talked positively about their sense of being part of a community and indicated that this was a major attraction to them in attending the conferences over the years. First, following on from the above comments by de Laat and Ryberg, it appeared that participation in the conference encouraged thinking critically about the notion of community itself:

> *I think that my first attendance at NLC 2004 was especially useful to make me think in critical terms about the notion of community—so influential in higher education at that time, also because of the wide popularity of Wenger's notion of community of practice. I started to think that using the term communities in higher education means privileging a certain kind of relationships, closely knit, while networked learning does not privilege a certain kind of relationships, for example those reflecting a notion of collaboration, and makes it possible to appreciate different forms of participation for learning. I think this notion has become much more relevant—and useful—than that of community to understand forms of experimentation and collaborative learning that have emerged with digital networks* (r16).

In addition, as discussed further in the next sections, while the idea of an ongoing NLC community was considered important, it was not considered by particularly more recent attendees of the conference to be a closed or unwelcoming community. Our analysis of the respondents' comments suggests several different but mutually supporting views of the NLC community.

So, for example, respondents talk about the community as a place where members can develop attachments, friendships and ties. The concept of weak and strong/close ties is a familiar one from the literature on social networking and networked learning (Jones et al. 2008). All but two of the respondents to our survey indicated that they felt part of the NLC community of researchers. They talked about the strong ties that they have made or experienced within the NLC community. Some talked of the importance to them of being part of an ongoing and continuing series of conferences where a core of the community was relatively stable, thus allowing them to build relationships, stating, for example, that the community was *a manageable size so one does not get lost. It is consistent from conference to conference so one can build relationships over time* (r13).

The roots of the conference community are, however, Anglo-Saxon in culture and thinking. And the language, in common with many other international conferences, is English. All of these can potentially present barriers to being part of the NLC community for those from other cultures and other ways of thinking and speaking, as one respondent says:

> *I found that language but also culture is still a barrier for my colleagues to take part in the debates of the NLC. However, I appreciated the fact that many researchers within the NLC adopted French and German critical and post-modern theories to develop their own reflections. While the NLC's language was English, the community's culture was open and well beyond the Anglo-Saxon perspective of research and practice* (r12).

What this respondent says indicates that for them, despite the real barriers, she seems to value the openness of the networked learning community.

Another theme in some respondents' replies was the way in which the conference community provides participants with affirmation of their professional practice and helps them consider their practice in the light of collegial discussion:

> *There are new ideas. There are works in progress. There are some 'old' ideas which are still bearing fruit in terms of practical implications for my work in higher education. I find this mix quite supportive of some aspects of my practice, but also quite stimulating in terms of framing and reframing my ideas and my practices … and so refining them. This is important, particularly for researchers and practitioners like me who may not have ready access to a group of peers that is co-located* (r17).

And for some, the opportunity for sharing and critiquing ideas in the community was a key feature:

> *with each new conference the NL community critiques the political/ethical implications of reliance on [technology] tools to theorise relationships among tutors, learners, resources, and mediating technologies (including inscribed designs for learning)* (r9).

The way in which the NLC community puts into practice the values of connection, collaboration and knowledge building associated with networked learning and the way in which the community provides a space in which members can grasp, understand and enact networked learning practices were all seen as important: As one respondent aptly commented:

> *NLC sure lives up to that side of its label (i.e. networking)* (r19).

To summarise, the analysis of respondents' comments on community indicates that the conference provides a space for enacting the following values and practice of networked learning:

- A communal spirit of encouragement and support
- Informally sharing and critiquing ideas in a supportive way
- Affirming professional practice in networked learning
- Openness to other ways of thinking and speaking
- Connection, collaboration and knowledge building

It appears to be the case that the networked learning conference community has developed a culture where participants place high value in supporting each other and in working towards a collective and shared process of participation and understanding. In noting this, we should not be complacent about the conference being a space that supports everyone. As one respondent also commented, there might be a 'canon' in the networked learning community (r20). To this extent, as mentioned by respondent r16 above, the idea of community may itself be problematic. Ideas on community can be nostalgic and seen as some kind of utopian ideal. They can be used to try to foster conformity and consensus, which can have a normative effect, which may lead to the setting of norms that exclude certain kinds of behaviour and ways of being (Hodgson and Reynolds 2005, McConnell 2006, Roberts 2006, Ferreday and Hodgson 2008). Our NLC survey respondents seldom talked of the NLC community in this way. However, we should remain alert to the possibility that for others, who do not clearly identify or see themselves as part of the NLC com-

munity, their experience of community may be very different from the one described above.

1.6 Scholarship in Networked Learning

Another characteristic of the conference that respondents identify is the way in which scholarship is developed through the conference. Our analysis indicates that scholarship is evident in two broad areas: the conference processes, i.e. the quality of participants' relations and the sharing of ideas, and the way in which networked learning is defined and re-shaped during the conferences.

The patterns and processes of the conference community can lead to new forms of knowledge and scholarship concerning the theory, pedagogy and practice of networked learning. From our analysis of the responses, it is evident that the conference is a place where participants share a common sense of identity as scholars of networked learning and where participants 'exchange information, build alliances, dispute ideas and work together' (Tight 2015):

> *NLC is also a place where one can hear/talk about ideas. That's important. Other conferences in the 'Ed Tech' area tend to be dominated by show-and-tell accounts of recent educational innovations or (more rarely) by empirical studies that value method over substance. I don't mean that the perfect conference is a philosophical talk-fest—far from it—but NLC seems to welcome people who have interesting ideas to share, without requiring the supporting props of shiny new gadgets or tight data* (r21).

Hodgson et al. (2012) consider the ontology of networked learning and the assumptions it makes about the nature of being and existence. Making sense from one's own personal experiences and view of the world is a key feature of networked learning. Our analysis of the survey responses indicates that many conference participants experience the NLC as a scholarly setting in which they can make sense of their own personal and professional experiences and where they can engage in scholarly discussion of issues that are instrumental in driving their scholarly activities. Respondents reported that attending the conference exposes them to new ideas and engaging discussions that helped them make sense of networked learning and their own personal dilemmas and concerns through processes where, for example:

> *I found myself in an ideal mix of exposure to new ideas, active discussion of both theory and practice, and a truly welcoming group of strong thinkers. This experience has repeated itself at each of the NLC's I have attended* (r17).
>
> *My research-theory-practice 'home' will always include a complex combination of my Canadian and UK experiences. I have nowhere outside the NLC to sort this complexity and highly value the opportunity to continue working toward that goal* (r9).
>
> *Within these discussions, there was the recognition of a distinction between seeing networked learning in terms of it being online or offline was disappearing:*
>
> *… the field of networked learning has moved from a focus on 'online learning' towards including how networked technologies are affecting on-campus, full-time students … new modes and mixes of online/offline and digital/analogue are emerging and call for reconceptualization of distinctions such as online/offline* (r7).

As the educational landscape experiences such changes, participants' quest to discover is striking in many of the responses, which capture an enduring characteristic and spirit of scholarship, which is a wish to solve problems, discover alternative viewpoints and transform practice. It is also evident in the way in which the conference over time has contributed to shaping and defining understandings of networked learning and in the way in which it offers other and new theoretical perspectives, as suggested in the following responses:

> *The conference has always engaged with the idea of how we define networked learning: the definition of this that emerged from the work of Vivien and David, (i.e. the authors of the survey) and other colleagues, who established it has continued to shape it, but has also adapted and moved on as other theoretical frameworks have emerged* (r1).

> *I go to NLC because speakers are not continuing to figure out how to put courses online or how to develop 'best practices' for instructors. Presenters and attendees tend to be in the forefront of new thinking about how networked learning can be used, where it applies, and how to take the best advantage of it, whether for exploring new theories or new practices* (r10).

> *NLC has helped to engage with an audience of researchers and practitioners to explore and design for social learning relationships, appreciate human agency in networked learning and develop my work over the years to include non-technological social (f2f) networked structures for learning and professional development* (r6).

These and other comments made by the respondents help us understand the place of scholarship in the networked learning conference and the central role it plays in its development of networked learning ideas. Participants are seeking a place in which they can engage in high-level discussion, debate current ideas and theories and explore the way in which networked learning is developing, as well as being challenged in their thinking. For some, the conference provides an important and, as already discussed, critical and supportive space for them to clarify their thinking in ways that is not possible elsewhere.

1.7 Developing Practice in Networked Learning

The final significantly recurring theme in participants' responses relates to the development of practice from a networked learning perspective. This is a theme that epitomises the idea of epistemic practice where the theory of networked learning is captured in the practical accomplishment not only of one's learning designs but also in our situated performative actions/work and social practices.

There was the recognition of how the conference had for many of the respondents a direct impact on informing their approach to their own professional and academic practices. Not only in terms of developing their theoretical ideas but also for sharing and getting feedback on their practice. Finding the community as a place to share and provide feedback in a supportive but still challenging manner:

There is still room for a joyful sharing of things that have been tried out and might provide some inspiration for teaching—I love the mix of challenge and stimulation (r5).

I have been inspired by studies of specific NL designs for planning my own teaching, and I often use texts from the NL community in my syllabuses (r2).

It was not, however, only a case of taking on or developing ideas to implement in one's own teaching and learning practice and also to be able to share these with others either when designing new programmes or advising other institutions etc.:

Networked learning has challenged my thinking about groups and communities as the locus or main pedagogical constellation and this has also meant a lot for how I have tried to work with networked learning locally. I.e. working with networked technologies to increase transparency between student groups; thinking in ways of how students can develop and utilise their personal learning networks as a way to strengthen and challenge collaborative knowledge building (r7).

Ideas from NL fed into the last major program I helped design (the Masters in Learning Sciences & Technology at (name of University) and they also inform some of the work I do as a consultant to other universities wrt (with respect to) design approaches, professional development programs, network/community-oriented learning, etc (r21).

I discuss NL with research students and this gives them a point of reference and a way of looking at technology and higher education, which often they have not really thought about. It gives me a point of reference in discussing technology internally too for example it is interesting to see people use different frames for the use of technology (they often become quite 'transmissionist' when it comes to distance learning in ways they would critique if teaching face to face) and I like NL for giving another way of looking at it (r14).

In addition, as one respondent commented, in the examination of practice at the conference, there has been an ongoing extension or focus of the domains of practice considered:

… first towards informal education and then towards activist perspectives. There has perhaps been a shift from technologies for teaching to technologies for coding—and what happens to the data from these. These are probably natural responses to some of the perceived threats to our institutions and values that have also featured strongly in recent years (r5).

This said, respondents felt that there remains a degree of difficulty in engaging others in their institutions in the ideas and practice of networked learning. This was despite a perceived increased potential relevance of networked learning in relation to the above-mentioned threats faced by HE institutions. As r5 also commented:

Highly relevant to my own practice, though I feel that the conference itself is an opportunity to stand back and review this practice. There is still a nebulous aspect to Networked Learning—its reach is extending but it is some way off being meaningful to those outside it (r5).

Another respondent explained:

In many ways, I see the position in the UK the position of NL is even more precarious than previously due to a) the integration of new technologies into the mainstream of HE b) the marketization and consumer focus of HE c) the limited room to experiment. To some degree this seems to affect many other HE systems but the UK and US seem to be the most affected (r3).

Further, as already touched on, the difficulties of bringing in others from non-Anglo Saxon or English-speaking traditions are complex but, it would appear, certainly not impossible:

> *I proposed a debate within a project in Latin America on the terms 'Distance Education', frequently used and emphasizing the logistic dimension of technology enhanced learning and 'Networked Learning', emphasising the pedagogical and socio-cultural dimension of TEL. Happily, it was possible to translate and discuss these two terms in Italian, Spanish and Portuguese* (r12).

It thus seems that for many of the respondents, they felt that they were not only developing their networked learning practice through their participation in the conference and its knowledge community but also taking this experience back to their home institutions and into their own situated practice and doing of networked learning.

1.8 Conclusions

In our analysis of the responses to our five survey questions, we have attempted to tease out and look afresh at characteristics of networked learning as they are enacted in and through the networked learning conference. The four themes that we have focused on (critical space, community, scholarship and developing practice), we suggest, are all characteristics of the epistemic practice of the networked learning knowledge community. Further, in our analysis of these themes, we found that there were degrees of overlap and interaction and that together they constituted key aspects to the way the NL conference 'institutionalises' and is a practical accomplishment of networked learning. It has arguably achieved this through its own attempts to work with the NL definition and early ideas of networked learning, as described earlier in the paper, of

- Learning community
- Connections
- Reflexivity
- Criticality
- Collaboration
- Relational dialogue

As we have discussed elsewhere (Hodgson and McConnell 2019), over the years these NL ideas and values have been translated into learning principles and key features for designing and implementing networked learning programme and modules. What has not previously been explored is how these figure in participants' experience of the networked learning conference or how the conference itself is an example of networked learning in practice. As respondent r15, quoted earlier put it, *the conference setting and the event itself becomes an opportunity to realise networked learning practices.*

What do the above ideas and comments reveal about the position of networked learning in the current highly politicised, globalised and increasingly digitalised higher education sector? If nothing else, they show that the conference provides a community to examine and discuss the practical difficulties faced within HE in a postdigital world. Arguably, they also demonstrate that the networked learning community of researchers reveal their epistemic beliefs not only in what they write but also in what they attempt to do in their practice—both as participants at the conference and in their own situated teaching and learning practices. It is a reiterative process of developing one's own networked learning practice through the affordance of the NL conference and the conference's own practical accomplishment of networked learning.

References

S.F. Akkerman, A. Bakker, Boundary crossing and boundary objects. Rev. Educ. Res. **81**(2), 132–169 (2011)

M.M. Bakhtin, Epic and novel (C. Emerson, & M. Holquist, Trans.), in *The Dialogic Imagination by M. M. Bakhtin*, ed. by M. Holquist (University of Texas Press, Austin, 1981)

S. Bayne, J. Ross, Posthuman literacy in heterotopic space, in *Literacy in the Digital University: Critical Perspectives on Learning, Scholarship and Technology*, (Routledge, Abington, 2013), p. 95

T. Becher, *Academic Tribes and Territories: Intellectual Enquiry and the Cultures of Disciplines* (Open University Press, Milton Keynes, 1989)

L. Carvalho, P. Goodyear, M.F. de Laat, *Place-based Spaces for Networked Learning* (Taylor & Francis, Abington, 2017)

M. de Laat, T. Ryberg, Looking back and moving forward, in *Networked Learning—Reflections and Challenges. Advances in Research on Networked Learning*, ed. by N. Dohn, S. Cranmer, J. A. Sime, T. Ryberg, M. de Laat, (Springer, Dordrecht, 2018)

N.K. Denzin, Y.S. Lincoln, *Strategies of Qualitative Inquiry*, vol 2 (Sage, Thousand Oaks, 2008)

N. Dohn, S. Cranmer, J.-A. Sime, T. Ryberg, M. de Laat (eds.), *Networked Learning—Reflections and Challenges. Advances in Research on Networked Learning* (Springer, Dordrecht, 2018)

E-Quality Network, 'E-quality in e-learning Manifesto' presented at the Networked Learning 2002 conference, Sheffield, 2002. Available at http://csalt.lancs.ac.uk/esrc/

T. Fenwick, Pondering purposes, propelling forwards. Stud. Contin. Educ., 1–14 (2018). https://doi.org/10.1080/0158037X.2018.1425205

D. Ferreday, V. Hodgson, The Tyranny of Participation and Collaboration in Networked Learning, ed. by V. Hodgson, C. Jones, T. Kargidis, D. McConnell, S. Retalis, D. Stamatis, M. Zenios, *Proceedings of the 6th International Conference on Networked Learning*, 2008 ISBN 978-1-86220-206-1

S. Gherardi, A. Strati, *Learning and Knowing In practice-based Studies* (Edward Elgar, Cheltenham, 2012)

P. Goodyear, S. Banks, V. Hodgson, D. McConnell, Research on networked learning: an overview, in *Advances in Research on Networked Learning*, ed. by P. Goodyear, S. Banks, V. Hodgson, D. McConnell, (Kluwer Academic, Dordrecht, 2004)

V. Hodgson, D. McConnell, Postdigital Science and Education, in *Networked Learning and Postdigital Education*, (Springer, New York, 2019)

V.E. Hodgson, M. Reynolds, Consensus, difference and 'multiple communities' in network learning. Stud. High. Educ. **30**(1), 9–22 (2005)

V. Hodgson, D. McConnell, L. Dirckinck-Holmfeld, The theory, pedagogy and practice of networked learning, in *Exploring the Theory, Pedagogy and Practice of Networked Learning*, ed. by L. Dirckinck-Holmfeld, V. Hodgson, D. McConnell, (Springer, New York, 2012), p. 318. ISBN: 978-1-4614-0495-8

V. Hodgson, M. de Laat, D. McConnell, T. Ryberg, *The Design, Experience and Practice of Networked Learning* (Springer, New York, 2014)

C. Jones, D. Ferreday, V. Hodgson, Networked Learning a relational approach—weak and strong ties. J. Comput. Assist. Learn. **24**(2), 90–102 (2008)

Y.S. Lincoln, E.G. Guba, *Naturalistic Inquiry*, vol 75 (Sage, Thousand Oaks, 1985)

D. McConnell, *E-Learning Groups and Communities* (SRHE/OU Press, Maidenhead, 2006), p. 209. ISBN 0 335 21280 8

M.B. Miles, A.M. Huberman, *Qualitative Data Analysis*, 2nd edn. (Sage, Thousand Oaks, 1994)

C. O'Shea, Learning how kinds matter: a posthuman rethinking of Ian Hacking's concepts of kinds, dynamic nominalism and the looping effect. *Proceedings of the 11th International Conference on Networked Learning 2018*, ed. by M. Bajić, N.B. Dohn, M. de Laat, P. Jandrić, T. Ryberg, 2018. ISBN 978-1-86220-337-2

M.A. Peters, W. Hume, Education in the knowledge economy. Policy Futures Educ. **1**(1), 1–19 (2003). Retrieved September 12, 2003 from http://www.triangle.co.uk/PFIE/NetworkedLearning; Book Series: http://www.springer.com/series/11810

J. Roberts, Limits to communities of practice. J. Manag. Stud. **43**(3), 623–639 (2006)

C. Sinclair, Laugh with us, not at us: parody and networked learning. Chapter 11, this volume (Springer, New York, 2020)

B. Stiegler, What is called caring? Beyond the anthropocene. Technē Res. Philos. Technol. (2017). https://doi.org/10.5840/techne201712479. Online first Accessed December 2017

M. Tight, Theory development and application in higher education research: tribes and territories. High Educ. Pol. **28**, 277–293 (2015)

E. Wenger, *Communities of Practice: Learning, Meaning and Identity* (Cambridge University Press, Cambridge, 1998). ISBN 052143017 8hbk;0521663636pbk

Part I
Aspects of Mobility for Networked Learning in a Global World

Chapter 2
The Unbundled University: Researching Emerging Models in an Unequal Landscape

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2.1 Introduction

The term networked learning is generally thought of as learning that is mediated by digital networks, with an emphasis on remote collaborations. However, over the past decade, and as illustrated by several contributions to previous editions of the Networked Learning conference, it has successfully repositioned itself as an area of socio-technical interest beyond online education per se (e.g. Bayne et al. 2014; Cranmer et al. 2016). The focus on the networks into which learning is subsumed has been gradually challenged and expanded, drawing on several sociological and philosophical trends: posthumanism, actor-network theory, critical praxis and globalisation studies, to name a few. It is now clear to many in the networked learning community that our understanding of the changing educational landscape hinges on the interdisciplinary study of several, thoroughly networked phenomena in which technology is involved: the market economy and the neoliberal paradigm, emerging global markets of higher education, local and global inequalities, changing forms of educational governance and emerging business models. In this regard, the

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generalised ‘state of crisis’ of global higher education (HE) and the emergence of public–private partnerships to develop digital provision for teaching and learning represent together an area of great empirical interest.

This chapter and the project it stems from are interested in the increasing role of the market in HE and the harnessing of digital technology for increased opportunities for networked learning. In particular, it is focussed on how they are shaping developments in HE teaching and learning provision and resulting in the unbundling of educational provision. We are particularly interested in teaching and learning provision, rather than any other of the myriad ways in which the market is active in HE (Komljenovic and Robertson 2016), such as provision of student accommodation or campus catering facilities. The study analyses important changes in educational provision that have been in the making for the past three decades. However, these changes have gained greater traction recently, thanks to the general growth and the ensuing financial strain experienced by universities, as demand for tertiary education remains steadily high in the Global North and explodes in the Global South. This growth is evidenced by official data on gross tertiary enrolment rates, which show worldwide participation in HE increasing at the pace of 1% a year, termed as high participation systems (Marginson 2016). Over the last two decades, many commentators have seen this expansion as coinciding with a larger crisis of public HE (e.g. Readings 1999; Mamdani 2007; Washburn 2008; Holmwood 2011), which has been exacerbated by the global financial crisis of 2008, affecting in particular the funding of HE in developed and developing countries. The reduction in state funding (Robertson 2010) and the increase in student numbers have led to higher education institutions (HEIs) searching for additional and alternative sources of income in the shape of new student markets and new forms of provision. The utilisation of digital technology to develop these new forms of provision is the result of a number of drivers, including the desire to reach new student populations unable to attend campus-based classes due to location or other commitments such as employment or family; the finite physical space of many HEIs, especially those located in urban environments; the drive to develop low-cost provision for increasing numbers to serve the massification of higher education and also as a way to develop more innovative, learner-centred forms of provision (McCowan 2017; Bradwell 2009; Lewin 2012; Rizvi et al. 2013). At the same time, private companies are keen to expand into this area to take advantage of these ‘market openings’ (Williams and Goldberg 2005, p. 726). As a result, the past few years have seen the appearance of many flexible online courses and qualifications, delivered in new configurations of providers and partnerships, including by parties new to the sector, through a process of disaggregating educational provision into its component parts or unbundling. Whilst these changes may offer opportunities for increased numbers of learners to access education and thus contribute to economic prosperity, there is very little empirical research about the nature, process and impact of unbundling, as it is playing out in the rapidly reconfiguring global HE system.

2.2 The Evolving Nature of Higher Education and Emerging Topics in Networked Learning: Defining the Intersection of Digital Technology, Marketisation and Unbundling

HE, globally, is experiencing unparalleled demand (with a few exceptions), as well as huge financial pressures. At the same time, universities have placed a greater emphasis on accountability and measured outputs, such as the Research Excellence Framework (REF) and the Teaching Excellence Framework (TEF) in the UK and the increasing value attached to global rankings (Johnes 2018) whilst forging links with industry and business to support the knowledge economy (Olssen and Peters 2005). Globally, the concept of the university as a public good is under threat in favour of a market-driven approach to HE governance in which universities are increasingly pushed to commodify their products and outputs and compete for funding (Lynch 2015). There has been an increase in fees in many places, including South Africa (Case 2017), in response to the reduction of government funding, as well as due to the market influence, which suggests that those who directly benefit from higher education should pay for it (i.e. students in the form of higher future income).

Alongside these external pressures, universities also face rising expectations from students, educators and employers to make effective use of digital technology to increase flexibility, access and improve learning outcomes for their students, as well as respond to massification, for example through massive open online courses (MOOCs). MOOCs, emerging in 2008, have come to be dominated globally by a handful of companies such as Coursera, edX and FutureLearn, which provide platforms and templates for courses, whilst the institutions develop course content. MOOCs began as free, open access courses (Castillo et al. 2015; Lawton et al. 2013) but have increasingly become monetised through fees for certification, accreditation and prolonged access (Morris 2017; Shah 2018). At the same time MOOC platform providers are increasingly serving as online programme management companies (OPMs) in the formal credit-bearing sector. Additional emerging forms of provision range from a single learning object (e.g. digital badging) to modules or courses (e.g. microcredentials) and full online degree programmes (Kranz 2014; Radford et al. 2014; Dillahunt et al. 2016) This is resulting in the creation of markets in the sector as universities develop new business models and rely to varying degrees on the involvement of private companies (Komljenovic and Robertson 2016; Sharrock 2015). Private companies are taking on the role of OPM, including activities such as market research, student enrolment and technical support, as well as content development (P3-Edu 2018). It is this intersection of the increasing role of the market and the activity of private companies in higher education, exploiting the affordances of digital technology that is leading to the unbundling of teaching and learning provision (see Fig. 2.1). Examples of unbundling are increasingly common in the UK HE landscape, in particular for the postgraduate market, a phenomenon that may be partly due to the domination of MOOCs by learners from the post-university workforce, using online courses as a means for continuing professional development

Fig. 2.1 The intersection of digital technology, marketisation and unbundling (Morris et al. 2017, p. 1)

(CPD), lifelong learning or skill development (Swinnerton et al. 2017). For example, one institution that partners with an MOOC platform provider has developed 16 MOOCs to date. The institution also partners with two OPMs to provide online degrees, with multiple entry points throughout the year that can be taken on a pay-as-you-go module basis. The institution develops the content, whilst the OPM manages the recruitment, marketing and some personal tutoring. In this example, the components of the postgraduate degree have been unbundled. This disaggregation of educational provision into smaller parts offers, in theory at least, opportunities for HE institutions to separate traditionally integrated components and reimagine new products and services (Yuan et al. 2014).

The complex relationship between unbundling and the marketisation of HE requires, however, additional clarification. To begin with, unbundling is not merely an educational concept but also a technological and corporate one, a neologism that emerged in the computing sector, with the pivotal event being IBM's separation of software and services from hardware sales in 1969. This led to dramatic market expansion and the birth of the software industry. Technology-based unbundling was also a highly disruptive phenomenon in the music and home entertainment industries. For some commentators, the disaggregation of TV and music from the traditional creation and distribution channels and its reaggregation as on-demand digital 'content' represent a template for HE (Craig 2015). This, however, assumes that HE and the entertainment industries operate according to similar market laws, which is not the case, as shown by research on the peculiar nature of HE markets and quasi-markets. In this regard, Marginson (2013) argues that universities will only ever be regulated quasi-markets due to some universities restricting supply to create value through exclusivity. At the same time, governments still insist that HE has a role to play in promoting public good, contributing to social participation and socio-economic and gender equity. However, the story of the last 40 years in HE in most countries has been of decreased government spending, an increasing role for the market and increased state regulation of HE, leading to hybrid funding models. HEIs are competing with each other for state funding and other forms of income,

whilst private companies are eager to enter this potentially lucrative market. Against such a complex background, this chapter reports findings from the research project 'The Unbundled University: Researching emerging models in an unequal landscape'. Whilst the project takes place in South Africa and England, this chapter presents some reflections and findings from data collection in South Africa. We present a visual mapping of the patterns of partnerships between public universities and OPMs in South Africa to explore the terrain and the emerging 'picture'.

2.3 The South African Context

The South African HE context is experiencing similar economic pressures on universities, which have led to fee increases, specifically 9% per annum since 2010 in this country, making HE even more unaffordable for most students. Student protests calling for 'free' education and the call for decolonised education reveal a more contested landscape than in the UK. However, the discourse about who should pay for education is located in inequality; South Africa has been deemed to be the most unequal country in the world over the past few years based on the World Bank's Gini index estimates (World Bank 2018). Issues of access and low throughput rates are widespread, and unequal by race: 39% of white students who enrolled in 2009 graduated in three years, compared to 20% of black students; furthermore, 61% of white students from this cohort graduated in six years, compared to 51% of black students (CHE 2016). Until recently, large numbers of students, referred to as the 'missing middle', were unable to pay fees or apply for fee funding because their family income exceeded the threshold for fee relief but for whom university education was unaffordable (Merten 2018). In this context, access is as much about staying in and succeeding in higher education as it is about entering the system.

The system itself has been restructured to try to address its historical inequities and to concretise a policy-driven standard classification of the types of HE institutions that exist, in order to replace informal categorisations from the past and unify the sector (CHE 2016; DHET 2013). South African HE institutions are grouped according to the type of academic programmes offered (CHE 2016). 'Traditional universities' offer a wide range of professional and general formative programmes at undergraduate and postgraduate levels and are active in extensive knowledge output (CHE 2016). 'Comprehensive universities' are those institutions that combine university-type academic programmes and technikon-type programmes, with technikon referring to historical institutions focussed on vocational training (CHE 2016). Although this standard classification resulted in a movement away from historical categorisations, and despite calls to limit further differentiation of institutions, the Department of Higher Education and Training (DHET) continues to discuss funding in relation to historical legacies (e.g. DHET 2013, 2014). There is an acknowledgement that for funding frameworks to contribute to the achievement of national priorities, resource allocation must include a 'disadvantage factor' based on an institution's historical status (DHET 2014, p. 4). A ministerial committee,

established to review the state funding of public universities in South Africa in 2013, introduced sub-categories for institutions in order to respond to the financial challenges of the 'historically disadvantaged' institutions (DHET 2014). Based on these historical legacies, the categorisation includes (1) 'Historically Advantaged Institutions (HAIs)', which were predominantly white institutions championed during the apartheid era (DHET 2014), and (2)'Historically Advantaged Institutions with Historically Disadvantaged Sites (HAI with HD sites)', which exist as a result of the mergers between traditional universities and former technikons. As a result, some institutions maintain their historically advantaged status but have campuses or sites that are considered historically disadvantaged and (3) 'Historically Disadvantaged Institutions (HDIs)', which were disadvantaged during apartheid and remain unaffected by the mergers and reforms introduced by the post-apartheid government (DHET 2014). New institutions refer to three universities that were established within the last five years and have not been categorised according to historical status (DHET 2014). (For more on the development of higher education in South Africa, see Swartz et al. 2018.)

Distance learning is seen by some, including the South African government (DHET 2013), as a way to increase access. As with the Open University in the UK, distance learning is not new to South Africa, with the country having a dedicated distance learning university (Unisa, University of South Africa). On this basis, and given the current austerity programmes implemented in South Africa, DHET states that all universities can 'expand online and blended learning as a way to offer niche programmes, especially at postgraduate level, to those who are unable to attend full-time programmes, either due to their employment status or their geographical distance from a campus' (DHET 2013, p. 51). In effect, this removes the previous barrier from residential universities providing distance provision. As the funding pressures continue, some institutions have moved into the market to gain revenue, and those that previously focussed on face-to-face provision are increasingly offering more flexible forms of provision, sometimes in partnership with for-profit or commercial providers. These developments are gathering pace in South Africa, but there is very little empirical research about the nature, process and impact of such changes. There are a few excellent examples focussed on the UK or US contexts (e.g. Komljenovic and Robertson 2016), and as Marginson notes (Marginson 2013), there is a growing interest in the fast-developing HE contexts of East and Southeast Asia. However, there is a lack of evidence about how these market dynamics are affecting institutions in other regions of the Global South (chiefly Africa) and the role of Western and local providers or partners.

This focus is exemplified by the following research question: does the pattern of current partnerships between universities and OPMs in South Africa suggest that unbundled provision challenges the existing differentiation of universities? In particular, it is focussed on the extent to which unbundling of provision has taken place in South African universities, the configuration of partnerships between such companies and universities and whether this type of activity is the privilege of particular types of institution. We explore these patterns by creating interactive visual mappings of these partnerships, which allow the data to be clustered in several ways.

2.4 Data Collection Methods and Methodology

2.4.1 Mapping to Uncover New Insights

Social cartography involves creating visual maps to communicate the dynamic of social change (Liebman and Paulston 1994). Recognised as a subset of social cartography, tactical cartography involves creating interactive maps with digital tools to show the movement and arrangements of social networks for further analysis (Ruitenberg 2007). The technique is often presented as a way of discovering power dynamics within systems (Institute for Applied Autonomy 2007). A number of authors have developed visual mappings of market activity and public-private networks in higher education using digital social network analysis tools (e.g. Metcalfe 2006; Sohn et al. 2009; Mathies and Slaughter 2013). Visualisations mapping the dynamics of the OPM market in the changing higher education terrain have appeared in a number of blog posts by Hill (2012, 2016, 2018), with the aim of capturing the array of partnership approaches and online delivery models. However, there are no such mappings of higher education institutions and their partnerships with OPMs.

Our strategy involved using our theoretical framework in the designing of the maps to inform parameters, visual features and interactive options in order to discover patterns for analysis. Findings emerging from earlier data collection in the form of interviews and workshops with senior decision-makers and senior support staff in public universities and OPMs, secondary literature from the field of higher education studies and the analysis of documents and other artefacts identified through desk research suggest that rankings are significant. They play a key role for many institutions in decision-making and in bolstering their reputation to attract overseas students and third-stream income, whilst historical inequalities endure (Swartz et al. 2018). The maps we have developed cluster institutions and their partnerships by the themes of historical status and international rankings. In producing a systematic mapping of emerging partnerships between public HE institutions and OPMs, a panoramic perspective of the terrain is captured, providing an overview at a moment in time.

2.4.2 Methodology

This chapter draws on official sources available publicly to create a database of partnerships between public universities and OPMs, partnerships that exist to develop online provision. This database has been used to create mappings of these partnerships, explore patterns and suggest certain organisational principles according to which partnerships between certain types of actors emerge. All data sourced for these partnerships were gathered, in the period October–December 2017 and updated in August 2018, through organisational websites, press releases, and policy documents of universities and OPMs and verified through telephone conversations

with the 20 public universities included here. Data collection involved iteratively searching public databases for search terms within the scope of the project. Each university website was searched using the terms 'distance', 'e-learning', 'web-based learning', 'online course', 'online programmes', 'online degree' and 'MOOC'. The distance-learning policies of the universities were considered to verify that 'online learning' refers to fully online courses that do not have a face-to-face element. Courses that were advertised as online but whose course descriptions included terms or phrases such as 'blended', 'postal service', 'assessment on site', 'compulsory study days on campus' were excluded. Blended provision includes a wide range of different types of provision, which may or may not involve private partners, but does not tend to result in unbundling. This project is focussed on unbundled provision, i.e. provision that is fully online. Once it was established that a university does provide one or more aspect of teaching and learning fully online, it was investigated whether this is done through a partnership or independently. University press releases and media were searched using the terms 'online', 'collaborate', 'partner' and 'partnership'. Course descriptions were scanned for logos affiliated with any OPMs. In some cases, OPMs list their partners on their websites. If a university was listed on the website of an OPM, the university website was checked to verify that the partnership is still active. The systematic data collection approach has resulted in the development of a dataset that is considered to be an accurate record of partnerships in the South African HE landscape at that point in time. The dataset has been used to develop the maps using Kumu,[1] an online platform for the creation of interactive relationship maps.

2.4.3 Visual Features

There are not only static, two-dimensional maps included in the cartographic discourse but also layered, interactive and dynamic maps (Ruitenberg 2007). By allowing users to see and explore large amounts of information simultaneously, interaction techniques in the visual analytics stimulate new insights (Thomas and Cook 2006). Interactive visual maps elucidate some of the potential influencers within the context and make explicit connections between different actors that give rise to new phenomena or reinforce phenomena already embedded in the context (Stanley 2006). Clustering around different categories and in different ways contributes to a disruption in preconceived notions of the terrain. Or as Stanley (2006) suggests, when studying a new context 'in the absence of an overall "blueprint", globally emergent patterns can arise through local interactions for the ongoing movement and unfolding of the system itself' (Stanley 2006, p. 74).

The functionality of the Kumu platform enables elements within the maps to be clustered. The interactive version of the maps that we have prepared in our larger

[1] www.kumu.io

study has used this functionality to cluster according to several variables: place in university ranking systems, type of institution according to provision and historical status, and digital education offering such as provision of online courses or the number of MOOCs on offer. Each new arrangement of the elements in different clusters provides a lens for the analysis of our research data on the links between public universities and OPMs. We return to our research question of whether newly emerging partnerships disrupt the differentiated terrain of HE in South Africa or whether they echo differences and inequalities between institutions. The visual maps shown in this chapter explore how partnerships relate to existing classification systems used to categorise South African public universities:

- The national system of classification that divides them into traditional and comprehensive institutions[2]
- A categorisation according to historical status (HAI, HAI with HD sites, HDI and new), as related to funding frameworks (DHET 2014)
- A world ranking (Times Higher Education ranking) that classifies them within a global field of HE

2.4.4 The Maps

The two maps shown in this chapter contain information relating to the type of university, whether they are traditional or comprehensive, their historical status of being advantaged or disadvantaged, their relative size in terms of enrolment rates and ratio of contact to distance, and their global position according to the Times Higher Education World Ranking. The maps also contain information relating to OPMs active in this space, focussing on the type of provision they offer and the institutions they partner with, as well as their size and country of origin.

Figure 2.2 is a mapping of the relationship between public universities and OPMs according to institution type (traditional versus comprehensive). We can see immediately that OPMs are active in the South African HE terrain. They consist of companies founded in the US, the UK and South Africa, utilising digital technology to provide – in partnership with certain institutions – MOOCs, online programmes and online courses. However, the map shows that this type of activity is not taking place across the whole South African HE terrain. Four of the 11 traditional universities have partnerships with OPMs (University of Cape Town (UCT), Stellenbosch University (SUN), University of the Witwatersrand (Wits) and University of Free State (UFS)). Of these universities, UCT, SUN and Wits are all HAIs (DHET 2014) and partner with multiple OPMs. UCT partners with four different companies: FutureLearn and Coursera to provide MOOCs and GetSmarter and Hubble to provide online courses. Wits also partners with four companies: edX to provide MOOCs, GetSmarter and LRMG to provide online courses and Academic Partnerships to provide online pro-

[2] Universities of technology and private universities are excluded.

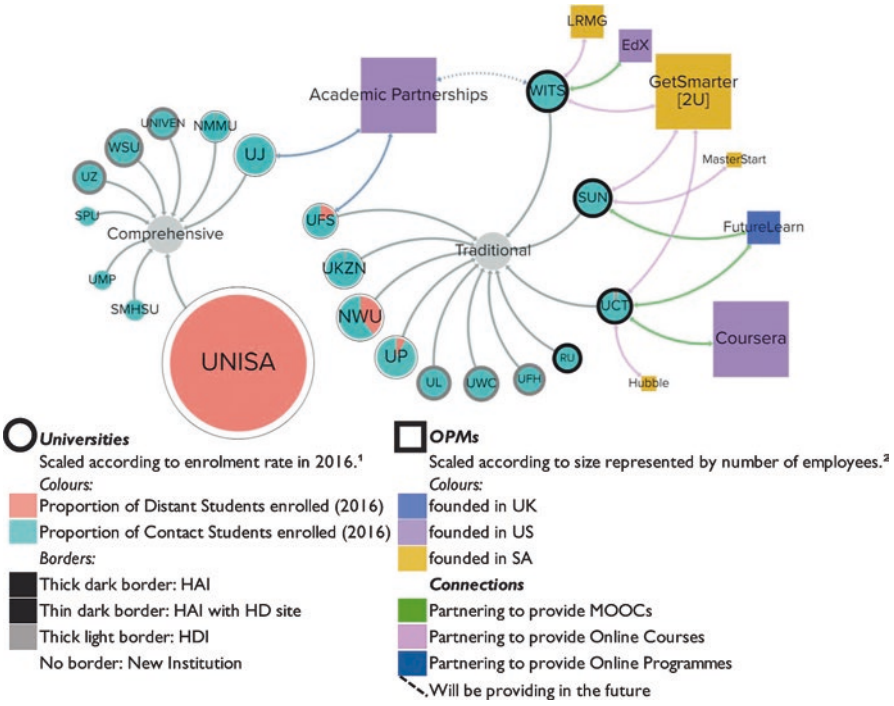

Fig. 2.2 University and OPM partnerships clustered according to institution type. [1]DHET (2018); [2]data about companies are found on their websites and social media platforms (such as LinkedIn)

grammes. SUN partners with three companies: FutureLearn to provide MOOCs and GetSmarter and MasterStart to provide online courses. The fourth traditional university to partner is UFS, a HAI/HD (DHET 2014), which partners with Academic Partnerships to provide online programmes. Some of the OPMs partner with more than one university: FutureLearn partners with two HAI universities, GetSmarter partners with three HAI universities, whilst Academic Partnerships partners with the University of Johannesburg (UJ), a comprehensive university, as well as two traditional universities, one a HAI (Wits) and one a HAI/HD (UFS). The remaining seven traditional and eight comprehensive universities do not have any partnerships with OPMs. This map shows that OPMs are working predominantly with a specific type of institution: traditional HAIs. The two exceptions are a traditional HAI/HD (UFS) and a comprehensive HAI/HD (UJ). The distinction becomes even clearer when considering which universities do *not* have any partnerships, these being predominantly HDIs or HAI/HDs, although it includes one HAI, Rhodes University (RU). The mapping also illuminates the volume of partnerships, showing that the three institutions that engage in a high number of partnerships are the traditional HAIs.

Given that one of the drivers for developing online provision is to provide more flexible access to students who may not be able to attend a campus-based course, it is of interest to explore the relationship between the development of online provision

and the existence of a distance cohort. Based on the most recent contact versus distance enrolment statistics (for the academic year 2016, DHET 2018), the 11 traditional universities have predominantly contact enrolments (campus-based students). Five of these (UCT, UFS, University of Pretoria (UP), University of KwaZulu-Natal (UKZN) and North-West University (NWU)) have varying proportions of distance students. Of the nine comprehensive universities, one is fully distance (University of South Africa (UNISA), seven are fully contact enrolments and Nelson Mandela University (NMMU) has a very small proportion of distance students. Six of the comprehensive universities with no distance students also have no partnerships to offer online provision. Two of the HAI traditional universities that partner with OPMs (SUN and Wits) to offer MOOCs, online courses and online programmes do not have distance students, although the other, UCT, does. Interestingly, in the first iteration of this map (completed by December 2017 and based on enrolment data from the academic year 2015), we did not find any evidence of a distance cohort at UCT, which by August 2018 (based on enrolment data from 2016) had appeared potentially as a response to the existence of online provision developed in the last two years. However, the mapping shows little relationship between partnering with private companies to develop online provision and the existence of a distance student cohort yet. This suggests that online provision is being developed not only for existing distance students but as an attempt to grow this cohort and possibly to support campus-based students. As reports are published with updated enrolment figures, we expect to see a slightly larger distance cohort at UCT and emerging distance cohorts for SUN, Wits and UJ as they offer more short courses and programmes online. In contrast, the comprehensive universities that may want to exploit the distance market are not forming partnerships to develop online provision, with the exception of UJ. UNISA, fully distance, does not offer any stand-alone fully online courses or programmes. The university does provide some course content online, an e-library and online submission tools, as well as offering some modules online as part of a programme. However, the provision is a blended offering as the institution conducts compulsory exams and assessments at their numerous sites and is not fully electronic, relying on telecentres and courier services for the distribution of materials (UNISA n.d.). The institution does not partner with an OPM, which may be due to OPMs not approaching Unisa or may be due to the institution eschewing any such approaches.

The differentiation of the system in global terms, as expressed through relationships with OPMs, is also evident when we examine the HE system in South Africa through the lens of global rankings. In Fig. 2.3, universities are grouped according to their Times Higher Education (THE) World University Rankings 2017/18 (2018): a ranking system that is based on teaching, research outputs and citations, industry outcomes and international outlook of universities (Times Higher Education 2018). In the map, universities are sorted into five main groups: 1–400, 401–600, 601–800, 801+ and not ranked (not in the 1258 THE globally ranked universities). It is clear that universities that are highly ranked (UCT, SUN and Wits) engage in partnerships with OPMs: UCT and Wits each with four companies and SUN with three. UJ, ranked 601–800, partners with one company. The lowest ranked (801+) universities and those not ranked have only one instance of a partnership between them, UFS

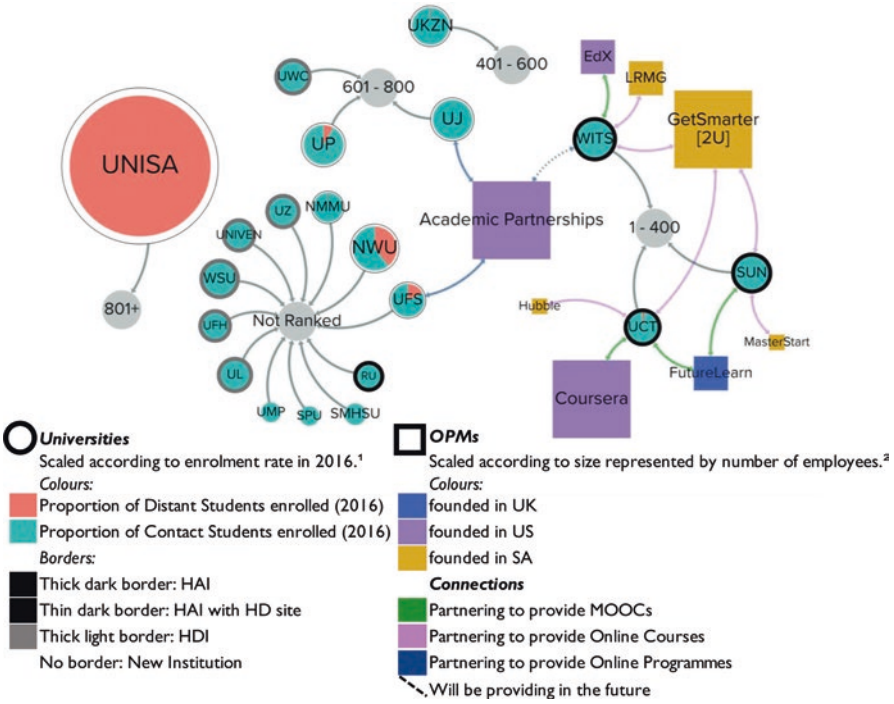

Fig. 2.3 University and private company partnerships clustered according to THE rank.[1]DHET, 2018; [2]data about companies are found on their websites and social media platforms (such as LinkedIn)

with Academic Partnerships. The three highest ranked universities in South Africa and the only three in the top 400 globally, UCT, SUN and Wits, are collectively partnered with all nine of the OPMs currently active in the terrain.

The two mappings shown here are clearly interrelated, indicating that those universities that are highly ranked are also traditional HAIs (UCT, Wits, SUN), with one traditional HAI (RU) amongst those not ranked.

2.5 Conclusion and Next Steps

Mapping the OPM phenomenon across an entire sector reveals new ways in which networks around teaching and learning might manifest in light of digital affordances and disruption, emerging markets and the existing inequalities in a specific context. By illustrating some of the increasing plurality of HE provision, we reveal how online solutions, and the networks created to provide them, may echo offline disparities. Particular institutions are able to partner with multiple OPMs to provide MOOCs, online courses and online programmes, suggesting that they are not only

being approached by multiple companies but are able to choose which company to partner with for each offering. These patterns of partnership echo the existing differentiation in the system in terms of OPM activity being almost exclusively located within traditional HAIs, with high international ranking, reputation and thus recognisable brands. Such partnerships do not disrupt an unequal terrain but rather reflect and possibly reinforce the asymmetries already at play. These findings raise important questions about the introduction of digital technology for teaching and learning. However, further analysis of our data is required to enable an exploration of how these partnerships and the associated provision impact on teaching and learning. The mapping of the terrain at a broader level is not a statistical exercise but rather a way of using publicly available information to gain a 'snapshot' of a rapidly changing landscape. Instead of two distinct research stages, the interaction between the broader overview (the mapping) and the stakeholders' insights (data collection through interviews) is iterative and will serve loosely as a method of triangulation. In terms of analysis, the maps provide a broad view of the terrain to provide context for the data gathered through qualitative methods. Building upon and enhancing the foundational mapping, the patterns that have revealed themselves point to questions to be explored with the qualitative analysis opening up spaces for the voices of the participants and stakeholders. This landscape is undergoing rapid change, and new OPMs are entering the terrain as others exit. Private companies already in the HE sphere are expanding their role, with MOOC platform providers increasingly offering and performing online programme management activities, concerned to demonstrate value to the sector. MOOC and short-course credits are increasingly portable to full online programmes as a way of encouraging learners to go further on their pathway, as well as to provide flexibility. Such partnerships with HEIs are likely to flourish and become closer in the future. Mindful that it is early days for these new private/public relationships, it will be valuable to track which types of institutions form these networks going forward, which grow internal capacity and in which ways, and which are not active in the unbundled digital sphere. Particularly relevant are the implications for agendas to address inequities both in the system and for the student experience.

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References

S. Bayne, C. Jones, M. de Laat, T. Ryberg, C. Sinclair, (eds), *Proceedings of the Ninth International Conference on Networked Learning 2014*, 2014. ISBN: 978-1-86220-304-4

P. Bradwell, *The Edgeless University: Why Higher Education Must Embrace Technology* (Demos, London, 2009)

J. Case, Public higher education in peril? A view from down south, *Working Paper 15,* Centre for Global Higher Education, London, 2017

N.M. Castillo, J. Lee, F.T. Zahra, D.A. Wagner, MOOCs for development: trends, challenges and opportunities. Inf. Technol. Int. Dev. **11**(2), 35–42 (2015)

Council on Higher Education (CHE), South African higher education reviewed. *Two decades of democracy*, Pretoria, CHE, 2016. http://www.che.ac.za/sites/default/files/publications/CHE_South%20African%20higher%20education%20reviewed%20-%20electronic_0.pdf. Accessed 16 Jan 2018

R. Craig, *College Disrupted: The Great Unbundling of Higher Education* (Palgrave Macmillan, New York, 2015)

S.J. Cranmer, N. Bonderup-Dohn, M. De Laat, T. Ryberg, J.A. Sime, (eds.), *Proceedings of the Tenth International Conference on Networked Learning 2016*: *Looking Back–Moving Forward*, 2016. ISBN (electronic): 978-186220-324-2

DHET, White Paper for Post-School Education and Training, Pretoria, DHET, 2013. http://www.che.ac.za/sites/default/files/publications/White%20Paper%20-%20final%20for%20web.pdf. Accessed 20 Sep 2017

DHET, Report of the Ministerial Committee for the Review of Funding (Pretoria, DHET, 2014). http://www.dhet.gov.za/Financial%20and%20Physical%20Planning/Report%20of%20the%20Ministerial%20Committee%20for%20the%20Review%20of%20the%20Funding%20of%20Universities.pdf. Accessed 16 Jan 2018

DHET, Statistics on Post-School Education and Training in South Africa: 2016, 2018. http://www.dhet.gov.za/Research%20Coordination%20Monitoring%20and%20Evaluation/6_DHET%20Stats%20Report_04%20April%202018.pdf. Accessed 08 Aug 2018

T.R. Dillahunt, S. Ng, M. Fiesta, Z. Wang, Do Massive Open Online Course Platforms Support Employability? in *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing*, (ACM, New York, 2016), pp. 232–243

P. Hill, Online Educational Delivery Models: A Descriptive View. *Educause*, 2012. http://er.dut.ac.za/bitstream/handle/123456789/56/Hill_2012_Online_Educational_Delivery_Models.pdf?sequence=1

P. Hill, Online Program Management: A view of the market landscape. *e-literate*, 2016. https://mfeldstein.com/online-enablers-a-landscape-view-of-the-market-for-higher-education/

P. Hill, OPM market may be growing, but it's not without chaos, 2018. *e-literate*. https://mfeldstein.com/opm-market-may-be-growing-but-its-not-without-chaos/

J. Holmwood (ed.), *A Manifesto for the Public University* (Bloomsbury Academic, London, 2011)

Institute for Applied Autonomy, Tactical cartographies, in *An Atlas of Radical Cartography*, ed. by L. Mogul, A. Bhagat, (Journal of Aesthetics Protest Press, Los Angeles, CA, 2007), pp. 29–37

J. Johnes, University rankings: what do they really show? Scientometrics **115**, 585–606 (2018). https://doi.org/10.1007/s11192-018-2666-1

J. Komljenovic, S.L. Robertson, The dynamics of 'market making' in higher education. J. Educ. Policy **31**(5), 622–636 (2016)

G. Kranz, MOOCs: The next evolution in e-learning? Workforce, 2014. http://www.workforce.com/articles/20358-moocs-the-next-evolution-in-e-learning. Accessed 18 Feb 2018

W. Lawton, M. Ahmed, T. Angulo, A. Axel-Berg, A. Burrows, A. Katsomitros, Horizon scanning: What will higher education look like in 2020? Observatory on Borderless Higher Education, 2013

T. Lewin, Instruction for masses knocks down campus walls', The New York Times, 2012. http://www.nytimes.com/2012/03/05/education/moocs-large-courses-open-toall-topple-campus-walls.html. Accessed 07 July 2018

M. Liebman, R.G. Paulston, Social cartography: a new methodology for comparative studies. Compare **24**(3), 233–245 (1994)

K. Lynch, Control by numbers: new managerialism and ranking in higher education. Crit. Stud. Educ. **56**(2), 190–207 (2015)

M. Mamdani, *Scholars in the Marketplace: The Dilemmas of Neo-Liberal Reform at Makerere University, 1989–2005* (CODESRIA, Dakar, 2007)

S. Marginson, The impossibility of capitalist markets in higher education. J. Educ. Policy **28**(3), 353–370 (2013)

S. Marginson, The worldwide trend to high participation higher education: dynamics of social stratification in inclusive systems. High. Educ. **72**(4), 413–434 (2016)
C. Mathies, S. Slaughter, University trustees as channels between academe and industry: toward an understanding of the executive science network. Res. Policy **42**(6–7), 1286–1300 (2013)
T. McCowan, Higher education, unbundling, and the end of the university as we know it. Oxf. Rev. Educ. **43**(6), 733–748 (2017)
M. Merten, Higher Education: Saving the 'missing' middle. First Thing, 2018, October 29. http://firstthing.dailymaverick.co.za/article?id=76269#.W9bOCHv7SUk. Accessed 29 Oct 18
A.S. Metcalfe, The corporate partners of higher education associations: a social network analysis. Ind. Innov. **13**(4), 459–479 (2006)
N. Morris, *Unbundling. Ulster University Access Digital and Distributed Learning*, 2017, April 1. http://addl.ulster.ac.uk/digitalfutures/view/unbundling. Accessed 27 Feb 18
N. Morris, A. Cliff, L. Czerniewicz, M. Ivancheva, C. Perrotta, R. Swartz, B.J. Swinnerton, S. Walji, *The Unbundled University: Researching emerging models in an unequal landscape: Briefing Number 2*, 2017. https://unbundleduni.com/wp-content/uploads/sites/8/2017/12/pamphlet2_APPROVED_forpublish.pdf. Accessed 29 Oct 2018)
M. Olssen, M.A. Peters, Neoliberalism, higher education and the knowledge economy: from the free market to knowledge capitalism. J. Educ. Policy **20**(3), 313–345 (2005)
P3-Edu, A directory of leading companies partnering with colleges and universities for strategic and financial impact, 2018. Innovation and public-private partnership in higher education. http://universityventures.com/images/publication856-P3-EDU-100.pdf
A.W. Radford, J. Robles, S. Cataylo, L. Horn, J. Thornton, K.E. Whitfield, The employer potential of MOOCs: a mixed-methods study of human resource professionals' thinking on MOOCs. Int. Rev. Res. Open Distrib. Learn. **15**(5) (2014)
B. Readings, *The University in Ruins* (Harvard Univ. Press, Cambridge, MA, 1999)
S. Rizvi, K. Donnely, M. Barber, An Avalanche is Coming: Higher Education and the Revolution Ahead*,* IPPR, 2013. http://www.ippr.org/publications/an-avalanche-is-coming-higher-education-and-the-revolution-ahead. Accessed 20 Sep 2018
S.L. Robertson, Corporatisation, competitiveness, commercialisation: new logics in the globalising of UK higher education. Glob. Soc. Educ. **8**(2), 191–203 (2010)
C.W. Ruitenberg, Here be dragons: exploring cartography in educational theory and research. Complicity Int. J. Complex. Educ. **4**(1), 7–24 (2007)
D. Shah, By the Numbers: MOOCS in 2017, 2018. https://www.class-central.com/report/mooc-stats-2017/. Accessed 17 Feb 2018
G. Sharrock, Making sense of the MOOCs debate. J. High. Educ. Policy Manag. **37**(5), 579–609 (2015)
D.W. Sohn, H. Kim, J.H. Lee, Policy-driven University-industry Linkages and Regional Innovation Networks in Korea. Environ. Plan. C Gov. Policy **27**(4), 647–664 (2009)
D. Stanley, Comparative dynamics: Healthy collectives and the pattern which connects. Complicity Int. J. Complex. Educ. **3**(1), 73–82 (2006)
R. Swartz, M. Ivancheva, N. Morris, L. Czerniewicz, Between a rock and a hard place: dilemmas regarding the purpose of public universities in South Africa. *Higher Education*, 2018. (online first). Accessed 20 Sep 2018
B. Swinnerton, S. Hotchkiss, N. Morris, Comments in MOOCs: who is doing the talking and does it help? J. Comput. Assist. Learn. **33**, 51–64 (2017)
J. Thomas, K. Cook, A visual analytics agenda. IEEE Comput. Graph. Appl. **26**(1), 10–13 (2006)
Times Higher Education, *World University Rankings 2018*, 2018. https://www.timeshighereducation.com/world-university-rankings/2018/world-ranking#!/page/0/length/25/sort_by/rank/sort_order/asc/cols/stats
UNISA, *Open distance learning is a different way of learning,* n.d.. https://www.unisa.ac.za/sites/corporate/default/Apply-for-admission/Honours-degrees-&-postgraduate-diplomas/ODL,-Unisa-and-postgraduate-studies/Open-Distance-Learning-(ODL)-is-a-different-way-of-learning. Accessed 29 Oct 2018

J. Washburn, *University, Inc.: The Corporate Corruption of Higher Education* (Basic Books, New York, 2008)

J.B. Williams, M. Goldberg, The evolution of e-learning. In Balance, fidelity, mobility: Maintaining the momentum? *Proceedings ascilite* Brisbane 2005, 2005

World Bank, *Overcoming Poverty and Inequality in South Africa: An Assessment of Drivers, Constraints and Opportunities* (International Bank for Reconstruction and Development/The World Bank, Washington DC, 2018)

L. Yuan, S. Powell, B. Olivier, *Beyond MOOCs: Sustainable Online Learning in Institutions* (Centre for Educational Technology, Interoperability & Standards (CETIS), Bolton, 2014)

Chapter 3
Distilling Complexity Through Metastability and Mobility: The Networked Learning of Amara

Michael Gallagher

3.1 Networked Learning and Mobilities

The type of networked learning being referenced in this chapter alludes to, and hopefully builds upon, the work emerging from the Networked Learning community itself. It has been positioned as referring to 'learning in which information and communications technology (ICT) is used to promote connections: between one learner and other learners; between learners and tutors; between a learning community and its learning resources' (Goodyear et al. 2004). Such a focus on the connectivity of learning through 'cooperation, collaboration, dialogue, and/or participation in a community' also advances a particular value-structure for the field, along with the a 'high-level pedagogical consensus' that such a value structure entails (Jones et al. 2000). Despite divergent research agendas in the interim, networked learning maintains an adherence to these largely socially-driven, community-oriented approaches to learning.

Interest in networked learning has generated research specific to pedagogy and practice (Dirckinck-Holmfeld et al. 2012); to critical learning (Jandrić and Boras 2015); and the spatiality of networked learning either through the architecture of learning networks (Carvalho and Goodyear 2014) or the analysis of learning spaces (Dohn et al. 2018). Carvalho et al. (2017) identify the impact of these sociomaterial relationships in learning spaces in structuring activities, interactions, and outcomes. This spatial and sociomaterial focus in networked learning research has naturally aligned with a growing body of research in posthumanism and sociomateriality aimed at interrogating the evolving nature of networked learning practices around teacher agency (Misson 2013), teacher automation (Bayne 2015), and the Massive Open Online course (Knox 2016). The research presented in this chapter largely

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emerges from this growing body of networked learning research, and in particular an emerging theme which might act as a research strand for the field, namely mobility (Dohn et al. 2018).

3.2 Mobilities and Education

This chapter builds on the oft-referenced 'new mobilities paradigm' in the social sciences by further addressing the need to open up all sites, places and social practices 'to the mobilities that are already coursing through them' (Sheller and Urry 2006: 209), and links it more explicitly to networked learning. This is not an especially difficult leap. Mobilities frameworks engage with many of the same research themes as networked learning, in particular a focus on the spatiality and sociomateriality of its construction. These mobilities frameworks are attempts to counteract sedentarist positions in the social sciences and to emphasise that 'all places are tied into at least thin networks of connections' and to explore the movements through them (p. 209). Much mobilities research explores the complexities of larger mobilities systems (the car, for example in Sheller and Urry 2000), while this chapter attempts to identify the possible impact of these mobilities systems on individual agency.

Mobilities frameworks are largely non-representational and concerned with the relationality of 'bodies and objects and conjoined metabolisms of bodies and space' (Lefebvre 2004). They present utility in understanding the 'dynamic intersections of people, objects and places, interfaces of the social and spatial' (Waterton and Watson 2013) that permeate networked learning. Such approaches naturally emphasise the material relations that exist between humans and non-humans (Fenwick et al. 2011), the mobilities that course through these relations, and the new networked learning spaces created as a result.

Mobilities approaches are typified by a structural typology consisting of five mobility types: mobility of objects, corporeal mobility, imaginative mobility, virtual mobility and communicative mobility (Urry 2007). What this chapter is primarily concerned with is corporeal mobility (the movement of individuals physically); virtual mobility (the mobility experienced online by internet users); communicative mobility (person-to-person communication modalities connected to movement); and the effects of these on imaginative mobilities, the representation of mobility as elaborated and broadcasted by the media (Fortunati and Taipale 2017) and personified in the actions of individuals in these networked learning spaces. This typology foregrounds the diversity of mobility being experienced by networked learners: one can be decidedly mobile virtually while being decidedly immobile corporeally and communicatively. Endless permutations exist in the emergence of these mobilities, in any number of temporal sequences.

Emerged and emergent technologies such as the mobile phone and the automated systems and artificial intelligence (AI) increasingly used to structure these relational mobilities 'introduce a significant break in the way individuals, groups and society

as a whole conduct their everyday activities, as well as add new dimensions to our understanding of the social world'; these shifts have cascading 'practical and epistemological implications' (Hesse-Biber 2011: 4). The immobilities posed by relational mobilities are offshoots of the 'material inequalities in the distribution of communication technologies' (Chouliaraki 2012), as well as in the types of mobility being expressed therein. The social and material interact in a complex set of evolving relations generating a diverse set of mobilities and immobilities.

By way of example, the types of mobilities being expressed through forced displacement and refugee populations has been critiqued through a mobilities lens in Gill et al. (2011) as a 'last-ditch attempt to exercise agency – often regrettably and from a position of deep insecurity'. 'The lack of an end point or destination, the constant movement from one location to another and the persistent uncertainty about the future' are validations of Adey's (2010) critique of mobility being expressed as 'linked to freedom and liberty' (2010) and a rebuke of antiquated positions of an innately positive mobility seen as progress, freedom, and change (Cresswell 2006). Mobility is seen in this chapter largely through a sociomaterial lens as a result of existing or shifting relations generating a further relationality. It is neither liberatory nor positive in and of itself, but rather effects a particular structure for networked learning, a structure that has significant impact on the agency of networked learners. Much of this is illustrated in this chapter through Amara and the mobilities she experiences partly due to her identity as an international student.

3.3 Methodologies and Mobilities

To illustrate these mobilities, this chapter advances a composite character, Amara, who rather than representing a wholly fictitious persona, is a distillation of networked and mobilities practices gleaned from the author's own research largely in development contexts from 2005 to 2018. This research largely focused on identifying and documenting lived accounts of networked learning practices, largely through ethnographic methods and largely through mobile technology in Ghana, South Africa, Tanzania, and Nigeria in sub-Saharan Africa; and in Bangladesh, Nepal, India in South Asia across several projects with INGOs primarily around mobile learning in low resource contexts. In South Korea, further research was conducted with university students in relation to mobile learning and intersections with history and literature (Gallagher 2015); and in Cambodia with civil society organisations looking at gender inclusion. Research emerging from these projects was coupled with research conducted through the Centre for Research in Digital Education at the University of Edinburgh largely around the networked learning practices of online students in the UK and throughout Europe (best typified spatially by Bayne et al. 2014; and regarding practice in Ross et al. 2013).

As such, what is presented in this chapter in the form of Amara is the distillation of a secondary analysis of the outputs emerging from this research, an analysis that foregrounds the mobilities exhibited in these educational contexts and the range of

practices needed to manage them. Hence mobilities focus presented here in this chapter, which involves interrogating the evolving nature of networked learning practices, the spatiality of these practices, and the entanglements generated between these and larger sociomaterial systems required an explicit focus on mobility itself. How mobility it is enacted, how it evolves, how it is maintained, what further mobilities and immobilities are accelerated as a result (Hannam et al. 2006), and how that impacts agency required, insofar as possible, a methodological emphasis on networked learning practices and their employ in broader systems of mobility.

This chapter echoes Thompson's (2013) conviction that critique and creativity work in tandem methodologically: 'the critical side is operationalized through cartographies of the power (potestas) relations at work in the production of discourses and social practices...the creative side enlists the resources of the imagination ... for the purpose of learning to think differently, inventing new concepts and actualizing alternatives to the dominant humanistic vision of the subject' (2013: 341). This pairing of creativity and critique methodologically is needed precisely as any emergent analysis would be "in transit", moving on, passing through, creating connections where things were previously disconnected or seemed unrelated, where there seemed to be "nothing else to see" (Braidotti 2002:173). Attendant mobility methods have included interactional and conversational analysis; mobile ethnographies; textual, pictorial or digital diaries; computer simulations; imaginative travel using multimodal methods, the tracking of affective objects; and more (Adey et al. 2014: 16); speculative methods abound, blurring 'boundaries between research, design and teaching' (Ross 2017) and allowing research to 'engender new kinds of analytical orientations and tackle different questions' (Enriquez 2013). Many of these methods are inherently messy or incomplete precisely due to their 'not-yetness that comes with working with emerging technologies in education' (Ross 2017).

Analysis becomes a highly subjective interpretation *in motion*, one furthering the complexity of the entanglements of networked learning; the separation of subject and object is no longer tenable (Hayles 2006). Further, the author posits that the separation of the social and material in a mobility context is largely untenable. We are left methodologically with relationality, mobilities and the practices enacted therein, an entanglement that largely evades an agential cut or categorisation as an imbrication that can be reverse engineered (Bratteteig and Verne 2012). In this position, agency 'is not an attribute, but the ongoing reconfigurings of the world' (Barad 2003: 818).

For this chapter, and for narrative coherence, this involved a distillation of the complexity and depth gleaned over years of research into a composite structure, a personification of a large cluster of interrelated practices and implications within a single individual or group of individual characters. The motivation for this distillation is largely to identify the myriad number of practices engaged routinely by individuals within larger systems of mobility and how these practices structure one another in relational pathways and to surface what was routinely presented in my research: that individuals will exert considerable effort to maintain the diversity of their personal systems of mobility, the aforementioned metastability.

Yet there are risks involved with such an approach. Characters or personas of this sort are inherently reductive: individuals are presented not holistically but rather as sets of data deemed adequate to represent their pertinent characteristics (Clarke 1994). Characters or personas naturally carry with them Global North underlying epistemologies (Cabrero et al. 2016) roundly critiqued when employed as is (Dearden and Rizvi 2009) and marginally received when adapted to derive further knowledge in particular contexts (Cabrero et al. 2015). 'A lack of cross-cultural validity, local relevance, and designerly liability make personas prone to false or oversimplified representations in depicting local populaces' (Cabrero et al. 2016). I would concur with the considered critique presented in these cautions.

In this chapter and as an address to these critiques, I elect to present composite characters not as design scenarios, which are inherently solution-oriented attempts to resolve or dissolve complexity, but rather as mobility scenarios, where the emphasis is surfacing complexity of mobility and the practices generated to manage it. The character presented in this chapter exists as a means of foregrounding the mobilities involved in networked learning and the practices of managing both networked learning and mobility itself. It is an attempt to distill complexity into practice, to identify the typologies of these distilled practices and to identify the typologies of mobilities expressed through these practices. The use of a character in this chapter is not designed to present a coherent narrative across the different modes of data or to critique specific sociocultural traits or to generalise about any particular population. It is designed to enact the mobilities that my research identified consistently. It is an imperfect, yet necessary, methodological device. As such, what follows is the story of Amara, a composite character.

3.4 Amara and Her Mobilities

Amara is a Nepalese student currently studying in Europe for a postgraduate degree. She is on a meagre scholarship from the Nepalese government that covers her housing, and she receives a partial stipend as well through an international NGO based in the capital, Kathmandu, that specialises in international student mobility. Amara learned about these opportunities through her undergraduate coursework at her university in Kathmandu.

She routinely connects to her communities in her home in Nepal largely through mobile technology: to her former classmates, extended family, immediate family and former faculty at her Nepali university and occasionally to schools or organisations showcasing her example for subsequent generations of students.

In her host country, she works 20 h a week, the maximum allowed by the host government, to support herself. She works in the library and tutors when it is available, work that she largely discovered online. When she has the capacity, she remits money home to her family using her mobile phone through one of the many services available in Nepal largely to service remittances from overseas Nepali workers.

Her local government leaders praise her and fully expect her to return home on the completion of her studies to improve local conditions and provide, possibly, the same mobility for others that she currently enjoys. She has met with an immigration lawyer to explore permanent residence yet makes no mention of this to her communities at home.

Amara navigates her administrative, legal and other duties associated with her mobility: the visas, the government and local council registration, the rent and utilities, the taxes, the public transportation card, the meetings with supervisors and the subsequent reports to ensure that she does not run afoul of immigration law. Amara has a note on her mobile phone with all her important information, an insecure but accessible tether to all these communities: passwords, telephone numbers, bus routes, wire transfer information, rent payments and renewal dates.

She navigates the uncertainty and fragility of her existence amidst a rapidly shifting political landscape in Europe. Amara sees the contrast in the welcoming invitations of her university website extolling the virtues of being an international student and the rise of populist parties and their attendant electioneering emphasising a nativist discourse of 'self-interests, intolerance and xenophobic rejection of otherness' (Braidotti et al. 2013). She lives, at times uncomfortably, in this juxtaposition.

She engages with and manages her academic and professional identities through the tropes of practice: papers, symposia, lectures, discussion boards and mobile messaging application chats with her peers. Amara engages with and manages her personal and professional identities through the practices of familiarity: as a Nepali, as a family member, as a potential role model for aspiring students, as an economic actor in both Nepal and her host country. Amara engages with and manages her imagined identities, largely manifested in the digital: the maintenance of her professional profile online, her growing network of like-minded people and their attendant actors of mobility (visa and immigration lawyers, recruitment agencies and visa sponsorable employers), all orchestrated, insofar as possible, to mobilise towards a narrative of her own design.

Amara oscillates between the considerable effort to maintain these identities and engagements with sanctuary and solitude: time in her small flat alone, a walking playlist that she listens to on her commute, rest, away from the necessity of speaking a second language. The idea of assimilation from 'a standpoint of identification, of a unitary self' into any one of these identities is not explicit; the task for Amara 'is to survive in the diaspora' (Haraway 2016) of her own mobilities. Amara is cosmopolitan amidst a chaotic 'multi-faceted, affective cosmopolitics of embodied subjectivities grounded in diversity and radical relationality'; she resides in a 'transnational community' as her 'historical location' (Braidotti et al. 2013: 171). Mobility, broadly defined, is the attendant circumstance of her condition.

It is in the orchestration of these identities and practices that forms such an important tenet of Amara's existence. Amara orchestrates these identities and practices in a relentless process of adjustment in the pursuit of metastability, a process

historically shared structurally amongst larger 'relatively fixed and self-correcting social structures' (Urry 2016: 59). Her communities, her responsibilities, her emerging identities as an academic, a professional, an autonomous adult all enact on and are enacted by the social structures through which she moves.

Critiques of such a position question the capacity of either Amara or these social structures to generate equilibrium, emphasising the largely unmanageable aspects of complexity, a complexity that 'cannot be reduced either to the actions of individual actors or to persisting social structures' (59). This complexity resists proportionality or linearity; small changes can generate large structural consequences, a 'metastable' condition: Amara will exert considerable resources towards navigating this metastability. Her mobility is often non-linear, not progressive, not always welcome, but nonetheless remains a chronic condition of her existence.

Amara is engaging this routinely on multiple fronts: her academic work, her paid employment, her meetings with immigration lawyers, her updates to her community leaders in Nepal, her family remittances and her calls home. These are not activities linearly assembled towards one conclusive end for Amara; they are actors in a larger system of mobility, actors that Amara routinely assembles and disassembles based on her own perception of need and desire and in response to movements within the larger social systems of 'global interdependence' (Braidotti et al. 2013: 171), which she moves through.

However, Amara's practices are emblematic of a system that is loose enough to evolve, adapt to both individual and structural changes or be re-orchestrated to respond to a further mobility. If we broaden Amara's system to include one, if not all, of her learning communities, we are left with a set of systems that respond to a structural dynamic where elements, if not realities, of stability are present. It is through this dynamic that we see an evolving position of networked learning emerge, one that attempts to incorporate structural instability and stability, organisations and communities, materiality, relationality (how Amara organises these actors in her systems), intent and disposition. Movement in these systems is non-linear; 'there is thus no distinction in complexity thinking between states of equilibrium and growth states – all systems are dynamic and processual, with new structures developing and others disappearing in ways that are often difficult to anticipate' (Urry 2016: 62). Amara experiences growth and equilibrium states simultaneously, as do the systems she works through. It is a form of agency insofar as that is possible in such a highly interdependent set of mobilities.

3.5 Materialities and the Networks of Mobility

Amara is both privileged in her capacity to enact an academic mobility owing to her role as an international student and disadvantaged in this role as an 'other' whose mobility is constrained by her visa status: in this transnational mobility,

humans cross borders far less easily than flows of culture and media (Braidotti et al. 2013: 310). The corporeal mobility that Amara enjoys is strictly defined and delineated; the imaginative mobility that this corporeal mobility engenders or fulfils is less so.

The materiality of this mobility circulates through Amara's systems as both an agent and an artefact. The passports, forms, stamps and signs of Amara's mobility are both symbols of mobilities and evidence of their enactment; the timings associated with them structure the mobility itself. The need to renew a visa, for example, will dictate Amara's capacity for mobility in a specific time frame; the need to renew a passport will structure that visa renewal. Mobilities are constructed through careful sequencing of roles, identities, materials and time; these mobilities are mobilised through an orchestration of practices. The role of technology in managing and enacting these mobilities is critical to understanding the mobilities themselves. Amara is dependent, to some degree, on her phone, her laptop, the electricity required for both to run. They allow her to engage her network, to negotiate and maintain her mobility and ultimately to survive in this diaspora.

Castells suggests that networks 'constitute the new social morphology of our societies, and the diffusion of networking logic substantially modifies the operation and outcomes in processes of production, experience, power, and culture … the network society, characterized by the pre-eminence of social morphology over social action' (1996: 469). It is in this emphasis on structure over social action that we see Amara's situation most readily revealed. Amara places great emphasis on the maintenance of her system of mobility rather than in her capacity to perform a specific action. Deliberately or dispositionally, Amara orchestrates, insofar as possible, actors, identities, material, and systems towards maintaining her capacity for mobility.

This is not the linear sequencing of activity towards a deliberate outcome, although that is indeed present: Amara wants that advanced degree in economics, and she can clearly articulate her imagined identity. This negotiation is Amara aligning herself with the chaosmosis of Guattari (1995), the 'vital processes of transformation alongside and with a multiplicity of human and non-human others' (Braidotti et al. 2013: 452–458). Amara maintains her mobility rather than enacts a specific outcome; the network in which she engages provides the foundation from which 'the vital processes of transformation' are engaged towards an imaginative mobility, what she wants to be. This imaginative mobility towards imagined communities 'includes future relationships that exist only in the learner's imagination as well as affiliations – such as nationhood or even transnational communities' (Kanno and Norton 2003). Amara manifests a gravity towards these imagined communities: her decisions, the maintenance of her metastability, her deliberate activities, her intent and her disposition are all, in some way, attuned to her future communities. Amara is maintaining and moving through a larger system of mobility propelled, to some degree, by a projection of an imaginative future.

3.6 Disposition and Mobility

There has been reference in this chapter repeatedly to agency, intent and practice, all in some way suggesting a deliberate, intentional activity or structure in an otherwise relational sociomateriality. This holds true for Amara, who is apt to act in this network and through her mobilities deliberately. However, in such an interdependent relational sociomateriality, agency as a manifestation of 'the ongoing reconfigurings of the world' (Barad 2003: 818) is not exclusively a deliberate act. Indeed, it is an emergent property, one that naturally blurs the boundaries between the tacit and the explicit. Networked learning is largely concerned with both.

Habitus is presented to address this blurring. Habitus is the evolving personality structure of the individual, a composite set of schemata, sensibilities and tastes with their own defining logic yet resisting any mere caricature as being a product of a conscious or slavish devotion to rules or the mere obedience of a governing entity or instructional agent. Habitus is positioned by Bourdieu (1977) as follows:

> systems of durable, transposable dispositions, structured structures predisposed to function as structuring structures, that is, as principles of the generation and structuring of practices and representations which can be objectively 'regulated' and 'regular' without in any way being the product of obedience to rules, objectively adapted to their goals without presupposing a conscious aiming at ends or an express mastery of the operations necessary to attain them and, being all this, collectively orchestrated without being the product of the orchestrating action of a conductor (16).

This chapter notes the 'disposition' as being both 'durable' and 'transposable' and 'without presupposing a conscious aiming at ends' as it provides a needed parallel to Amara's context described thus far. Amara's context is highly interactional and generally ephemeral, as described earlier regarding mobility research: both the individual systems (Amara's generally) and the social systems (largely outside Amara's control) are persistently shifting, forcing on Amara the need to manage her mobility within these shifts. Context collapses and reassembles routinely, yet habitus sheds light on their governing dynamics. Amara acts within her mobilities often dispositionally rather than as explicitly purposeful. She interacts because she is disposed to, rather than exclusively in response to, a pressing need or a predefined purpose. Amara's imagined communities, for example, exert a structure on her activities beyond a predefined outcome; she is aligning herself with what she perceives these communities to be, however opaque they might appear to her in the present, adopting and employing traits that she associates with those communities in the process. A turn of phrase or rhetorical strategy, a particular technological practice, a newly identified extra-curricular activity all incorporated into her system of metastability all provide a means of evidencing the type of networked learning that Amara presents: a maintenance of a set of mobilities and a gravity towards an imaginative one.

Amara's practices, as such, are reproducing the context in which they are being enacted and responding to the opportunity provided by the context itself. The prac-

tices and materials needed for Amara to complete an essay for her subject are largely emergent from the context itself: that of the university, of the discipline, of her role as a graduate student and of her emergent professional affiliations. The complexity and mobility of Amara's existence are largely emergent from the contrasting elements that inform Amara's practices: that of an international student, of a woman, of a Nepali citizen, a family member, a friend, a prospective permanent resident in a host country and of a future member of an imagined community. In short, 'the life world of the individual framed both as challenge and as an environment and a potential resource for learning' (Kress and Pachler 2007: 22). Amara's networked learning emerges from this frame.

This provides an opportunity for networked learning and the mobile technology through which many of these practices are enacted as a means of structuring and evidencing the transformation of habitus itself. Spatial connections between previously disparate fields or activities begin to appear through Amara's mobile screen: reminders of visa applications and assignments on her lock screen and discussion groups for economics, for potential residents in new countries, for a Nepali international student group all lay side by side in WhatsApp. Recent missed calls from her mother, from a recruiter and from her landlord all demand attention. All of these emerge from often discrete strands of practice, from identity and ultimately from entangled strands of mobility.

This entanglement is encapsulated in Kress and Pachler's (2007) position of networked learners as being 'constantly mobile, which does not refer, necessarily, to a physical mobility at all but to a constant expectancy, a state of contingency, of incompletion, of moving toward completion, of waiting to be met and "made full"'. Networked learning, when broadened to include a learning state of expectation, contingency and lack of completion, is useful for exploring the movements through mobilities, as this chapter attempts to do, the ones that Amara routinely experiences and manages to some degree. It provides a foundation from which to observe engagement and interaction across spaces and technologies of mobility.

Amara experiences such contingency and expectation acutely; she is relatively comfortable in her diaspora (Haraway 2006). Amara is attempting to be one with the vital processes of transformation alongside and with a multiplicity of human and non-human others as comfortable as possible amidst the chaosmosis (Guattari 1995). She is signalled to action amidst this through a dispositional cue: a pang of anxiety, a reminder, a message, a hint of something emerging and something passing, the end of term, the latent guilt of knowing that she might not return home, a professional future and so forth. There is a dispositional metastability amidst the chaos.

Amara has some capacity to artfully manage her movement through these systems, and through the diaspora of her existence, and disposition provides a means of both expanding and evidencing research capacity to identify this phenomenon, particularly in complex and shifting mobility systems. Without habitus and its attendant disposition, networked learning in this context is reduced to monitoring shifts in practice, activity and context. With the inclusion of disposition, we enact a fuller

picture of learning: the material, the intellectual, the dispositional and the social, one that begrudgingly begins to present the mobilities manifest in Amara's practices.

Yet habitus has received significant criticism, particularly as it is often perceived to be deterministic and objectivist (King 2000). Beyond being a trait that this chapter is attempting to avoid and to which much research is subject, determinism refers to the critique that habitus provides disposition in relation to fields without agency, suggesting the lack of capacity to shift or enact significant transformation within a habitus by either the individual or the field (Butler and Shusterman 1999). This determinist critique neglects moves in the social sciences towards posthuman positions, where human agency is situated within a larger landscape of actors, human or nonhuman, all generating systems of activity. As Bourdieu and Wacquant (1992) suggest: '… a habitus is neither compelled by the field (as in structuralism), nor freely chosen by actors (as in rational choice theories or phenomenology). Thus, habitus is the hinge between objectivist and subjectivist accounts of human action and helps to explain the intransigence of social change' (97).

It is in this balancing between individual and structural forces that habitus provides utility for the position advanced in this chapter. It provides a definition that accounts for disposition, the reaction to and maintenance of mobilities structured by both the system and the individual, to counter the deliberation of constructivism or the execution of deliberate activity for learning. Rather than positioning either as deterministic, a turn towards habitus and disposition merely reinforces the assumption that both exert control over activity in varying measures; the 'intransigence of social change' does not negate the potential for individual transformation within a system or community. Amara is bound within a mobility system but has agency within those demanding parameters.

3.7 Moving Towards Networked Learning Research Agendas

Amara wakes one Saturday morning. She needs to study, to call her family in Nepal; she needs to pay her rent online and schedule her upcoming administrative duties: a visa needs renewed, but first is her passport renewal. Aligning these takes careful consideration. Amara begins doing her laundry for the week, finishes her chores, reflexively searches a job site that she receives weekly alerts from as well. She is going to meet her friends later in the day, but after completing her tasks she decides to go for a walk. She starts down her urban street, turns left, then left again and then right, lost in the recorded lecture she is listening to on her phone. Her path is chosen whimsically, yet she concludes the walk near the university library, a familiar destination. Her mother sends her a text. With an hour to wait before she meets her friends, she sits on a bench with her back to the campus and watches the sun set in front of her as the dulled anxieties of a Sunday and encroaching responsibility seep into the day.

Further research is needed to account for these practices that Amara, and the research base from which she emerged, exhibits and how they function interdepen-

dently. Some of these practices are explicitly directed towards networked learning, some provide a functional metastability to engage in that networked learning, some work imaginatively to structure a further set of mobilities for the future. The mobilities expressed by networked learners are further complicated by larger structural relationalities outside the individual, relationalities that Amara experiences acutely: renewal dates, visa applications and xenophobic sentiment sitting alongside discourses of student mobility and imaginative possibility. Many of these mobilities are evidenced and structured through the technology in which they are expressed, representing a significant strand of future research for networked learning.

References

P. Adey, *Mobility* (Routledge, London, 2010)

P. Adey, D. Bissell, K. Hannam, P. Merriman, M. Sheller (eds.), *The Routledge Handbook of Mobilities* (Routledge, London, 2014)

K. Barad, Posthumanist performativity: toward an understanding of how matter comes to matter. Signs. J. Women Cult. Soc. **28**(3), 801–831 (2003)

S. Bayne, Teacherbot: interventions in automated teaching. Teach. High. Educ. **20**(4), 455–467 (2015)

S. Bayne, M.S. Gallagher, J. Lamb, Being 'at' university: the social topologies of distance students. High. Educ. **67**(5), 569–583 (2014). Retrieved from http://link.springer.com/article/10.1007%2Fs10734-013-9662-4

P. Bourdieu, *Outline of a Theory of Practice* (Cambridge University Press, Cambridge, 1977)

P. Bourdieu, L.J. Wacquant, *An Invitation to Reflexive Sociology* (University of Chicago Press, Chicago, 1992)

R. Braidotti, *Metamorphoses: Towards a Materialist Theory of Becoming* (Polity Press, Cambridge, 2002)

R. Braidotti, P. Hanafin, B. Blaagaard (eds.), *After Cosmopolitanism* (Routledge, London, 2013)

T. Bratteteig, G.B. Verne, Creating a space for change within sociomaterial entanglements. Scand. J. Inf. Syst. **24**(2), 7 (2012)

J. Butler, R. Shusterman, Performativity's social magic, in *Bourdieu: A Critical Reader*, ed. by R. Shusterman, (Wiley-Blackwell, Hoboken, 1999)

D. Cabrero, H. Winschiers-Theophilus, G. Koch Kapuire, C. Stanley, K. Rodil, J. Abdelnour-Nocera, Reflecting User Created Persona in Indigenous Namibia: what NOT to do when working in Foreign Land. in *Proceedings of the International Conference on Communities and Technologies (C&T'15)*, 2015. pp. 53–62

D.G. Cabrero, H. Winschiers-Theophilus, J. Abdelnour-Nocera, A Critique of Personas as representations of the other in Cross-Cultural Technology Design. in *Proceedings of the First African Conference on Human Computer Interaction*, ACM, 2016, November. pp. 149–154

L. Carvalho, P. Goodyear (eds.), *The Architecture of Productive Learning Networks* (Routledge, London, 2014)

L. Carvalho, P. Goodyear, M.F. de Laat, *Place-based Spaces for Networked Learning* (Taylor & Francis, Abindgton, 2017)

M. Castells, *The Information Age: Economy, Society, and Culture*, The Rise of The Network Society, vol I (Blackwell, Malden, 1996)

L. Chouliaraki, Cosmopolitanism as irony: a critique of post-humanitarianism, in *After Cosmopolitanism*, ed. by R. Braidotti, P. Hanafin, B. Blaagaard, (Routledge, London, 2012), pp. 87–106

R. Clarke, The digital persona and its application to data surveillance. Inf. Soc. **10**(2), 77–92 (1994)

T. Cresswell, *On the Move: Mobility in the Modern Western World* (Routledge, London, 2006)

A. Dearden, S.M.H. Rizvi, A deeply embedded sociotechnical strategy for designing ICT for development. Int. J. Sociotechnology Knowl. Dev. **1**(4), 52–70 (2009)
L. Dirckinck-Holmfeld, V. Hodgson, D. McConnell (eds.), *Exploring the Theory. Pedagogy and Practice of Networked Learning* (Springer, New York, 2012)
N. Dohn, S. Cranmer, J.-A. Sime, T. Ryberg, M. de Laat (eds.), *Networked Learning - Reflections and Challenges. Advances in Research on Networked Learning* (Springer, Dordrecht, 2018)
J. Enriquez, Being (T)Here: mobilising 'mediaspaces' of learning. Learn. Media Technol. **38**(3), 319–336 (2013)
T. Fenwick, R. Edwards, P. Sawchuk, *Emerging Approaches to Educational Research: Tracing the Sociomaterial* (Routledge, London, 2011)
L. Fortunati, S. Taipale, Mobilities and the network of personal technologies: refining the understanding of mobility structure. Telematics Inform. **34**(2), 560–568 (2017)
M. Gallagher, Artfully converting open (Urban) space to learning space: mobile learning and Korean literature. Media Educ. Stud. Ricerche Buone Pratiche **6**(2), 294–307 (2015)
N. Gill, J. Caletrío, V. Mason, Introduction: mobilities and forced migration. Mobilities **6**(3), 301–316 (2011)
P. Goodyear, S. Banks, V. Hodgson, D. McConnell (eds.), *Advances in Research on Networked Learning* (Kluwer Academic, Dordrecht, 2004)
F. Guattari, *Chaosmosis: An Ethico-Aesthetic Paradigm* (Power Publications, Sydney, 1995)
K. Hannam, M. Sheller, J. Urry, Mobilities, immobilities and moorings. Mobilities **1**(1), 1–22 (2006)
D. Haraway, A cyborg manifesto: Science, technology, and socialist-feminism in the late 20th century. The international handbook of virtual learning environments, 2006. pp. 117–158
D. Haraway, *Manifestly Haraway* (University of Minnesota Press, Minneapolis, 2016)
N.K. Hayles, Unfinished Work: From Cyborg to Cognisphere. Theor. Cult. Soc. **23**(7–8), 159–166 (2006)
S. N. Hesse-Biber (ed.), *The Handbook of Emergent Technologies in Social Research* (Oxford University Press, Oxford, 2011)
P. Jandrić, D. Boras (eds.), *Critical Learning in Digital Networks* (Springer, New York, 2015)
C. Jones, M. Asensio, P. Goodyear, Networked learning in higher education: Practitioners' perspectives. J. Assoc. Learn. Technol. **8**(2), 18–28 (2000)
Y. Kanno, B. Norton, Imagined communities and educational possibilities: Introduction. J. Lang. identity Educ. **2**(4), 241–249 (2003)
A. King, Thinking with Bourdieu against Bourdieu: A 'practical' critique of the habitus. Sociol Theory **18**(3), 417–433 (2000)
J. Knox, Posthumanism and the MOOC: opening the subject of digital education. Stud. Philos. Educ. **35**(3), 305–320 (2016)
H. Lefebvre, *Rythmanalaysis: space, time and everyday life* (Continuum, London, 2004).
R. Misson, The problem of agency: posthumanist theory and English teaching. Chang. Engl. **20**(4), 351–363 (2013)
G. Kress, N. Pachler (Eds.), 'Mobile Learning: Towards a Research Agenda'. WLE Centre, Occasional Papers in Work-based Learning 1, 2007
J. Ross, Speculative method in digital education research. Learn. Media Technol. **42**(2), 214–229 (2017)
J. Ross, M. Gallagher, H. Macleod, Making distance visible: assembling nearness in an online distance learning programme. Int. Rev. Res. Open Distance Educ. **14**(4) (2013). https://doi.org/10.19173/irrodl.v14i4.1545
M. Sheller, J. Urry, The city and the car. Int. J. Urban Reg. Res. **24**, 737–757 (2000)
M. Sheller, J. Urry, The new mobilities paradigm. Environ Plan A **38**(2), 207–226 (2006)
L. Thompson, Posthuman critical theory, in *Posthuman Glossary (Theory)*, ed. by Braidotti, (Bloomsbury Publishing, London, 2013)
J. Urry, *Mobilities* (Polity Press, Cambridge, 2007)
J. Urry, *What is the Future?* (John Wiley & Sons, Hoboken, 2016)
E. Waterton, S. Watson, Framing theory: towards a critical imagination in heritage studies. Int. J. Herit. Stud. **19**(6), 546–561 (2013)

Part II
Use and Misuse of Algorithms and Learning Analytics

Chapter 4
Learning in the Wild: Understanding Networked Ties in Reddit

Marc Esteve Del Valle, Anatoliy Gruzd, Priya Kumar, and Sarah Gilbert

4.1 Introduction

As social media platforms become more prevalent in our society, more educators are incorporating these platforms into their online and face-to-face classrooms. Some examples of social media use for teaching and learning include using Twitter as a backchannel to support synchronous discussions, blogging about current events related to a class or using Facebook to host asynchronous class discussions (Absar et al. 2015, Esteve Del Valle et al. 2017, Gruzd et al. 2018, Gruzd et al. 2016, Paulin et al. 2015). Previous research also found that social media use was beneficial to students' class engagement and academic performance (Collins and Gruzd 2017, Denker et al. 2018, Junco et al. 2013, Tang and Hew 2017). However, much of the research to date has focused primarily on providing insights about how social media platforms are used to support formal modes of learning. Few studies have examined the use of platforms like Twitter and Facebook to support informal learning outside the classroom (Gruzd et al. 2014, Gruzd and Conroy 2018). This chapter seeks to address this research gap by investigating what we refer to as 'learning in the wild'

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(following Hutchins' Cognition in the Wild, 1995), in which learning is not occurring in formal classes, guided by instructors, graded or structured around a syllabus. Instead, we are interested in understanding how learning is happening when social media users (regardless of their demographic characteristics, educational and professional background) turn to these platforms to pose and answer questions, comment, discuss, debate and argue. These new forms of learning echo Siemens' perspectives of connectivism (Siemens 2005), where social learning is integrated with information and communication technologies, and learning becomes a networked process. Such networked learning processes can be studied with the help of social network analysis (SNA), which 'provides a toolkit for exploring learning where connectivity is the major area of investigation' (Haythornthwaite et al. 2016, p. 253).

To study how learning is happening 'in the wild' (beyond formal classes), we explore interactions among users on Reddit, a popular social media site, in which we believe that informal learning is likely to happen. Specifically, we examine what structural configurations of resulting communication networks (for instance, the prevalence of mutual ties) or individual attributes (for instance, being a moderator) may predict the formation of 'learning' ties among Reddit users (known as Redditors). Our research was guided by the following two questions:

- How are learning processes taking place in informal social media environments such as Reddit?
- How do network configurations and/or individuals' attributes affect access to and the ability to act in informal networked learning environments?

Considering that there are over a million[1] of communities formed on Reddit (known as subreddits), we decided to adopt a case study approach by focusing on two communities known for their educational content: AskStatistics and AskSocialScience. While both subreddits are designed to support a question-answer type community, they are different in terms of the domain that each covers (statistics versus social science), as well as the number of members and moderators they have: AskStatistics has 13.1 k members and one moderator, as compared to 81 k users who joined AskSocialScience and 15 moderators (as of February 2019). Considering a small sample size of the studied population (two cases), the goal of this work is not to come up with generalizable results but rather to identify an initial set of factors that influence how learning ties are formed and maintained among Reddit users so that future work in this area can apply and validate our results in other communities and platforms.

In the next section, we conceptualise 'learning in the wild', a novel notion that is at the core of this research. We continue by reviewing studies that have used SNA to examine learning, followed by an explanation of Reddit. We then provide details on the data and methods used to answer our broad research questions. Last, we outline the results and discuss the factors explaining the formation of ties in both AskStatistics and AskSocialScience subreddit communities.

[1] According to the Reddit metrics website: http://redditmetrics.com/history/month

4.2 Learning in the Wild

Internet technologies have broadened learning opportunities among their users by giving rise to the emergence of *networked learning communities*. In these communities, learners connect with others using 'knowledge that is collaboratively constructed through their dialogues and social interactions' (De Laat 2006, p. 123). At the core of our research are networked learning communities that are formed on social media. Such communities offer virtual spaces for open discussions where anyone can join and contribute their ideas and opinions, find and share relevant resources and connect with experts. Because of the open nature of these spaces, understanding the conduct of community members is important to comprehend how these networked communities operate. Rules and norms emerge from members' interactions, with new users able to see and imitate observed practices. Subsequently, rules and norms determine not only what topics are appropriate for discussion but also what language and discourse practices should be used by community members. While community members are often able to flag or downvote a particular content that they find inappropriate, the enforcement of the rules usually depends on a limited number of users (e.g. moderators). And while joining such communities may be easy at first due to their open nature, it is much more difficult to stay and be active because rules and norms are in constant development and sometimes conflict with broader contexts. For example, Gilbert (2018) found that Reddit-wide norms of minimal moderation were problematic for members of a subreddit with strict rules and enforcement, largely because users who did not know or value the subreddit's rules engaged in disruptive transgressions and rule-breaking behaviour. Successful integration into the community was often achieved through trial and error (during which users' rule-breaking content would be removed) or prolonged passive participation while learning rules and norms.

In this chapter, we use the phrase 'learning in the wild' to explain interactions through social media and the key social and informal learning processes that lead to the emergence of relatively stable, *networked learning communities.* We view 'learning in the wild' as a form of social learning, which occurs through observation of and reaction to how others behave and interact (Bandura 1977). For example, as legitimate peripheral participants (Lave and Wenger 1991), new users learn and appropriate behaviours in keeping with group norms. Similar learning processes occur in social media sites, as individuals lurk before posting and as they observe others responding to and addressing inappropriate behaviour (Haythornthwaite and Andrews 2011). In these learning environments, social learning occurs through discussion. Online posting and reactions provide the material for learning about codes of conduct and community practices. Previous research has tried to unfold the learning occurring 'in the wild' by studying discursive practices among learners (Gunawardena et al. 1997, Chen and Resendes 2014) and by analysing the characteristics of their interactions (Gruzd and Haythornthwaite 2013, Schreurs and de Laat 2014). In general, results show that conversations among members of networked learning communities forge a web of social ties that contribute to both individual and group learning (Haythornthwaite 2011, Kumar et al. 2018,

Kumar and Gruzd 2019). Our research team has been working for several years on studying the practices of learning online (see, for instance, Esteve Del Valle et al. 2017 and Gruzd et al. 2018) by observing and researching the trends towards more learner-centred participation. We have developed a coding scheme to assess learning practices on social media (Haythornthwaite et al. 2018) and new models to understand the factors explaining networked interactions between learners (Esteve Del Valle et al. 2018). In doing so, our aim has been to understand learning processes in the social media age to suggest ways of improving and supporting current learning practices.

In addition to being *social*, learning 'in the wild' is also *informal*. Learning processes among social media users (usually) do not take place in institutionalised contexts (e.g. course units) and lead to formal certifications. In these platforms, users gain knowledge through their daily interactions and exposing themselves to the opinions of other users. As a consequence, learning becomes an unregulated, incidental and experiential process. Livingstone's (1999) definition of informal learning helps us conceptualise the learning occurring 'in the wild' as the following:

> Any activity involving the pursuit of understanding, knowledge or skill which occurs outside the curricula of educational institutions, or the courses or workshops offered by educational or social agencies. The basic terms of informal learning (e.g., objectives, content, means and processes of acquisition, duration, evaluation of outcomes, applications) are determined by the individuals and groups that choose to engage in it. Informal learning is undertaken on one's own; either individually or collectively, without either externally imposed criteria or the presence of an institutionally authorized instructor. (p. 2)

In sum, learning activities associated with social media share both characteristics; they are social and informal. Users of social media can, for instance, post a question, and their peers can ignore this request or respond to the learning need. An answer to the user's question will give rise to a networked tie that can be analysed through the lens of a social network analysis approach, as shown in the following section.

4.3 Social Network Analysis

Social network analysis (SNA) provides our study with theoretical lenses and measures for exploring collaborative learning activities in social media. The core concepts of SNA (such as *nodes, relations, ties* and *networks*) can be used to describe and study online learning processes in communities and wider networks (e.g. Rainie and Wellman 2012, Haythornthwaite 2014). Specifically, SNA can be employed to (a) develop interventions informing teachers (in their guiding role of the networked learning processes) and students about their social learning activities, (b) discover factors explaining the formation of online social learning activities, (c) predict learning outcomes, and (d) understand the nature and meaning of learning ties (Haythornthwaite et al. 2016). Below, we provide some examples of how SNA has been used to study learning processes occurring in online environments that are

especially relevant to the current study. The review below is not meant to be comprehensive. It is used as a starting point to demonstrate a variety of perspectives and questions that can be investigated in this area using SNA.

4.3.1 Network Visualisation and Data Exploration

In social learning analytics, researchers have designed interventions aimed to inform teachers and students about their online activities, such as experimenting with tools that visualise social learning activities automatically (Bakharia and Dawson 2011). An example of these tools is the Network Awareness Tool (NAT), designed by Schreurs and de Laat (2014). The tool aims to promote learner-centric reflection (e.g. how individuals use their peers for learning) and helps find peers who are engaging with the same learning topics online. Used as a plugin for online learning platforms, NAT visualises networked interaction (both actors and ideas) by identifying relations between people who interact around similar topics. In a related work, Comber, Durier-Copp and Gruzd et al. (2018) used network visualisations as a learning analytics tool to provide insights about student interactions in class-wide forum discussions. They confirmed that network visualisations are capable of 'making the "invisible" visible to instructors' by helping them to see who is engaged in online discussions and how. In our study, we experiment with Gephi (Bastian et al. 2009), a popular program for network visualisations, and Netlytic (Gilbert 2016), an SNA-based tool designed for the collection, analysis and visualisation of publicly available social media posts. We use Gephi and Netlytic to visualise and examine public interactions among members of the AskStatistics and AskSocialScience communities as networks.

4.3.2 Prediction

SNA has also been used to predict learning outcomes, such as discovering associations between students' positions in a network and forecasting their successes in learning processes. For instance, Russo and Koesten (2005) found that prestige and degree centrality measures (i.e. the degree to which students are connected and engaged with others in the network) had a positive effect on classroom learning outcomes. Additionally, Cho et al. (2007) showed a significant association between students' closeness centrality (a type of centrality measure that emphasises how easy is to reach a particular person based on their position in the network) and their final grades. While we do not study learning outcomes directly (in part due to the challenges of operationalising 'learning in the wild'), we build on these studies by relying on network centrality measures to see why certain users are more central than others and if their position in the network affects who they interact with and how often they interact with them.

4.3.3 Nature and Formation of Learning Ties

Our work is especially close to the area of research that studies the nature of learning ties and how they are formed. In a related study, de Laat (2006) explored the gaps between social network data and learning processes using a multi-method approach that collected information on learning networks (who learned from whom?) and on the relational content of the learning ties (what were they talking about) and on combination-facilitated learning (why were they talking in such a way or in another?). Posing these questions allowed de Laat to triangulate data and explore learning processes by considering all relational aspects between networks and learning. In another study, Aviv et al. (2003) examined the process of knowledge creation in a formal and asynchronous online learning network (comprised of 18 participants) and in a more informal and asynchronous online learning network (comprised of 19 participants). The researchers found that the knowledge construction process in the formal and asynchronous online learning network reached a high phase of critical thinking, while in the asynchronous informal online learning network, the knowledge construction process reached a low phase of cognitive activity. The results of these studies serve as a guide to interpret the outcome of our investigation, specifically those of Aviv et al. (2003), concerning informal learning processes in online environments.

Research in networked learning has also aimed to discover the variables predicting the formation of learning ties. These variables can be based on individual or network characteristics. Individual attributes can include personal characteristics (e.g. age), and network characteristics can refer to one's position in the network (such as a centrality measure). Despite the relevance of this type of research, few studies have incorporated both individual and network characteristics to analyse learning processes in the online environment. A noteworthy example is Cho et al. (2007), who studied 31 learners working together to design an aerospace system using online collaboration tools. Their study showed that central individuals in the network remained connected to the same people over time, while individuals placed in the boundary of the network were more proactive in forming new learning ties with others.

Gilbert and Paulin (2015) used SNA to explore the role of experts, referred to as more knowledgeable others (MKOs), in conference Twitter networks. Using the (LAK) conference as a case study, the authors identified two types of MKOs: subject-specific MKOs who were involved in relevant professional organisations and past conferences and other MKOs with a relatively high h-index score of 23 or above (i.e. highly cited authors[2]). Both types of MKOs were found to have significantly higher levels of centrality and prestige than those who were not MKOs, suggesting that they are prominent members of the conference Twitter community and

[2] H-index is used to quantify the impact of someone's publication record by indicating how many of their publications are cited a particular number of times. For example, an author with the h-index of 23 has at least 23 publications that have been cited at least 23 times.

thus occupy positions in the network that allow them to make impactful contributions.

The results of the two studies described above (Cho et al. 2007, Gilbert and Paulin 2015) have relevant implications for learning purposes since they show that learners' attributes (such as being a subject expert) and network properties (such as one's position in the network) are important to consider when studying or designing networked learning activities. Indeed, we have considered the results of these studies when choosing the statistical models to examine Redditors' interactions in the AskStatistics and AskSocialScience subreddit communities. As discussed in the Methods section below, we chose to use exponential random graph models (ERGMs), a statistical approach capable of considering both individual and network characteristics, when studying tie formation. Building on the previous literature related to networked learning analysis, we seek to expand the understanding of what variables predict the formation of learning ties in online environments. The next sections provide more details on the social media site chosen for this study and our methods.

4.4 Reddit

Reddit is an online social content aggregation site that is commonly referred to as 'the front page of the Internet' for the way crowd-based voting raises the profile of user-submitted news or other items to a front-page equivalent. By its own account, 'Reddit bridges communities and individuals with ideas, latest digital trends and breaking news' (Reddit 2017). It has become increasingly popular since its launch in 2005, and it currently ranks 18th in terms of global traffic and sixth in the United States (Alexa 2019).

The basic framework of the Reddit system revolves around (a) subreddit communities, (b) posts, (c) comments, (d) votes, and (e) Karma (a popularity score earned by posting content that other users find engaging). Reddit is composed of millions of user-generated and user-moderated online communities on a wide range of topics (e.g. politics, economics, academia, etc.), which are called subreddits. Subreddits have their own norms and rules determining, for instance, what can and cannot be posted. Any registered user (Redditor) can create, comment and vote on posts. Comments are hierarchically threaded (root comment and subsequent comments) and can be in response to a general post (root comment) or in reply to another comment.

Redditors can upvote or downvote others' posts and comments. By default, posts and comments are displayed on the site according to the total vote ranking function; i.e. upvoted posts and comments rise to the top, while downvoted posts and comments are pushed to the bottom. Votes on Redditors' posts and comments contribute to their Karma score; posts and comments that are upvoted increase Redditors' Karma scores, while posts and comments that are downvoted detract from total Karma.

Redditors can also become Gold members[3] and moderators. Gold membership grants access to extra features such as reading more comments per page or joining a private subreddit only available to those with Reddit Gold, among others. Holding a moderator role gives Redditors a range of controls for configuring the subreddits they moderate, for instance editing the rule page of the subreddit or banning specific users from participating in the subreddit.

Reddit is an ideal environment for our investigation of learning 'in the wild' because conversations emerge from the contribution and promotion of the members, combining perspectives of experts and non-experts (Gilbert 2018) outside traditional classroom settings. By analysing publicly available discussions on Reddit, we evaluate how the network configurations and Redditor's individual attributes may influence the networked learning processes on this site.

4.5 Methods

We collected all posts and comments submitted to the AskStatistics and AskSocialScience subreddits in 2015. As part of this process, we also collected information about the (a) Karma points, (b) the Gold membership status (being or not being a Gold member) and (c) the moderator role (being or not being a moderator) of the Redditors of these two communities.

Data were collected using a custom application that relied on Reddit's public application programming interface (API). In accordance with Canada's Tri-Council Policy Statement on Ethical Conduct for Research Involving Humans (2014), review by a Research Ethics Board was not required as the research was non-intrusive and did not involve direct interaction between the researchers and subreddit members. The only data collected were publicly viewable discussions on the website. In addition, consent was not considered necessary to solicit from individual users or group moderators because of the lack of personally identifiable information (i.e. users on the platform do not use their real names) and low sensitivity of the discussion topics (Nissenbaum 2004). Finally, to further ensure the privacy of users whose data are included in our study, the results are presented in aggregate without identifying any particular username.

To discover the network characteristics and the Redditors' attributes that were facilitating ties among the users of these two subreddits, we employed exponential random graph models (ERGM). Broadly speaking, ERGM are designed to test various network-based hypotheses by generating a large set of random networks, based on a chosen set of network configurations and node attributes, and comparing these networks to an observed network (Esteve Del Valle and Borge 2017, Gruzd and Tsyganova 2015, Lusher et al. 2013). In our case, we used ERGM to test whether certain network configurations (i.e. statistics in the ERGM terms) and node attri-

[3] After data collection, in August 2018, Reddit's Gold Membership program was overhauled and renamed Reddit Premium.

butes can explain the formation of ties in the subreddit communication networks or whether ties in these networks are likely to occur by chance alone. To run ERGM, we used the 'statnet' package in R (Goodreau et al. 2008, Hunter et al. 2008).

When using ERGM, the process starts with building a null model (*net~edges*), which only accounts for the tie density of the observed network without considering any other predictors. Our subsequent model, Model 1, included three network parameters corresponding to reciprocity (*mutual*), which is a statistic counting the ratio of mutual replies (Goodreau et al. 2008); transitivity (*transitive*), which occurs whenever in a discussion thread User A replies to User B, User B replies to User C, then User C replies to User A; and, finally, popularity, which is based on the number of Redditors who replied to a user (*gwindegree*). The underlying idea of adding these network statistics to the model is to evaluate their effects in increasing or decreasing Redditors' likelihood of establishing communication ties in both 'Ask' communities. Next, we expanded Model 1 by adding Redditors' attributes that were available to the research team: 'Gold Membership', 'Karma' and 'Moderator'. Specifically, Model 2 included Redditors' 'Gold Membership' status (*nodefactor* ['*Gold_Member*']). Model 3 added Redditor's Karma score as a popularity measure of the content that users shared in the subreddit (*nodecov* ['*Karma*']). Lastly, Model 4 added Redditors' moderator role (*nodefactor* ['*Moderator*']) to indicate if they are a moderator in each studied community.

Finally, to determine the quality of the resulting model, randomly generated networks were compared to the observed networks by assessing the goodness of fit (Hunter et al. 2008, Li and Carriere 2013).

4.6 Results

4.6.1 Descriptive Network Statistics and Network Visualisations

Table 4.1 shows descriptive statistics of the AskStatistics and AskSocialScience networks. In the case of the AskStatistics subreddit, 1951 Redditors posted a total of 4301 replies, while for the AskSocialScience subreddit a total of 3689 Redditors posted 7723 replies. In both networks, the graph density is very low (0.001), meaning that only 0.1% of the total possible relations among the Redditors occur. This observation is also demonstrated by the fact that the average number of users a Redditor interacts with (average degree) is only 2.205 in AskStatistics and 2.094 in AskSocialScience. At the same time, the average path length (i.e., the average graph-distance between all pairs of nodes) is 4.409 for the AskStatistics subreddit and 5.232 for the AskSocialScience subreddit, indicating that the average distance between any pair of users is 4.4 steps in the former subreddit and 5.2 in the latter. Although the density in both networks is low, relatively short distances make it possible for Redditors to connect easily to others.

Table 4.1 Descriptive network statistics of the 'AskStatistics' and 'AskSocialScience' subreddits

	AskStatistics	AskSocialScience
P (number of posts)	2352	1523
N (number of nodes)	1951	3689
R (number of replies)	4301	7723
Graph density	0.001	0.001
Average path length	4.409	5.232
Average degree	2.205	2.094
Modularity	0.621	0.641

Another network statistic to examine is modularity (Gruzd et al. 2017). The modularity scores for both networks are 0.621 for the case of AskStatistics and 0.641 for the case of AskSocialScience. These scores indicate the existence of clusters, which may be formed around certain topics or threads of conversation. Notably, although we observe different clusters of conversations, the fact that the modularity scores are not closer to 1 (the maximum possible value for this metric) suggests that these clusters are interconnected, potentially through a core group of users who contributed to multiple different topics discussed by their group.

Lastly, for each subreddit, we built a network representing who replies to whom based on the collected posts and comments, where nodes are Reddit users (Redditors) and directed edges in the network represent their communication patterns. The network visualisation step allowed us to confirm the findings based on the descriptive statistics visually, as well as to continue our exploratory analysis of emerging communication networks in both communities. Figure 4.1 shows the visualisation of the networks. Node colours are assigned automatically to indicate highly connected nodes based on a community detection algorithm. The colour of the nodes indicates the existence of different clusters. The size of the nodes is equivalent to the degree centrality of the Redditors in the network. The ties among the nodes represent the replies between the Redditors (the thicker the line of the ties is, the stronger is the intensity of the relations – number of replies – among the Redditors).

4.6.2 Resulting ERG Models

Tables 4.2 and 4.3 summarise our results of running Model 1–Model 4. The selection criteria were driven by significance levels of the tested parameters and the iterative reduction in both Akaike information criterion (AIC) and the Bayesian information criterion (BIC) values, with smaller values indicating a better fitting model (Goodreau et al. 2008).

The last column of the two tables reports the estimates of Model 4, which includes all the variables of the analysis. In both tables, the edge parameter is negative, a common characteristic of sparse networks (Mai et al. 2015). The estimates suggest that reciprocity and transitivity remain positive and significant across all models, whereas popularity remains significant but negative. This means that reciprocity and transitivity increase Redditors' likelihood of establishing networked ties, whereas popularity decreases their likelihood of forming new ties.

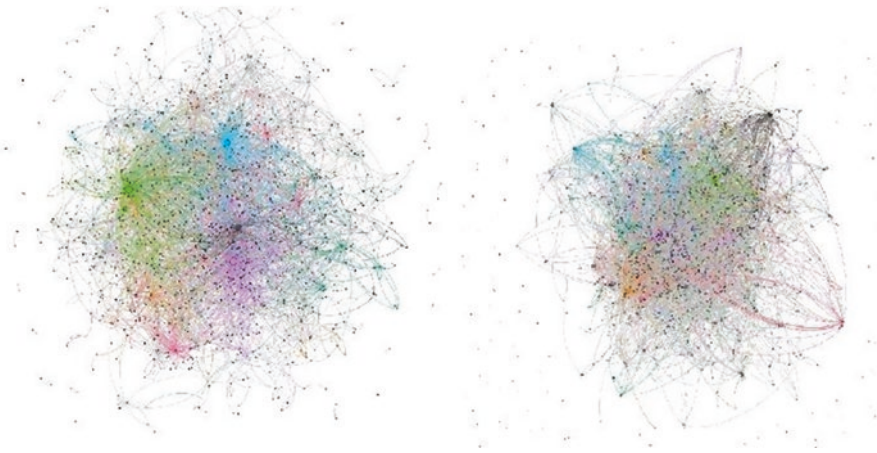

Fig. 4.1 Communication networks among Redditors in AskStatistics (on the left) and AskSocialScience (on the right)

Table 4.2 Factors underlying the formation of ties in the AskStatistics subreddit

	Model 1		Model 2		Model 3		Model 4	
	EST	*SE*	*EST*	*SE*	*EST*	*SE*	*EST*	*SE*
Structural features								
Edges	**−7.631**	0.021	**−7.682**	0.026	**−7.318**	8.297	**−7.348**	8.111
Reciprocity	**6.523**	0.039	**8.096**	0.034	**6.826**	3.310	**6.789**	3.427
Popularity	**−0.751**	0.022	**−0.531**	0.024	**−1.064**	1.624	**−1.151**	1.362
Transitivity	**0.630**	0.000	**0.666**	0.000	**6.652**	1.168	**6.137**	3.383
Redditors' attributes								
Gold member			**−0.225**	0.049	**−2.340**	1.552	**3.939**	9.670
Karma					**3.341**	1.077	**−1.027**	3.658
Moderator							**9.343**	9.779
Akaike information criterion (AIC)	58,577		58,406		58,427		58,294	
Bayesian information criterion (BIC)	58,630		58,471		58,505		58,386	

Note: Coefficients in bold are significant at the 99% level

Results from Model 4 also show the effects of Redditors' attributes in facilitating networked ties. The estimates of the 'Gold Membership' status are positive and significant for AskStatistics but negative and significant for AskSocialScience. This contradictory finding makes it difficult to reach any definitive conclusion on the effects of being a 'Gold Member' in increasing or decreasing the likelihood of replying or receiving a reply from another user. The estimates of Redditors' Karma scores are negative and significant for AskStatistics, but they are not significant for AskSocialScience. Again, these results do not allow us to draw conclusions about the effects of the Karma scores on forming ties on Reddit. Lastly, the estimates of the 'Moderator' attribute are significant and positive for both AskStatistics and

Table 4.3 Factors underlying the formation of learning ties in AskSocialScience subreddit

	Model 1		Model 2		Model 3		Model 4	
	EST	*SE*	*EST*	*SE*	*EST*	*SE*	*EST*	*SE*
Structural features								
Edges	**−7.040**	0.023	**−7.102**	0.024	**−7.107**	5.283	**−7.174**	5.830
Reciprocity	**8.277**	0.105	**8.056**	0.131	**8.211**	4.111	**8.041**	1.031
Popularity	**−2.521**	0.050	**−2.398**	0.067	**−2.447**	8.392	**−2.375**	8.604
Transitivity	**0.377**	0.040	**1.003**	0.003	**3.799**	1.521	**3.940**	1.644
Redditors' attributes								
Gold member			**−0.075**	0.028	**4.914**	5.300	**−1.544**	5.207
Karma					**1.296**	4.013	4.982	3.966
Moderator							**9.903**	4.430
Akaike information criterion (AIC)	120,183		120,022		120,127		119,680	
Bayesian information criterion (BIC)	120,241		120,094		120,213		119,781	

Note: Coefficients in bold are significant at the 99% level

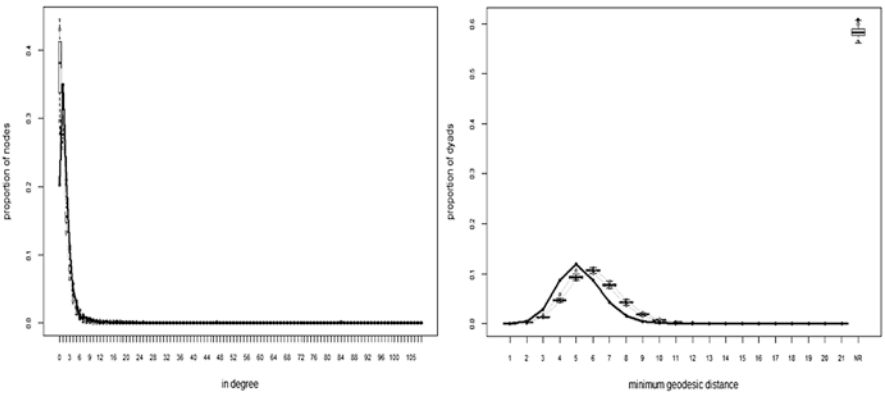

Fig. 4.2 Model 4 goodness-of-fit diagnostics for AskStatistics

AskSocialScience. This means that being a moderator highly increases the likelihood of establishing a tie in both networks.

To assess how well the final model, Model 4, captures the structure of the observed data, Figs. 4.2 and 4.3 show how the observed in-degree and minimum geodesic distance distributions reproduce the network's statistics observed in the original data. This step allows us to see how similar networks simulated based on the final model (Model 4) are to the observed networks based on the two network statistics (in-degree and minimum geodesic distance), which have not been explicitly included in the tested model.

In the plots, the vertical axis is the relative frequency of nodes (in-degree) and dyads (minimum geodesic distance). The observed statistics in the actual network are indicated by the solid lines (thick black lines). The grey dotted lines represent

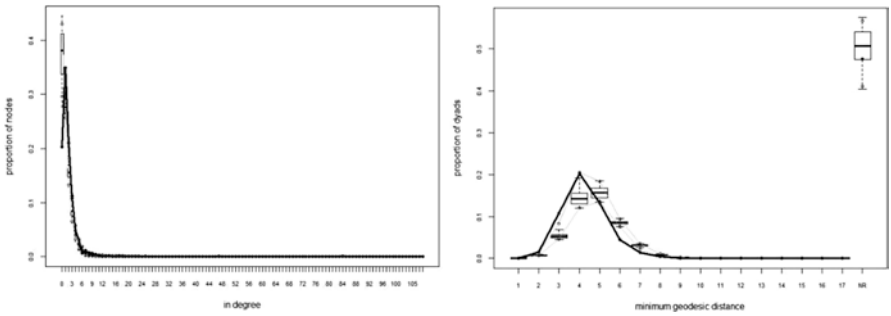

Fig. 4.3 Model 4 goodness-of-fit diagnostics for AskSocialScience

the range of 95% of the simulated statistics. The models perform relatively well for the in-degree and geodesic distance distributions. The observed distributions generally fall within the quantile curves for most of the range. The model overestimates the average in-degree distribution and geodesic distance, but overall it captures the shape of the distributions.

4.7 Discussion

This study sought to expand our current knowledge of learning processes in informal social media environments by discovering what factors may predict tie formation in two subreddits: AskStatistics and AskSocialScience. Using SNA, we analysed one year of data on all communication-related relations (based on posts and comments) and three Redditor attributes (Gold membership, Karma scores and moderator status). Our review of some commonly used descriptive network statistics revealed a low connectivity among Redditors of these two communities. This is because of relatively low values of the graph density (0.001 for both networks) and the average number of connected Redditors (2.2 for AskStatistics and 2.1 for AskSocialScience). However, the results of the average path length (4.409 for AskStatistics and 5.232 for AskSocialScience) show that despite the low connectivity in both networks, shorter distances between Redditors make it possible for them to connect and share information with one other efficiently (see also Esteve Del Valle and Borge 2017).

Based on the results of the ERG models, we found that in both subreddits, the likelihood of establishing networked learning ties greatly increases with Redditors' reciprocal posting behaviour (i.e. when User A and User B reply to each other) and increases with the existence of transitive replying behaviours (i.e. when User A replies to User B, User B replies to User C and User C completes the cycle by replying to User A). A possible explanation of this transitive replying behaviour among Redditors is the existence of a clustering effect facilitating interactions between users of the same conversational threads. Our findings also show that the likelihood

of establishing a tie decreases when users' posts are very popular (i.e. received a lot of replies). This suggests that there may be an upper limit on the number of replies and connections that a user can get on Reddit, which may be due to the platform's interface affordances or other factors requiring further research. We see three interrelated explanations for this result: (1) because Reddit collapses comments as threads get larger, users who are quickly scrolling through comments may not click on collapsed comments to view, read and respond to them; (2) reading popular posts with many comments may cause fatigue, and thus others are more likely to respond to comments displayed at the top of the page rather than at the bottom; (3) knowing that comments visible at the top of the page are more likely to be read, users may be more inclined to respond to top-level comments as a way to increase their Karma scores.

Finally, at the individual level, contradictory results concerning the Redditors' Gold membership status and their Karma scores do not allow us to draw clear conclusions on the effects of these two attributes in establishing communication ties. It is possible that these individual characteristics and their role in tie formation are subreddit specific. Gold membership status could be indicative of an active Reddit user since Gold members must either have purchased this status for themselves or have been gifted it by another user. But it appears not to be the case in at least one of the studied subreddits.

Our results regarding Karma scores also differ from conclusions drawn by Kilgo et al. (2016), who suggested that Karma scores may be used to identify opinion leaders (i.e. highly connected individuals). This may be explained by two factors. First, as relatively small subreddits, the primary form of recognition among users may be qualitative, such as giving thanks when answers are provided, rather than quantitative, such as upvoting and adding to Karma; this pattern of recognition has been noted as a key characteristic of online communities, particularly in those with a core intent of knowledge exchange, such as academic communities (Haythornthwaite 2009). Second, Karma scores are derived from participation across Reddit, rather than through participation in individual subreddits. Thus, a high Karma score may not be reflective of users' expertise in a given community. Hence, future research should examine more cases to clarify the role of these two attributes in establishing networked ties among Redditors.

While we found some conflicting results regarding the effects of Gold membership and Karma on the formation of communicative ties (and what we believe to be *learning* ties as well, considering the educational focus of both communities), we did find evidence to support the claim that being a moderator increases the likelihood of establishing ties in both subreddits. Unlike Gold membership, which is available to any user, being a moderator is likely indicative of more active and regular participation in a subreddit. In Reddit's topic-based 'Ask' subreddits, moderators are also often subject experts and thus also contribute to the community by responding to questions, thereby establishing learning ties. In 2015, AskSocialScience had 13 moderators, eight of whom were noted as experts in a specific topic area—'flaired' in Reddit terms. In AskSocialScience, a 'flair' is granted when a Redditor provides evidence that they have a university degree in the area and/or has a proven record of contributing high-quality social science comments. While AskStatistics

has no flair system, the subreddit has only one moderator, who is also the subreddit's creator, suggesting that the moderator has an interest in providing users with responses to statistics questions.

4.8 Conclusions

This chapter contributes to the understanding of learning 'in the wild'; that is, learning taking place on social media, beyond institutionalised curricula and formal classes. We chose Reddit as the platform for our investigation, and more specifically the subreddits AskStatistics and AskSocialScience, because their educational nature suggested that we would observe informal learning processes.

The main goal of our study was to predict the factors explaining interactions among the users (Redditors) of the AskStatistics and AskSocialScience *networked learning communities* (De Laat 2006). To do so, we used ERGM to examine interactions among the users of these two communities for a period of one year (2015). The results show that relations among users of these two communities are determined by both network configurations (reciprocity and transitivity) and individual attributes (being a moderator). This means that for the users of these communities, the likelihood of establishing learning ties increases if a user maintains reciprocal interactions with other users, participates in multiple conversational clusters or is a moderator.

From a methodological point of view, our study demonstrates the usefulness of applying SNA-based concepts and measures to make sense of learning processes occurring 'in the wild'. We hope that our research will inspire other colleagues to study on learning occurring across various social media sites and not just Reddit. From a practical perspective, we expect teachers to bridge the gap between formal and informal learning by using social media for educational purposes. More broadly, we expect educational institutions to make use of the networked analytics derived from learning interactions on social media to better understand today's ever-changing learning tools and strategies that often combine formal and informal elements and are based on both self- and collaborative learning.

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References

R. Absar, A. Gruzd, C. Haythornthwaite, & D. Paulin, Media Multiplexity in Connectivist MOOCs. in *Proceedings of the Fifth International Conference on Learning Analytics and Knowledge* (ACM, New York, NY, USA, 2015), pp. 424–425. https://doi.org/10.1145/2723576.2723654

Alexa.,Traffic, Demographics and Competitors – Alexa. Retrieved December 23, 2019, from https://www.alexa.com/siteinfo/reddit.com

R. Aviv, E. Zippy, G. Ravid, & A. Geva, Network analysis of knowledge construction in asynchronous learning networks. Journal of Asynchronous Learning, **7**(3), 1–23 (2003).
A. Bakharia, S. Dawson, SNAPP: A Bird'S-eye View of Temporal Participant Interaction. in *Proceedings of the 1st International Conference on Learning Analytics and Knowledge* (ACM, New York, NY, USA, 2011),. pp. 168–173. https://doi.org/10.1145/2090116.2090144
A. Bandura, Social learning theory (Prentice-hall series in social learning theory). Englewood Cliffs: Prentice-Hall. (1977).
M. Bastian, S. Heymann, M. Jacomy, Gephi: an open source software for exploring and manipulating networks. In *Third international AAAI Conference on Weblogs and Social Media*, 2009
B. Chen, M. Resendes, Uncovering what matters: Analyzing transitional relations among contribution types in knowledge-building discourse. *Proceedings of the 4th International Conference on Learning Analytics and Knowledge*, ACM, 2014. pp. 217–225
H. Cho, G. Gay, B. Davidson, A. Ingraffea, Social networks, communication styles, and learning performance in a cscl community. Comput. Educ. **49**(2), 309–329 (2007). https://doi.org/10.1016/j.compedu.2005.07.003
R. Collins, A. Gruzd, Learning within Digital Media: Investigating the Relationships Between Student Citation Networks, Assignment Structures, and Learning Outcomes. in *Proceedings of the 50th Hawaii International Conference on System Sciences*, 2017. Available at https://scholarspace.manoa.hawaii.edu/handle/10125/41407
S. Comber, M. Durier-Copp, A. Gruzd, Instructors' perceptions of networked learning and analytics. Can. J. Lear. Technol. **44**(3) (2018). https://doi.org/10.21432/cjlt27644. Available at https://www.learntechlib.org/p/188299/
M. De Laat, *Networked Learning* (phd), 2006., Retrieved from https://eprints.soton.ac.uk/20358/
M. Esteve Del Valle, A. Gruzd, C. Haythornthwaite, S. Gilbert, D. Paulin, Social media in educational practice: faculty present and future use of social media in teaching. in *Proceedings of the 50th Hawaii International Conference on System Sciences*, 2017. pp. 164–173
K.J. Denker, J. Manning, K.B. Heuett, M.E. Summers, Twitter in the classroom: modeling online communication attitudes and student motivations to connect. Comput. Hum. Behav. **79**, 1–8 (2018)
M. Esteve Del Valle, R. Borge, Leaders or brokers? Potential Influencers in online parliamentary networks. Policy Internet **10**(1), 61–86 (2017)
M. Esteve Del Valle, A. Gruzd, C. Haythornthwaite, P. Kumar, S. Gilber, D. Paulin, Learning in the wild: Predicting the formation of ties in 'Ask' subreddit communities using ERG models. in *Proceedings of the 11th International Conference on Networked Learning*, IEEE, 2018. pp. 157–164
S. Gilbert, Learning in a Twitter-based community of practice: an exploration of knowledge exchange as a motivation for participation in #hcsmca. Info. Commun. Soc. **19**(9), 1214–1232 (2016). https://doi.org/10.1080/1369118X.2016.1186715
S. Gilbert, *Motivations for participating in online initiatives: exploring motivations across initiative types* (Doctoral dissertation). 2018. Retrieved from https://open.library.ubc.ca/cIRcle/collections/ubctheses/24/items/1.0372890
S. Gilbert, D. Paulin, Tweet to learn: Expertise and centrality in conference Twitter networks. in *Proceedings of the 48th Hawaii International Conference on System Sciences*, IEEE, 2015. pp. 1920–1929
S.M. Goodreau, M.S. Handcock, D.R. Hunter, C.T. Butts, M. Morris, A statnet Tutorial. J. Stat. Softw. **24**(9), 1–27 (2008)
A. Gruzd, N. Conroy, Designing a learning analytics dashboard for twitter-facilitated teaching. in *Proceedings of the Fifth Annual ACM Conference on Learning at Scale (L@S '18)*. ACM, New York, NY, USA, 2018. Article 46. https://doi.org/10.1145/3231644.3231704
A. Gruzd, C. Haythornthwaite, Enabling community through social media. J. Med. Internet Res. **15**(10), e248 (2013). https://doi.org/10.2196/jmir.2796
A. Gruzd, K. Tsyganova, Information wars and online activism during the 2013/2014 crisis in Ukraine: examining the social structures of pro- and anti-maidan groups. Policy Internet **7**(2), 121–158 (2015)

A. Gruzd, C. Haythornthwaite, D. Paulin, R. Absar, M. Huggett, Learning analytics for the social media age. in *Proceedings of the Fourth International Conference on Learning Analytics And Knowledge* (LAK'14). ACM, New York, NY, USA, 2014. pp. 254–256. https://doi.org/10.1145/2567574.2576773

A. Gruzd, D. Paulin, C. Haythornthwaite, Analyzing social media and learning through content and social network analysis: a faceted methodological approach. J. Learn. Anal. **3**(3), 46–71 (2016)

A. Gruzd, P. Mai, A. Kampen, A how-to for using Netlytic to collect and analyze social media data: a case study of the use of Twitter during the 2014 Euromaidan Revolution in Ukraine, in *The SAGE Handbook of Social Media Research Methods*, ed. by L. Sloan, A. Quan-Haase, (SAGE, Thousand Oaks, 2017)

A. Gruzd, C. Haythornthwaite, S. Gilbert, D. Paulin, M. Esteve Del Valle, Users and gratification factors for social media use in teaching: Instructors' perspectives. New Media Soc. **20**(2), 475–494 (2018)

C.N. Gunawardena, C. Lowe, T. Anderson, Analysis of a global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. J. Educ. Comput. Res. **17**(4), 397–431 (1997)

C. Haythornthwaite, Crowds and communities: light and heavyweight models of peer production. in *Proceedings of the 42nd Hawaii International Conference on System Science*, 2009. 1–10. https://doi.org/10.1109/HICSS.2009.137

C. Haythornthwaite, Learning networks, crowds and communities. in *Proceedings of the Learning Analytics and Knowledge Conference*, Banff, Alberta, Canada, February, 2011. pp.18–22.

C. Haythornthwaite, Learning networks, in *Encyclopedia of Social Network Analysis and Mining*, ed. by R. Alhajj, J. Rokne, (Springer, New York, 2014), pp. 785–793

C. Haythornthwaite, R. Andrews, *E-Learning Theory and Practice* (SAGE, London, 2011)

C. Haythornthwaite, M. de Laat, B. Schreurs, A social network analytic perspective on E-learning, in *The SAGE Handbook of E-learning Research*, (SAGE Publications Ltd., Thousand Oaks, 2016), pp. 251–269

C. Haythornthwaite, P. Kumar, A. Gruzd, S. Gilbert, M. Esteve Del Valle, D. Paulin, Learning in the wild: coding for learning and practice on Reddit. Learn. Media Technol. **43**(3), 219–235 (2018)

D.R. Hunter, M.S. Handcock, C.T. Butts, S.M. Goodreau, M. Morris, Ergm: a package to fit, simulate and diagnose exponential-family models for networks. *J. Stat. Softw.* **24**(3), nihpa54860 (2008)

E. Hutchins, *Cognition in the Wild* (MIT press, Cambridge, 1995)

R. Junco, C.M. Elavsky, G. Heiberger, Putting twitter to the test: assessing outcomes for student collaboration, engagement and success. Br. J. Educ. Technol. **44**(2), 273–287 (2013)

D.K. Kilgo, J.J. Yoo, V. Sinta, S. Geise, M. Suran, T.J. Johnson, Led it on Reddit: An exploratory study examining opinion leadership on Reddit. First Monday **21**(9) (2016). https://doi.org/10.5210/fm.v21i9.6429

P. Kumar, A. Gruzd, Social Media for Informal Learning: A Case of #Twitterstorians. in *Proceedings of the 52nd Hawaii International Conference on System Sciences*, IEEE, 2019. pp. 2527–2535

P. Kumar, A. Gruzd, C. Haythornthwaite, S. Gilbert, M. Esteve Del Valle, P. Drew, Learning in the wild: Coding Reddit for learning and practice. in *Proceedings of the 51st Hawaii International Conference on System Sciences*, IEEE, 2018. pp. 1933–1942

J. Lave, E. Wenger, *Situated learning: legitimate peripheral participation* (Cambridge University Press, Cambridge, 1991)

Y. Li, K.C. Carriere, Assessing goodness of fit of exponential random graph models. Int. J. Stat. Probab. **2**(4), 64 (2013)

D. Livinsgtone, Exploring the icebergs of adult learning: Findings of the first Canadian survey of informal learning practices. Nall Working Paper No: 10. Centre for the Study of Education and Work, OISE/IT, Toronto, 1999. Retrieved from https://tspace.library.utoronto.ca/retrieve/4451

D. Lusher, J. Koskinen, G. Robins, *Exponential Random Graph Models for Social Networks: Theory, Methods, and Applications* (Cambridge University Press, Cambridge, 2013)

B. Mai, J. Liu, S. González-Bailón, Network effects in the academic market: mechanisms for hiring and placing PhDs in communication (2007–2014). J. Commun. **65**(3), 558–583 (2015)
H. Nissenbaum, Privacy as contextual integrity. Wash. Law Rev. **79**, 39 (2004)
D. Paulin, S. Gilbert, C.A. Haythornthwaite, A. Gruzd, R. Absar, Beyond the backchannel: Leveraging Twitter to enact learning processes. *iConference 2015 Proceedings*, 2015. URI: http://hdl.handle.net/2142/73779
H. Rainie, B. Wellman, *Networked: The New Social Operating System* (The MIT Press, Cambridge, MA, 2012). Retrieved from http://search.ebscohost.com.proxy-ub.rug.nl/login.aspx?direct=true&db=nlebk&AN=452133&site=ehost-live&scope=site
Reddit, Reddit, 2017, September 7. Retrieved September 7, 2017, from https://about.reddit.com/
T.C. Russo, J. Koesten, Prestige, centrality, and learning: a social network analysis of an online class. Commun. Educ. **54**(3), 254–261 (2005). https://doi.org/10.1080/03634520500356394
B. Schreurs, M. de Laat, The network awareness tool. Comput. Hum. Behav. **37**(C), 385–394 (2014)
G. Siemens, Connectivism: a learning theory for the digital age. Int. J. Instr. Technol. Distance Learn. **2**(1), 3–10 (2005)
Y. Tang, K.F. Hew, Using Twitter for education: Beneficial or simply a waste of time? Comput. Educ. **106**, 97–118 (2017)
Tri-Council, Ethical conduct for research involving humans. Ottawa, Ont, 2014. Retrieved April 14, 2019 from http://www.pre.ethics.gc.ca/pdf/eng/tcps2-2014/TCPS_2_FINAL_Web.pdf

Chapter 5
Dashboard Literacy: Understanding Students' Response to Learning Analytic Dashboards

Liz Bennett and Sue Folley

5.1 Context and Rationale

Dashboards are the graphical interface that manipulate and present data about students' learning behaviours (attendance, visits to the library, which books they take out, their attainment etc.). Although only a few UK higher education institutions (HEIs) have developed a dashboard for students, most other UK HEIs have an aspiration to develop their use (Sclater 2014). Many dashboards are descriptive, in that that they represent visually student behaviours (for example, a pie chart to show attendance that is authorised and unauthorised or a graph showing the student's results over the three years of their study), although a growing number contain predictive elements that use machine learning algorithms to calculate a likely outcome for the student based on their past behaviour (Bodily and Verbert 2017). Another key feature of a student dashboard is its ability to display peer comparison whereby a student's behaviour is compared to that of others in the group. Peer comparison is a feature of dashboards that has the power to invoke a strong emotional response and is a topic that is under research in terms of its impact on students' motivation (Jivet et al. 2017).

Learning analytics take students' behaviours as 'proxies for learning', and in doing so they simplify and codify learning in terms of what they are able to measure. There have been critical views of other uses of such top-down technologies, including Land and Bayne's (2002) analysis of the VLEs that applied Foucault's (1977) metaphor of the panopticon, a prison designed for easy surveillance, which brings about compliant behaviours even when prisoners are not being watched. Similarly, MacFarlane has critiqued the way that the UK higher education audit culture uses measures of student performance as proxies for their development

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(cognition) (2017, p. 47). Gourlay (2015) has problematised the notion of student engagement, which is complex and often not visible, and notes that the term student engagement, as defined by Trowler (2010) and Coates (2007), is missing out on the invisible, the intangible and the process aspects of learning (interlocution). She argues that the notion of time on task is problematic and leads to a 'tyranny of participation' (2015, p. 402). These critiques of top-down approaches to defining and measuring learning provide a critical lens to understanding the limitations of dashboards.

Research into the use of dashboards is in its early stages, with some evidence of their positive impact on student engagement leading to improvements in student motivation, retention, satisfaction and attainment (Duval et al. 2013, HEA 2014, Sclater 2014, UCISA 2015). However, much of the focus of the research is on the technical aspects of collecting and analysing data (Papamitsiou and Economides 2014, Jivet et al. 2017), with little detail understood about how students respond to seeing data presented in this form (Duval et al. 2013). Jivet et al. (2017) have carried out a literature review of 26 articles to identify which educational concepts are integrated into the design of student-facing dashboards. They found that the majority of studies employ self-regulated learning. However, they argue that the use of self-regulation principles needs to be expanded to incorporate changes that are cognitive, emotional and behavioural, rather than being limited to the metacognitive processes associated with self-regulated learning. In addition, they comment that even when a dashboard design has been informed by principles of self-regulation, they tend to focus on reflection and evaluation but that dashboards need to support other parts of the self-regulation process, such as goal setting. Their study concludes by arguing for more research into how learner dashboards are experienced and used by learners, and this is the gap that this small-scale study set out to address.

5.2 Methods

The study set out to gain an in-depth understanding of students' emotional and learning responses to seeing their data presented in dashboard form. The first stage of the study involved a focus group to understand which types of the dashboard elements (e.g. pie chart, comparative data, progress, word cloud) the students liked. Following the focus group, individual interviews were held with 24 students, who were given their own data in dashboard format. The interviews were semi-structured around three open interview questions:

- What were your response to seeing the dashboard elements containing your actual data?
- What action would you take as a result of seeing your data?
- Whose responsibility do you think it is to act on the results of your data?

5.2.1 Sample

The sample was drawn from final-year undergraduate students within the School of Education at a single case study of UK higher education institutions. The sample for the focus group and first round of interviews was a self-selecting group of ten students. The second round of interviews involved a whole cohort consisting of 14 final-year students.

The academic range of the sample was varied, with students in the first round of interviews ranging from 1st to 168th in their cohort. Their on-track score (showing what class of degree the students were on track to get) ranged from 51% (low 2:2) to 74% (1st), which is a range of 23%. The dashboard presented each student with their performance in a recent assignment: for half of the group, this assignment mark was better than their overall average, and half of the group did worse in this assignment than their overall average. This suggests that we had the potential to uncover a range of emotional responses to the assignment data, not just being pleased that this assignment was bringing their average markup or just disappointment that it was lowering their mark. Overall, the sample had significant variation in the academic range of the students and in where this mark sat on their overall profile.

5.2.2 Ethics

The study was sensitive in nature, given its focus on students' academic performance. Ethical concerns related to providing data about progress to students that might negatively impact on their well-being. These students were all in their final year, a time of increased anxiety and pressure as they come towards their final pieces of assessed work that will determine their degree classification.

BERA principles informed the study (2018). Participation was voluntary, so students made informed choices about what they would get out of their participation. The value to the students was that they would get some first-hand experience of data gathering that might benefit them in terms of being able to apply this understanding to their own research. In addition, providing students with data about their progress has been found to support positive student engagement and retention (see the rationale for the study). We were aware of the responsibility that we had for supporting students' positive experience of receiving data about their progress. We did this by preparing carefully to ensure that all the data presented were valid and by helping students to interpret their data in a way that would encourage positive outcomes, for instance explaining how the on-track score was calculated and how it will change as future results are entered (for instance we explained how the details of the final degree classification is arrived at by explaining that the lowest mark is dropped from the calculation of the final degree classification and talked about, in particular,

how the students' current on-track score could be improved). Students all appeared to value this discussion and find it motivating. Students' identity has been anonymised through the use of pseudonyms.

5.3 Analysis

Our analysis uses Sutton's (2012) feedback literacy notions to understand the data. Sutton (2012) draws on understandings of academic literacies to make the case for the notion of feedback literacy. The work of Lea and Street to understand the nature of students' academic practices identified the notion of academic literacies, which are embedded practices that exist within discipline values and norms and have epistemological roots (1998). They suggest that academic literacy is not simply a set of discrete technical and instrumental skills that learners must master; rather, academic literacies are entwined with 'issues of identity and the institutional relationships of power and authority that surround, and are embedded within, diverse student writing practices across the university' (Lea and Street 1998, p. 157).

Drawing on this understanding of academic literacies, Sutton (2012) has developed a model of feedback literacy around three interrelated dimensions or pillars – knowing, being and doing – and suggests that acquiring feedback literacy is mediated by the students' perceptions of their university teachers' identities. In the analysis of the data, we provide a description of each of Sutton's (2012) pillars, knowing, being and acting, followed by quotes from our data that exemplify each dimension. We then conclude by arguing that there is a particular type of literacy associated with understanding dashboards.

5.3.1 Knowing

Sutton (2012) describes the knowing dimension of feedback literacy as engaging with the epistemological dimension of feedback in which academics comment upon the quality and quantity of knowledge that learners have presented and also feedback for learning that offers guidance on how academic performance can be improved. In relation to dashboards, the knowing dimension has a number of features, including checking its accuracy (especially the attendance data), understanding their individual marks and their significance to their personals goals (ipsative feedback). It also involved understanding where their performance sits in the cohort (norm-referenced performance) and understanding their performance relative to the criteria for 'good' students (criteria-referenced performance).

The ipsative dimension is illustrated in the following examples where students are making sense of the dashboard and the way that it presents their data. Their understanding of the data is as something personal, that is about their own academic development or their interaction with the university:

> it's nice to know but it doesn't really affect me. I don't really pay that much attention to what other people have got really (Sannah, 2nd out of 16).

> I still got a 2.1, but it's just when it's [compared to the rest of] the group [that it looks worse] (Sazia 13th out of 16).

One of the more challenging aspects of the dashboard is seeing how one's performance compares to the rest of the cohort peer comparison. The responses to peer comparison were highly personal, depending on the student's disposition: some students liked knowing this information as it helped them to better understand their position in the cohort. It was surprising that it was not only those who were doing well who felt this way: Claire who scored 71% and was 25th in the cohort of 178 (towards the top of the class) was happy to see her results compared to others:

> It was quite useful for me because I know my position in the class … Knowing your position in a class is always a nice thing because you know where you are, what you need to do, do you need to move up … are you on the right track? Are you following other classmates? (Claire, 25th out of 178)

However, Justine, who had a higher mark than Claire, was really uncomfortable seeing her mark being compared to others because it took away some of the satisfaction that she felt with achieving a good mark:

> I'm happy with that [mark of 75%] but I don't think I still need to know what position I'm in. Because I know that I've done better than the majority, so that's fine … I was happy with the grade and I've done better than the majority I still think that [positional data] kind of makes me feel I still could've done better (Justine, 15th out of 178).

Other students were more ambivalent about seeing their mark being compared to the rest of the cohort. For instance, Jasmin who was around the middle of the group, and Ingrid, who was in the bottom 10%, both expressed a less emotional response to this comparative data:

> I mean I would like it to be higher but, because I know it's not one of my best, yeah. I do like it because you can see kind of where you are, but then it kind of makes me think, oh well eighty-two people are better than me (Jasmin, 83rd out of 178).

> Not really that bothered because if you already know your grade and you know that you didn't do that well you know, you've kind of already guessed that you're not going to be at the highest point with everybody else (Ingrid 168th out of 178).

> I never expect to be top anyway … I don't feel like I did terrible (Sareena 13th out of 16).

The final aspect of 'knowing' (understanding) dashboard feedback relates to ways that students responded to data presented in criteria-referenced form. On the dashboard, students were able to see their score relative to thresholds that we determined: red, amber and green flags were used to RAG rate the score that each student received; see Fig. 5.1. RAG (red/amber/green) rating is a common technique for presenting data because it conveys simply three benchmarked levels of achievement (You 2016).

Course Summary

Year	Module Code	Module Title	Credits	Mark	Grade	Status	Action Needed
16/17	DIM1130	Safeguarding Children and Young People	30	55			
16/17	DIM1330	Social Policy and Inclusion	30	68			
16/17	DIM1130	People in Action: Work with individuals and Groups	30	64			
16/17	DIU6130	Reflection and Practice	30	40			Discuss the feedback at a tutorial with the PAT

Fig. 5.1 A student's profile with RAG rating flags

> I like the flags because it's another visual aid to see, okay well if I'm green I'm good (Rebecca, 1st out of 178).

> if you're going through it in your first year you don't really know what you're doing and if you see [the flag saying] 'need to make an appointment' you are more likely to make an appointment because you know you haven't done that well (Ingrid, 168th out 168).

RAG rating is a technique used to benchmark in that it indicates where a student's performance is acceptable (good), at risk (amber) and below the desired performance (red). RAG rating makes criteria-referenced judgements about what is considered to be 'good' (green) and bad (red). It encodes a set of values and determines what is judged as success (green) and what is judged as failure (red). In our dashboards, we coded these firsts and 2:1 scores as green (i.e. 60% and above), scores in the 2:2 range as amber (i.e. 50–59%) and scores below this red (i.e. below 50%). This is, of course, problematic as it imposes a set of values on the student and does not allow them agency to determine their own personal goals. Many of our participants wanted to change the way that we had RAG rated their profile to reflect their personal aspirations; see the below quote from Jasmin. On the other hand, others were happy for the institution to set the flags; see the quote from Marcia:

> I would prefer it if it was a bit more personal, like to me a B is maybe an amber flag because I'm not happy with Bs (Jasmin, 2nd out 178).

> I'm happy for it [the flag colour] to be decided for me because I think it motivates me more to work harder, whereas if I set it myself, I'd just [set it] too low (Marcia, 53rd out of 178).

5.3.2 Being

Sutton's (2012) second pillar of feedback literacy is the notion of 'becoming' which refers to the student's investment of their identity in their academic work. Sutton (2012) illustrates the power that feedback has in shaping a student's identity, which involves feelings of being worthy, for instance that they have the ability to achieve the degree. Feedback affects students by helping them to develop their self-confidence, or alternatively it can have a negative impact on individuals. Sutton (2012)

argues that students need to recognise that accepting feedback is a process of self-development, and for some learners developing their mode of educational being constitutes a challenging and anxiety-provoking experience.

When exploring our data, it was clear that similar processes occurred as students interpreted the data in their dashboard. Marcia talks about seeing herself as a 2:1 student and feeling concerned at the way the dashboard appears to show her as doing less well:

> oh am I really going to graduate with a 2:2? […] Because I've always seen it as hoping to aim for a 2:1 or a first (Marcia, 53rd out of 178).

> I like it. Sixty per cent is good for me (Kirsten, 10th out of 178).

The criteria-referenced data presented a significant emotional challenge for many learners, both those at the top and the bottom of the group. Jasmin, who was on track for a first but who scored around the middle of the cohort in the particular assignment presented on the dashboard, conveys her disappointment: she needs to process this emotion to make sense of it, and looking at the dashboard display that shows where she stands in the cohort is a way to do that:

> Because I was really disappointed with it [seeing her position in the group], but then seeing that maybe that is average, it's not as bad I suppose (Jasmin, 83rd out 178).

Seeing her score of 75% compared to the cohort, Justine expresses how this has a negative impact on her:

> 14 other people have still done better than me ... I had thought I'd really, really topped it, I've maxed out here. And it's taken away a bit from that feeling of elation (Justine, 15th out of 178).

> When you look at the position thing, like thirteenth out of seventeen. It's a bit crap (Nadia, 6 out of 16).

For some students, seeing their data in this way will boost their self-confidence as a learner:

> So that's a bit of an ego boost isn't it? It tells you how well you're doing…

> it's quite nice to see that I'm using it [VLE] enough but I'm definitely using it more than the others and it seems to be reflecting in my grades … I've done better as the years have gone on and it's really shown how much university has helped me progress with my academic writing skills (Rebecca, 1st out of 178).

5.3.3 Acting

The final dimension of feedback literacy is that of acting on the feedback. It involves reading it, thinking about it and taking action as a result of it (Sutton 2012). Similarly, students needed to read and interpret their dashboard data, and in doing so it invoked a range of ways in which they would act in response. The following

quotes illustrate these action-orientated responses to seeing their data. For many of our students, their response was to feel more motivated and determined to do better and to prioritise their academic study:

> I think when I first, as soon as I saw it I decided I'm taking a month off [paid] work to just get on with my dissertation (Marcia 53rd out of 178).

> I'd work even harder to get my last module to be like, so hopefully I would get a first type of thing … even if I were on track for a third I think that this probably would motivate me if it had some pointers as to what I could be doing to get a higher grade (Sarah, 65th out of 178).

> the on-track one, it's very clear and motivated me a lot (Claire, 25th out of 178).

> if I'd seen that like at the start of the year that would make me want to go to uni more (Pavan, 11th out of 178).

However, alongside the positive impact on motivation, there was also evidence that providing data could be unsettling and destabilising. Ingrid's response to seeing marks from previous years, which she can't change, is feeling of sadness:

> The saddest one that will make me feel is like the core summary overall because looking back on grades that you've previously had is, like you can't really change them any more so you can't really do anything (Ingrid, 168th out of 178).

> I think if I was being pushed to think, you're falling behind, you need to do well, I'd probably just stress out and it'd probably make me not work as hard (Kirsten, 10 out of 178).

Thus, in relation to the 'acting' dimension of dashboard literacy, for most students, dashboards appeared to help them reflect on learning and to motivate learning. Much of the literature on the use of dashboards has focussed on their potential to support self-regulation learning behaviours (Jivet et al. 2017), and our data support this potential of dashboards; however, we have also highlighted a range of ways in which students engage with their dashboard data, including deeper questions of learner identity, discussed above.

Whilst there were examples of positive learning behaviours in our data, there were ways in which the dashboards encouraged action that might be of questionable value. Many of the students focussed on the accuracy of their attendance data and wanted to correct any inaccuracies in their recorded attendance pattern. This investment in time and effort to correct attendance data could be seen as effort that is wasted or that could be better spent on other learning-related activities. Hence, the potential of dashboards to raise anxiety levels was evident. Further, it illustrates MacFarlane's (2017) notions of student presentism, whereby students feel compelled to attend lectures because they are being monitored rather than because they believe that they will be a valuable learning opportunity, and demonstrates how an institution's policies and practices shape students' behaviours in ways that may not be the best use of their time and effort.

5.3.4 *Dispositions to Learning and Response to Dashboard*

Sutton talks about grades being polysemic, in that they signify different meanings to different students (2012, p. 34). Similarly, students' responses to their dashboard need to be seen as very personal with a strong ontological dimension: there is no 'one size fits all' approach to the way that dashboards are interpreted by students. Justine's and Ingrid's responses to the dashboard were completely different. Justine was on track for the first time and had the 15th highest mark in the whole group, yet she found it challenging to receive this information via the dashboard. However, Ingrid, who was doing significantly worse, coming 168th out of 178, is phlegmatic about her position and finds a way to talk to herself in a way that is kind on her self-image, and India, who is at the bottom of her cohort, finds the dashboard motivational:

> I was happy with everything apart from the position. I still don't think that part's relevant. Although I know that I've got, I got 75% and this next section, the distribution of marks, shows that I got higher than the average, I'm happy with that, but I don't think I still need to know what position I'm in. Because I know that I've done better than the majority, so that's fine. [I don't like it because] I know that fourteen other people have done better than me … I still think that kind of makes me feel I still could've done better (Justine, 15th out of 178).

> [How do you feel seeing the positional data?] I'm not really that bothered because if you already know your grade and you know that you didn't do that well you know, you've kind of already guessed that you're not going to be at the highest point with everybody else. It reminded me of when I was like younger and I would come back home with like a bad grade and show it to my mum…and I would turn around and say 'oh well Helen got worse than me', and she said 'well it doesn't matter because you're not Helen' (Ingrid, 168th out of 178).

> I think it gives me motivation to try harder (India 16th out of 16).

The notion of the variation in student dispositions (Barnett 2012) helps to understand students' response to dashboards and to avoid simplistic overgeneralisations about how dashboards impact students as if they are a homogenous body. Understanding this personal (ideographic) response is important because institutions need to avoid losing sight of the individual when scaling up the use of data.

This lack of predictability in a student's response was most evident when the dashboard compared the student to their peers. Although the majority of students, even those at the lower end of the cohort (for instance Ingrid and India) appeared to be motivated by seeing their data presented in a dashboard format, there was one example of where this did not hold true. Justine, despite scoring 75% (a very good score in the first range), was angry about being presented with this comparative data, which showed her as 15th in the group. Thus, it seems that making generalisations about how students will react to the dashboard is problematic. The literature on the use of peer comparison within learning analytics is conflicting, with some studies finding that students liked being compared to their peers (Konert et al. 2016), whereas others found that they preferred to receive personal

information (Tabuenca et al. 2015). When students make comparisons, it changes the ways that those who do better and those who do worse think about themselves, which is likely to change the dynamics of groups. For instance, comparisons with students who perform worse (downward comparison) can lead to feelings of superiority and positive affect (Major et al. 1991) whilst comparisons with others who perform better (upward comparisons) can evoke negative affect and lower academic self-concept (Dijkstra et al. 2008).

The challenges and sensitivities of using peer comparisons reinforce our argument that students are complex and unpredictable, and thus dashboards may need human mediation alongside being embedded into student support processes. We consider the practical implications of this in the following sections of the chapter.

5.3.5 Designing in Student Agency

Learner dashboards appear to offer the potential to engender positive learning behaviours, within the acting and being dimensions of dashboard literacy, such as a sense of agency and motivation to act. However, given the polysemic nature of the responses, we argue that students need to be given a choice over what is presented to them via their dashboard, for instance by enabling students to customise the RAG rating criteria, allowing them to see themselves compared to others in the group etc. As Knox (2016) has argued, the student is generally positioned as the passive recipient of the analytical process. Student control of what they see via dashboards is especially important, given that the drivers for learner analytics are often linked to institutional priorities such as improving retention and graduation rates (Newland and Trueman 2017, Sclater and Mullan 2017).

In the discussion of the knowing dimension, we illustrated how institutions need to pay attention to design learner dashboards because of their power to valorise the sorts of behaviours and the levels of attainment that are seen to be important, valid and worthy of measurement or recognition. This is particularly evident in relation to the use of criterion-referenced presentations of the data. Techniques such as RAG ratings can impose values on students and thus reduce student agency as they embed institutional goals. The values that underpin adoption of dashboards need to ensure that learner dashboards are tools that foster and develop students as active agents in their own learning. This can be achieved by giving students a choice in what they see and how it is presented. There is a danger that students, faced with their learning dashboard, become more docile and compliant. In our study, many appeared to spend a disproportionate amount of time focussing on data about their attendance, as suggested by MacFarlane's (2017) notions of student performativity and presentism. Indeed, the danger that learner dashboards may lead to more compliant ways of thinking has been noted by Ifenthaler and Schumacher (2016). Yet one of the key imperatives for higher education is 'to develop a culture which demands disciplined thinking, encourages curiosity, challenges existing ideas and generates

new ones' (The Dearing Report 1997, p. 8). Hence, our findings suggest that the design and implementation of learner dashboards need to be driven by an explicit intention of developing students' critical autonomous behaviour. For instance, dashboards should not identify action for students; instead, institutions need to guide and support students in the process of interpretation and identification of their own actions. By emphasising the way that students interpret their dashboards, we suggest that it helps to mitigate the dangers of compliant student behaviour.

One way to support student agency is to provide students with a choice about the ways that their data are presented, that is to make dashboard elements customisable by the student. Similarly, customisable dashboards have been advocated in other research literature (Roberts et al. 2017, Jivet et al. 2018). However, once we provide a choice to students over what they see and the way that they see it, we are taking a path that is likely to be a one-way street, a decision that we are unlikely to be able to reverse, and the full implications might not be understood until they are used at scale.

5.4 Conclusion

In this chapter, we have analysed some of the complexities in the ways that dashboards are understood by individual students using Sutton's (2012) dimensions of feedback literacy: knowing, becoming and acting. The chapter has illustrated how these dimensions apply to students' understanding of dashboards and suggests the term 'dashboard literacy' to explain the ways in which students make sense of them. By identifying students' engagement with dashboards as a literacy practice, we suggest that it involves a growing student identity that is individually experienced and constructed. It is not simply a technical skill or a cognitive understanding; rather, it involves the way in which students think about themselves and how they are shaped by it and moulds their academic identity, and it is influenced by their past experience of learning, by their personal dispositions and by institutional and discipline contexts. Thus, we suggest that institutions have a significant role to play in influencing how these tools are used by students. This might include the academic support that is offered to guide students through the process of interpretation of their dashboards, which pays attention to these three dimensions of dashboard literacy: knowing, becoming and acting.

We have illustrated how institutions need to be cautious in relation to their implementation of dashboards because of their power to valorise the sorts of behaviours and the levels of attainment that are seen to be important, valid and worthy of measurement or recognition. This is particularly evident in relation to the use of criteria-referenced presentations of the data. Techniques such as RAG (red, amber and green) ratings can impose values on students and thus reduce student agency as they embed institutional goals. This is part of an ethical dimension of the use of dashboards, which needs to be consciously considered by institutions to ensure that

dashboards are tools that foster and develop students as active agents in their own learning. In addition, we suggest that institutions should make explicit the principles that underpin their use (see, for example, the Open University's 2014 Policy on Ethical Use of Student Data for Learning Analytics).

Dashboards are often associated with interventions offering extra support, which are targeted at particular, usually low-attaining students (Sclater and Mullan 2017). Our findings have suggested that the impact of seeing interventions presented via a dashboard is likely to be emotionally charged for some students, and has the potential to have a negative impact on student's well-being and to reinforce feelings of negativity and 'otherness' (Thomas 2012). Thus, within a context of increased incidence of students' mental health, illustrated in the recent Higher Education Policy Report (Brown 2017), institutions have a duty to take care how they implement dashboards.

There is a growing expectation that data gathered about students' learning behaviours and attainment will be shared with students in the form of a dashboard (Sclater 2014). The findings from this study support this development by illustrating the power and potential to support students' motivation for the majority of students. However, whilst the majority were motivated, there were some for whom seeing their position within the cohort was emotionally challenging. These students were not necessarily the ones at the bottom of the cohort but were students for whom learning was particularly emotionally laden, and this highlights the challenges of scaling up the adoption of dashboards and the need to provide support to students in ways that recognise the individual dimensions of using data.

Flowing from our study are some practical recommendations for the design and implementation of dashboards:

- Ensure a focus on ipsative ways of presenting data.
- Consider ways to make norm-referenced data optional and/or allow students to have a control over how norm-referenced data are presented (e.g. allowing students to choose who their scores are compared against (average mark for the module or cohort or to the highest performers on the module or cohort).
- Allow students to set their own goals so that any criteria-referenced display is tailored to an individual student's targets.
- Embed the use of dashboards into personal development planning and/or personal academic tutorial processes to ensure that each student is individually and collectively supported to interpret and plan how to act based on their data.
- Focus on the way that interventions are signposted with an awareness of the emotional component of feedback.
- Develop institutional principles that recognise the ethically sensitive nature of adoption of data.

The study was based on final-year students, and the extent to which the findings apply to other less-experienced learners needs further research. However, bearing in mind the caveats discussed in the chapter, it provides evidence to advocate the use of dashboards as a tool to support student engagement and motivation.

References

R. Barnett, Learning for an unknown future. High. Educ. Res. Dev. **31**(1), 65–77 (2012). https://doi.org/10.1080/07294360.2012.642841

R. Bodily, K. Verbert, Review of research on student-facing learning analytics dashboards and educational recommender systems. IEEE Trans. Learn. Technol. **10**(4), 405–418 (2017). https://doi.org/10.1109/TLT.2017.2740172

British Educational Research Association, *Ethical Guidelines for Educational Research* (Bera, Nottingham, 2018)

P. Brown, The invisible problem? Improving students' mental health, 2017. Retrieved from http://www.hepi.ac.uk

H. Coates, A model of online and general campus-based student engagement. Assess. Eval. High. Educ. **32**(2), 121–141 (2007). https://doi.org/10.1080/02602930600801878

P. Dijkstra, H. Kuyper, G.V.d. Werf, A.P. Buunk, Y.G. van der Zee, Social comparison in the classroom: a review. Rev. Educ. Res. **78**(4), 828–879 (2008)

E. Duval, K. Verbert, J. Klerkx, S. Govaerts, J.L. Santos, Learning analytics dashboard applications. Am. Behav. Sci. **57**(10), 1500–1509 (2013)

M. Foucault, *Discipline and Punish: The Birth of Prison* (Penguin Books, London, 1977)

L. Gourlay, 'Student engagement' and the tyranny of participation. Teach. High. Educ. **20**(4), 402–411 (2015). https://doi.org/10.1080/13562517.2015.1020784

HEA, Design4learning: from blended learning to learning analytics in HE, 2014. Retrieved from https://www.heacademy.ac.uk/events-conferences/event9900

D. Ifenthaler, C. Schumacher, Student perceptions of privacy principles for learning analytics. Educ. Technol. Res. Dev. **64**(5), 923–938 (2016). https://doi.org/10.1007/s11423-016-9477-y

I. Jivet, M. Scheffel, H. Drachsler, M. Specht, Awareness is not enough. Pitfalls of learning analytics dashboards in the educational practice. Chapter presented at the Data Driven Approaches in Digital Education. EC-TEL 2017, 2017

I. Jivet, M. Scheffel, M. Specht, H. Drachsler, License to evaluate: Preparing learning analytics dashboards for educational practice. Chapter presented at the LAK 18, Sydney, 2018

J. Knox, Data power in education: Exploring critical awareness with the 'Learning Analytics Report Card' (LARC). Telev. New Media (2016). https://doi.org/10.1177/1527476417690029

J. Konert, C. Bohr, H. Bellhäuser, C. Rensing, PeerLA-Assistant for individual learning goals and self-regulation competency improvement in online learning scenarios. Chapter presented at the Advanced Learning Technologies (ICALT), 52–56, ISBN 978-1-4673-9041-5, 2016

R. Land, S. Bayne, Screen or Monitor? Surveillance and disciplinary power in online learning environments, in *Improving Student Learning Using Learning Technology*, ed. by C. Rust, (OCSLD, Oxford, 2002), pp. 123–138

M. Lea, V.B. Street, Student writing in higher education: an academic literacies approach. Stud. High. Educ. **23**(2), 157–172 (1998). https://doi.org/10.1080/03075079812331380364

B. MacFarlane, *Freedom to Learn* (Routledge, London, 2017)

B. Major, M. Testa, W.H. Blysma, Responses to upward and downward social comparisons: The impact of esteem-relevance and perceived control, in *Social Comparison: Contemporary Theory and Research*, (Lawrence Erlbaum, Hillsdale, NJ, 1991), pp. 237–260

B. Newland, P. Trueman, Learning Analytics in UK HE 2017: A HeLF Survey Report, 2017. Retrieved from https://helfuk.blogspot.co.uk/p/research_19.html

Open University, Policy on Ethical Use of Student Data for Learning Analytics, 2014. Retrieved from http://www.open.ac.uk/students/charter/sites/www.open.ac.uk.students.charter/files/files/ecms/web-content/ethical-use-of-student-data-policy.pdf

Z. Papamitsiou, A.A. Economides, Learning analytics and educational data mining in practice: A systemic literature review of empirical evidence. Educ. Technol. Soc. **17**(4), 49–64 (2014)

L.D. Roberts, J.A. Howell, K. Seaman, Give me a customizable dashboard: personalized learning analytics dashboards in higher education. Technol. Knowl. Learn. **22**(3), 317–333 (2017). https://doi.org/10.1007/s10758-017-9316-1

N. Sclater, Learning analytics The current state of play in UK higher and further education, 2014. Retrieved from https://www.jisc.ac.uk/podcasts/jisc-releases-new-report-on-learning-analytics-in-the-uk-21-nov-2014

N. Sclater, J. Mullan, Jisc Briefing Learning analytics and student success – assessing the evidence, 2017. Retrieved from http://repository.jisc.ac.uk/6560/1/learning-analytics_and_student_success.pdf

P. Sutton, Conceptualizing feedback literacy: knowing, being, and acting. Innov. Educ. Teach. Int. **49**(1), 31–40 (2012). https://doi.org/10.1080/14703297.2012.647781

B. Tabuenca, M. Kalz, H. Drachsler, M. Specht, Time will tell: the role of mobile learning analytics in self-regulated learning. Comput. Educ. **89**, 53–74 (2015)

L. Thomas, Building student engagement and belonging in Higher Education at a time of change. Retrieved from Paul Hamlyn Foundation HEFCE, 2012

V. Trowler, Student Engagement Literature Review, 2010. Retrieved from https://www.heacademy.ac.uk/system/files/studentengagementliteraturereview_1.pdf

UCISA, 2014 Digital Capabilities Survey Report, 2015. Retrieved from UCISA: http://www.ucisa.ac.uk/~/media/Files/publications/surveys/Digital_Capabilities_survey_report_2014.ashx

J.W. You, Identifying significant indicators using LMS data to predict course achievement in online learning. Internet High. Educ. **29**, 23–30 (2016). https://doi.org/10.1016/j.iheduc.2015.11.003

Chapter 6
Whose Domain and Whose Ontology? Preserving Human Radical Reflexivity over the Efficiency of Automatically Generated Feedback Alone

Amanda Russell Beattie and Sarah Hayes

6.1 Introduction

There are some forms of feedback in daily life that, though generated and delivered via a machine, we may welcome because they help us to function with ease. For example, in taking a wrong turn whilst driving, to be provided with explicit directional instructions from a sat nav, can save time and embarrassment from being late. This reduces the need to think too much about the route, inducing quite 'automatic' responses in a human driver, if progress is underway. However, a driver may not always agree with the predefined route that a sat nav provides, suddenly finding themselves stuck. At this point, they may also experience emotional reactions as they seek to decide a way forward. A more reflexive response from the human behind the wheel is now needed. Human agency comes into play as they consider the choices open to them in the light of their previous experience. As the driver, they have an option to turn the machine off or to look at the road signs and opt for a route that is physically signposted. Perhaps frustrated by the sat-nav-directed route, they might consult the scruffy old map that they once used and still have in the car. Failing that, there is the possibility of winding down the window and asking a human being. Hopefully, the direction is made clearer through discussing it with the chosen person. It may not be, though, because humans are fallible too.

Even in a short dialogue with someone we ask for directions, we might learn something additional, interesting or reassuring via the feedback they give us. They may impart local knowledge relating to the journey or place of destination in reply

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to questions. Or they might express more personal empathy about the frustrations of driving when new to an area. This kind of 'bodily feedback' (rather than algorithmic responses from machinery) sought from another human in order to complete a journey (yet one that was at first directed by a machine, signposts and even a map…) is often a brief encounter. Yet even brief forms of human feedback are *different*, to automatically generate feedback, such as that from a sat nav alone. After thanking a human adviser in the street, a driver may move swiftly on, either to complete their travel or perhaps to resume the sat nav instructions. What emerges from this example is a small illustration of feedback constituted across intertwined technical and human encounters in the form of networked learning.

The above learning scenario did not take place within a university, but it demonstrates how automatically generated feedback is contested and supplemented by physical encounters and human feedback. This enables interesting observations to be made on both 'fallibility' and 'reflexivity'. Soros argues:

> The two principles are tied together like Siamese twins, but fallibility is the firstborn: without fallibility there would be no reflexivity. Both principles can be observed operating in the real world (Soros 2013: 310).

In the sat nav example, fallibility of a machine directing a driver led to emotional responses and a reflexive decision on the part of that driver to seek alternative forms of guidance. Feedback from other people in this driving situation may be short-lived, but in longer term learning relationships in universities, more radical forms of mutually reflexive feedback between a student and a teacher can develop. Such feedback encounters might be understood as 'networked' as they facilitate the authorial voices of students along a learning journey, across physical and virtual locations (in class, across email, in tutorials, across digital forums, in a café on campus, over a phone call or Skype). In a sense, fallibility opens the space for a reflexive response across all of these platforms. However, if the route of student learning is directed via algorithmic forms of technically generated feedback alone, this may hamper what might now be considered 'postdigital' possibilities for learning. Recent theory suggests that students are now learning in a 'postdigital' era (Jandrić et al. 2018; Fawns 2019; Hodgson and McConnell 2019):

> We are increasingly no longer in a world where digital technology and media is separate, virtual, 'other' to a 'natural' human and social life' (Jandrić et al. 2018).

With this in mind, we turn our attention towards examining these ideas in relation to universities and within the context of networked learning (NL) theory (Dirckinck-Holmfeld et al. 2011: 16). We question whether rapidly developing digital possibilities are being adapted to intervene in student learning with critical pedagogical insights or to simply increase economic efficiencies for institutions. Furthermore, whilst 'technologies may arise in educational contexts, they are often developed and commercialised elsewhere and sold back to educational institutions as products', this means that education has become a consumer of technologies developed for other purposes (Jones 2019). It is important to emphasise that (no matter how much efficiency is sought from a technical system in relation to learning), humans are still

active participants (Soros 2013: 311). Unfortunately, as contemporary higher education (HE) has become increasingly valued for its contribution to the global economy, students have become treated as consumers, who simply pay fees for educational 'products' (Hayes 2015: 125, McRae 2018). In an effort to provide good value for money, automated forms of feedback (such as those that might be developed in *Turnitin* or new artificial intelligence (AI) solutions) are being introduced alongside discrete modules for learning. The risk is that learning begins to resemble 'a set of tasks' (Hayes 2015: 125) if new technological forms of automated feedback are *all* that students encounter. Then unfortunately, this may induce 'automatic' responses in students (not unlike the reactions described above when responding to a sat nav). Yet even in the face of such apparently objective feedback systems, human subjectivity has not been erased. Opportunities for more reflexive and mindful practices, in mutually constitutive feedback processes between teachers and students, have though been marginalised.

In this chapter, we challenge an increase in the uncritical application of similar algorithmic processes to those described above (in the form of a sat nav), for providing automatically generated feedback for students in HE. Though we define 'human feedback' as information arriving directly from a human being, and 'non-human feedback' as information arriving from algorithms and other 'thinking' machines created by human beings, we also see this as a rough classification. It is defined through its extremes. In reality (as shown by the sat nav example), forms of feedback for learning may fall anywhere within this continuum. Yet the human side of the feedback continuum seems to increasingly give way to the non-human side. A range of e-technologies and their algorithmic affordances are now called upon to meet the demands of time and space, which emerge from within a neoliberal framing of contemporary higher education (HE) (Hayes and Jandrić 2017). Our initial concerns were in relation to observations on the e-marking platform *Turnitin*. However, generic pre-programmed student feedback delivered via Turnitin cannot be considered in isolation from other rapidly developing artificial intelligence (AI) systems now being applied in an HE context. For example, the introduction of facial recognition drone monitors to track students' facial expressions and emotions in class (Bhandari 2018) adds another dimension to the huge amounts of data already being collected on the activities of students. Learning analytics and intelligent campus developments may arise from concerns for student well-being and progression, but they also open routes into economically driven manipulation of data and metrics and potentially dangerous forms of surveillance. If any of these systems are applied to extremes, at the non-human side of the feedback continuum, then we question: where (under these circumstances) might we locate a student voice?

Initially, we place our concerns within the context of networked learning principles. These overlap with the notion that we are living in postdigital times. Therefore, in a sense, the 'postdigital' nature of our lives now reveals an increasing number of practical examples where networked learning theory is applicable. Networked learning (NL) emerged in the later 1990s in reaction to technological determinism 'and as a way of critically examining that determinism' (Hodgson and McConnell 2019). Articles concerned with the 'postdigital' are now pinpointing many instances

of why it is necessary 'to push against, or move beyond, the simple "solutionist" view of digital technologies' (Reeves 2019) alone. Emerging postdigital perspectives, published in the journal of *Postdigital Science and Education*, reject the notion that education can ever be entirely online or digital; instead, it always involves the combination of digital, biological, material and social (Jandrić et al. 2018; Fawns 2019). As such, NL intersects across postdigital developments and radical pedagogies.

Part One of this chapter interrogates the extreme end of the feedback continuum where non-human algorithmic affordances control feedback generation. We examine the e-marking platform *Turnitin* and some rapidly emerging developments of artificial intelligence (AI). Then Part Two turns explicitly to the other end of the feedback continuum to discuss performing human 'radically reflexive feedback'. When generic (but power-laden) maps are now being incorporated into both student and staff 'perceived' spaces through AI, we surface the aspects of feedback that risk being lost. This part of the chapter draws on our own relational and lived experience as a demonstration of performing radically reflexive feedback within a Master's in Education programme. We discuss our own tutor/participant relationship, which, from the outset, denied traditional forms of power and authority. Drawing on autoethnographic understandings (Ellis et al. 2011), we discuss a mode of knowledge production that focuses on the experiences and interpretation of participants in their own learning narratives. We noticed that our own mutual offerings of feedback facilitated a form of radical reflexivity. We also became aware of the centrality of 'the body' when generating transformative feedback. Our emerging consciousness of the role that our human bodies and related vulnerabilities play in teaching and learning contexts raises awareness of the lesser role that the body is often 'assigned' within neoliberal higher education, and now also via algorithmic culture and AI. Indeed, we point out the irony of technology to monitor facial expressions in class (Bhandari 2018) when the topic of emotions is in reality an almost illicit conversation to be had within neoliberalism. In this vein, we question on behalf of students and staff: *where do we cry in higher education?*

In the final section, we explore the insights generated from reflexively guided professional practice in the context of feedback. Radical reflexivity in the process of feedback supports students to seek out their own lived experience (Hayes 2015: 132) and voice their own particular subjectivities within HE, when they may otherwise remain unaware of this voice. We suggest that a radically reflexive form of feedback is consistent with the development of NL and could empower students in new 'postdigital' learning encounters. Radically reflexive feedback can provoke a student voice and a route towards critical self-navigation. When automation threatens human employment, the characteristics of what it is to be creatively human need to be preserved (Peters et al. 2018, 2019). As such, we advocate for creative and mindful practices aligned with teaching and learning journeys, whatever new technological platforms are introduced. Learning should not be reduced to the 'sat-nav experience' alone, in terms of feedback. A more nuanced understanding of the range of human participation taking place in and around technological systems is necessary through NL and postdigital theories. We suggest that, as technology becomes ever

more intimately embedded into our everyday lives, there is a risk we may not notice or contest how data and systems may be applied indiscriminately in HE to serve particular neoliberal agendas. Therefore, in automatic forms of feedback generated by AI, ethical issues are a primary concern:

> We need to be clear what data is being processed, where, and how. And any actions or recommendations made by an AI need to be subject to human review (Hamilton 2018).

It is important to question, as digital solutions are sought and applied within universities: *where are the related critical pedagogies?* Critical theories about emancipated forms of learning through feedback need to be considered in the policies we create for the integration of AI into HE. Otherwise, the individual student and staff voices and emotions simply become trapped in a generic 'iron cage' of 'the student experience' (Hayes and Jandrić 2018). Under this universal policy banner, alternative values can become hushed, along with other ways of organising academic labour (Couldry 2010: 12, Hayes 2019). Like Amsler (2011), we challenge 'soft pedagogies' that encourage passive students and suggest instead that radically reflexive feedback has a particular role to play within her depiction of 'hard pedagogies'. We situate these arguments within the wider narrative of critical pedagogy and imagine instead a learning journey whereby teachers and students are co-producers of knowledge and share authorial privilege in the unfolding journey they embark upon together. A radically reflexive form of feedback may not follow a predefined route or map, but it does offer a vehicle to restore individual student and staff voices and critical self-navigation of both physical and virtual learning spaces. This needs to be preserved in the ongoing shaping of contemporary postdigital HE.

6.2 Networked Learning (NL) and Radically Reflexive Feedback

Our initial arguments are closely linked to the underlying principles of NL:

> Which can be traced back to the critical pedagogy of Freire and emphasises a critical relationship with the digital, the human and the current socio-political and material higher educational context' (Hodgson and McConnell 2019).

Educational feedback is a complex communicational, cultural and social phenomenon. Whilst it might be tempting to analyse feedback using the dichotomy between human and non-human communication, it is not enough to assume that there is a straightforward distinction between something 'human' and something 'technological' or 'algorithmic'. All these things have 'human' and political aspects too. However, this does not imply radical equality between feedback generated by a human being and feedback created by an algorithm (which, under multiple layers of technology, is also created by human beings).

We therefore question what space remains for the human side of the feedback continuum, developed within a radically reflexive framework, if this gives way to

algorithmic culture alone. Radically reflexive feedback is part of a wider transformative process that defies the notion of the 'student as consumer' or something generic referred to as 'the student experience' (Hayes and Jandrić 2018). The role of feedback that we present challenges the logic of education as an economic transaction, calculated for us, via algorithms. It seeks, on the other hand, to enable each student to locate their own 'voice' and indeed their entire bodies as co-producers of knowledge and to contest increasingly negative iterations of their subjectivities within HE. We therefore emphasise the importance of connections between developments in technology and the 'radical pedagogies and humanistic educational ideas from Dewey, Freire, Giroux and Rogers' that have characterised NL from the outset (Dirckinck-Holmfeld et al. 2011: 4, Jandrić and Boras 2015). If the emphasis is only on 'arriving' at, or 'producing' something, via technology, then what separates a university education from following the directions of a sat nav? Unfortunately, students receiving automatically generated feedback are not in a position to alter their direction of 'travel', unlike the driver of a car. The 'map' has been pre-programmed, and there are no alternatives. Therefore, if technological forms of feedback are uncritically applied, a student route to learning in HE, through mindful contemplation and autonomous decisions, may swiftly become analogous to one simply driven by a sat nav, without alternatives.

NL developed initially as a critical pedagogical response in relation to new information and communication technologies and online learning programmes. Throughout its history, NL has been characterised by 'not separating pedagogical and socio-material aspects of integrating new technology into learning designs' (Hodgson and McConnell 2019). Algorithms are now routinely designed in, and contribute to, an alteration of our sociotechnical learning spaces; therefore, it is important that communities that have always approached technology critically now unite across disciplinary boundaries to strengthen their voice. Algorithms work within our 'lived space' in real time as they calculate routes, data and procedures (Chesher 2012: 315). As digital media increasingly mediate our everyday spatial and navigational practices (Chesher 2012), there emerges a dominant e-structure that alters our educational spaces (Jandrić et al. 2017). There is therefore a pressing need now to contest the imagined role for algorithms in contemporary HE and confront this with research that has shaped the field of NL. A 'postdigital attitude' that 'inquires into the digital world, examining and critiquing its constitution, its theoretical orientation and its consequence' (Hodgson and McConnell 2019) is well aligned with NL in cutting across both critical pedagogy and the socio-cultural designs of learning mediated by technology (Dirckinck-Holmfeld et al. 2011: 16). We turn now in Part One to discuss ways in which algorithmic cultures might suppress individual student voices. We consider both developments in AI and the algorithmic affordances of *Turnitin* software for marking and plagiarism detection. We seek to excavate the silences it creates in order to illustrate (in a learning context) the problems of a 'sat nav student experience'. The creative potential of a radically reflexive feedback relationship instead sustains a positive imagining of students as co-producers of knowledge.

6.2.1 *Part One: AI, Turnitin and the 'Sat Nav Student Experience'*

We begin with a particular understanding of algorithmic cultures (Jandrić et al. 2017). Drawing on the writings of Striphas (2015), we assume that algorithmic culture is 'the enfolding of human thought, conduct, organisation and expression into the logic of big data and large-scale computation, a move that alters how the category of culture has long been practiced, experienced and understood' (Striphas 2015: 396). For Striphas, imposing order on information—via the use of algorithms to decide what can, and ought, to be disseminated—suggests a level of cultural elitism. Whilst Striphas does not extend this argument to the realms of institutional learning design, it is not difficult to envision how such forms of elitism can inform both the professional practice of academics and the lived experience of students. For example, in adaptive learning, the curriculum is modified to respond to the strengths and weaknesses of a person learning. Technology moves into the role of a coach or mentor, and the goal is to improve student performance. However, our concern is what aspects of feedback may be silenced in such encounters with a machine. The provision of additional exercises by, for example, the Duolingo language system (Hamilton 2018) may improve basic language skills, but it is not even close to reflexive and mutually shared feedback between people. Chat bots are now offering out-of-hour help and advice to students. As Hamilton points out, these technologies work across time zones, will never take industrial action and will not need a pension (Hamilton 2018). Yet basic advice is different to the role of a teaching assistant. For example, the BBC education correspondent Sean Coughlan wrote on 14 December 2016 of an AI teaching assistant used at Georgia Tech University. The article wonders if, and how, teaching will be transformed through the use of technology and automated workers in ways that mirrors other skill-based industries. Such developments have interesting implications for those delivering feedback. In his TEDx Talk, AI creator Ashok Goel discusses the motivation for creating the AI assistant named Jill Watson. He suggests that this was to address the frequently asked questions by students in order to help free up time for academics to attend to other tasks. Ashok is keen for teachers to embark on what he calls 'creative tasks' that would enable education to be accessible to all in a personal, and enjoyable, fashion. We wonder, though, where this leaves student creativity. Whilst the BBC article notes how students chiefly enjoyed the timeliness of the replies, Coughlan describes how Jill Watson was programmed with a time delay to ensure that answers provided by AI did not arrive too soon after the original question was posed! Already we can see, within this unfolding negotiation, how the demands of time and the unfolding expectations of students as consumers inform not only the demands for a particular type of feedback but also how they subtly informs the affordances of AI as well.

Striphas (2015) provides a timely reminder of the etymology of algorithm, noting that in its historical unfolding, and contemporary usage, algorithm is about both information inclusion and exclusion. He suggests that the use of algorithms to manage information is not unlike cryptology and code breaking. In deciding what information

to include and exclude, there is, at the heart, a human negotiation. It is within this negotiation that a desire to impose order on a vast amount of information emerges and a particular public image takes hold. Already, within the development of AI provisions of feedback, a choice is being made to attend to timeliness, to the detriment of creativity. This has implications on the individual lived experiences of students and those of teachers too. Ashok attends to the voice of the programmer, and their relationship to the AI, in pioneering an AI teaching assistant. These voices are important because they make visible the stories behind algorithmic culture. Yet, at a time when 'the student experience' has become a widely adopted buzz phrase in policy discourse (Hayes and Jandrić 2018; Hayes 2019) we question: where, within this unfolding technology, are the voices of students?

Striphas (2015) recounts a particular challenge faced by Amazon.com when consumers noticed that gay literature was being excluded from top title rankings. When made aware of this particular form of silencing, individuals took to Twitter to voice their unhappiness. This trend was able to prompt a change of algorithmic use on Amazon.com, thereby allowing for the inclusion of gay literature in their public rankings. Striphas' example reveals how, when afforded a voice, individuals can use various forms of public negotiation as both a site of resistance and institutional change within politics. Indeed, his writings align with the work of Crawford (2016), who suggests a need to understand an agonistic quality within algorithmic cultures. She turns to the writings of Mouffe (2003) and distinguishes between 'the political' and 'politics', reminding readers of the agonistic quality within the political that informs a democratic practice. Crawford is invoking this agonistic ethos in order to query the focused interpretations of algorithmic technologies that might emerge if they are understood outside of their political environment. She suggests that it is necessary to understand the affordances of algorithms if we are to better understand their wider political value and influence within society and to a multiplicity of agents (Striphas 2015).

We ask therefore: where, in the experience of AI and teaching, is the democratic voice of the student community? If we attend to the online platforms that inform about e-marking and feedback, we can trace the beginnings of a virtual, but real, silencing of students. Their work is submitted online via an e-platform, for example *Turnitin*, at which point the voice of the teacher dominates and any vestige of an agonistic framing of feedback is impossible to locate. Teachers who use *Turnitin* are though offered two spaces within which to provide student feedback. Firstly, there is a text box that allows up to 5000 characters whereby teachers can leave personal feedback aligned with the work they have critically reviewed. Feedback within this space is personal, tailored to the work submitted by the student and can be in depth and highly reflexive. Such an approach to student feedback, whilst valuable, does take time as it requires teachers to reflect and address particular areas of strength and weakness that can contribute to the development of the student-cum-researcher.

On the other hand, Turnitin also provides teachers with a series of pre-fabricated tabs that can be inserted by simply dragging and pasting the tab into the submitted text document. This approach to feedback is developed with an awareness of common mistakes made by undergraduate students and provides a 'one size fits all'

approach to feedback, not unlike Jill Watson. What tabs to include on the Turnitin platform reflects a series of choices, but generated in an impersonal and impartial manner, with implications for the transformative potential of students. We suggest that, rather than engage students in a transformative nature, conducive to reflexivity and growth, this software enhances the consumerist nature of contemporary HE. Introna (2015: 31) highlights the performative nature of *Turnitin*, as an 'algorithmic actor' embedded now in HE. Such technologies are suggested to be complicit alongside governing practices such as league tables, student satisfaction surveys, analytics and institutional audits, leading to traditional staff and student subjectivities and practices becoming reconstituted (Shore and Wright 2004).

As student identities are now increasingly expected to take the form of customers and the academic as a related service provider, so 'the academic essay (with its associated credits) is enacted as the site of economic exchange' (Introna 2015: 33). Student submissions then become commodities to be verified through feedback that is simply a rating system that values the goods produced. From the point of view of students, we are aware from our own teaching that they express anxiety and fear about committing plagiarism. Introna adds that 'they may even pay Turnitin to check them in order to certify themselves the owners of their texts, "just in case"' (Introna 2015: 39). These observations uphold points made by Zwagerman (2008) that the student–teacher relationship now *begins* from a point of mistrust as plagiarism detection takes priority over more mindful forms of exchange where learning experiences might be co-produced. It is not until we move away from a calculative culture of systems and practices, where students are primarily occupied with not breaking the rules, that we can develop forms of self-interrogation to virtually eliminate tendencies to plagiarise. Perhaps most problematically is that this image of the student, both their ontology and their embodied subjectivity, is unfolding without their knowledge, thus displaying a key difference to the algorithmic stories provided by Striphas. Whilst his use of trending tweets reveals a capacity to engage and effect change, students in this lived experience remain unaware of their depiction within the institutional design of HE and the use of feedback and assessments to inform their lived experiences. If the task of teachers is to facilitate a transformative environment for their students, and thus afford them a voice of equal engagement in the learning journey, this image of students is problematic. It not only reinforces the passivity of the student, thus handicapping the ability to overcome a pedagogy of lack described by Kahane (2009), but also further reifies the soft pedagogy critically evaluated by Amsler (2011). Most problematic is that within this use of technology to augment a particular form of student, to the detriment of another, students lack a voice to challenge this imagining of their embodied portrayal as students.

We now return to Crawford (2016), as we use our own lived experience of feedback as a model of resistance to the missing student voices effected through AI and algorithmic culture. An algorithmic 'black box' discussed by Crawford (2016) needs to be exposed, and so it is important to 'unpack the warm human and institutional choices that lie behind these cold mechanisms' (Gillespie 2013:169). The risk if we do not is that invisible 'winners' and 'losers' take part in hidden contests and accountability for these is lost (Crawford 2016). It is only when we bring the human

body back into the feedback process that we can establish the negotiations that give context to the algorithm being used to sustain HE. In order to excavate this postdigital challenge (Jandrić et al. 2018), we are informed by NL and critical pedagogy.

6.2.2 Part Two: Where Do We Cry in Higher Education?

Crawford (2016) acknowledges that we cannot begin to understand algorithmic calculations in isolation. We must, she suggests, understand the broader context in which they operate. Whilst algorithms are frequently discussed as 'powerful', they are influenced by complex values, ideologies and practices of neoliberal pedagogy (Giroux 2004). Neyland and Mollers argue for a move away from considering algorithms as having social power in the form of technological agents able to cause an effect on society. Instead, it is important to recognise the situated character of algorithmic systems in relation to individual narratives. Distinct components are designed and reworked as 'they come together with rules, people, processes and specific kinds of relationships' (Neyland and Möllers 2017: 59). Treated as a commodity, feedback is a part of a package that we deliver to students who are already paying for their education. In the UK, it is represented through data to provide evidence for a teaching excellence framework (TEF) (BIS 2016) and discussed as an element that contributes to student 'learning gain'. This is one example of the public dimension of feedback, but this may overlook and diminish the private human spheres involved—and this is where we seek to respond. Feedback takes place in a set of circumstances, but is always influenced by factors beyond the humans involved, and is also linked to emotions. Whether the phone rings during the writing of student feedback or a student reads or hears feedback in a physical class or through a technological system, human and affective links are ever present in that student's life. All factors have a bearing on how feedback messages are experienced by the contributing parties. Whilst Willis seeks to transcend a pedagogy prefaced on narratives alone, we wonder what value there is in a narrative of the human body, to inform a radically reflexive engagement with feedback in HE. Coughlan (2014) writes: 'If we broaden our scope to include the array of human and algorithmic actors developing a space, sometimes in collaboration, sometimes seeking to counter and outwit each other, we find a different narrative and a more diverse cast of political actors.' (Coughlan 2014: 81) In seeking out this diversity, we suggest turning inwards, to what can seem to be almost illicit stories alongside more consumer-focused perspectives of HE. Yet these are the narratives that inform our lived experience as academics. They reinvigorate an awareness of sensation, emotion and practice as played out between relational bodies.

Intuitively, we know that feedback is a human, even bodily, process. Yet this intuition only emerged from within a series of informal, and unplanned, discussions—conducted as a tutor and participant—on an MEd programme aimed at transformation (Hayes 2015). We offer up, as a sign of our particular claims, our own lived, and relational, experiences of feedback on the MEd and as fellow

teachers in HE. We suggest, in the spirit of Rowe (Carrillo Rowe 2012), that lived experience expressed as autoethnography brings theory and ideas to life. It enriches that natural encounter that must count for something in the ambition of an idea and a dedication to its cultivation and eventual realization. It is within Rowe's critique of neoliberalism and articulation of an erotic pedagogy that we find the courage to shock those that would recoil from an assumed illicit conversation. Within feedback, there is a vulnerable power that can awaken a wider sense of self and creation within the production of knowledge. Feedback between us on the MEd (and as co-authors) was both formal and conversational. A compelling story emerges that suggests that feedback is both human and emotional and draws upon illicit forms of experience that are traditionally denied in neoliberal iterations of accepted knowledge production.

In our feedback sessions, a relationship emerged that now informs a collegial friendship. This friendship embraces a form of vulnerability that encourages possibility. It probes the illicit and wonders at the creative potential when knowledge is informed by the personal and the emotional. There was, within our roles, a surrendering to a process that defied traditional HE roles. This process was constituted by a stepping back and forth between teacher and student so that it became difficult to understand where one started and the other ended. It is hard to imagine how automatically generated feedback through an algorithm could respond in such a way. Instead, our experience of feedback might have been replaced by the silencing discussed by Striphas (2015) in algorithmic cultures. The challenges of neoliberal expectations of professional practice tend to deny the emotionality of being human. So we sought to discover these silences, to excavate the human and respond to it, as we explored and reflected on practices of mindfulness within the MEd classroom. This revealed authenticity in personal accounts of practice and identity. These felt raw and emotional rather than sanitised or systemised to meet the expectations of neoliberal HE culture.

We engaged with and responded to practices of free writing. This helped us to acknowledge, with honesty, the roles of our bodies in writing. We learnt through our conversations that there is a physical presence to feedback—sensations of heat and cool—love and sadness—knowing when you have gone far enough or perhaps not far enough—the prickle of tears, the running of sweat, the racing of hearts. They are all actions and reactions, and they are not captured if the feedback is enacted *only* via technological experiences. Within these encounters, there is a rush of exploration, of discovery, of the potential for ontology to push the boundaries of the illicit and open up the boundaries of vulnerability. Feedback, in the process of creation, is not unlike the practice of yoga. The exhale is the relaxation. The inhale is the working process. In the sweat of exercising the body, astonishing revelations may enter the mind. Within the inhalation, you ease into the process and you feel your way back into comfort. But in the spirit of transformation, you know you cannot stay there—that within the comfort there is a drive or desire to keep pushing to explore the boundaries and to negotiate anew what is emerging and becoming. Through mindfulness, we can contemplate what spaces we open for 'lived' feedback—the breathing technique is a physical experience

that provides a route to a more permanent change, where contemplative techniques remain with us. They do not fade as they might, if they are only thought and not 'lived'.

Thinking through our experiences of this form of living feedback leads us to conclude that to breathe in this way challenges the instrumentality of neoliberalism. It renews our interest in connections between our bodily functions and our minds (Shahjahan 2015; Hayes 2015; Peters and Jandrić 2018). The demand for constant activity and learned habits of electronic stimulation in modern society need not be negative, if these are tempered with contemplation. Hart (2004) suggests that contemplative techniques provide a portal to our inner world. It is a world that as co-authors we have just begun to explore, where daily learning, living and feedback have intermingled. We dared to allow intimacy to develop in our feedback. This led to a wonder and excitement in what lies ahead. Our authentic and intimate lived experience of human feedback has reinvigorated how we in turn enact feedback with our own students, at least before robots take over to deliver feedback on our behalf.

Our conversations highlighted what Jaggar (1989) reveals in her telling work on emotions: that we can only start from where we begin. But beginnings are important as they carry with them human experience that has gone before. Could any automated process really be programmed to be aware of multiple human life stories and the emotions therein? Furthermore, our emotional promptings when permitted to surface can reveal a deeper sense of meaning in what we study. In essence, there is more than a simple desire to explain or understand. This drive to create, and produce new forms of knowledge, might just be more personal, and more human, than perhaps a neoliberal framing of knowledge creation might allow to be acknowledged. We embraced an overt need for emotions, as discussed in the reflexive notions espoused by Jaggar. With uncertainty, but faith in a wider sense of transformation within pedagogy, we repeatedly returned to the writings of hooks (2014) to find comfort in a role for both tears and joy in the classroom. Much like Rowe's critique of neoliberal eroticism, tears and emotions exist outside a defined iteration of the classroom, leading us to wonder, *where do we cry in higher education?* Perhaps more broadly, where do we attend to the human in our iterations as both teachers and researchers in higher education? Emotions, like eroticism, are an illicit conversation to be had within neoliberalism. They render individuals insecure, revealing a vulnerability that, as Shildrick suggests, cannot be controlled. Whilst she documents within the history of ideas how various institutional approaches to vulnerability have sought to deny overt forms of vulnerability, we suggest, instead in the spirit of Beattie and Schick (2013), that this treats vulnerability as an agonistic experience. Vulnerability is not a rational state, but when acknowledged within the feedback process, it does allow individuals and groups to negotiate their very ontology. From within this experience, new creative forms of understanding of the self, and the other, are revealed in feedback.

6.2.3 *Part Three: Towards Radical Reflexive Feedback*

We contend that only humans can take this need for reflexive thinking and transformation further still, to reapply what they have learned and, in so doing, to influence the learning of others. However, we also acknowledge the hybrid existence we all inhabit, whereby we are dialectically intertwined as both human and machine. Our learning experiences are always augmented to some degree by technology, and we are politically implicated in its design (Winner 1980). Transformation occurs in a relational context, with critical reflexivity and relational dialogue acknowledged as key concepts within networked learning (Dirckinck-Holmfeld et al. 2011: 291, Jandrić 2017). We suggest that transformations require a form of radical reflexivity in feedback that acknowledges the relational component of being human across postdigital encounters. On the Med, this was enacted in the space between classroom encounters and the social media platform: Yammer. Yet what emerged as a dialogue across Yammer felt like an extension of the feedback shared in our physical classes. We would argue that this only became possible through a shared radical reflexivity twined with mindfulness, which had helped us to contest power and authority in the HE classroom.

This situation must, by its very nature, defy traditional iterations of power and authority and imagine students not as vessels but rather as co-producers of knowledge and a key party to the iterative processes that algorithmic cultures remove. Ackerly and True (2008) suggest the need for academics to actively engage in a form of self-reflexive thinking in order to excavate the underlying relationships of power and authority that inform their relationships of research subject and researcher. Mauthner (2000) reflects on the ability, or inability of scholars, to engage on an emotional level within the production of knowledge. Autoethnographic disclosures can support these reflexive developments. Yet such disclosures also come at a cost. Many eschew autoethnographic reflections as mere navel gazing, a point not lost on Brigg and Bleiker (2010). Inayatullah (2011) reflects that it was only in sharing his own embodied experiences that he felt a deeper pull, or sense of connection, to those with whom he was relationally intertwined in his lived experiences. Autoethnographic reflexivity deepened his sense of the worlds in which he was a part. It is this sense of connectivity that was embraced in our development of a radical feedback experience. This experience emerges from abandoning traditional forms of pedagogy that reify technical rationality. We drew strength instead in the claims of Kahane (2009), whose experiences of free writing in the classroom generated a sense of honesty and authenticity. Not only were students compelled to take on the role of community building in the classroom, but they also moved away from the hard pedagogy discussed by Amsler (2011). Kahane suggests a pedagogy of plenty whereby students and teachers co-produce the classroom experience and build relationships via the practices of mindfulness.

Intuitively, it would seem that an individual experience emerges from within the intersection of pen and paper in free writing, perhaps foreclosing on the shared bodily experience of radical forms of feedback. We suggest otherwise. In opening

up the quiet to reflect on personal, ontological lived experience and academic narratives, there is space to recall the emotionality of silence—space to wonder, experience, laugh and cry and to recognise an active form of engagement within the writing journey. Reflecting inward does not lead to isolation. This form of vulnerability seems (in our experience) to prompt sharing and, within that, transformation. Individuals experience what Inayatullah (2011) describes as a form of necessary indulgence. Excavate the self, and what do we find? It is not essentialised indulgence but dynamism (Inayatullah 2011: 8). Such dynamism is available to teachers and students alike. We suggest that a radical form of feedback, accompanied by an autoethnographic interpretation of pedagogy, can generate a community within the classroom that encourages engagement and not recipience. In itself it is both site and form of resistance to the iterations of the negative student image that informs contemporary HE.

6.3 Conclusion

In conclusion, our arguments, situated within an autoethnographic account of teaching and learning, are for some controversial. They are though linked to some key values of networked learning, such as cooperation and collaboration in the learning process, self-determination, trust and investment of self in the networked learning process (Dirckinck-Holmfeld et al. 2011).

Therefore, we reiterate a challenge to the embodied portrayal of the HE student as AI systems take hold. The current depiction of students within the technological, e-marking narrative and online platforms more generally suggests a sneaky character willing to take shortcuts in the production of their work. This framing is unwittingly produced in a technological forum that shuts down conversations, leaving students largely in the dark and unaware of these assumptions. Yet in view of the introduction of a teaching excellence framework (BIS 2016) and emphasis on measuring the 'learning gain' of students, we suggest that it is timely for the points we have raised to be a part of new institutional and management commitments to critically reflexive feedback processes. We hope that in adopting a radically reflexive form of feedback, we can contest this particular framing of students, as if they were of one universal identity (Hayes and Jandrić 2018), thereby championing the notion of the student as a diverse co-producer of knowledge.

A radically reflexive interpretation of feedback welcomes students into a process where they reflect not only on their embodied experiences but also on the journey they wish to navigate as co-pilots within and beyond the classroom. It is not a simple 'sat nav' route. We suggest that as lecturers and students develop their feedback relationship, there are opportunities for co-authorship, as we found as fellow academics through the MEd.

It provokes a series of conversations that provide a timely rejoinder to the calls of Amsler and Kahane for a soft pedagogy of plenty that reifies the positive embodiments of the student and lecturer alike. We finish with an analogy of student jour-

neys, in relation to the sat nav, 'which is not always a reliable guide to the road' (Chesher 2012: 325). As Chesher points out:

> Drivers on the road with sat navs also become 'users', as their information space is populated by databases and live information. Manufacturers promise this will give them greater command over the road: if there is traffic ahead, live traffic information will suggest changes to the route … Find the cheapest petrol nearby, great food and shopping. Watch the estimated distance and time to destination, and live information. In each way that users open themselves to more information, they can open themselves to influences of advertising, tracking and other forces. Personal information spaces are overlaid by a growing array of information nodes, informing subjects about surrounding spaces. As these technosocial phenomena become more intimately embedded in everyday life, the hermeneutics of the technical, social and political forces, both 'trivial' and power-laden, must be taken seriously (Chesher 2012: 326–327).

We hope that our work provides, alongside such interventions, a vehicle for a student voice to challenge the negative assumptions surrounding their learning journey and their particular portrayal as consumers in the algorithmic framing of contemporary AI-driven feedback experiences. A radically reflexive form of feedback is closely linked with the values of networked learning. It can provoke a student voice and a route towards critical self-navigation, which is absent, but very much needed, in the ongoing shaping of contemporary HE.

References

B. Ackerly, J. True, Reflexivity in practice: power and ethics in feminist research on international relations. Int. Stud. Rev. **10**(4), 693–707 (2008)

S.S. Amsler, From 'therapeutic' to political education: The centrality of affective sensibility in critical pedagogy. Crit. Stud Educ. **52**(1), 47–63 (2011)

A.R. Beattie, K. Schick, *The Vulnerable Subject: Beyond Rationalism in International Relations* (Palgrave Macmillan, London, 2013)

B. Bhandari, Facial Recognition Drone Monitors Chinese College Class. *Sixth Tone*. (2018), https://www.sixthtone.com/news/1002354/facial-recognition-drone-monitors-chinese-college-class

M. Brigg, R. Bleiker, Autoethnographic international relations: exploring the self as a source of knowledge. Rev. Int. Stud. **36**(3), 779–798 (2010)

Business Innovation & Skills (BIS), Teaching Excellence Framework Technical Consultation (2016), https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/523340/bis-16-262-teaching- excellence-framework-techcon.pdf. Accessed 23 Aug 2017

A. Carrillo Rowe, Erotic pedagogies. J. Homosex. **59**(7), 1031–1056 (2012)

C. Chesher, Navigating sociotechnical spaces: comparing computer games and sat navs as digital spatial media. Convergence **18**(3), 315–330 (2012)

S. Coughlan, Could robots be marking your work? (2014), http://www.bbc.co.uk/news/business-38289079. Accessed 3 Sep 2017

N. Couldry, *Why Voice Matters: Culture and Politics After Neoliberalism* (Sage, London, 2010)

K. Crawford, Can an algorithm be agonistic? Ten scenes from life in calculated publics. Sci. Technol. Hum. Values **41**(1), 77–92 (2016)

L. Dirckinck-Holmfeld, V. Hodgson, D. McConnell (eds.), *Exploring the Theory, Pedagogy and Practice of Networked Learning* (Springer, New York, 2011)

C. Ellis, T.E. Adams, A.P. Bochner, Autoethnography: an overview. Hist. Soz. Forsch. **36**, 273–290 (2011)

T. Fawns, Postdigital education in design and practice, in *Postdigital Science and Education*, (Springer, New York, 2019)
T. Gillespie, *The relevance of algorithms. Media technologies: Essays on communication*, materiality, and society, (2013)
H. Giroux, *The Terror of Neoliberalism: Authoritarianism and the Eclipse of Democracy* (Paradigm, Boulder, 2004)
M. Hamilton, Deep dreaming of AI in education. *Jisc* (2018), https://www.jisc.ac.uk/reports/deep-dreaming-of-ai-in-education
T. Hart, Opening the contemplative mind in the classroom. J. Transform. Educ. **2**(1), 28–46 (2004)
S. Hayes, Encouraging the intellectual craft of *living* research: tattoos, theory and time, in *Learning to Research—Researching to Learn*, ed. by P. Bartholomew, C. Guerin, C. Nygaard, (Libri, London, 2015)
S. Hayes, *The Labour of Words in Higher Education: Is it Time to Reoccupy Policy?* (Brill Sense, Rotterdam, 2019)
S. Hayes, P. Jandrić, Learning, technologies, and time in the age of global neoliberal capitalism. Knowl. Cult. **5**(2), 11–17 (2017)
S. Hayes, P. Jandrić, Resisting the iron cage of 'the student experience'. Šolsko polje **29**(1-2), 127–143 (2018)
V. Hodgson, D. McConnell, Networked learning and postdigital education, in *Postdigital Science and Education*, (Springer, New York, 2019)
N. Inayatullah, *Autobiographical International Relations: I, IR* (Routledge, London, 2011)
L.D. Introna, Algorithms, governance, and governmentality on governing academic writing. Sci Technol Human Values (2015). https://doi.org/10.1177/0162243915587360
A.M. Jaggar, Love and knowledge: emotion in feminist epistemology. Inquiry **32**(2), 151–176 (1989)
P. Jandrić, *Learning in the Age of Digital Reason* (Sense, Rotterdam, 2017)
P. Jandrić, D. Boras (eds.), *Critical Learning in Digital Networks* (Springer, New York, 2015)
P. Jandrić, J. Knox, H. Macleod, C. Sinclair, Learning in the age of algorithmic cultures. E-Learn Digital Media **14**(3), 101–104 (2017)
P. Jandrić, J. Knox, T. Besley, T. Ryberg, J. Suoranta, S. Hayes, Postdigital science and education. Educ Philos Theory **50**(10), 893–899 (2018)
C. Jones, Capital, neoliberalism and educational technology, in *Postdigital Science and Education*, (Springer, New York, 2019)
D. Kahane, Learning about obligation, compassion, and global justice: the place of contemplative pedagogy. New Dir. Teach. Learn. **2009**(118), 49–60 (2009)
M. Mauthner, Snippets and silences: ethics and reflexivity in narratives of sistering. Int. J. Soc. Res. Methodol. **3**(4), 287–306 (2000)
A. McRae, What does 'value for money' mean for English higher education? *Times Higher Education* (2018, February 22), Retrieved October 10, 2018, from https://www.timeshighereducation.com/features/what-does-value-money-mean-english-higher-education
C. Mouffe, *The Return of the Political* (Verso, London, 2003)
D. Neyland, N. Möllers, Algorithmic IF… THEN rules and the conditions and consequences of power. Inf. Commun. Soc. **20**(1), 45–62 (2017)
M.A. Peters, P. Jandrić, *The Digital University: A Dialogue and Manifesto* (Peter Lang, New York, 2018)
M.A. Peters, P. Jandrić, S. Hayes, The curious promise of educationalising technological unemployment: what can places of learning really do about the future of work? *Educational Philosophy and Theory*, 1–13 (2018). https://doi.org/10.1080/00131857.2018.1439376
M. A. Peters, P. Jandrić, A. J. Means (eds.), *Education and Technological Unemployment* (Springer, Singapore, 2019)
T. Reeves, A postdigital perspective on organisations, in *Postdigital Science and Education*, (Springer, New York, 2019)
R.A. Shahjahan, Being 'lazy' and slowing down: Toward decolonising time, our body, and pedagogy. Educ. Philos. Theory **47**(5), 488–501 (2015)

C. Shore, S. Wright, Whose accountability? Governmentality and the auditing of universities. Parallax **10**(2), 100–116 (2004)
G. Soros, Fallibility, reflexivity, and the human uncertainty principle. J. Econ. Methodol. **20**(4), 309–329 (2013)
T. Striphas, Algorithmic culture. Eur. J. Cult. Stud. **18**(4-5), 395–412 (2015)
L. Winner, Do artifacts have politics? Daedalus **109**(1), 121–136 (1980)
S. Zwagerman, The scarlet P: plagiarism, panopticism, and the rhetoric of academic integrity. Coll. Compos. Commun. **59**, 676–671 (2008)

Part III
Understanding and Empowering Learners

Chapter 7
Understanding and Identifying Cognitive Load in Networked Learning

Benjamin A. Kehrwald and Brendan P. Bentley

7.1 Introduction

Cognitive load theory (CLT) focuses on human cognition and the limitations of short-term memory. CLT seeks to appreciate the cognitive effort required to complete a learning task relative to the capacity of the short-term memory (Sweller 1988, 1994). It provides a framework for understanding practical implications for both the design of learning situations (sometimes called 'instructional design' or 'learning design') and the support and facilitation of learning (often called 'teaching'). As De Jong (2010) points out, CLT has supported the advancement of educational theory and practice by aiding in the explanation of a large set of experimental findings. The premise that underpins the application of CLT is as follows: by recognising and addressing (reducing or eliminating) instances of cognitive load in learning situations, educators can improve learners' ability to acquire and develop schema and, in doing so, support learning.

This chapter considers CLT in networked learning (NL) and seeks to provide guidance in the identification and description of instances of cognitive load in NL so that they can be addressed through design and teaching practices that specifically aim to reduce cognitive load in NL situations. This chapter is guided by two broad questions:

- How does cognitive load manifest in learning (in general)?
- How does cognitive load manifest in in networked learning (in particular)?

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This chapter is structured in three main sections: the first section provides the background to our exploration of CLT in the context of NL. It includes an overview of CLT and its development, an overview of NL and a definition of the problem that this chapter investigates, namely, that NL situations include instances of cognitive load that may not be present in other (e.g. face-to-face or on-campus) learning situations and therefore need to be identified and understood so they can be addressed. The second section explores common features of NL and identifies key sources of cognitive load in NL situations, thereby providing a basis for, firstly, understanding cognitive load in NL and, secondly, addressing it. The third section identifies a potential research agenda to guide further explorations of CLT in NL.

7.2 Background

7.2.1 Cognitive Load Theory

CLT postulates that the short-term memory has a limited capacity and exceeding this capacity may hinder learning (Chandler and Sweller 1991; Sweller 1988, 1994). The theory attempts to resolve the issue through the development of instructional techniques that are designed to reduce the demands placed on the working memory and maximising the available resources of the working memory when processing information (Sweller et al. 1998).

CLT suggests three types of cognitive load: intrinsic, extraneous and germane (De Jong 2010). Intrinsic cognitive load is the essential load associated with achieving intended learning outcomes in a specific learning task. It is the cognitive load that is necessary to acquire the skills and knowledge associated with the task. Once considered relatively fixed and not subject to influence, intrinsic cognitive load is now viewed as more dynamic than previously understood. As a feature of the relationship between the subjective learner and the task, intrinsic cognitive load can be altered through careful attention to the relationships between the learner, task and subject matter (Paas et al. 2003). Extraneous cognitive load is the load that is evoked that is not associated with the intended learning outcomes (De Jong 2010). Extraneous cognitive load is generated as a consequence of the presentation of the learning material as the learner attempts to make sense of information presented to them. This form of cognitive load can be altered by changing the design and presentation of the learning materials and tasks. Germane cognitive load is the load associated with processing information, the development of schemas and the automation of information processing tasks. Skills such as interpreting, differentiating and organising information are considered germane load (Mayer 2002). Germane cognitive load can be beneficial to the acquisition of knowledge and may enhance the learning process (Ayers 2006). It can also hinder learning when the addition of germane load exceeds the capacity of learners' working memory. As germane load

is induced by learners' efforts to process and comprehend, it can be altered through the design of materials and activity (Brunken et al. 2003).

Significant in the development of CLT has been the investigation and clarification of the term *load* within a CLT paradigm. Recent work highlights two variations of the notion of load. The first variation centres on the learner and defines cognitive load in terms of effort that is exerted by the learner within the context of a learning task. The second variation centres on the task itself and defines load in terms of the complexity of the learning activity and the instructional constraints of the context (de Jong 2010, Paas 1992). Although these two views of load are related, it is important to differentiate between them to be able to identify cognitive load in NL.

Various tools have been developed to measure the multidimensional nature of cognitive load (Brünken et al. 2003, Daneman and Carpenter 1980, De Jong 2010). Both analytical and empirical methods have been developed. Analytical methods draw upon expert opinions or analysis of tasks and provide a subjective framework of data. Empirical methodologies use introspective rating scales, psychophysiological data (heart rate), pupil dilation and electroencephalography (EEG) to assess cognitive load (Paas et al. (2003). Some measures such as the NASA-TLX have been developed to quantify mental demand, as well as physical demand, temporal demand, performance and frustration (Sweller et al. 2011). CLT researchers have in general focused on introspective scales to rate mental effort (Paas 1992) or task difficulty (Ayres 2013). In particular, the use of a self-perceived reporting scale such as a Likert scale has become a common methodology (Ngu et al. 2015, Paas and Van Merriënboer 1993).

Two strategies are commonly used to address cognitive load. The first strategy is to reduce cognitive load. Careful attention to instances of cognitive load and alteration to the design and presentation of instructional materials can reduce the levels of cognitive load (see, for example, Chandler and Sweller 1991, De Jong 2010, Mayer and Moreno 2003, Paas et al. 2003). The consideration of CLT in educational design is a key to using this strategy. Educational design includes the overall conceptualisation of the learning process, the sequencing of learning tasks, the design of individual tasks and the presentation of both learning materials and tasks. Consideration of cognitive load in each of these stages of educational design and development can help reduce cognitive load. We expand on these points below.

The second strategy is to increase the cognitive capacity of the learner in order to maximise the acquisition schema. CLT draws upon dual-process theories to explain cognition operating on parallel 'controlled' and 'automatic' pathways (Paas and Van Merriënboer 1990, Sweller and Chandler (1994). The controlled pathway is conscious and slow and requires relatively more effort. The automatic pathway is faster, non-conscious and relatively effortless (Feldon 2007). In automatic processing, the effect of a particular automatised activity on cognitive load is present but limited, reducing 'working memory load by effectively bypassing working memory' (Mousavi et al. 2004, p. 319).

7.2.2 Networked Learning

As described by Goodyear et al. (2004), networked learning is 'learning in which information and communication technology is used to promote connections: between one learner and other learners; between learners and tutors; between a learning community and its resources' (p. 1). As the name implies, NL seeks to leverage the power of networks to facilitate learning as an active, social process.

The network component of NL refers not only to technology but also to social structures (i.e. 'networks') (see Fox 2002) in which relationships are structured by 'networked logic' and the accompanying notions of culture, production and experience (Castells 1996). Networked learners rely on connections with both resources and people (Steeples et al. 2002) because both are necessary for efficient and effective learning (Collins and Berge 1996).

The learning component of NL is informed by socially oriented learning theories, such as situated learning, situated cognition, socio-cultural approaches and community-based learning models (Jones and Asensio 2002). Learning in this context is inherently active, and learners' energy and attention are focused on production within connected community (or network) structure. Learning is a process of developing individual and shared understandings that inform changes in attitudes, beliefs, capabilities, knowledge structures and skills. Learning activity is facilitated by the connectivity provided by the network. Knowledge is embodied in practice, which is socially reproduced, supervised and modified over time (Brown and Duguid 2000). Notably, networked practices may represent a significant departure from more 'traditional' didactic, teacher-centric approaches, which remain commonplace on university campuses. The learner-centric orientation, and the associated attention to the learner, learner activity and learner experience (Jones and Steeples 2002) in NL, implies a different set of roles for course participants than in more traditional approaches (Hammond et al. 2002). The change in roles is not without its inherent conflicts related to power relations associated with the practicalities of assessment and educational administration (Trehan and Reynolds 2002). Understanding NL practice requires a careful unpicking of potentially new systems of activity. Moreover, extrapolating findings of educational research drawn from non-networked contexts requires a careful analysis of contextual factors, including the social and cultural systems in both contexts, in order to support decisions about the transferability of findings.

7.2.3 Defining the Problem

Throughout this chapter, cognitive load in NL is identified and explored to provide insight into how cognitive load may be addressed through specific attention to practical aspects of design, delivery and facilitation. Of interest are aspects of NL that have the potential to introduce additional cognitive load based on the nature of NL

environments and networked activity. Identifying key features of NL that distinguish it from other learning situations, particularly placed-based contexts that may have been the subject of previous CLT research, has the potential to help NL practitioners to identify and address sources of cognitive load and thereby support and facilitate learning.

7.3 Discussion: Identifying Cognitive Load in Networked Learning

CLT provides a lens for understanding and addressing challenges that confront learners in NL situations. In terms of improving learning outcomes for networked learners, the focus of CLT is twofold: first, there is a responsibility for designers and teachers to identify, reduce or eliminate instances of cognitive load. By rationalising the cognitive load that learners experience, educators have an important opportunity to structure and support learning processes with less cognitive load. Second, there is an opportunity to support learners' cognition by supporting the development of automaticity in cognitive processes and thereby reducing the load learners' experience when confronted with complex tasks.

Steeples et al. (2002) describe an architecture for networked learning that centres on an educational setting in which the following are also situated: a) the learning environment, which may include both physical and virtual spaces in which learning activity takes place; b) learning tasks, which provide a specification for learner activity; and c) learner activity, which is the actual activity undertaken by learners in response to tasks. These features of NL architecture provide a framework to describe the sources of cognitive load that networked learners encounter. 'NL environments' is considered as the broad technical and social context for networked learning. Learning tasks are conceived as discrete units of specific learning activity (as opposed to 'learning' in general). While there is clearly an overlap among the learning environment (where learning activity takes place), the specific learning tasks (what learners are asked to do) and the learning activity (what learners *actually* do), these ideas have been separated in the analysis of the application of CLT to NL according to 'broad' (course-wide) considerations and task-specific considerations when distinguishing between the learning environment and learning tasks.

7.3.1 Cognitive Load in Networked Learning Environments

When contrasted with place-based learning environments, NL environments present learners with several challenging features. These include the use of mediating technologies; the demands of operating in highly connected, media-rich environments; a potentially unfamiliar social environment; and the demands of computer-mediated communication.

First, the use of mediating technologies represents a source of cognitive load as technologies add manifold demands on learners' cognitive processing. Networked learning environments, by definition, rely on the use of technology not only to connect learners but also to mediate activity.

Cognitive load can impact novice learners in unexpected ways – even before they enter the NL environment. For novice learners, a computer that simply does not turn on or freezes as it boots up may prove to induce cognitive load. Not knowing how to diagnose the problem and to find a solution may raise the level of cognitive load as the learner searches to find out what is happening. A failing modem or an unplugged keyboard, a mouse that is not correctly connected all require the use of valuable working memory resources in the attempt to operationalise the technology and answer the question: 'why isn't it working?' For an experienced user, this situation is generally easily remedied with the minimum use of working memory as both the solution to the problems and the problem-solving heuristic are automated in the long-term memory.

For novice learners, the experience of multiple technology interfaces in different software applications may add to their apprehension and possible cognitive load even before they attempt to engage with the interfaces. Learners who do not have the skills to navigate the multiple interfaces are more likely to experience significant demands on their cognitive functioning and problem-solving ability due to high levels of cognitive load. This load also inhibits their ability to make sense of and use a variety of technological tools that comprise the learning environment. As highlighted by Morrison and Anglin (2005), the load of learning about technology concurrent with learning about the subject matter should not be underestimated. Learners can be overwhelmed by multiple additional loads introduced by the demands of navigating hypertext environments with complex non-linear relationships between information (Kalyuga and Liu 2015, Zumbach and Mohraz 2008) and the possibility of technical failure with one or more of the required technologies. By contrast, for experienced users (or relative 'experts'), engaging with learning management systems, computer-mediated communications tools, social media platforms and content-specific computing applications does not add significant cognitive load.

Second, networked learners have the additional cognitive load of managing large amounts of rich, multi-modal information that is associated with highly connected networked environments. The additional load is a result of complexity. This point is significant because novice learners are attempting to deal with new and rich information. They have already used some of their working memory resources to understand and use the NL environment, so their cognitive resources are depleted. This depletion of working memory resources is further exacerbated when there is a potentially excessive number of elements or there are complex interrelationships between the elements (high element interactivity). This may further overload the working memory, impairing the ability to acquire and automate schemas (Paas et al. 2003). Network learning situations that have *low* element interactivity are less difficult to process and require fewer working memory resources. For network learners that engage in *high* element interactivity, the task is more difficult (in terms of information processing) and requires more working memory resources. Where a learner is processing several

elements simultaneously such as a rich, multi-modal task, larger amounts of working memory are required. As Sweller (2010) suggests, 'The more elements that interact, the heavier the working memory load' (p. 124). Therefore, there is the potential for networked learners to experience overload when dealing with both the quantity and quality of information available, making discerning choices difficult about which information to use and the management of that information for ongoing use.

Third, in addition to the more 'technical' requirements of NL, there are important social and cultural implications of mediating technologies. Technologies introduce social and psychological distance between participants in interactive exchanges (Riva 2002). This distance creates a need for learners to reconsider the degrees of structure in their interactions; the type, amount and focus of their interactions; and the levels of autonomy that they are required to exercise in managing their learning activity (Dron 2007; Moore 1972, 1973). Orienting to this new social space and overcoming the social and psychological distance introduced by technology add cognitive load. For novice networked learners, additional cognitive load exists in every communicative and social act. Learning simple socially and culturally accepted communicative responses in an unfamiliar NL environment places additional stress on the learner. Within individual communications, concentrating attention on whether the salutation is acceptable or whether the interjection is correct takes away not only working memory resources but also the focus on the learning taking place. In wider communicative situations such as asynchronous discussions or synchronous conferencing, there are many social and cultural features that place demands on learners' cognitive resources, for example understanding the social and cultural conventions of participation, interpreting others' messages in the absence of familiar social cues and understanding and taking on particular roles in dynamic NL environments driven by social activity.

Fourth, computer-mediated communication, which may be the only communication channel available to networked learners, poses a risk of cognitive overload. Online communication requires familiarity with computer-mediated communications tools, often across different media. It requires a different set of communication skills, understanding of different communication protocols and interpretative skills. Researchers in online learning have documented the demands of technology-mediated communication, including the need to learn to read and interpret online social cues (Kehrwald 2008, Kreijns et al. 2004, Murphy 2004), the establishment of communication protocols (Palloff and Pratt 1999, 2001; Preece 2001), the development of social-relational mechanisms in online interpersonal interaction (Kehrwald 2010, Murphy 2004) and the pressure of goal-oriented online collaboration. As Kehrwald (2008) points out, online communication is a learned activity, and thus it represents an additional load to learning the intended subject matter. Abbreviations, acronyms, emojis and other mechanisms that 'humanise' the NL interaction are communication skills that need to be learnt. In some respect, it is akin to learning to speak a new language. For novice networked learners, communication comes with the same uncertainty as to whether the learner is using the correct tenor and tone of a language, whether the words and meaning they are using make sense, all while attempting to mediate a new technology.

Notably, these sources of cognitive load are *additional to* the cognitive load associated with learning the subject matter (Morrison and Anglin 2005). The important implication of this point is that in order to keep learners' effort and attention oriented toward the intended learning outcomes, educational designers have a responsibility to mitigate the potentially massive additional load introduced by networked learning environments.

7.3.2 Cognitive Load in Learning Tasks

Learning tasks represent a critical opportunity to influence learner activity. Thus, they are a key mechanism to address cognitive load with attention to the presentation of information, the creation of supportive structure, anticipation of learners' needs and the facilitation of productive learning activity.

The literature of CLT is rife with examples of extraneous load that emanates from the presentation of information (Brunken et al. 2003, Mayer and Moreno 2003, Moreno and Valdez 2005). As described by Chandler and Sweller (1991), the presentation of information without careful attention to cognitive load theory frequently results in high levels of extraneous cognitive load. Given the wide variety of media and modes of presentation that are employed in NL, the presentation of information is a potentially common source of extraneous cognitive load. Specific research has been undertaken investigating the relationship between cognitive load and multimedia. Of interest for NL is the effect upon learning when multiple sources of information were concurrently being treated by the working memory. The use of text, video, audio, still imagery and interactive multimedia derived from a variety of sources and used in combination as part of comprehensive packages of learning materials presents a significant risk in terms of the introduction of cognitive load (Brunken et al. 2003, Mayer and Moreno 2003, Moreno and Valdez 2005).

An important aspect of schema acquisition in multimedia learning is the splitting of a learner's attention across mutually dependent information sources. Research suggests that schema formation and learning can be negatively affected when even one more source of data is used concurrently (Chandler and Sweller 1991, Kalyuga et al. 1999). Notably, this occurs when the sources of information do not synchronise or support each other, and the learner is therefore required to search for semblances of connectivity between the data sources. Where text and diagrams are used, the 'split attention effect' can be overcome by strategically placing the text at an appropriate position, in relation to the diagram, synchronising both the text and diagram in a single integrated source of data, maximising the reinforcing effect of the text+visual combination and supporting meaning making.

A further effect upon schema acquisition occurs when texts and diagrams are accompanied by an auditory source. This effect is known as the 'modality effect'.

Researchers such as Mayer et al. (1998) found that the 'multi-media learners can integrate words and picture more easily when the words are presented auditorily rather than visually' (p. 312). The 'modality effect' affirms that when information is instructionally designed to minimise cognitive load and is presented from two differing sources, such as an auditory and visual source, schema formation and learning can be enhanced.

As with the use of mediating technologies, the presentation of learning tasks presents an opportunity for the introduction or, indeed the mitigation of, additional cognitive load. As described by Steeples et al. (2002), learning tasks specify and elicit learner activity. Each task 'needs to be sufficiently well-specified that the changes of the learner engaging in unproductive activity are kept within tolerable limits' (Steeples et al. 2002, p. 332). The focus on limiting unproductive activity highlights the potential for learning tasks to introduce additional cognitive load. When considered in combination with the presentation of information, the use of mediating technologies and the skills required for productive online communication, the presentation of learning tasks represents an opportunity to address several potential sources of cognitive load. A key consideration in the design and presentation of learning tasks is the goal of optimising the relationship between the learning activity and the cognitive load that is produced when learners engage with the task.

Central to the design of learning tasks is consideration of a learner's prior knowledge. As suggested by Vygotsky (1978), to successfully acquire schema, learners benefit from tasks that provide them engagement, are sympathetic to their previous experiences and are within their zone of proximal development. More specifically to NL, it is critical to understand the network of relations between a) the subjective learner, who has a unique perspective based on experience and prior knowledge; b) the learning task, which mediates subject matter, introduces structure and influences activity; and c) the networked learning community, which provides a social and cultural context for activity. Ideally, these relations support learning through the development of a network of connections that give the learner access to people, resources and tools that support learning. However, the complexity of these relations and the learner's abilities to make use of the relations (based on their unique combination of experience, skills and prior learning) make it very difficult to cater to each individual. NL designers need a repertoire of strategies to a) appreciate the complex relations present in networked learning situations, b) identify and accommodate the diversity of learners in a given NL situation and c) address instances of cognitive load arising in the learner-task relation. The design of learning tasks should acknowledge their past experiences and activate existing schema that can be recalled automatically. Using the principles of CLT to enhance the design of the technologically based learning while considering the prior knowledge of the learner invites the reduction of cognitive load that may enhance the acquisition of schema.

7.3.3 Cognitive Load in Learner Activity

Learner activity is central to the identification of cognitive load because all cognitive load is predicated on learner activity. The very nature of NL activity presents potentially novel demands on learners' cognitive processing abilities, including learners' efforts to 'learn to learn' on the network through the acquisition and automation of skills that support highly connected learning in networked environments.

Learning to learn online (or in NL) is a phenomenon that may be better understood through CLT. In his study of learning to learn online, Arbaugh (2004) highlights that 'while most indicators of online learning quality and effectiveness increase significantly as students take subsequent online courses, much of this increase occurs between the first and second online course' (Arbaugh 2004, p. 179). While Arbaugh did not indicate causality between student perceptions and cognitive load, cognitive load offers possible explanations. Central to the notion of learning to learn in NL is the idea of automaticity and learners' abilities to automate common learning activities, thereby freeing up capacity in their working memory. As learners orient themselves to highly connected, media-rich NL environments, they develop both skills and ways of working, which become automatic as they gain experience. While the initial learning curve may be quite steep for novice networked learners, the automation of NL activity reduces cognitive load as learners become more familiar with and more skilled at working in NL environments.

The second factor is a shift from more traditional roles in teaching-learning relationships to a more learner-centric arrangement with shared control and differing levels of learner autonomy and interdependence (see, for example, Garrison et al. 2000; Palloff and Pratt 1999, 2001). This arrangement creates the possibility of a much wider range of roles that learners may play in networked learning that are potentially more 'open', more democratic, more participatory and even more emancipatory than other more highly educationalised types of learning (Fox 2002). However, with these new, different or novel learning arrangements comes an associated need for learners to identify, understand and learn to act in new roles. So in addition to learning about technology and its application in NL, novice networked learners must also learn to be productive in technology-mediated social environments and take on potentially new roles as they participate in networked learning.

7.4 Conclusion and Directions for Future Research

This chapter explores the usefulness of CLT as a tool to help NL practitioners identify, understand and address difficulties experienced by networked learners. Using CLT as a lens to identify and understand learner experiences in NL environments has the potential to help NL practitioners refine their NL practices and, by extension, support learners. However, the understanding of CLT in NL is far from complete. Further work is needed to understand both the operation of NL environments

and the application of CLT to activities in those environments. In order to help researchers continue the important work of applying CLT to NL, further research is needed.

First, investigating how cognitive load can be addressed through NL practices is central to understanding further the impact that CLT may have on improving NL engagement and learning. Research investigating on specific methods applying CLT principles to reduce the levels of cognitive load associated with the presentation of information in highly connected rich-media networked environments will help address what is potentially the most significant area of extraneous cognitive load – the presentation of information. Further work with the development of computer interfaces can provide a mechanism to benefit large numbers of networked learners by simplifying their learning about and interactions with mediating technologies. As suggested by Kalyuga and Liu (2015), 'With this (CL) theory, the technology-based learning environments could be better matched to the nature of human cognition (p. 4).'

Second, research into the use of instructional design techniques sympathetic to CLT and specifically targeting NL and engagement tasks also may provide further insight into improving the learning outcomes of network learners. In particular, the identification of either the split attention or modality effect and levels of element interactivity provide a basis to improve the online network learning experience.

Third, questions specific to NL such as 'What particular germane skills are more likely to benefit network learners and enhance their learning?' may provide insight into the maximising of the development of cognitive processing. While germane load can be generalised as the load associated with the processing information, development of schemas and the automation of information processing tasks there is a need to consider how this might be applied to NL. Researching a) whether there are skills and processes specific to network learning and b) how these might be developed could help inform the design of networked environments and tasks that better support cognitive processing in NL.

Fourth, further work is needed to understand learning to learn in NL from a CLT point of view. Understanding cognitive load experienced by novice learners informs about the development of environments and tasks that address extraneous load and support automaticity, which improves learners' cognitive capacity.

References

J.B. Arbaugh, Learning to learn online: a study of perceptual changes between multiple online courses. Internet High. Educ. **7**(3), 169–182 (2004)

P. Ayers, Using subjective measures to detect variations of intrinsic cognitive load within problems. Learn. Instr. **16**(5), 389–400 (2006)

P. Ayers, Can the isolated-elements strategy be improved by targeting points of high cognitive load for additional practice? Learn. Instr. **23**, 115–124 (2013)

J.S. Brown, P. Duguid, *The Social Life of Information* (Harvard Business School Press, Boston, 2000)

R. Brunken, J.L. Plass, D. Leutner, Direct measurement of cognitive load in multimedia learning. Educ. Psychol. **38**(1), 53–61 (2003)
R. Brünken, J.L. Plass, D. Leutner, Direct measurement of cognitive load in multimedia learning. Educ. Psychol. **38**(1), 53–61 (2003)
M. Castells, *The Information Age: Economy, Society and Culture*, vol 1 (Blackwell, Oxford, 1996)
P. Chandler, J. Sweller, Cognitive load theory and the format of instruction. Cogn. Instr. **8**(4), 293–332 (1991). https://doi.org/10.1207/s1532690xci0804_2
M. Collins, Z. Berge, Facilitating interaction in computer mediated online courses. FSU/AECT Distance Education Conference (1996), Retrieved from http://www.emoderators.com/moderators/flcc.html
M. Daneman, P.A. Carpenter, Individual differences in working memory and reading. J. Verbal Learn. Verbal Behav. **19**(4), 450–466 (1980)
T. De Jong, Cognitive load theory, educational research, and instructional design: some food for thought. Instr. Sci. **38**(2), 105–134 (2010)
J. Dron, From transactional distance to transactional control, in *Control and Constraint in E-learning: Choosing When to Choose*, (Idea Group, Hershey, 2007), pp. 18–39
D.F. Feldon, Cognitive load and classroom teaching: the double-edged sword of automaticity. Educ. Psychol. **42**(3), 123–137 (2007)
S. Fox, Studying networked learning: some implications from socially situated learning theory and actor network theory, in *Networked Learning: Perspectives and Issues*, ed. by C. Steeples, C. Jones, (Springer, London, 2002), pp. 77–91
D.R. Garrison, T. Anderson, W. Archer, Critical inquiry in a text-based environment: computer conferencing in higher education. Internet High. Educ. **2**(2), 87–105 (2000)
P. Goodyear, S. Banks, V. Hodgson, D. McConnell (eds.), *Advances in Research on Networked Learning* (Kluwer Academic, Dordrecht, 2004)
N. Hammond, A. Trapp, C. Bennett, Small group teaching across the disciplines: setting the context for networked learning, in *Networked Learning: Perspectives and Issues*, ed. by C. Steeples, C. Jones, (Springer, London, 2002), pp. 243–252
C. Jones, M. Asensio, Designs for networked learning in higher education: a phenomenographic investigation of practitioners' accounts of design, in *Networked Learning: Perspectives and Issues*, ed. by C. Steeples, C. Jones, (Springer, London, 2002), pp. 253–278
C. Jones, C. Steeples, Perspectives and issues in networked learning, in *Networked Learning: Perspectives and Issues*, ed. by C. Steeples, C. Jones, (Springer, London, 2002), pp. 1–14
S. Kalyuga, T.-C. Liu, Guest Editorial: managing cognitive load in technology-based learning environments. Educ. Technol. Soc. **18**(4), 1–8 (2015)
S. Kalyuga, P. Chandler, J. Sweller, Managing split-attention and redundancy in multimedia instruction. Appl. Cogn. Psychol. **13**(4), 351–371 (1999). https://doi.org/10.1002/(sici)1099-0720(199908)13:4<351::aid-acp589>3.0.co;2-6
B.A. Kehrwald, Understanding social presence in text-based online learning environments. Distance Educ. **29**(1), 89–106 (2008)
B.A. Kehrwald, Being online: social presence and subjectivity in online learning. Lond. Rev. Educ. **8**(1), 39–50 (2010)
K. Kreijns, P.A. Kirschner, W. Jochems, H. Van Buuren, Determining sociability, social space, and social presence in (a)synchronous collaborative groups. Cyberpsychol. Behav. **7**(2), 155–172 (2004)
R.E. Mayer, Rote versus meaningful learning. Theory Pract. **41**(4), 226–232 (2002). https://doi.org/10.2307/1477407
R.E. Mayer, R. Moreno, Nine ways to reduce cognitive load in multimedia learning. Educ. Psychol. **38**(1), 43–52 (2003)
R.E. Mayer, R. Moreno, G.M. Pressley, A split-attention effect in multimedia learning: evidence for dual processing systems in working memory. J. Educ. Psychol. **90**(2), 312–320 (1998)
M.G. Moore, Learner autonomy: the second dimension of independent learning. Convergence **5**(2), 76–88 (1972)

M.G. Moore, Towards a theory of independent learning and teaching. J. High. Educ. **44**(9), 661–679 (1973)
R. Moreno, A. Valdez, Cognitive load and learning effects of having students organize pictures and words in multimedia environments: the role of student interactivity and feedback. Educ. Technol. Res. Dev. **53**(3), 35–45 (2005)
G. Morrison, G. Anglin, Research on cognitive load theory: application to e-learning. Educ. Technol. Res. Dev. **53**(3), 94–104 (2005)
S.Y. Mousavi, A. Renkl, J. Sweller, Cognitive load theory: instructional implications of the interaction between information structures and cognitive architecture. Instr. Sci. **32**(1), 1–8 (2004)
E. Murphy, Recognising and promoting collaboration in an online asynchronous discussion. Br. J. Educ. Technol. **35**(4), 421–431 (2004)
B.H. Ngu, S.F. Chung, A.S. Yeung, Cognitive load in algebra: element interactivity in solving equations. Educ. Psychol. **35**(3), 271–293 (2015)
F. Paas, J.J.G. Van Merriënboer, Automation and schema acquisition in learning elementary computer programming: Implications for the design of practice. Comput. Hum. Behav. **6**(3), 273–289 (1990)
F. Paas, Training strategies for attaining transfer of problem-solving skill in statistics. J. Educ. Psychol. 84(4), 429–434 (1992)
F. Paas, J.J.G. Van Merriënboer, The efficiency of instructional conditions—an approach to combine mental effort and performance-measures. Hum. Factors **35**(4), 737–743 (1993)
F. Paas, A. Renkl, J. Sweller, Cognitive load theory and instructional design: recent developments. Educ. Psychol. **38**(1), 1–4 (2003)
R.M. Palloff, K. Pratt, *Building Learning Communities in Cyberspace: Effective Strategies for the Online Classroom* (Jossey-Bass, San Francisco, 1999)
R.M. Palloff, K. Pratt, *Lessons from the Cyberspace Classroom: The Realities of Online Teaching* (Jossey-Bass, San Francisco, 2001)
J. Preece, Sociability and usability in online communities: determining and measuring success. Behav. Inform. Technol. **20**(5), 347 (2001)
G. Riva, The sociocognitive psychology of computer-mediated communication: the present and future of technology-based interactions. Cyberpsychol. Behav. **5**(6), 581–598 (2002)
C. Steeples, C. Jones, P. Goodyear, Beyond e-learning: a future for networked learning, in *Networked Learning: Perspectives and Issues*, ed. by C. Steeples, C. Jones, (Springer, London, 2002), pp. 323–342
J. Sweller, Cognitive load during problem solving: effects on learning. Cogn. Sci. **12**(2), 257–285 (1988). https://doi.org/10.1207/s15516709cog1202_4
J. Sweller, Cognitive load theory, learning difficulty and instructional design. Learn. Instr. **4**(4), 295–312 (1994). https://doi.org/10.1016/0959-4752(94)90003-5
J. Sweller, Element interactivity and intrinsic, extraneous, and germane cognitive load. Educ. Psychol. Rev. **22**(2), 123–138 (2010). https://doi.org/10.1007/s10648-010-9128-5
J. Sweller, P. Chandler, Why some material is difficult to learn. Cogn. Instr. **12**(3), 185–233 (1994)
J. Sweller, J.J.G. Van Merriënboer, F. Paas, Cognitive architecture and instructional design. Educ. Psychol. Rev. **10**(3), 251–296 (1998)
J. Sweller, P. Ayres, S. Kalyuga, *Cognitive Load Theory* (Springer, New York, 2011)
K. Trehan, M. Reynolds, Online collaborative assessment: power relations and 'critical learning', in *Networked Learning: Perspectives and Issues*, ed. by C. Steeples, C. Jones, (Springer, London, 2002), pp. 279–292
L.S. Vygotsky, *Mind in Society* (Harvard University Press, Cambridge, 1978)
J. Zumbach, M. Mohraz, Cogntive load in hypermedia reading comprehension: influence of text type and linearity. Comput. Hum. Behav. **24**(3), 875–887 (2008)

Chapter 8
Networks of Knowledge, Students as Producers, and Politicised Inquiry

Patrick Carmichael and Frances Tracy

8.1 Introduction

In this chapter, we will explore the relationships between a number of patterns and trends in higher education, namely, the reconceptualisation of students as producers rather than solely as consumers of knowledge, and the evolution of the idea of digital and data literacies, in relation to the development of ideas about networked learning. We will explore these relationships through the lens of a series of inquiries which were part of a programme of technological and pedagogical research and development designed to explore the educational potential of semantic web and linked open data approaches. This included participatory design and development activities involving teacher and students in higher education institutions in the United Kingdom. Our contention is that this provides insights into the development of critical perspectives on networked learning and highlights ways in which teachers and students can reconnect with the radical and emancipatory purposes of higher education.

8.2 The Student as Producer

One of the most influential framings of teaching and learning in higher education in the UK over the past decade has been Neary and Winn's work on the 'student as producer' (Neary and Winn 2009). This has, in our experience as teachers in higher

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education, been interpreted largely in relation to concerns about students becoming consumers or customers of higher education institutions. It has underpinned a continuing commitment to active, participatory pedagogies, and this is indeed one way in which Neary and Winn have articulated the idea. This has an obvious appeal in the context of the development of digital technologies: many pedagogical initiatives which involve the introduction of digital technologies involve some form of individual or collaborative production, and in the course of our work with semantic web and linked open data technologies, students could be said to be producers, as they were involved in the design, development and evaluation of new digital platforms and applications (Martinez-Garcia et al. 2012).

However, Neary and Winn also advance a more radical notion of what they mean by production and, in turn, what it means for students to be producers. Rather than defining this in terms of enhancement of 'student experience', or by arguing that students need to produce kinds of knowledge capable of contributing to dominant discourses in order to enhance their employability (Healey and Jenkins 2009) or to cope with the complexities and uncertainties of modern life (Barnett 2012), they locate the idea as part of an effort to rediscover the radical purposes of the university. They point to the alignment of the idea with the objectives of nineteenth-century liberalism, and also to avant-garde Marxism (Neary 2010), the work of Walter Benjamin on the 'author as producer' and the aspirations of the student-worker uprisings of 1968 (Neary 2012). Neary and Hagyard (2010) argue that this involves a 'pedagogy of excess' in which:

> … students can be enabled to transcend the constraints of consumerism by overcoming the limits of what it is to be a student in higher education. They can do this through collaborative acts of intellectual enquiry, working with academics and with each other, on subjects that look beyond their own self-interest and identity as students. (Neary and Hagyard 2010, 210)

The idea of such a 'pedagogy of excess' reflects recurring themes, both in the Marxist humanism of the 'new left' (Gorz 1970 and Illich 1971, 1978) and the post-Marxist tradition of operaismo (workerism) and autonomia (autonomism), particularly its practices of 'workers' inquiry' and *conricerca* (co-research) (Haider and Mohandesi 2013; Alquati 1993), and 'militant metropolitan inquiry' that takes place beyond workplaces (Negri 2018, 52). The importance of changes to educational establishments currently seen to be in crisis is identified by a number of writers in this tradition, who are explicitly referenced by Neary (2012), notably Roggero (2007, 2011), who calls for the reinstatement of the university as an 'institution of the common', and Dyer-Witheford (1999, 2005), who identifies ways in which university study and inquiry could be reoriented in order to involve students in the production of new knowledge and contribute to a new political economy.

Central to this argument is the idea that new forms of production, including the production of knowledge, be reoriented towards the use value, rather than the exchange value, of what is produced, resisting the tendency identified by Lyotard (1984) for relationships between suppliers and users of knowledge, particularly in digital environments, to assume the same forms as has existed around other forms

of commodities. In the autonomist tradition mentioned above, this is achieved through a shift towards what Negri describes as *autovalorizzazione* (usually translated into English as 'self-valorisation'), that is, 'the autonomous elaboration of new ways of being, of new social relationships alternative to those of capitalism' (Cleaver 1979, 17–18). It should be noted that Negri's appropriation of this term from Marx has been criticised as being too vague and abstract to be useful (see Cleaver 2011; Wright 2002), but in the specific context of education, it means that learners are not simply encouraged to exercise greater agency regarding their own learning, but rather are empowered to set more ambitious and radical agendas, identify desirable outcomes based on their potential use-values and undertake politicised and self-elucidating inquiries. This, then, is a more radical and expansive version of the idea of 'student as producer'.

Research and development focussed on this more radical idea of student as producer has significant concerns, commitments and theoretical influences in common with that around networked learning. Both perspectives see learning as social and situated while at the same time encouraging transgressions of conventional organisational and disciplinary boundaries; both are attentive to the significance of time and space; and both encourage pedagogies that are democratic and participatory. Furthermore, they reject the notion that technologies, including digital technologies, arise independently in society, arguing instead that they are co-constituted with, and reflective of, broader political and social developments. And, turning to the focus of this chapter, they share a commitment to inquiry on the part of learners: not simply as a means of exercising specific literacies, or evidencing competencies or attributes, but rather as a critical disposition to be developed and that is central to radical and potentially emancipatory change.

8.3 The Production of Knowledge in Networks

The role of networks and networking practices in the production of knowledge has been widely discussed. Paavola et al. (2004) and Hakkarainen et al. (2004) advance the argument that, in addition to models or metaphors of learning based on acquisition and participation (as described by Sfard 1998), there is a third, 'knowledge creation metaphor' for learning. This views knowledge creation as a social process, albeit one in which individual actions as part of a stream of social activities are significant, which acknowledges the importance of multiple forms of knowledge, which encourages criticism and questioning as a means of fostering insight and innovation and which recognises the importance of 'knowledge artefacts' both as a focus for collaboration and as products (Paavola et al. 2004). Accordingly, networked environments allow teachers and learners to form collaborative teams, share their ideas and engage in collective inquiry which may coalesce around specific artefacts and generate new ones through networking practices which themselves may be emergent (Hakkarainen et al. 2004).

Within what Jones (2015) describes as the 'networked learning paradigm', these characteristics have been explored and elaborated in a range of contexts including schools, universities and different kinds of professional learning. Across these contexts, there is a broad consensus that knowledge is not a 'body' nor is it reducible to a set of skills or aptitudes: rather, knowledge is 'emergent: a socio-culturally influenced outcome of sense-making of experiences through relational dialogue, and/or collaborative interactions' (Hodgson et al. 2012). A key aspect of networked learning is that the networks in question are not solely digital, or social, but are, rather, heterogeneous. Learning activities or aspects of practice, which are often site-, domain- or discipline-specific, provide a focus, point of intensity or stabilisation of the network (Goodyear et al. 2016, 94), stating that:

> We take a learning network to be a heterogeneous assemblage of people and things connected in activities that have learning as an explicit goal or a significant side effect. Coherence among the activities helps resolve the learning agenda of the network, which, in turn, helps trace the limits of the network.

This recognition of the heterogeneity of networks is reflected in the increasing numbers of contributions to the biennial Networked Learning Conferences that refer to and apply concepts from socio-material theories such as actor-network theory (de Laat and Ryberg 2018).

This heterogeneity means that even in ostensibly 'digital' or 'online' activities, there will be iteration between contexts. For many students, the 'primary context' of their activities will not be online (Dohn 2014), so activities may be initiated in an online environment before being extended to a physical location or practice, or, alternatively, aspects of practice or the objects of inquiry may be represented in digital environments through processes of translation which may be tentative or iterative. Networked learning, therefore, is understood to involve more than online training or distance learning, and teachers need not simply to author and structure online content, but rather to design and develop activities that enable and mediate iteration between the digital and physical contexts of learning, so as to develop new assemblages and knowledge artefacts. This has implications for what 'production' is understood to mean in the context of networked learning. Student production is, according to this view, understood not solely a matter of reporting or representing activities via online tools, nor of development of personal capacities, but as participation in the co-production with others of new material, digital and knowledge artefacts and networked assemblages, which may include redesign and reconfiguration of learning environments themselves. All of these represent elements of what Neary and Hagyard (2010) would describe as a pedagogy of excess.

Within networked learning, as in the student as producer agenda, there is a well-developed radical strand which frames educational research and development not simply in terms of enhancing learning, but in terms of critical pedagogy and radical societal transformation, drawing on sources including Illich, Freire and MacLaren. McLaren and Jandrić (2015) echo many of the arguments made about students as producers and discuss how a key task for educators is to explore how technological developments have been appropriated under capitalism and to consider both how to

resist and to develop alternatives. Jaakkola (2015) argues that the reflection expected of teachers needs to be extended beyond immediate pedagogical concerns into a broader critical heutagogy. Also paralleling more expansive ideas about student production, Dohn et al. (2018, 201) reflect that commitments in education to a broad notion of social justice may not be particularly helpful in practice, and they cite the call by Czerniewicz (2018) for more critical and politically astute studies of how inequalities are created and reproduced, and how networked learning might address them. This involves looking beyond rhetorics of transformation, novelty and openness which may not necessarily be accompanied by structural changes or improvements in learners' experiences or opportunities.

In the remainder of this chapter, we will consider some of these tendencies and rhetoric and two in particular: that of 'openness', specifically as it relates to research data generated through student inquiry, and the idea that student learning in networks can be expressed in terms of some form of digital literacies. Our argument is that, as with the idea of student as producer and networked learning more generally, there are opportunities to engage critically with these and conceptualise these in more expansive and politicised ways. 'Linked data' or 'linked open data' approaches (Heath and Bizer 2011; Pereira et al. 2018) provide opportunities for the realisation in practice of student as producer initiatives. Neary et al. (2014, 25) state that they can be directed 'towards a greater strategic priority of reconfiguring the nature of teaching and learning in higher education and encouraging students to become part of the academic project of the university', whether these involve the contribution of the outcomes of student inquiry to collective knowledge resources such as archives, or peer-to-peer collaboration in the production of new knowledge artefacts. Linked open data approaches go beyond the generation of new data sets and may involve the production of co-authored content in wikis, collaborative annotation environments and other shared information ecologies, which in turn employ open data approaches to structure and share information. However, as Raffaghelli (2018) suggests, while the potential for open data approaches has been recognised at a macro level, and open approaches have been implemented across large-scale collaborative networks, they have seen only limited uptake at local and individual level. If we are to explore the potential of open data in the production of knowledge more widely, then we need to explore how literacies might be understood in the context of open data specifically, but also in relation to production as well as consumption.

8.4 Dimensions of Digital Literacies in the Ensemble Project

Ideas about digital literacies have moved beyond concerns with the acquisition of 'computer skills' to incorporate conceptual understanding (Gilster 1997), and more recently, they have come to be understood as situated practices (Gillen and Barton 2010; Lankshear and Knobel 2008), which are developed through discourse and involvement in digital production processes (Buckingham 2015). Gourlay and Oliver (2013, 2016) further advance this idea of digital literacies as situated

networked learning practices, positioning them not as a set of competences that reside in individuals, but rather as complex and heterogeneous assemblages of human and non-human actors. They caution against trying to identify hierarchies or sequences of digital literacies as this hides the nuanced and situated nature of these practices (Gourlay and Oliver 2016). It is notable, however, that recent discussions of 'data literacies' have tended to revert to a focus on technical skills emphasising the role of statistical knowledge in informed decision-making (Calzada Prado and Marzal 2013; Mandinach and Gummer 2013), although there have been more nuanced discussions which point to the need for a critical awareness of data practices that are shaped by policy contexts (Williamson 2016) and of the place of individuals within rapidly evolving data economies (Pangrazio and Selwyn 2019).

We draw here on our experience of a large research and development programme, ('Ensemble: Semantic Technologies for the Enhancement of Case-Based Learning') which was funded by the UK's Economic and Social Research Council and Engineering and Physical Sciences Research Council to explore the pedagogical potential of the semantic web and linked and open data technologies and approaches in higher education. As these technologies were novel, and unfamiliar to many of the teachers and students with whom we worked, we were concerned to explore how related digital and data literacies could be developed and supported. These needed to be situated in disciplinary and professional contexts, often in areas where practice was complex or evolving rapidly as a result of the adoption of new technologies. But they also needed to reflect emergent pedagogical contexts, specifically those which used some kind of case-based learning as a response to that complexity and change (Martinez-Garcia et al. 2012).

The project worked in six main disciplinary areas (plant sciences, archaeology, management, education studies, contemporary dance and environmental and earth sciences, with smaller-scale projects in law, journalism and history). The project team included software developers as well as educational researchers, and a range of new digital tools and platforms were developed in the course of the main project and as part of an associated doctoral study.

The project also evolved over time with a number of distinct phases and led to a number of follow-up projects and applications. These are summarised in Table 8.1.

In Phase 1 of the Ensemble project, there was an emphasis on working with teachers to produce rich web applications such as interactive timelines, maps and catalogues of resources with associated semantic search interfaces. Applications were developed using the Exhibit web application framework (Huynh et al. 2007) which was developed as part of the SIMILE project (http://www.simile-widgets.org) based at the Massachusetts Institute of Technology, and, where necessary, using the Fedora digital repository (https://duraspace.org/fedora/) for larger-scale data sets and digital content. Data presented through the visualisations and catalogues were linked to other web resources such as learning resources, Wikipedia pages, publishers' websites and online databases. An interactive timeline of plant evolution for bioscience undergraduate students, for example, displayed important points in plant evolutionary development, geological events, and levels of atmospheric gases and temperatures, and was also linked to key readings, wiki pages,

Table 8.1 Main phases and activities of the Ensemble project and its successors

Phase	Location[a]	Curriculum contexts	Participants
Pilot projects 2009–2012	University A	Plant sciences Epidemiology History	Undergraduate students involved in student researcher scheme, working with teachers and developers
Phase 1 2009–2012	University A	Plant sciences Archaeology	Primarily teachers of undergraduate programmes
	University B	Marine operations and management	Primarily teachers of postgraduate programmes
Phase 2 2010–2014	University A	Plant sciences	Teachers and students on undergraduate programmes
	University C	Education studies Environmental education	Teachers and students on undergraduate programmes
		Contemporary dance	Students involved in choreography and curriculum development project
Follow-up projects 2013–present (selected examples)	University C	Education studies	Students involved in undergraduate projects
		Accounting and finance	Teachers of undergraduate programmes
Archiving projects 2010–present	Various	Education studies Research methods Workers' education	Teachers and researcher users of 'teaching archives' using semantic web technologies

[a]University A, an 'old' research-intensive university; University B, an urban university specialising in professional and business education and research; University C, an urban, 'modern' university with specialisations in vocational and professional education and applied research

images of plants and maps of the world at different periods in its history (Jordan et al. 2010). Data sets presented were generally simplified and other resources to which students were directed were selected, rather than the students themselves being encouraged to explore and identify sources from across wider online networks.

Phase 2 of the project involved positioning students much more explicitly as co-designers of semantic web platforms to support collaborative learning activities. This involved the identification of online resources and their collaborative annotation, with examples including shared bibliographies by science students and the annotation of student-produced video content by groups of contemporary dance students (Brooks 2012). Our work did not take place in isolation: other teams working on semantic web and linked data projects at this time, including the group in Finland mentioned previously who were responsible for theorising learning in terms of the generation of knowledge artefacts, also identified semantic web technologies, and particularly semantic annotation of multimedia content, as a potential basis for reframing learning in terms of collaborative production of such artefacts (Batatia et al. 2012).

Another example of the project's work in this second phase involved teachers and students of environmental and earth sciences. Pedagogical 'cases' such as location studies or fieldwork investigations included data collected via remote sensing

and involved new data practices around the use of very large data sets from diverse sources, alongside local data that might be collected by the students themselves. Thus, any development of digital or data literacies in such educational settings involved teachers being aware of the changing nature of broader disciplinary practice and mediating these changes through curriculum design and pedagogical interventions (Carmichael and Litherland 2012). The situated and semiotic approach to digital literacies of Kress (2010), in particular, encouraged us to connect our participatory research methods to the development of digital literacies. Teachers and learners were encouraged to develop their understanding of learning, discipline-specific data practices and technological affordances, through their participation in design, development and evaluation.

The examples mentioned here involved research and development in varied educational contexts (although the majority involved undergraduate level study), different combinations of new and emerging technologies, and data of different kinds and from diverse sources. Additionally, each was designed and developed to support a different pattern of student participation and engagement, and demanded or supported the development of particular and situated digital literacies. While remaining mindful of the argument made by Gourlay and Oliver (2016), about the need to avoid thinking about digital literacies as simple sequences or hierarchies of skills, it is possible to identify patterns from across the project of how combinations of semantic web technologies were incorporated into teaching and learning activities and the digital literacies that they involved.

At the time of the project, advocates of semantic web approaches generated a number of visualisations of the semantic web 'technology stack' and we used these as a starting point for an inductive analysis of applications, pedagogical activities and emerging digital literacies. Very few of the applications that were developed used all of the technologies associated with the semantic web, and some used only one or two, in combination with other, more established web technologies. Our analysis drew on a range of sources, including use cases developed to inform the design of the applications, researcher and developer diaries, observations of the applications in use by students and teacher and student analysis.

What emerged were sets of activities and literacies involving:

(a) Navigation around online tools presenting linked data through interfaces or visualisation tools that could be manipulated in a variety of ways. This enabled exploration and encouraged the formulation of questions and framing of inquiries, but the data was typically simplified and bounded, and options for representation restricted by external developers or teachers. Examples include the plant evolution timeline mentioned above.
(b) Data searching and retrieval from external sources, typically using familiar software or prebuilt 'portals' or directories. Data were often selected and simplified and might be used in illustrative ways, rather than being for extensive exploration and analysis. This might be oriented towards demonstration of the ways that data are used to represent concepts and cases, or to encourage students to assess the reliability and granularity of the data and consider social and

political factors at work in its collection and representation. Examples included selected and simplified data sets used to support an undergraduate course in the history, philosophy and sociology of education and a course in postgraduate marine operations and management studies which involved students being presented with exemplary data sets in support of 'learning cases'.

(c) Working with 'raw' data that were 'born digital', involving their manipulation in an online environment or other data analysis software which involved working with large data sets from multiple sources, critically evaluating data and sources and explicitly considering the data practices around its collection, categorisation and representation. A good example of this in the context of the project involved exploring epidemiological data relating to the spread of plant diseases and the physical and meteorological factors that might affect this.

(d) Generation of new data and metadata and linking these internally and to other resources. This required teachers and students to engage with data formats, metadata schemes and taxonomies and to consider how these might affect knowledge representation and algorithmic treatments of the data. The contemporary dance students involved in the production of video content had to address issues of how it could be described and annotated using established taxonomies as well as their own reflective narratives.

These activities in turn can be understood in terms of a set of dimensions which can be identified across curricular settings:

- Boundedness: that is, the extent to which the students are working within closed 'microworlds' with selected data oriented towards predetermined learning outcomes (a) or across an 'open' and potentially global data space (b, c, d)
- Familiarity of technologies: technologies that are stable and well understood by students (a, b) and those that are emergent and less well understood (c, d)
- Role of the students in knowledge production: primarily as consumers (a through c), or producers of data, analyses and interpretation (increasing potential from b through d)

The different projects and applications developed in the course of Ensemble can be located at the intersections of these dimensions. The timeline of plant evolution was, for all its visual appeal and complexity, deliberately bounded so as to limit students' exploration and to guide them towards specific learning outcomes – within the project – and echoing Papert, it was characterised as a 'microworld' (Carmichael and Tscholl 2013). In fact, in the design of this application, it emerged that the pedagogical scenarios of which teachers were most wary were those in which students had full access to the global data space but were at the same time primarily positioned as 'consumers'. Their concern was that students, lacking the specific data literacies that would enable them to critically evaluate them, would be at risk of importing and reproducing knowledge from unknown or untrusted sources.

Edwards et al. (2011) highlight the tensions between engaging students in networked learning in open and complex cyberspaces in (rather than the closed spaces of virtual worlds and simulations) and 'keeping it in the comfort zone for the

students' (227–228), which meant that while developing skills working with data handling and interactive representations, the students remained consumers, albeit of sophisticated and customised digital products. In other examples, where the boundaries around application were more permeable, the mediating role of teachers in supporting critical engagement with data and resources was essential. This was most obviously in encouraging students in type (b) scenarios to critically explore the extent to which data and the categories used to describe them were ideologically shaped and reflected dominant discourses.

The question of how familiarity, or a perception of familiarity, with digital technologies emerged as being of significance across the project. In some cases, teachers and students engaged with semantic web and linked and open data approaches with relative ease because they already used online databases (earth sciences), video for performance review (contemporary dance) or news aggregators (journalism), and in these cases, they could identify desirable enhancements to existing ways of teaching, learning and collaborating. The dimension to which we will pay greatest attention here, however, is the third and which is related to our opening discussion about students' roles as consumers and/or producers. The example we will primarily draw on relates to student learning in undergraduate education courses: specifically, about the history of education in the UK.

8.5 Student Inquiry, Research Objects and Knowledge in Networks

Following the completion of the main project's work in 2012, applications during the project continued to be used in teaching and learning, and development work continued in several areas, including within education studies courses at Liverpool John Moores University (University C in Table 8.1). By the end of the main Ensemble project in 2012, students of education studies at Liverpool John Moores University had access to a set of semantic web applications developed in the course of the main phases of the project. These included an interactive timeline of the history of education in the UK which allowed them to locate educational developments, key writings and legislation, against a range of other social, historical and political events. The timeline acted as a portal to a wide range of contextual information and data sets: events such as the Education Act of 1870, which initiated the provision of universal elementary education, could then be explored in their broader political context and in relation to changing patterns of work, urbanisation and public works, and students could access records of the public and parliamentary debates that took place at the time. Another web application provided semantic search access to collections of video, images, key documents and data sets, some of which had been developed by teachers at the university, while others were existing open data resources published to the web by their originators.

In subsequent work, however, student roles changed significantly. In a follow-up project, undergraduate students were employed as researchers which involved them in compiling an online directory of open data sources of relevance to student and professional inquiry in education. In addition to collating existing metadata about the data sets and sources (from their providers, usually branches of government), they wrote additional narratives to accompany each source. These included notes on a range of technical issues (many of the data sets were incomplete, inconsistent, or included estimated values) and also raised broader questions about the application of problematic categories, indicators and concepts, often related to contemporary policy discourses. Such activities went beyond students contributing to the building of a bounded microworld or providing teaching data sets for students with specific pedagogical purposes: the data sets were made available, with commentaries, for any student to use in the course of their own inquiries. And while the development of the directory involved only a small number of students and staff, its purpose was to encourage a larger audience to engage with open data and appreciate the complexities and problematic aspects of secondary analysis of existing networked data.

Perhaps the most ambitious development activity involved students incorporating the data they had collected into existing semantic web applications and data networks. Litherland and Forrester (2013) describe how their work complemented and extended existing data presented in the timeline from phase 2 of the main project and included historical studies of the UK national curriculum, UK educational policy post 1988, policy on special needs and inclusion and the changing role of audiovisual technologies in education. Besides identifying existing online data sources, the students also generated new data sets from existing sources, collected new data and conducted interviews about their chosen focus of inquiry: these too were linked to the timeline. The students reflected not only on their experiences of developing specific new digital and data literacies, but also the ways in which policy contexts and political developments influenced what they had previously seen as unproblematic issues of educational practice. However, Litherland and Forrester (2013, p. 13) do identify the persistence amongst the students of epistemologically naive views about reliability and bias and only limited awareness of how human intervention or algorithmic processes might operate in the context of complex networks of data.

What was developed in the course of these activities was different to the previous examples and differs from examples in environmental and earth sciences and in archaeology, the other project settings in which student-generated data might be shared across networks. In these cases, there are established data practices related to a long tradition of amateur and citizen science, but the data that are collected and shared are generally very specific and limited in nature (see discussion of this in Conde 2014). In the case of the education students, the data, analyses and commentaries that were being generated involved self-directed inquiry and were much more varied in their form and critical in their content.

This reinforces a significant point made previously, however: that not all pedagogical activities which invite student production are intrinsically as radical as Neary and Winn would intend. Simply involving students in the production of data

through fieldwork activities does not necessarily develop their critical digital literacies, and at the same time, many activities which are ostensibly directed towards student consumption do involve the application of critical analysis and expertise and may lead to transformative insights on the part of students. In the case of the students who collated and assessed existing data resources, rather than simply regarding these as consumers or producers, it is perhaps more useful and accurate to understand them as being involved in a hybrid set of reconfigurative practices: what Gourlay and Oliver (2016) describe as the creation and coordination of sociomaterial assemblages, involving acquisition, curation, destruction and creation of texts.

8.6 Students as Producers of Research Objects

Little of the work carried out by students as part of the various Ensemble and post-Ensemble project activities was concerned with the creation of conventional texts. Instead, what were produced ranged from new data sets, metadata records and annotations to 'packages' of data and metadata: the dance students, for example, generated 'bundled' video content with segments identified which were tagged, together with annotations and reflective commentaries (Morris 2012), and the education studies students produced packages of qualitative and quantitative data, research instruments and interpretations. In other cases, what was produced was a new configuration of a digital tool (such as one of the timelines) which was then incorporated in some form into a more conventional representation such as an essay or report. All of these represent examples of the networked knowledge artefacts theorised by Paavola et al. (2004). De Roure (2014, 236) describes such productions as semantically rich and shareable 'research objects' which, he argues, will be significant in future models of academic publishing that are less dominated by articles and monographs (discussed elsewhere in detail by the authors: see Tracy and Carmichael 2017). Such research objects can present the richness and complexities of research data, together with discussion of theories, interpretations and conclusions, but also enable others to develop them further, adding additional data, annotations, analysis or interpretations. If students are to be involved in the production of knowledge, then learning activities and student inquiries need to be oriented towards the production of such flexible and generative research objects, rather than primarily towards extended essays and dissertations modelled on the conventional academic article.

This has significant implications for pedagogical practice and its organisational mediation within higher education. Our experience within some of the settings explored by the Ensemble project revealed how, while some teachers could see the potential of semantic web and linked open data technologies to address pedagogical challenges and offer new opportunities, and were keen to develop applications and integrate them into their practice, others could equally well see such potential, but were much more cautious about their adoption. Even in settings where there was a

strong rhetoric of authenticity, currency and 'real-world experience' and where case-based approaches were a pedagogy of choice, the cases that were taught were often selected and constructed to address specific and predetermined learning outcomes. The unpredictability and fluidity of learning in less bounded environments, either with students positioned as consumers, producers or a combination of these, was a concern for at least some of these teachers. In other cases, the introduction of new technologies, linked open data amongst them, was seen a challenge in relation to teachers' disciplinary identities, which had been established against a background of less technologically mediated practice. Teachers of earth and environmental sciences, for example, expressed regret that digitally mediated practices were increasingly supplanting conventional fieldwork which they saw as intrinsic to their disciplinary practice and identities (Carmichael 2015, 289).

The need for changes to pedagogical practice have been discussed by others working within the networked learning paradigm. Our experience of working with teachers as part of Ensemble aligns particularly well with the work of Jaakkola (2015, 172–174) who highlights the importance of personal and emotional factors in the adoption of new technologies and their associated pedagogies and offers a model of how critical reflection of existing and potential future practice can be scaffolded. Koseoglu and Koutropoulos (2016) discuss (in the context of the introduction of MOOCs) how activities need to be reframed and students given recognition for participation in learning activities such as reflection, artefact creation or project work, rather than simply for achievement in summative assessments. Perhaps most significant though (for the development networked learning, for the repositioning of student as producer, and for the realisation of the potential of linked open data) is a recognition of the central importance of student inquiry and of the development of a disposition towards such inquiry as a desirable educational outcome for students and teachers alike.

8.7 Promoting Pedagogies of Excess

On reflection, the most significant changes in pedagogical practice and learning outcomes enabled by the Ensemble project and its implementation of linked open data were not those which involved the development and deployment of rich and complex, but still bounded, microworlds, but rather those that changed the relationships between teachers, students and knowledge and engendered new socio-material assemblages. This was where we saw instances of Neary's 'pedagogies of excess', as students were able to set the agenda for their own inquiries and contribute knowledge artefacts to wider networks. Where this was most fully realised, students exceeded the conventional demands of curriculum and assessment: in the case of education studies students who contributed to the development of the timeline, Litherland and Forrester (2013) report how they reflected on having gained greater insights – into pedagogical processes, into the ways in which their own knowledge was mediated through digital networks and about the relationship between their

own and their families' educational experiences and broader historical developments. And the contemporary dance students' involvement in participatory design, development and evaluation of performance review tools led to the emergence of digital tools that were oriented not simply to satisfy university assessments, but rather to support their creative practices, online presence and aspirations beyond the immediate university setting. These students firmly redirected the design and development activities of the Ensemble project team away from some semantic web technologies towards others. Specifically, they wanted semantic annotation tools that would allow them to present their capabilities as dancers and choreographers to diverse audiences including those beyond the university setting (Carmichael 2015; Morris 2012).

What this means for understandings of digital literacies is also significant. In the course of their pursuit of new lines of inquiry and the production of new knowledge artefacts, students were required to draw on, reconstruct and reconfigure networks. While interpretations of digital and data literacies as a form of situated social practice still hold, the fact that the primary context, stimulus or point of departure for inquiry might be established by students means that the digital literacies that they need to develop will be shaped by their own concerns, intentions and existing network relations. This means that for pedagogies of excess to emerge and be fully realised, curriculum designs and learning activities need to be reframed in terms of their opportunities to enable this. Teachers and curriculum developers need to reposition themselves as creators of spaces for fruitful encounters and generative inquiries, and as enablers of the kinds of projects and lines of inquiry that students wish to pursue. The specific digital and data literacies that develop in such settings are therefore necessarily contingent on the nature of the inquiries proposed and have more in common with the idea of data activism as advanced by Milan and van de Velden, who distinguish the conventional notion of digital literacies from 'reactive' data activism (often based around issues of privacy, surveillance, data sharing and accountability) and 'proactive' data activism, which involves the appropriation and creation of new data, representations and the development of 'antiprograms' (Milan 2016; Milan and Van der Velden 2016).

With this, we return to the idea of student as producer. Combining inquiry and activism within student-directed programmes is a common theme across student as producer initiatives, the avant-garde and autonomist Marxist traditions that underpin them, and within more radical envisionings of networked learning. In each of these, self-directed and self-elucidating inquiry is a central and radicalising form of praxis. In the context of higher education, it involves a deliberate blurring of the distinction between academic work and activism and the legitimising of more explicitly political inquiry as something to be undertaken by academics, workers, and students as workers in formation (McLaren and Jandrić 2015). This requires a critical and selective appropriation and reworking of the resources and methods of academic study towards ends different to those mandated by capitalist production, business interests and concerns with the perceived 'employability' of students. Wardrop and Withers (2014), in their review of such initiatives from across the university sector (which includes examples of student inquiry, networked learning and

the repositioning of the university's role more generally) characterise this as involving development of a new role: the 'para-academic'.

This in turn involves positioning of the university as the locus of such inquiry and activism. Universities need to offer something much more than training for future employment and instead become hubs or points of intensity in local, regional or wider networks of which they are an intrinsic part. Tellingly, this is an area into which Neary and Winn (2017) have extended their work on student as producer, by looking to the co-operative movement for models of how universities might overcome the concentration of the means and outcomes of production in the hands of a powerful minority and to develop alternative civic roles. Co-research involving both teachers and students allows critical practice to be discursively constructed and modelled rather than taught as a set of competencies, skills or graduate attributes. Such developments also have the potential to support challenges to existing disciplinary norms as they are reproduced within educational organisations; Jandrić (2016, 176) suggests that: 'transdisciplinarity … questions the existing systems of knowledge and domination and acquires genuine potentials for emancipation and social change'. What the availability of networked and linked open data, and the opportunities to link, aggregate and visualise these from diverse sources enables is a means of articulating, focussing and exploring such questions. It makes it possible for researchers who have identified an issue of concern or a point of departure not only to contextualise their own inquiries but, critically, to explore and critique how issues are conceptualised within both dominant and alternative discourses. Our experience within the Ensemble project provided us with models of such practice, the comparative freedom offered by a programme of research and development allowing teachers, students and researchers some space to position themselves differently in relation to each other, to the curriculum and to technologies, and to explore counter-discourses and antiprograms.

8.8 Conclusion

In conclusion, we would argue that the promotion of an expansive and radical version of the students as producers agenda, and the politicised inquiry that accompanies it, provides insights which can inform and guide the aspirations of those involved in networked learning and a framing for the development of networked learning more generally. However, while Neary and Hagyard (2010) are concerned to counteract the identity of the student as consumer, there is clearly a need for both teachers and students to develop critical digital and data literacies that enable them to engage as both critical consumers and producers of data, knowledge and practice. Both historical precedents and our own experiences indicate strongly that this is best achieved through placing inquiry at the centre of curriculum design and pedagogical practice. Consumption and production are thus linked in cycles of inquiry which are represented and given substance as elements of wider, heterogeneous networks.

Linked open data technologies and approaches provide many opportunities to realise both the potential of students as producers and a means of manifesting, accessing and sharing the knowledge artefacts or research objects that are a key element of dynamic learning and knowledge networks. These technologies and the approaches and discourses that accompany them provide not only the resources for situated and politicised inquiry; they also provide a means of sharing and aggregating the outcomes of inquiry, act as a focus for nuanced and situated critical digital literacies and represent a key means of developing counter-hegemonic data spaces. These can provide environments in which teachers and students can become investigators, researchers and activists. They can work together to create new data and construct case studies, contribute new knowledge and interpretations to networks, develop alternative interpretations, frame new inquiries and establish emancipatory trajectories: essential elements of a radical political economy of education.

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References

R. Alquati, *Per Fare Conricerca* (Calusca Edizione, Torino, 1993)
R. Barnett, Learning for an unknown future. High. Educ. Res. Dev. **31**(1), 65–77 (2012). https://doi.org/10.1080/07294360.2012.642841
H. Batatia, K. Hakkarainen, A. Mørch, Tacit knowledge and trialogical learning: towards a conceptual framework for designing innovative tools, in *Collaborative Knowledge Creation*, ed. by A. Moen, A. Mørch, S. Paavola, (Sense, Rotterdam, 2012)
P. Brooks, Dancing with the Web: students bring meaning to the semantic web. Technol. Pedagog. Educ. **21**(2), 189–212 (2012). https://doi.org/10.1080/1475939x.2012.697400
D. Buckingham, Defining digital literacy: what do young people need to know about digital media? Nordic J. Digit. Lit.**10**, 21–34 (2015).
J. Calzada Prado, M.Á. Marzal, Incorporating data literacy into information literacy programs: core competencies and contents. Libri **63**(2) (2013). https://doi.org/10.1515/libri-2013-0010
P. Carmichael, Not just about gadgets: time, innovation and change in the design of learning technologies. E-Learn. Digit. Media **12**(3–4), 279–294 (2015). https://doi.org/10.1177/2042753015571052
P. Carmichael, K. Litherland, Transversality and innovation: prospects for technology-enhanced learning in times of crisis, in *Surviving Economic Crises through Education*, ed. by D. Cole, (Peter Lang, New York, 2012)
P. Carmichael, M. Tscholl, Cases, simulacra and semantic web technologies. J. Comput. Assist. Learn. **29**(1), 31–42 (2013). https://doi.org/10.1111/j.1365-2729.2011.00459.x
H. Cleaver, *Reading Capital Politically* (University of Texas Press, Austin, 1979)
H. Cleaver, Self-valorization in Mariarosa Dalla Costa's "Women and the Subversion of the Community" (2011), Retrieved from https://la.utexas.edu/users/hcleaver/357k/HMCDallaCostaSelfvalorization2.htm
M. Conde, Activism mobilising science. Ecol. Econ. **105**, 67–77 (2014). https://doi.org/10.1016/j.ecolecon.2014.05.012
L. Czerniewicz, Inequality as higher education goes online, in *Networked Learning*, ed. by N. B. Dohn, S. Cranmer, J.-A. Sime, M. de Laat, T. Ryberg, (Springer, Dordrecht, 2018), pp. 95–106

M. de Laat, T. Ryberg, Celebrating the tenth networked learning conference: looking back and moving forward, in *Networked Learning*, (Springer International, Cham, 2018), pp. 1–20. https://doi.org/10.1007/978-3-319-74857-3_1
D. De Roure, The future of scholarly communications. *Insights* **27**(3), 233–238 (2014). https://doi.org/10.1629/2048-7754.171
N.B. Dohn, Implications for networked learning of the 'practice' side of social practice theories - a tacit-knowledge perspective, in *The Design, Experience and Practice of Networked Learning*, ed. by V. Hodgson, de Laat, D. McConnell, T. Ryberg, (Springer, Dordrecht, 2014), pp. 29–49
N.B. Dohn, J.-A. Sime, S. Cranmer, T. Ryberg, M. de Laat, Reflections and challenges in networked learning, in *Networked Learning*, ed. by N. B. Dohn, S. Cranmer, J.-A. Sime, M. de Laat, T. Ryberg, (Springer, Dordrecht, 2018), pp. 187–212
N. Dyer-Witheford, *Cyber-Marx: Cycles and Circuits of Struggle in High-technology Capitalism* (University of Illinois Press, Chicago, IL, 1999)
N. Dyer-Witheford, Cognitive capitalism and the contested campus, in *Engineering Culture: On the Author as (Digital) Producer*, ed. by G. Cox, J. Krysa, (Autonomedia, New York, 2005), pp. 71–93
R. Edwards, F. Tracy, K. Jordan, Mobilities, moorings and boundary making in developing semantic technologies in educational practices. Res. Learn. Technol. **19**(3), 219–232 (2011)
J. Gillen, D. Barton, *Digital Literacies* (London Knowledge Lab/TLRP, London, 2010)
P. Gilster, *Digital Literacy* (Wiley Computer, New York, 1997)
P. Goodyear, L. Carvalho, N.B. Dohn, Artefacts and activities in the analysis of learning networks, in *Research, Boundaries, and Policy in Networked Learning*, ed. by T. Ryberg, C. Sinclair, S. Bayne, M. de Laat, (Springer, Dordrecht, 2016), pp. 93–110
A. Gorz, Detruire l'université. Les Temps Modernes **285**, 1553–1558 (1970)
L. Gourlay, M. Oliver, Beyond 'the social': digital literacies as sociomaterial practice, in *Literacy in the Digital University: Critical Perspectives on Learning, Scholarship and Technology*, ed. by R. Goodfellow, M. Lea, (Routledge, Abington, 2013)
L. Gourlay, M. Oliver, It's not all about the learner: reframing students' digital literacy as sociomaterial practice, in *Research, Boundaries, and Policy in Networked Learning*, ed. by S. Bayne, C. Jones, M. de Laat, T. Ryberg, C. Sinclair, (Springer, Dordrecht, 2016), pp. 77–92
A. Haider, A. Mohandesi, Workers' inquiry: a genealogy. Viewpoints **3** (2013). Retrieved from https://www.viewpointmag.com/2013/09/27/workers-inquiry-a-genealogy/
K. Hakkarainen, T. Palonen, S. Paavola, E. Lehtinen, *Communities of Networked Expertise: Professional and Educational Perspectives* (Elsevier, Amsterdam, 2004)
M. Healey, A. Jenkins, *Developing Undergraduate Research and Inquiry* (Higher Education Academy, York, 2009)
T. Heath, C. Bizer, Linked Data: Evolving the Web into a Global data Space. Synthesis lectures on the semantic web: theory and technology, **1**(1), 1–136 (2011)
V. Hodgson, D. McConnell, L. Dirckinck-Holmfeld, in *The Theory, Practice and Pedagogy of Networked Learning*, ed. by L. Dirckinck-Holmfeld, V. Hodgson, D. McConnell, (Springer, Dordrecht, 2012), pp. 291–306
D. Huynh, D. Karger, R. Miller, Exhibit: lightweight structured data publishing. *Proceedings from WWW '07: Proceedings of the 16th International Conference on World Wide Web*, Banff, Alberta, Canada New York, NY, USA, 2007
I. Illich, *Deschooling Society* (Marion Boyars, London, 1971)
I. Illich, *The Right to Useful Unemployment and its Professional Enemies* (Marion Boyars, London, 1978)
M. Jaakkola, Teacher Heutagogy in the Network Society: a framework for critical reflection, in *Critical Learning in Digital Networks*, ed. by P. Jandrić, D. Boras, (Springer, Dordrecht, 2015), pp. 163–178
P. Jandrić, The methodological challenge of networked learning: (post)disciplinarity and critical emancipation, in *Research, Boundaries, and Policy in Networked Learning*, ed. by T. Ryberg, C. Sinclair, S. Bayne, M. de Laat, (Springer, Dordrecht, 2016), pp. 165–182

C. Jones, *Networked Learning: a Paradigm for the Age of Digital Networks* (Springer, Dordrecht, 2015)
K. Jordan, H. Griffiths, K. Johnstone, An interactive timeline of plant evolution - a HEA Bioscience case study (2010), Retrieved from http://www.bioscience.heacademy.ac.uk/ftp/casestudies/jordan.pdf
S. Koseoglu, A. Koutropoulos, Teaching Presence in MOOCs: Perspectives and Learning Design Strategies. *Proceedings from Networked Learning Conference 2016*, Lancaster, 9-11 May 2016
G. Kress, The profound shift of digital literacies, in *Digital Literacies*, ed. by J. Gillen, D. Barton, (London Knowledge Lab/TLRP, London, 2010), pp. 6–7
C. Lankshear, D. Knobel, *Digital Literacies: concepts, policies and practices* (Peter Lang, New York, 2008)
K. Litherland, G. Forrester, Undergraduates as co-producers of a history of education timeline. *Proceedings from BERA Conference*, Brighton, 3–5, September 2013
J.-F. Lyotard, *The Postmodern Condition* (Manchester University Press, Manchester, 1984)
E.B. Mandinach, E.S. Gummer, A systemic view of implementing data literacy in educator preparation. Educ. Res. **42**(1), 30–37 (2013). https://doi.org/10.3102/0013189x12459803
A. Martinez-Garcia, F. Tracy, M. Tscholl, S. Morris, P. Carmichael, Case based learning, pedagogical innovation and semantic web technologies. IEEE Trans. Learn. Technol. **5**(2), 104–116 (2012). https://doi.org/10.1109/TLT.2011.34
P. McLaren, P. Jandrić, The critical challenge of networked learning: using information technologies in the service of humanity, in *Critical Learning in Digital Networks*, ed. by P. Jandrić, D. Boras, (Springer, Dordrecht, 2015), pp. 199–226
S. Milan, Data activism as the new frontier of media activism, in *Media Activism in the Digital Age: Charting an Evolving Field of Research*, ed. by G. Yang, V. Pickard, (Routledge, Abingdon, 2016)
S. Milan, L. Van der Velden, The alternative epistemologies of data activism. Digit. Cult. Soc. **2**(2), 57–74 (2016). https://doi.org/10.14361/dcs-2016-0205
S. Morris, Semantic Web Use Cases and Case Studies: Using the Semantic Web to Enhance the Teaching of Dance (2012), Retrieved from https://www.w3.org/2001/sw/sweo/public/UseCases/LJMU/LJMU.pdf
M. Neary, Student as producer: a pedagogy for the avant-garde? Learn. Exch. **1**(1) (2010). Retrieved from http://eprints.lincoln.ac.uk/4186/
M. Neary, Student as producer: an institution of the common? [or how to recover communist/revolutionary science]. Enhancing Learn. Soc. Sci. **4**(3), 1–16 (2012). https://doi.org/10.11120/elss.2012.04030003
M. Neary, A. Hagyard, Pedagogy of excess: an alternative political economy of student life, in *The Marketisation of Higher Education and the Student as Consumer*, (Routledge, Abingdon, 2010), pp. 209–244
M. Neary, J. Winn, The student as producer: reinventing the student experience in higher education, in *The Future of Higher Education: Policy, Pedagogy and the Student Experience*, ed. by L. Bell, H. Stevenson, M. Neary, (Continuum, London, 2009), pp. 192–210
M. Neary, J. Winn, Beyond public and private: a framework for co-operative higher education. Open Libr. Humanit. **3**(2), 1–36 (2017). https://doi.org/10.16995/olh.195
M. Neary, G. Saunders, A. Hagyard, D. Derricott, *Research-engaged Teaching: an institutional strategy* (Higher Education Academy, York, 2014)
A. Negri, *From the Factory to the Metropolis* (Polity Press, Cambridge, 2018)
S. Paavola, L. Lipponen, K. Hakkarainen, Models of innovative knowledge communities and three metaphors of learning. Rev. Educ. Res. **74**(4), 557–576 (2004). https://doi.org/10.3102/00346543074004557
L. Pangrazio, N. Selwyn, 'Personal data literacies': a critical literacies approach to enhancing understandings of personal digital data. New Media Soc. **21**(2), 419–437 (2019) https://doi.org/10.1177/1461444818799523

C.K. Pereira, S.W.M. Siqueira, B.P. Nunes, S. Dietze, Linked data in education: a survey and a synthesis of actual research and future challenges. IEEE Trans. Learn. Technol. **11**(3), 400–412 (2018). https://doi.org/10.1109/tlt.2017.2787659

J. Raffaghelli, Open Data for Learning: A case study in Higher Education. *Proceedings from European Distance and E-Learning Network*, Genoa, 17–20 June 2018

G. Roggero, The autonomy of the living knowledge in the metropolis-university. Transversal, **2007**(5) (2007). Retrieved from http://eipcp.net/transversal/0707/roggero/en

G. Roggero, *The Production of Living Knowledge: The Crisis of the University and the Transformation of Labour in Europe and North America* (Temple University Press, Philadelphia, 2011)

A. Sfard, On two metaphors for learning and on the dangers of choosing just one. Educ. Res. **27**(2), 4–13 (1998). https://doi.org/10.3102/0013189X027002004

F. Tracy, P. Carmichael, Disrupting the dissertation: linked data, enhanced publication and algorithmic culture. E-Learn. Digit. Media **14**(3), 164–182 (2017). https://doi.org/10.1177/2042753017731356

A. Wardrop, D. Withers (eds.), *The Para-Academic Handbook* (Hammer-On Press, Bristol, 2014)

B. Williamson, Digital education governance: data visualization, predictive analytics, and 'real-time' policy instruments. J. Educ. Policy **31**(2), 123–141 (2016). https://doi.org/10.1080/02680939.2015.1035758

S. Wright, *Storming Heaven: Class Composition and Struggle in Italian Autonomist Marxism* (Pluto Press, London, 2002)

Chapter 9
Stewarding and Power in Networked Learning

Andrew Whitworth and Lee Webster

9.1 Introduction

Hodgson and Reynolds (2005, 11) call for an approach to networked learning design that 'provides a basis for a more democratic ethos within higher education programmes' when compared to approaches that focus on the individual, face-to-face experience. From this follows that such an approach needs to confront issues raised in democratic theory. For instance, Jürgen Habermas's position is that the democratic ideal can be equated with a consensus, where all parties affected by a decision have agreed to it. Habermas (1984) calls this the 'ideal speech situation' while acknowledging that, in practice, real decision-making is subject to a range of limitations including imperfect information, lack of time, incompatible worldviews, and the operations of power and hierarchy. Smaller groups, however, are more able to reach consensus (Gastil 1993) and distribute authority over the practices that emerge within these groups (Whitworth 2014), e.g. collective judgments about what information is relevant, what technologies can be used to manage the collaborative work, and so on: this is why Hodgson and Reynolds make their aforementioned claim. Yet they go on to query whether aspiring to an idealised consensus is a desirable approach for networked learning design. A democratic ethos may be more suited to networked learning precisely because dissenting voices can use the nodes and channels of the network to seek out fresh spaces, develop their own practices beyond the

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surveillance of authority, and be part of ‘multiple and shifting‘ communities (Hodgson and Reynolds 2005, 12).

This chapter investigates the operations of group decision-making and the emergence of negotiated information practices, within learning networks, in order to reveal how power is integral to these processes and thus the role that community plays in networked learning. This is power in Foucault’s sense (1977): as something not simply used to oppress, but also to empower, something that learners in a setting can draw on to develop knowledge and practice. This investigation has been undertaken in an empirical research project, SPIDER (Stewarding and Power In Digital Educational Resources), based on a large data set, a corpus of text generated by groups of networked learners in higher education (HE), that has recorded micro-scale dialogues as they emerge during learning tasks. The data reveal how students learn to steward the digital habitat (Wenger et al. 2009) that the group draws on in order to complete its set tasks. These activities empower the networked learners in ways that accord with the intended learning outcomes embedded in the setting, but while the authority to steward the digital habitat and, thus, the information practices of the group is, to some extent, distributed across group members (cf. Whitworth 2014), proto-practices emerge alongside a proto-hierarchy that creates a level of differentiation in the members’ experience of stewarding. The pedagogical design in use in this setting, specifically the use of online discussions for assessment purposes, makes these practices and differences visible and open to scrutiny. We propose that this visibility contributes significantly to a democratic approach to networked learning design.

9.2 Background: Stewarding and Power in Networked Learning

The principal concern of the SPIDER study is how networked learning can develop digital and information literacies in learners in HE, along lines suggested by Gourlay and Oliver (2016): not as cognitive change, but as changes in practices, embedded in material and social networks. Gourlay and Oliver cite Gillen and Barton’s (2010, 9) definition which is appropriate to our concerns here: digital literacies are ‘the constantly changing practices through which people make traceable meanings using digital technologies’. This holds out the promise that these meanings can be traced within and through the digital practices that students are learning, as the outcome of collaborative and networked learning practices.

In attempts to understand how networked learning communities use ICTs and develop information practices, Wenger, White, and Smith’s *Digital Habitats* (2009) is a valuable reference work. Building on Wenger’s earlier studies (e.g. 1998) of communities of practice (hereafter, CoPs), Wenger et al. describe how communities that share learning needs create a ‘digital habitat’: a set, or ecology (Luckin 2010), of technological and communicative resources. Through the constant configuration

and reconfiguration of this habitat and the accumulation of choices made by community members, the CoP collectively negotiates what it means to be competent and digitally literate within their particular context. Each digital habitat emerges from these operations in distinctive ways: no two configurations are exactly alike.

A CoP is a social site in which learning needs, identity, definitions of competence, and judgments about relevance are constantly being negotiated. These judgments are rarely overt and/or formal. In many cases they are made implicitly as community members draw on established procedures or routines. However, some members of the CoP may have formal roles to play in stewarding the digital habitat, such as purchasing technologies, moderating websites, and defining a technology policy for the group. There is also a more informal educational aspect. Good stewards do not just configure technologies but assist the group in developing the capacities it needs to make best use of them. Stewards act as brokers (ibid, 28), a boundary zone, bringing new information into the CoP where it encounters other practices. In essence then, stewarding is the means by which the CoP collectively enacts its digital and information literacy (Whitworth 2014). The digital habitat is the accumulation of the judgments about relevance, and subsequent configuring/structuring work, that have been made by the CoP's members. Stewarding is thus a 'creative practice that evolves along with the community and reflects the community's self-design… as a vehicle for learning' and a 'critical part of community leadership, facilitating a community's emergence or growth' (ibid, 25).

Despite the significance of the notion for our understanding of how learning networks are configured, the stewarding idea has been subsequently underdeveloped. Wenger et al. (2009) is a guide for practitioners and does not discuss how stewarding may be conceived, and manifest itself, in different ways, depending on both the internal dynamics of a CoP and the external setting(s) within which that CoP must operate and with which it must engage. As Druckenmiller and Mittleman (2015, p. 572) say, 'little is known about the early life cycle of CoPs'. Can the act of developing and configuring a digital habitat spark the emergence of a CoP in the first place? How can community members *learn* to be stewards of a digital habitat, and what factors shape their learning? How do members of groups make decisions about what information and technology are relevant to the CoP, and how are they to be organised into particular configurations? And how do relationships and boundary zones with other contexts, and the relations of power that flows between and around these boundaries, affect the stewarding process?

Few research studies focus on how stewarding emerges, nor how it can be taught and learned. Gibbs et al. (2012) investigate the micro-interactions of a learning community, via the use of discussion board data, but their paper only sketches the emergence of new practices through these interactions. The authors note how messages exchanged in the CoP go beyond just 'Q & A' and include community building and negotiation of identity, 'sharing… tacit understandings of what it means to be a LITE [Local Information Technology Expert], how one should behave as a LITE in the workplace…' (Gibbs et al. 2012, p. 5). Davidson et al. (2014) describe a MA Educational Technology course in Canada which engages its students in technology stewarding as a form of 'service learning', but although there is detail

on the stewards' (students') motivations and insights, the focus of the chapter is on outcomes rather than the interactions. This interestingly illustrates that digital habitats can be shaped by stewards and they learn by doing so, but there is no investigation of how the community and stewards (and institution) interacted. Ayling and Flagg (2012) research an online CoP for teachers in New Zealand, via a survey of the 280 members and observation of postings on the site (powered by Ning) for 3 months. They draw attention to how community members create 'artefacts' that others can use in their own professional settings. This work is not distributed equally among community members. Most artefacts (in this case, blog posts) are created by two members of the group; large numbers of group members post nothing, identifying not as 'contributors' but 'information seekers'. Ayling and Flagg do not concern themselves, however, with how CoP members configure the broader informational space—including Ning, but not limited to it—to meet their learning needs.

Each of these studies has problems in common when it comes to analysing the educational elements of stewarding. Data on the *evolution* of the habitats are difficult to generate, as the community interactions that are the basis of these studies are not focused or directed. They emerge spontaneously and not as the result of pedagogical design, making it difficult to track the impact of specific interactions and how these coalesce into practice. If people are to be *taught* how to be stewards, then this may occur informally, within workplaces and the CoP itself, but could also be done within formal educational settings.

Goodyear, Carvalho, and Dohn (2016, 94) define learning networks as follows:

> We take a learning network to be a heterogeneous assemblage of people and things connected in activities that have learning as an explicit goal or a significant side effect. Coherence among the activities helps resolve the learning agenda of the network, which, in turn, helps trace the limits of the network.

Within HE, learning networks tend to achieve 'coherence' due to being bounded by administrative phenomena such as curricula, assessment regimes, and predefined sets of resources. In SPIDER we therefore investigate how stewarding can be taught in HE, specifically a professionally oriented postgraduate environment.

Yet there are two problems which must be accounted for by studies in this environment. Firstly, the field is characterised by a largely uncritical view of the notion of 'community'. As Hodgson and Reynolds state (2005, 14): '…the idea of community is invariably used normatively in higher educational discourse, so that while it might often be difficult to be sure of its precise meaning-in-use, it is strongly suggestive of values and practices which are unquestionably and morally desirable'.

Secondly, it is precisely these bounding phenomena—particularly assessment regimes—that instil into HE regimes of power and surveillance. Who has defined the assessment criteria, for example? What information practices are valued and thus rewarded by high grades, and what are riskier, possibly deviant? Learning networks cannot be studied as if they reside in an inert space, insulated from broader social and material relations. HE has many highly asymmetrical relations of power and authority. The 'lecturer' has authority invested in them, both by the institution and the students. They define core elements of the students' learning environment

and the criteria against which student performance is then judged. Tutors thus have a level of discursive control over the learning environments they manage and the practices which emerge there.

Yet nor is power simply imposed on students from above. It can be generated by them and on their behalf, through dialogue and other forms of pedagogical interaction. This is explicit in any intention to *empower* the learner, to have them develop capital and the ability to make changes to their own ecology of resources and the habitat of the community. This is a Foucaultian view of power, as something in 'flux' within a discursive environment, with structures of knowledge being the permanences that arise out of this flux (Kendall and Wickham 1999, 55), and power used to affix these structures in place within the digital habitat of a given community. This is not power as an oppressive tool, but as an enabling quality, and in this sense is never asserted without a parallel *resistance* to that power (*ibid*, 50).

Our interest is therefore in how the design of a networked learning environment can encompass and generate power in these ways and how this can develop in learners the capacity to steward, not only their present (HE) digital habitat, but those they will go on to engage with in later life. It is how the agency of the students and the structures of the university systems interact that is at the core of our enquiry. Distributing authority over stewarding requires students to begin to make their own claims to knowledge, to make their own judgments about the relevance of particular resources, and decisions about how to configure their digital habitat. Hodgson and Reynolds (2005, 15) extend the idea of a 'learning community' as far as 'an advanced interpretation of collaborative design… [where] as well as sharing ideas, tutors and students take joint responsibility for planning, implementing and evaluating the detailed design, content and direction of the course'. Can this ideal be approached in an actual learning network? Can at least some authority be dispersed from the 'authoring' academic to the empowered student, and how does this enable learning, stewarding, and the development of information practices?

9.3 Methodology

9.3.1 The Setting

The setting for the SPIDER study is a core course unit on a postgraduate degree in educational technology. Graduates from the programme often take up roles as educators or learning technologists with responsibility for stewarding technology in a range of settings, where they need to make informed judgments about the relevance of informational and technological solutions to educational problems. The unit runs for a full academic year and explicitly encourages learners to develop practices relevant to deconstructing learning environments, understanding how they have been shaped by prior decisions and practices, and proposing enhancements to meet the needs of diverse stakeholders.

The unit is taught to both on-campus and distance learners. Both are brought together in online tutorial groups comprising 5–7 learners. As part of their assessment on the unit, these groups engage in a series of three online discussion activities, each lasting 2 weeks. These activities increase in complexity over the series. In the first task, learners read and discuss an academic paper. The second places them in a simulated decision-making environment in which each group represents different stakeholders, and the third requires them to, as a group, propose designs for a technology enhancement to two educational environments, specifically museums. The tasks increase in complexity in terms of the information required. The first two tasks are defined in ways that provide groups with the information they need (the text in the first, the scenario in the second), but in the third task, groups must gather for themselves the necessary information, through a field trip. The first discussion is actively moderated by the course leader and a teaching assistant, as for many learners, this is likely to be their first encounter with this mode of learning (a majority of the students are from outside the UK). This scaffolding is progressively withdrawn, however. By the third activity, the boards are only monitored by the teaching assistant in case of procedural questions or technical problems. Thus, the series of activities is designed to promote independent, problem-based learning and to do so in an environment that encourages learners to develop transferable stewarding skills.

It would be remiss to identify these groups as 'full' CoPs as there is no requirement that the members engage in sustained interaction, after the course unit finishes. But though the tasks are, to some extent, simulations of professional 'knowledge work', the activities are graded, meaning that the groups have an *authentic* and *shared* objective: to complete their tasks in ways that are rewarded in the marking scheme (the rubric being publicised to them from the start of their engagement). Implicit in the criteria by which students in HE, particularly at postgraduate level, are assessed is the expectation that learners exercise independent information- and knowledge-generating capacity. In addition, students in collaborative settings are 'nomadic' knowledge workers, lacking a stable physical location on campus (like a shared office) and thus having to 'manage and orchestrate' a 'constellation' of applications, spaces, and devices in order to undertake their work (Rossitto et al. 2014, 137). Therefore, as we will show, the learners in this setting draw on the digital habitat provided by the instructor and the institution, but also introduce into the habitat their own resources. These introductions are, or are not, validated by other members of the group, through the dialogues that occur during each activity. Each group (Goodyear et al. 2016, 96) 'customise[s the] task to suit their own needs and interests… [this] provides an opportunity for them to strengthen their self-regulation skills'. 'Tasks are designable, activities are not -- they are emergent' (ibid). Students can complete these tasks in many ways. Thus, the digital habitat evolves, as a response to the designed task but not as a direct outcome of it. The groups can therefore be seen as social sites in which members are learning how to use the techniques of stewarding to help meet these learning needs, as each plays their part in the collective task of (re-)configuring the 'starter' digital habitat.

Nevertheless, in the small but crucial fact that these discussions are graded is concentrated significant power relations within this setting. Time is also a constraint, or rather, there is a specific relation to time (cf. Timmis and Williams 2016, 113) that is integral to the setting of the task (a deadline), and this constrains the activities of both individual students, and the groups, in that they cannot extend their discussions indefinitely.

9.3.2 The Data Set

The data set is comprised of the dialogues as recorded on the Blackboard discussion boards provided as part of the groups' starter habitat. These are not *post hoc* reflections on or reconstructions of judgments made (cf. Perriton and Reynolds 2014), but on-the-spot records, open to documentary analysis due to their stability. The dialogues on the boards offer both quantitative and qualitative data. Quantitative data on numbers and length of posts, patterns of posting over time, and the distribution of posts among group members have all been gathered, but for reasons of space they are not discussed further in this chapter. In qualitative terms, the data set offers a corpus of over one million words of text that allows for investigation of more than just each individual's subjective experience of the learning environment, but the collective construction of digital habitats and the practices within them.

The research also draws on ten interviews conducted with learners after the course unit was concluded. We also interviewed the course tutor. These interviews are focused on deriving underlying motivations for activities or perspectives manifested on the discussion boards and (in the tutor's case) the design of the learning environment, but not immediately apparent from the text itself. Ethical consent for the research was gained from the local approval committee. Confidentiality has been achieved by the removal of all institutional and personal identifiers. All learners referred to in the discussion board posts have had their names reduced to the initial letter of their forename (e.g. student G), whereas students interviewed are referred to by number (e.g. student 2).

The study gathered data from two academic years, 2015–2016 and 2016–2017. The course materials and assessment activities were the same in both years. Each cohort was divided into 10 online discussion groups (given various colour codes for identification, which have been incorporated into the metadata), of 5–7 students each. In the following sections, quotations from discussion boards are tagged according to the following conventions:

[15/Blue/1] [16/Green/3]

The first two digits show the academic year from which the data are drawn, that is, 2015–2016 or 2016–2017, respectively. The last digit is the number of the activity in a given year (1–3).

9.4 Findings

9.4.1 Stewarding and the Development of Community Artefacts

Each of the twenty groups has a 'starter' digital habitat. This is comprised of the course content, the administrative architecture into which it is placed (syllabus, course schedule, assessment requirements), the technical architecture (Blackboard VLE, discussion board), and the communicative and facilitative skills of the tutor and teaching assistant (TA). This starter habitat largely reflects the decisions and judgments of the tutor, but elements have seeped down from the institution, e.g. the need for there to be some kind of summative assessment and the use of Blackboard as the VLE (tutor interview). It has been stewarded by the tutor and, in a secondary way, his TA, prior to the implantation of the embryonic CoPs into this landscape: it is a habitat without inhabitants.

From the earliest stages, learners add to and reconfigure the 'starter' habitat: 'Specific artefacts are designed, developed and adopted by the community to meet its requirements' (Druckenmiller and Mittleman 2015, 575). These artefacts consist of more than just discussion board posts (cf. Gibbs et al. 2012; Ayling and Flagg 2012). Students introduce, firstly, new sources of information into the habitat and, later on, new technological tools and spaces.

For example, take this discussion from the third activity, in which students are tasked with designing an application for at least one context, a museum, that they have no direct experience of (see Webster and Whitworth 2017). Student W here responds to an earlier post by A [15/Orange/3]:

> [A], nice suggestions for the first app! Let's hear a few more and come to a decision by when? Is Tuesday evening (6 pm UK time) too soon? I also have suggestions for the second museum. I visited the Origins centre in Johannesburg - you can view it at http://www.origins.org.za/.

Note how he successively:

- Validates the prior suggestion of student A for the form of the design task
- Proposes a schedule for the group to take a decision on how to proceed to the next step
- Suggests a source of information where colleagues can learn about his suggested museum (context)

Other students provided similar information in image form, sharing photographs of their chosen museum, while still others drew on anecdote, giving a narrative account of their visit. These introduced resources are then subject to validation by other members. Here is student A replying to the post from W quoted above:

> I like [W]'s suggestion about Origins museum, so I vote to [*sic*] it with [C]. I have checked the website and it sounds interesting. I suggest the idea about VR to be to this museum and we will think more about it next week. It could move the museum to be virtual. The visitor can walk virtually inside the museum and be close to the exhibits and so on.

From a different group, this student acknowledges how new information provided—in this case about how a museum in China uses tablets to display visitor information—has changed their ideas about what the group could propose. They follow up this with further suggestions [16/Diamond/3]:

> [Q] and [G] have made me think about the interaction visitors expect when they go to any kind of museum. The iPad idea in the Chinese exhibit was an eye-opener for me in what you can do for the visitor…. the iPad is something I want to expand on. How about using Bar-Coding or QR Codes next to exhibits that take you directly to an interactive program pre-loaded on the iPad for that display….

These utterances and responses coalesce into both different outcomes and different information practices for each group. The 16/Diamond group propose a design that uses QR codes, whereas 16/Blue suggested an audio guide (for the same museum), and so on. Thus, the same pedagogical processes can lead to diverse outcomes.

In addition, the digital habitats of each group evolve differently, without *explicit* direction from the course tutor. Here is where stewarding in Wenger et al.'s (2009) sense is more explicitly visible. Members of groups bring together their community understanding and technology awareness to make selections of (new) technological and informational artefacts, help integrate them into the practice of the group, and help other members make the transition to using them (Wenger et al. 2009, 26–7). 15/White, for example, introduce a wiki into the habitat (see the next section); other groups use WhatsApp or videoconference tools to coordinate work. This variation might seem a 'natural' outcome of discussion, but that is precisely the point. Each group separately and distinctively works towards optimising the practices that they perceive as allowing them to meet their instrumental goals (getting the grade). They are 'patchworking': 'synthesising knowledge and creating their own study-related artefacts' (Timmis and Williams 2016, 119, via Dohn 2009).

Introduced artefacts are also knowledge-based, drawing on *authority.* In two other working groups, two members had previously worked in museums and therefore bring prior professional experience to their group discussions. In one group, student B describes his visit to an art museum in Asia and draws upon his previous work experience [15/Blue/3]:

> Before moving to Asia I lived and worked in Europe at [an art museum]. I was part of the education department creating and imparting guided tours.

This prompts student H to reveal that she is a keen museum goer, has a shared interest in art, and is therefore in common ground with B. As a result of this, H shares with the group a video (made for a different project) analysing how music is used within an art museum in Europe. The dialogue that included B's claim to authority in this context has led to a new resource being introduced into the habitat, in ways that would be unlikely to happen in the more constrained, face-to-face classroom environment.

Questions posed also serve as 'hooks' for subsequent utterances and are therefore also a form of stewarding, or 'shepherding' the dialogue, to help both the group and the individuals within it meet their learning needs. Take this example [15/Orange/3], where student C tries to find out from his colleagues about the museum

context that he did not visit, but (as part of the task) is still expected to make critical judgments about, in dialogue with the other students. He uses various prompts to elicit the information he needs:

> What about the lighting and layout of the museum? Was there a set path? Were you guided along … or could you move around freely and revisit other exhibits?...Can I ask a few questions..... Only basic answers needed of course!...

9.4.2 Power and Resistance

Stewarding is therefore evident in the discussions of each group. Each group creates its own distinctive constellation of informational resources, tools, questions, and other 'study-related artefacts'. But this does not happen against an inert background, nor in some kind of ideal way. Students' practices are not emerging in isolation, but from a nexus (cf. Hui et al. 2017) where various flows of information and power intersect. The most direct of these flows is that by which the tutor's authority influences the emerging practices, particularly due to the three discussion activities being assessed (collectively accounting for one-third of the overall unit grade). Student 3, in interview, explicitly acknowledged this influence:

> There were many times I didn't want to contribute to the discussion but I knew I had to do it. In fact I had a talk with another person yesterday who asked if the discussions had not been marked would you have contributed? I don't feel I would have contributed as much, if I didn't feel it would have impacted my grades I would speak but not as much.

However, a Foucaultian view of power sees it as not only wielded from above, by dominant interests in a setting against subordinate ones, but as something which emerges at the micro level, from discursive interactions. Kendall and Wickham sum up Foucault's view of power well (1999, 50–51):

> Power… is not essentially repressive; it is not possessed, but is practised. Power is not the prerogative of 'masters' but passes through every force. We should think of power not as an attribute (and ask, 'what is it?') but as an exercise (and ask, 'how does it work?')…. In addition, forces have a capacity for resistance, such that power is only exercised in relation to a resistance, each force having the power to affect and be affected by other forces… Resistance, then, is not a source of despair or celebration. The task of analysts… is to describe the way in which resistance operates as a part of power….

There is an essential *visibility* of the practices that emerge on the boards. At first sight, this seems to support a view of the boards as a 'panopticon', a tool for surveillance and continuous discipline (Foucault 1977). Brookfield (2005, 135–6) describes how '[c]ompulsory visibility… a relation of surveillance…is inscribed at the heart of teaching… as a mechanism that is inherent to it and which increases its efficiency'. Students *self*-discipline by trying to display practices that are those they believe the tutor expects and will thus reward with higher grades. Moreover, they will discipline other students in the group. Student 3 continued in her interview:

> There was another girl who was not very active so me and [Student L] were trying to get her to speak so if she didn't appear on [course VLE] we had to find a way to speak with her. So we started a discussion on Facebook and said 'look this is what's going on'. Whatever we discussed with her we posted to the discussion board. *There were a lot of times when we told to log on and speak and write something because we were all marked. (*our emphasis).

There are two important things occurring here. Firstly, this is not a direct imposition of power, but a *construct*: the actual operations of power are constructed and negotiated by the students themselves, just as much as the other (informational) practices which are in play here. The tutor only occasionally makes posts that direct students to contribute more, or in certain ways, even in the first activity; more common is that he and the TA provide 'hooks' (see previous section) that help link the ideas of one group member with another (e.g. 'A, what do you think of B's idea here?'). But by the third activity the tutor completely withdraws from the discussion. Any perception of his ability to intervene and direct the discussion must therefore be based on a kind of residual presence, indirectly expressed through texts such as the parameters of the set activity, the marking rubric, and the formative feedback given after the first two activities. Secondly, the visibility of the contributions to the emerging practice, as well as just providing useful data for judgments about the students' grades (and, indeed, viable data for SPIDER), allows *the members of the community* to scrutinise their own emerging practice. And it is in the new practices that enter the CoP that resistance arises in relation to the pedagogical and institutional power in this setting.

Both these are illustrated when students introduce new artefacts into the digital habitat that are a perceived improvement over the Blackboard discussion boards and engage in stewarding in an explicit way (cf. Wenger et al. 2009, 26–7). From student 4's interview:

> Our own *VLE proved to be tricky sometimes*... I valued that, as a team, we made use of different ways to communicate, group our ideas and give shape to our preliminary decision and strategy. Gmail, Facebook, Google Drive, and the chat room helped us explore the use of social media and Web 2.0 *tools to better communicate and write collaboratively*. (our emphasis).

A detailed example of this comes from the [15/White] group. Having experienced the boards in activity 1, the group, prompted by student J, reconfigures their information landscape by introducing a wiki to help them manage the more complex activity 2. This from J:

> I have created a wiki page for us, how would you all feel about using that to share all our ideas etc.? It would make information easier to summarise too I think.

J goes on to mentioning the practices around the wiki, the division of labour that the group has agreed on, and another technological resource they filter in, a videoconference:

> To ease the number of threads perhaps after the wiki has been edited by all (answering the questions posed to us…) we could try to summarise/do our own parts… then post them to the bottom of the wiki so we can all read what will be posted for the group? We can then use the adobe connect session to make sure we are all in agreement? How does that sound?

The group complete activity 2 with the use of these tools. A few weeks later at the beginning of the third activity, J suggests setting up a wiki again. C supports this suggestion immediately, saying [15/White/3] 'Not only do you like a good wiki…. We all like a good wiki now!'; showing how J's selection and integration of a new technological resource has been validated by members of the group and led to changes in group information practice.

Yet self-discipline, based on the *perceived* and *indirect* surveillance of the tutor, is once again generated by concerns that this will damage the group's instrumental goals (successful completion of the task, but in ways validated by the marking rubric). Prompted by a reminder about the activity parameters from a fellow student (not the tutor or TA, note), J worries that the wiki posts will not 'count' in assessment:

> I'm sorry, feel a bit guilty that I lead us down the wiki path without realising the fruits of our labour would not be seen but at the same time I feel it made the discussion a lot more effective that the threads would have done!

The following day she reposts the wiki content onto the board, as different posts attributed to their authors, even though this somewhat defeats the object of using a wiki (collective creation of a text); she does it because as grades are given for individual work, she seeks to ensure different posters achieve their individual outcomes. Thus, in the end, she configures not only her individual information practice, but also the other individual practices (contributions) of the members, to conform to what are perceived as the demands of the grading system, so that the group can *collectively* benefit.

Note, though, that these posts are transferred into the assessed discussion from a space (the wiki) that is free of direct tutor surveillance. Members of this learning network thereby develop 'opportunities to participate in both private and public forums simultaneously', even if there cannot be said to be a true 'plurality of competing publics' in this space (Hodgson and Reynolds 2005, 18 via Fraser 1992). Thus, this case epitomises the way that power within this environment is innately bound up with resistance. These new practices—creating different spaces in which to coordinate work—were developed independently and, on the surface, counterposed to those mandated by the tutor, viewed by the group as beneficial to *both* the instrumental and communicative outcomes of the task. Through this act of resistance, a new resource is introduced, validated by other members, and the habitat evolves.

9.4.3 The Emergence of Stratification

If the approach to networked learning design in this case is, as noted in this chapter's introduction, one that affords a more democratic pedagogy, then it needs to affirm the importance of difference and diversity (Hodgson and Reynolds 2005, 19). Difference is a learning opportunity, but can also fuel power relations, stratification, and hierarchies. Command structures can emerge within communities, and at times, some members become 'marginalised in order that the integrity of the community is preserved' (ibid, 16). In an earlier publication based on the SPIDER project

(Webster and Whitworth 2017), we affirmed the value of alterity, or 'outsideness' to the learning taking place within these groups and the broader network and noted how the presence of distance learners in the setting was the source of this quality. But does stratification open up within the groups along fractures other than the distance/on-campus split? Rather than difference and alterity, is 'normocentricity', as Hodgson and Reynolds term it (2005, 16), what is being rewarded by the marking scheme and, hence, the dominant discourse within this setting?

The starter digital habitat is the same for all, but that does not mean each student interacts with it in the same way, within or across groups. Variation occurs due to differences in learners' personalities; command of English; professional, technological, or prior managerial experience; and so on. As the set tasks increase in complexity over the series, for the groups to complete them in ways that meet their instrumental goals (a good grade, on time), they need to establish divisions of labour. In the guidance given by the tutor, Laurillard (2002, p. 155) is cited to suggest that among the different roles that can come into play here are those of summariser, moderator, or source checker. The value of these roles is something the group learns through engaging with the activity. But this is also an aspect of the work that introduces elements of stratification into the 'starter' habitats.

Take this post from student G [16/Diamond/3] who alludes to the role played by A in the previous activity:

> I do feel like we are at least going to need a leader (someone who is going to guide us, tell us to move on, make a decision etc.). Last time [A] did an amazing job at leading us so I think we should give her a break this time. Unless [A] you really want to lead us to victory again. It's up to you really.

A replies:

> I agree I think it's helpful to have a leader for the discussion task. I'm happy to let someone else have a go this time around! I think it may also be helpful to have a summariser we wrote a lot last time and it was really helpful to have someone drawing all those ideas together so we didn't need to search through masses of posts when referring back. I'd be happy to have a go at this role, unless anyone is really keen to have a go. In terms of the other roles, I think we're starting to become more selfregulating as a group, so I'm not sure they're necessary i.e. we're all pretty good at backing up our points with literature, drawing others into the conversation and generally moderating the discussion.

A credits the group as a whole with good information practice (e.g. 'backing up our points with literature'). But she and G both also recognise the instrumental and the communicative benefits of establishing divisions of labour within the group and propose that they take on particular roles here. Thus, they are suggesting a reconfiguration of the group's habitat, the information flows, and practices therein.

Reaching a consensus within the groups is not something that happens spontaneously or just because it is called for by the parameters of the task. Just as students introduce resources such as websites, photographs, and technologies to help build digital habitats, these *roles* are themselves part of the 'constellation' of resources that the group brings to bear to complete the task. This introduces an unevenness into the distribution of authority within the group, as observed by student 2 in their interview:

> There were some occasions, however, when I felt that we were not going anywhere… I have been a manager before, and making these sorts of difficult decisions is part of being a manager. *That's why I felt the need to take the lead sometimes* and make certain decisions for the team. (our emphasis).

Here, then, is where we can see the outcomes of the group work as including not just emergent practices, but an emergent hierarchy—stratification and difference within the group that *did not exist* prior to the start of the series of tasks.

Finally, note that groups are fixed in membership. Although in one case in 2016–2017, the tutor moved a student (with his permission) from one group to another to rebalance numbers after another student left the course, normally students stay in the same group throughout. Hodgson and Reynolds' claims (2005, 11) regarding the benefits of networked learning for democratic opinion formation are not manifest here because there seems no easy 'exit' for students who for whatever reason may be dissatisfied with a group and its discourse and no facility for splinter groups to form. The assessment tasks are a locus of power and hierarchy in this setting and the discussion boards, the locus of surveillance.

However, 'hidden transcripts' (Scott 1990) can still be distributed beyond the purview of the tutor, through the spaces and channels that students set up beyond the formal bounds of the course environment, that is, the VLE. Dialogues occurring outside the boards provided support and content for these 'mission-critical' boards, but were not accessible to the tutor except where groups decided to transcribe certain utterances into them. Note that this was also true of our research methodology, which (as with any other such project) has 'bounded' the field of study around the same artefacts, the discussion boards. Beyond these we have seen only what we have been permitted to see by the students, in this case through the interviews.

9.5 Conclusion

As noted earlier, the differences and diversity within these groups offer not only learning opportunities, but also fuel stratification. Consequently, these groups should not be idealised as democratic decision-making fora. The constraints imposed by a marking rubric and deadline, and the lack of an 'exit' option for students, are very apparent and result in a level of 'normocentricity' in group interactions. Dissensus within groups is not suppressed, but it is kept within private spaces. It is not the case that 'everything' in the group happens as if the actors' only motivation was to complete the task (cf. Hodgson and Reynolds 2005, 20, via Sauvagnac and Falzon 1996, 251). But there is a substantive focus on completing the task on time and on marshalling the group's constellation of resources—its digital habitat—to do so in a way that the students believe will result in the most desirable outcome.

Nevertheless, these factors do not devalue the worth of the groups as social sites in which group members can learn stewarding practice. As Gherardi et al. (1998. 278) state, CoPs are not characterised, at least in any defining way, by a 'consensual dimension, or [a] sense of harmony or closeness…'—rather, they are creations that

'support the carrying out and perpetuation of a practice'. All groups show clear evidence of stewarding in the sense of configuring a constellation of resources. Although, at times, more experienced or confident group members engage in the educational aspects of stewarding, taking the lead when it comes to 'selection and installation' of new resources (Wenger et al. 2009, 26) and 'adoption and transition' (ibid, 27), this is not a simple transfer of knowledge from stewards to colleagues. Rather, we see evidence of a more emergent form of knowledge, a distribution of cognition among the group members (Parchoma 2018) that is exemplified by, and embedded within, the materiality of the digital habitats they are building and how the specific configuration thereof is adjusted, and, when necessary, re-validated, by the group as their tasks unfold. The informational environment, though at first reflecting the power of the tutor and institution—and then, at times, the authority of more experienced group members—evolves in response to the students' collective learning and the ways they assert resistance to the tutors' power, for example, by introducing tools for discussion which are private and not available to be scrutinised by the tutor (as in the case of 15/White's wiki, for instance). The emergence of new practices within each digital habitat involve group members drawing on the power that flows around the setting. Thereby, new practices and *new knowledge* emerge.

Power and knowledge are *not* the same thing in Foucault's worldview: to think they are is a 'vulgar reading' of his work (Kendall and Wickham 1999, p.55). 'Power is non-stratified, local, unstable and flexible; knowledge is stratified, stable and segmented' (*ibid*). The power that has been invested in this setting through the pedagogical design of its information landscape by the tutor is simultaneously resisted by the group; it is this resistance that then contributes to the formation of knowledge and, consequently, practices. Whenever a student makes a suggestion, such as the use of a wiki instead of the discussion boards (a move in dialogue) and that is validated and built on by others, a new practice potentially emerges within the group—and with it, stratification.

This must not be seen as an undesirable outcome of the pedagogical design. Indeed, it is central to exploiting the value of *difference* in the groups and giving students material for reflection, an understanding of how stewards work at the boundary zones, bringing in new (different) practices from other contexts and, through dialogue, reaching agreement on how to shape the digital habitat of the community. These learners are developing a sense of the *value* of stratification to the development of information practices in communities of practice they will go on to *subsequently* join. The grading of assignments is thus not incompatible with learners' developing authority over their information practices (Whitworth 2014). This encounter with institutional practices is a generator of power in the Foucaultian sense: something that can later be used for personal, professional, and social change and the professional and effective management of the digital habitats used in networked learning more widely.

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References

D. Ayling, E. Flagg, Getting Stuck in: Learners Participation in an Online Community of Practice. New Zealand Association for Cooperative Education 2012 Conference Proceedings, pp. 31–37, 2012

S. Brookfield, *The Power of Critical Theory for Adult Learning and Teaching* (Open University Press, Maidenhead, 2005)

A. Davidson, I. Gulka, A. Valle, C. Castonguay, Technology stewarding as a medium to develop and sustain niche online communities, in *Educational, Psychological, and Behavioral Considerations in Niche Online Communities*, ed. by V. Venkatesh, J. Wallin, C. Castro, E. Lewis, (IGI Global, Hershey, 2014), pp. 228–247

N.B. Dohn, Web 2.0: Inherent tensions and evident challenges for education. Int. J. Comput.-Support. Collab. Learn. **4**, 343–363 (2009)

D.A. Druckenmiller, D. Mittleman, A Design Theory for Digital Habitats: Building Virtual Communities of Practice. *48th Hawaii International Conference on System Sciences* (2015), https://doi.org/10.1109/HICSS.2015.75

M. Foucault, *Discipline and Punish: The Birth of the Prison* (Penguin, London, 1977)

N. Fraser, Rethinking the public sphere: a contribution to the critique of actually existing democracy, in *Habermas and the Public Sphere*, ed. by C. Calhoun, (MIT Press, Cambridge, MA, 1992), pp. 109–142

J. Gastil, *Democracy in Small Groups: Participation, Decision Making and Communication* (New Society, Philadelphia, 1993)

S. Gherardi, D. Nicolini, F. Odella, Toward a social understanding of how people learn in organizations: the notion of situated curriculum. Manag. Learn. **29**(3), 273–297 (1998)

M.R. Gibbs, G. Wadley, S. Ng, Using 'Simple' Technology to Support Geographically Distributed Communities of Practice. IEEE 2012 Conference on Technology and Society in Asia, 2012

J. Gillen, D. Barton, *Digital Literacies: A research Briefing by the Technology Enhanced Learning Phase of the Teaching and Learning Research Programme* (London Knowledge Lab, London, 2010). http://www.tlrp.org/docs/DigitalLiteracies.pdf

P. Goodyear, L. Carvalho, N.B. Dohn, Artefacts and activities in the analysis of learning networks, in *Research, Boundaries and Policy in Networked Learning*, ed. by T. Ryberg, C. Sinclair, S. Bayne, M. de Laat, (Springer, New York, 2016), pp. 93–110

L. Gourlay, M. Oliver, It's not all about the learner: reframing students' digital literacy as sociomaterial practice, in *Research, Boundaries and Policy in Networked Learning*, ed. by T. Ryberg, C. Sinclair, S. Bayne, M. de Laat, (Springer, New York, 2016), pp. 77–92

J. Habermas, *The Theory of Communicative Action*, Reason and the Rationalization of Society, vol 1 (Heinemann, London, 1984)

V. Hodgson, M. Reynolds, Consensus, difference and 'multiple communities' in networked learning. Stud. High. Educ. **30**(1), 11–24 (2005). https://doi.org/10.1080/0307507052000307768

A. Hui, T. Schatzki, E. Shove, *The Nexus of Practices: Connections, Constellations, Practitioners* (Routledge, London, 2017)

G. Kendall, G. Wickham, *Using Foucault's Methods* (Sage, London, 1999)

D. Laurillard, *Rethinking University Teaching*, 2nd edn. (Routledge, London, 2002)

R. Luckin, *Redesigning Learning Contexts* (Routledge, London, 2010)

G. Parchoma, Traces of cognition as a distributed phenomenon in networked learning, in *Networked Learning: Reflections and Challenges*, ed. by N. B. Dohn, S. Cranmer, J. Sime, M. de Laat, T. Ryberg, (Springer, New York, 2018), pp. 23–38

L. Perriton, M. Reynolds, 'Here be dragons': approaching difficult group issues in networked learning, in *The Design, Experience and Practice of Networked Learning*, ed. by V. Hodgson, M. de Laat, D. McConnell, T. Ryberg, (Springer, New York, 2014), pp. 109–126

C. Rossitto, C. Bogdan, K. Severinson-Eklundh, Understanding constellations of technologies in use in a collaborative nomadic setting. Comput. Supported Coop. Work **23**, 137–161 (2014)

C. Sauvagnac, P. Falzon, Collaboration and underlying issues or the surprises of cooperative dialogues. Comput. Supported Coop. Work **5**, 251–266 (1996)
J.C. Scott, *Domination and the Arts of Resistance* (Yale University Press, New Haven, CT, 1990)
S. Timmis, G. Williams, Transitioning across networked, workplace and educational boundaries: Shifting identities and chronotopic movements, in *Research, Boundaries and Policy in Networked Learning*, ed. by T. Ryberg, C. Sinclair, S. Bayne, M. de Laat, (Springer, New York, 2016), pp. 111–124
L. Webster, A. Whitworth, Distance learning and alterity: facilitating the experience of variation and professional information practice. J. Inf. Lit. **11** (2017). https://doi.org/10.11645/11.2.2231
E. Wenger, N. White, J. Smith, *Digital Habitats: Stewarding Technology for Communities* (Portland, CPSquare, 2009)
A. Whitworth, *Radical Information Literacy: Reclaiming the political heart of the IL movement* (Chandos, Oxford, 2014)

Chapter 10
Boundary Practices and the Use of Boundary Objects in Collaborative Networked Learning

Marianne Riis and Lone Dirckinck-Holmfeld

10.1 Introduction

All learning involves boundaries, and in networked learning where information and communications technology (ICT) is used to promote connections, action, and interaction, discussions on boundaries and boundary practices are always prevalent (Ryberg and Sinclair 2016). In general, learning and collaborating at the boundaries is complex due to lack of shared vocabulary, habits, routines, worldview, etc. (Dirckinck-Holmfeld 2006), and in ICT-mediated contexts technology itself adds to the complexity due to decontextualization (Gourlay and Oliver 2016) and changing space-time configurations (Timmis and Williams 2016).

In practice studies, the concept of boundary objects has been proposed as a way of talking about certain objects that mediate knowledge, actions, and relations in and between practices (Carlile 2002, 2004; Wenger 1998; Star and Griesemer 1989). As seen from a social learning perspective (Wenger-Trayner et al. 2017), the challenge in networked learning is to create possibilities for learners to participate in meaningful ways while transcending different types of boundaries by way of using boundary objects to mediate the ongoing negotiation of meaning, identity, learning, and knowledgeability in communities of practice. Following Wenger-Trayner this paper researches into how students use boundary objects to facilitate collaborative networked learning with a focus on how the materiality of the boundary object, the pedagogical design, and the discursive practices afford engagement, imagination, and alignment.

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10.2 Method and Context of the Study

In this paper, we use findings from two different studies (Dirckinck-Holmfeld 2006; Riis 2016) conducted at the Danish master programme for professionals on ICT and learning (MIL). The MIL programme is inspired by the concept of communities of practice and founded on the principles of problem- and project-based learning. Students are not only distributed in time and space, but as MIL is a mutual and equal collaboration between four Danish universities—Aalborg University, Aarhus University, Copenhagen Business School, and Roskilde University—also faculty and the administrative secretary are distributed across time-space and institutional boundaries (Dirckinck-Holmfeld 2006; Dirckinck-Homfeld 2002; Fibiger et al. 2005). Essential for MIL is the use of a virtual learning environment (VLE) and additional digital technologies to mediate the participation and activities. Since the program's establishment in 2000, the use of these technologies as infrastructure, tools, and analytical objects has changed in line with the general technology development (Riis 2016).

10.2.1 MIL as Context for Studying Boundary Practices and Boundary Objects

As a context for studying boundary practices and boundary objects MIL is exemplary.

The basic principles of MIL's learning environment are based on problem-based learning, dialogue, collaboration, and learning in communities of practice, not only between students, but also in its setup with teachers and the secretary. This makes MIL an exemplary empirical setting for studying cross-boundary work. Further, as the program was established in 2000, it is a mature case environment. Finally, as a primarily virtual environment mediated by a digital learning platform, MIL provides a rich opportunity for doing virtual ethnography and enables a closer look into the traces of the student activities and dialogues as well as provides a shared environment for students and teachers to work closely together to explore new educational tools and settings. Hence, we expect that by using MIL as the empirical base for exploring and theorizing on boundary objects and boundary practices, we can provide new detailed insights in these processes.

The paper builds on two case studies as point of departure for the further exploration of boundary objects in boundary practices. The first study (study I) took place in 2003–2004 (Dirckinck-Holmfeld 2006) and explored the role of boundary objects used by MIL students to coordinate, collaborate on, and challenge their construction of knowledge and meaning. The virtual learning environment in MIL at that time was supported by a system called Virtual U, which was a 2D asynchronous learning

environment. The formal learning activities and the students' communication and collaboration took place as primarily asynchronous discussions in for a supported by four physical seminars and a shared examination day.

The other study (study II) took place from 2007 to 2011 (Riis 2016) and was especially focusing on how the use of avatars mediate the students' collaboration in one of the courses dedicated to the exploration of 3D learning environments. The course predominantly took place in a 3D learning environment called Second Life. For students and teachers to enter the 3D learning environment, they had to use an avatar. In the course, the use of the avatar was a shared phenomenon of study for the students as well as the researcher and teacher.

10.2.2 Methods

We are not doing a comparative study; however, we use the two studies to throw light on certain aspects of boundary objects and boundary crossing work in two different digital contexts. In a Danish setting the two case studies illustrate the historical opportunities for mainstreaming teaching and learning in virtual environments. The aim is to come closer to an understanding of how different boundary objects support teaching and learning and to throw light on the material aspects of boundary objects. Both cases are based on an explorative approach and inspired by virtual ethnography. Study I had a more traditional design looking into the practice of a course group in a shorter time span, whereas study II was organized as an action learning project exploring Second Life as part of a PhD project.

Traditional ethnography and virtual ethnography share an anthropological past; however, virtual ethnography transcends the traditional grounded research in several ways. One of them is about the site to study. In a traditional anthropological case, the researcher will engage in long-term, face-to-face fieldwork in one *geographic* site, while virtual ethnography includes different types of sites. Hine (2015) describes this as a multisited form of research that may span spatial and temporal boundaries online, offline, or as a combination of the two. Hine (ibid.) further explains that as field sites increasingly become networks, virtual worlds, and a combination of virtual and physical spaces, it raises new questions on what a "space" is, how to engage in observations, how to select a field site, and how to follow up with interviews and interventions (online and offline). As participants in digital environments leave digital traces, such as posts in the communication fora they use, and what, when, and with whom they communicate, this gives the researchers new ways to get insights into the black box of, e.g., a group learning environment. The virtual nature of the learning environment expands the opportunities for the researcher to participate in real time as well as to recall the communication and the activities, which have taken place.

10.3 Study I (2003–2004): Studying 2D Boundary Objects in Problem-Oriented Project Pedagogy

MIL provides a very rich set of data for exploring how collaboration takes place in a digital asynchronous learning environment. MIL is a "multisited" space, crossing spatial and temporal as well as physical and digital boundaries. In Virtual U (at that time), there were a little less than 300 asynchronous, 2D fora per year, which contained almost all of the interaction among the participants in the virtual periods (2-year groups of 50 students).

In study I, we are looking closer into one course group of five students (four men and a woman). The work took place as the first assignment the students had to do together. The course was dealing with cognition and values and was part of a module on human-computer interaction (HCI). The group worked together for 8 days, and they had to produce a shared, written project report within that period and deliver it for assessment.

10.3.1 Collecting and Analyzing Data

The data was collected based on a selection of the MIL fora, which were used by the group (five fora overall). The selection of the group and the fora was done by one of the authors based on purposive sampling. The selected group was the most active using the fora. As most of the teaching, collaboration, and learning activities took place in Virtual U, traces of these activities were accessible to the researcher. The analysis of the data was based on the students' fora.

First, all the fora of the course group were read in order to get an immediate insight into the collaboration process and to explore the boundary objects being used. The fora were read one by one. The mode for the readings was: all messages sorted by date—focusing on breakdowns/successes in the group work and identifying possible boundary objects. Based on the reading—and controlling search in the material—a draft "rich picture" (Fjuk 1998) of the process and the use of boundary objects was constructed. In the first iteration, one rich picture with all the activities was constructed. Based on the first reading, a simple coding system was constructed in order to identify and clarify categories of boundary objects (see Table 10.1). This coding system was inspired by the boundary object types suggested by Star and Griesemer (1989) and focused on object repositories, standards (self-regulated and MIL/teacher-regulated), products (ideal types), and communication tools.

This system was used in a second reading of the materials in order to clarify details and a revision of the rich picture took place, and three rich pictures were elaborated presenting all the used boundary objects, the problem formulation phase, and the finalizing project phase. Finally, a "thick description" (Geertz 1973) was written up around the data. The "thick description" had two narrator perspectives, which were interchanging, one of the students and one of the researchers.

Table 10.1 coding system to identify boundary objects

Coding system for boundary objects
Self-regulated standards: S1 = group collaboration agreement, S2 = group calendar, S3 = rules for communication, C4 = formative work evaluation criteria, C5 = scientific work methods, C6 = mail and telephone list, C7 = rules for referencing
MIL/teacher guidelines: G1 = assignment text, G2 = tutoring, G3 = teacher comments, G4 = evaluation criteria, G5 = teacher notes, G6 = technical help, G7 = inspiration from seminar *Products:* P1 = problem formulation, P2 = project outline, P3 = parts of project P4 = draft project, P5 = final project, P6 = list of references, P7 = layout, P8 = chat documents
Object repository: R1 = tutor conferences, R2 = teachers' conference, R3 = literature course 2, R4 = literature course 1, R5: World Wide Web, R6 = workplace, R7 = other MIL conferences
Communication tools: C1 = VUK3, 1–7; C2 = Messenger, C3 = VU Chat, C4 = video conference, C5 = telephone, C5 = face2face

Names were used to make the story livelier but did not represent the participants. The "thick description" and the figures were sent to the participants for discussions, clarification, and further elaboration.

10.4 Study II (2010–2011): Studying 3D Boundary Objects in Problem-Oriented Project Pedagogy

Study II was based on research-led action research, AR (McKay and Marshall 2001), which is characterized by a research interest that precedes and possibly initiates the search for the occurrence of a real-life problem (Riis 2016). The project was organized through four AR cycles with different MIL students—each of the cycles investigating both research issues and problem-solving interests.

This paper draws especially on the insights from the fourth AR research cycle, which was conducted in the winter 2010/2011, and the research interest was to further the study of Second Life as a VLE, different activities, and a synchronous assessment method. Furthermore, there was a specific interest in changing the overall communication mode from asynchronous to synchronous by making Second Life a learning objective in itself (Riis 2016 p. 204). In particular, the students' use of avatars and their experiences and reflections were a shared focus for the teaching and learning experiment.

The virtual and participating ethnography took place in an elective course module, which ran for 8 weeks. The study was a multisited study as the study activities were situated in four different locations: at a face-to-face the seminar, at the students' workplaces, in the students' private settings, and as inworld activities that took place between 8 and 10 PM, except for Fridays and Sundays between 3 and 5 PM.

Ten MIL students participated in this fourth cycle; however, one student fell ill and was therefore not included in the data. All participants came from the educational sector. The students were a combination of first- and second-year MIL

students, meaning that the teacher could not expect the same theoretical background knowledge. All, but one participant, were considered to match the profile of being relatively tech-confident; however, only two of the students were familiar with Second Life before entering the course. The virtual learning environment was a combination of First Class and Second Life, with the latter being in focus in this paper.

The author characterized her positionality in the project as being that of "insider in collaboration with other insiders" (Herr and Anderson 2005 cited in Riis 2016 p. 89.) having deep insights into the practice of MIL—both as a former student of MIL, a PhD student in relation to MIL, and as a teacher in MIL. To support the research, the author generated a data archive (Rapley 2007) collecting a large corpus of materials of texts, screen dumps, pictures, etc. The analytical approach was content analysis inspired by grounded theory (Riis 2016).

10.4.1 Theoretical Background

At the MIL programme, arguments for collaborative networked learning have primarily been based on a sociocultural perspective on learning, with the ideas of Lave and Wenger (1991), Wenger (2010, 1998), and Wenger-Trayner and Wenger-Trayner (2015) on situated, social learning as main inspiration. At the ontological level, sociocultural theories suggest that learning is constructed, social, situated, mediated, distributed, and a matter of coming to be (Riis 2016). At the pedagogical design level, the teaching and learning processes are realized through the inherent need for collaboration in problem-oriented project pedagogy (Dirckinck-Homfeld 2002). In problem-oriented project pedagogy learning, the starting point is directed by the students' interests, and the students define and "own" the problems derived from their different professional "landscapes of practice" (Dirckinck-Holmfeld et al. 2009). According to Wenger-Trayner and Wenger-Trayner (2015), the "body of knowledge" of any given profession is best understood as:

> [a] landscape of practice' consisting of a complex system of communities of practice and the boundaries between them. (ibid., p. 13)

Further, such a landscape of practice forms "a complex texture of distinction and association, possibilities and impossibilities, opening and closing, limits and latitude, gates and entries, participation and non-participation" (Wenger 1998, p. 121). As seen above, the design of the learning infrastructure at MIL is supported by ICT as a way of connecting and creating interdependencies between the participants and their different landscapes of practice, in line with the tradition of networked learning (Dirckinck-Holmfeld 2016).

10.4.2 Knowledgeability and Modes of Identification in Landscapes of Practice

Knowledgeability has been put forward as a way of describing the body of knowledge and complex relations that people build and maintain between intersecting practices, and the formation of identity is modulated in and across the boundaries of such practices through different modes of identification[1] (Wenger-Trayner and Wenger-Trayner 2015; Wenger 1998). In a landscape of practice, knowledgeability is shaped by the participants' personal and communal, intersecting trajectories of learning. Therefore, a learning trajectory in a social landscape is not merely a matter of knowledge acquisition, but of coming to be. The participants inhabit the landscape with different identities that over time shape the "accumulated memories, competencies, key performative events, stories and relationships to people and places" (Wenger-Trayner and Wenger-Trayner 2015, p. 19). In return, the landscape shapes the participants' identities through different modes of identification or dis-identification:

- *Engagement*—a way of talking about participants' active involvement in mutual processes of negotiation of meaning
- *Imagination*—a way of talking about participants' creation of images of the world and seeing connections through time and space
- *Alignment*—a way of talking about participants' coordination of energy and activities to fit within broader structures and contributions to broader enterprises (Wenger 1998)

All three modes of identification are ways to make sense of the landscape through positioning, and the relationships of either identification or dis-identification function both within and across the boundaries of the landscape. In our study, these modes are detectable in both MIL cases, albeit to varying degrees and mediated by different boundary objects.

10.4.3 Boundaries and Boundary Objects in Learning

The concept of boundary practice has been studied in various research domains where it has been used to describe a wide variety of phenomena, including professional identity, symbolic capital, politics, and knowledge sharing in and between intersecting practices (Lindberg et al. 2017; Lee 2007; Wenger 1998).

Based on an extensive review of boundary research within the educational field, Akkerman and Bakker (2011) defined a boundary as any *sociocultural difference* leading to discontinuity in action or interaction. In educational research, boundaries are typically identified in and between domains, practices, and contexts. However,

[1] The modes were called "modes of belonging" in Wenger (1998).

as stated by Akkerman and Bakker (2011, p. 22), "a boundary is not a static and predefined distinction," rather boundaries are experienced subjectively and contextually. Experienced boundaries can easily remain implicit during interactions, and the learning potential or opportunity is only realized when people identify boundaries through dialogical and collaborative engagement and negotiation. Furthermore, the authors found that the research interest in boundaries over the past decades has been linked to an attempt to reconceptualize the notion of (knowledge) transfer based on an appreciation of differences and diversity as potentials for learning (ibid.). In fact, as Wenger-Trayner et al. (2017) argue, boundaries should be regarded as learning assets, and when designing for learning, "the principle is to systematically make boundaries a learning focus" (p. 18).

When boundaries become a focal point of a design for learning, boundary objects come into play. Star and Griesemer (1989) introduced the concept of boundary object to describe an object that serves to mediate several intersecting social worlds while simultaneously satisfying the informational requirements of each of them. Originally, Star and Griesemer (1989, p. 410–411) proposed four categories of boundary objects (repositories, ideal types, coincident boundaries, and standardized forms), and Carlile (2002, 2004) further extended the notion of "effective" boundary objects into a hierarchical classification based on three levels of knowledge boundaries:

- A syntactic boundary, which potentially leads to *transfer of knowledge* through the use of representation objects (e.g., repositories)
- A semantic boundary, which potentially leads to *translation of knowledge* through the use of learning objects (e.g., standardized forms and methods)
- A pragmatic boundary, which potentially leads to *transforming knowledge* through the use of transformation objects (e.g., models and maps)

10.5 Boundary Objects in a 2D VLE (Study I)

In the first study, Dirckinck-Holmfeld (2006) explored how boundary objects serve as resources to support students' collaboration and learning in a networked learning arena organized as problem- and project-based learning, the MIL programme. Based on a case study of a course group's work, the study identified four different types of boundary objects, which the groups were using to support their work:

- Group products
- Ideal types of frameworks, concepts, models
- Standards and guidelines
- Communication infrastructure (ibid. p. 2)

These types of boundary objects share similarities with the proposal from Star and Griesemer (1989); however, the study also identify new objects, which served the course groups in their ongoing process of negotiation of meaning, knowledgeability, learning, and identity.

Among these objects, the study found that the *group products* were most important as a boundary object with the problem formulation and the outline as the most challenging, but also the ones promoting boundary crossing and horizontal learning opportunities. In the process of problem formulation and making the outline of the project, different kinds of learning and collaboration took place: (1) Learning about (assimilating knowledge): sharing experience from practice, introducing new theories, concepts, methods, and worldviews. (2) Transforming knowledge (accommodating knowledge): students transform their knowledge base struggling with the new concepts, references and frameworks and get novel insights about meaning, relations, application, and design. This process is both an individual and a group process. The individual student is struggling with the different kinds of input, while the process is pushed forward by their shared responsibility for the group work. Furthermore, the peers use the group as a community of practice, "thinking aloud," updating each other on new insights, and sharing references on literature, tools, exiting innovation projects, etc.

Using Wenger's framework (1998), the product becomes the shared enterprise of the group and the nexus for negotiation of perspectives. Especially the problem formulation phase, where the group of students has to develop a shared problem statement and research questions, afforded the enactment of students' experiences and different practices. The other phases of the course group work, writing the different parts of the assignment and finalizing the assignment, also facilitated boundary crossing. However, this kind of learning is of a consolidating character, mixed up with pragmatic reactions to the situation. In this phase, the goal became to submit the assignment on time and to pass.

Writing up a shared course project acted in the MIL context as a transformative boundary object for the group of students coming from different sectoral backgrounds. *Ideal types* such as theories, models, and concepts further supported the establishment of a shared repertoire among the students and functioned as a shared boundary object, where the students tried out their interpretations and reflections not only as a theoretical discussion, however, linking to their different experiences from practice. *Standards and guidelines*, such as the group agreement, the calendar, and the communication rules, supported the students in doing the work, and finally the *communication infrastructure* in Virtual U, such as the discussion fora, the layout and pedagogical design of the course template, and the Messenger unit (Virtual-U chat), was instrumental for the collaboration to take place.

Based on her study of MIL students' collaborative learning in the 2D arena, Dirckinck-Holmfeld (2006) found that all categories of boundary objects can mediate knowledge on different levels, and "what determines the 'efficiency' of a boundary object is *relational* to the situation, and to the objectives" (ibid, p. 7), thus adding to Carlile's (2004) relational understanding of knowledge and power.

When a boundary object supports the collaborative process on the routine level, it functions at the syntactic level and the participants share the syntax; however, when there is a breakdown, the participants will have to go to the level of semantics or pragmatics in order to "repair" the knowledge boundary. As the focus in problem- and project-based learning is on transformative learning (and paradigmatic changes in worldviews), it is vital that the students use the boundary objects that are in focus

in the collaborative learning process, such as the group products and the ideal types to go beyond syntax and semantics, and challenge each other at the pragmatic level.

If we take the standardized forms as an example, i.e., *the group agreement*, it has worked on all levels. When the group constructed the agreement on the seminar, they were working on the semantic and pragmatic level. Some of them for sure had never thought about working together in a virtual universe, and they were negotiating and altering their ideas and experiences for group working to fit this new context. However, when they in the following phase were using the standard they developed, it was used on the syntactic level—or the routine level. Only if there was a breakdown in the group communication, e.g., if the others did not respond because for them no response was "we agree," then because of the different interpretation, they would have to return to the semantic and pragmatic level and renegotiate the group agreement, and the group did so.

The same could be said about their repositories. A repository can be used if the students know the syntax; however; if there is a breakdown, they have to understand the way it is organized and categorized on a semantic level, e.g., how to label the conferences in order for other MIL project groups to use their conferences to find the relevant documents.

We would therefore propose that all three of Carlile's knowledge forms could be seen as related to the different kinds of boundary objects. When a boundary object is supporting the collaborative process on the routine level, it is functioning at the syntactic level; however, when there is a breakdown, then the participants will have to go to the level of semantics or pragmatics in order to "repair" the knowledge boundary. However, we also agree with Carlile that the different kinds of boundary objects do not serve equally important roles in the collaboration process. In a virtual learning environment, standards serve as subsidiaries for the collaboration on the shared product, which are in focus. Consequently, we will suggest a relational view on boundary objects. What determines the "efficiency" of a boundary object is *relational* to the situation and to the objectives. In a shared collaborative learning process and a networked learning environment characterized by strong ties, the construction of the shared product and the problem formulation is the strongest boundary object. However, in the case which Star and Grisemer was referring to, which was a loosed coupled "network of practices," the shared repository was maybe the strongest boundary object in the sense that all groups could contribute to this. Further, more the aim was different. In the MIL learning case, the enacting of transformative knowledge has the highest priority, while in the Star and Grisemer case, the intention was not to transform the knowledge boundary; it was more likely to broaden the knowledge base in the repository. Furthermore, the boundary objects may function at different knowledge levels—from syntactic to pragmatic—but there is a dynamic relation between the different levels. When collaboration is smooth, it acts on the syntactic level (routine level); however, when there is a breakdown, it prerequisites interchanges at the semantic or pragmatic level.

10.6 Boundary Objects in a 3D VLE (Study II)

The second study, which also was conducted at the MIL programme, was based on a multiple case study involving 53 students over a vast period in four consecutive action research cycles and did not initially focus on boundaries and boundary objects (Riis 2016). However, after reviewing and analyzing the data anew, we have identified the same types of boundary objects as in study II. One type of boundary object, namely, the *ideal types of frameworks, concepts, and models* as exemplified in compulsory literature, seemed to function in similar ways. In both studies, the literature represented a domain-practice alignment, meaning that in study I, the literature reflected discursive, online collaboration, whereas the literature in study II focused on embodied, online collaboration. As an example, in study II, the students stressed the possibility of experiencing and performing concepts such as immersion, embodiment, and presence in a grounded manner via their avatars, leading to a deeper understanding and a more critical stance towards the concepts. Our analysis also shows how the three other types of boundary objects—*group products, standards and guidelines, and communication structure*—were present, but differed due to their more manifest materiality.

In study II, the *group products* were also very strong boundary objects. Contrary to the written report in study I, these students had to do an analysis of the 3D virtual world as learning arena, build a reflected example of such learning arena in their designated sandboxes, and finally present their theoretical arguments and demonstrate (with required peer interaction) their environment in synchronous sessions. The manner in which the students were able to reify their collaborative work through material products and embodied processes inworld was underlined as one of the major benefits of this type of learning arena. Further, the performative nature of the presentations was typically enhanced by dressing up the avatars in—for the presentation theme—appropriate clothes and by using props (e.g., wheelchairs when the theme was nurse education). Figure 10.1 illustrates examples of the students' presentations of their group products.

As for *the standards and guidelines* boundary objects, in study II, the students initially struggled with the extra task of getting to know, understand, and practice the distinct 3D virtual world culture, which by all accounts constituted an ontological challenge. In study II, the students spent considerable amounts of time on avatar acclimatization and general enculturation. As well as the students in study I, these students needed to focus on the MIL culture, which seemed to change considerably from what they were used to from previous courses and modules in the MIL programme. The students emphasized the more informal and playful tone concerning interaction with both their peers and the teacher. On the other hand, the students also pointed to the difference in meeting other people/avatars in the learning arena, especially in terms of meeting strangers. In such cases, the students were left quite perplexed until they learned to "crack the cultural code" (ibid., p. 253). Meeting strangers, typically educators from around the world, was also a deliberate design decision throughout the research cycles, and in hindsight, these meetings illustrated exemplary boundary practices.

Fig. 10.1 Students' presentations of group products (Riis 2016)

In study II, one of the most remarkable boundary objects was the *communication infrastructure*. The students were all accustomed to the asynchronous conference discussions, when they first entered the 3D virtual world. In many accounts, the students highlighted the possibility of communicating synchronously and via material objects inworld (the avatar itself included). As found in study I, online students appreciate synchronous communication as a means of quick clarification and consolidation in negotiation processes, and in study II, the synchronous way of teaching and learning was often described as being "emancipating" in comparison to what the students were used to (ibid., p. 219). Besides differences in communication frequency, the students also pointed to another aspect of the communication infrastructure, which has to do with the materiality of the learning arena. The rich possibilities in terms of multimodality, and especially the possibility of visualizing, creating, and performing their processes and products of learning, were generally highly appreciated.

Finally, in study II, we identified a new type of boundary object, the 3D avatar, which turned out to be the most powerful boundary object given that it was through the avatar that the students experienced and participated in the inworld teaching and learning activities. The majority of the students became deeply involved in customizing the avatar in terms of its appearance and adjusting to its behavioral traits and possibilities. Through this boundary practice, the students were often challenged by boundaries between their own personal preferences and the technological affordances, and as such, the avatar represented the materialization of continuous identity struggles, oscillating between playful and carefree learners and goal-oriented and reflected students. In general, the avatar was a highly "effective" boundary object with regards to both collaboration and knowledge sharing.

However, for a few students in this study, the avatar became an impenetrable boundary, an object of obstruction rather than progression, as expressed by this student:

> Whether people want to play with paper dolls or if they have a need to make virtual social relations must be their choice. (Student quote from Riis 2016, p. 264)

For this student, the use of the 3D avatar clearly resulted in dis-identification and no sense of belonging to the community. In summary, our analysis of study II has shown how the different materialities of the boundary objects and consequently the boundary practices as well, as compared to study I, provided the students with new possibilities for knowledge sharing and identity work, but also it invited for a cheerful and experimenting learning environment embodying and promoting new performative actions. However, it also should be noted that not all students wanted to invest themselves in this social experimentation and could not see this as part of an academic learning agenda.

10.6.1 Differences Between the VLEs in Study I and Study II

Table 10.2 describes the dominant features of the two different settings for study I and study II. According to one of the developers, Virtual U was one of the first online, asynchronous environments designed with a specific pedagogical vision and framework in mind (Harasim 2017). The Virtual U focused on "discursive spaces" designed to facilitate collaborative learning and knowledge construction in an educational institution, and it was based on a campus metaphor, e.g., with course templates, conferences (for discussions), and personal workspaces (ibid., p. 127–128). Second Life, on the other hand, was designed as a shared simulated 3D space with no

Table 10.2 Dominant features in two settings for ICT-based networked learning (adapted from Riis 2016)

	The 2D VLE in study I Virtual U	The 3D VLE in study II Second Life
Purpose	Developer-determined • Teach, study	Self-determined • Multipurpose
Environment metaphor	Campus workspace Nonfictional	Mirror or fantasy world Nonfictional/fictional
User representation	2D profile, username (icon) Disembodied Pseudonyms not allowed	3D avatar, avatar name Embodied Pseudonyms are default
Communication modalities	Vision, writing	Audition, vision, proprioception, writing
Dominant interaction frequency	Asynchronous	Synchronous
Content creation	User-created	User-created

predefined purpose in mind other than socializing and promoting the users' freedom "to create their own fictions and communities, imbuing them with meaning through interaction" (Ondrejka 2008, p. 231).

Each learning environment offers many distinct features or affordances that are both functional and relational. As such, the purpose of the different arenas can be challenged. The 2D environment was purposely designed with teaching and learning in mind and was solely used as such. The 3D environment, however, was designed as an open social space in which users could choose to engage in a number of activities. Nonetheless, for the majority of the MIL students, the 3D environment was also primarily used as a space for teaching and learning. Only a few students engaged in extracurricular or private activities, and when asked about this, the students pointed to time restraints, leaving no or little time to use the environment for anything other than educational obligations (Riis 2016).

Furthermore, as pointed out by Hutchby (2001), some affordances are complex and need to be learned over the course of longer periods, and in our study, this holds true especially in terms of the perceived embodiment in the 3D arena. As an example, the sense of proprioception (e.g., experienced by seeing one's nose or limbs when moving), which in the 3D environment depends on the user's chosen point of view, became a distinct boundary between the user's "I" in the real and the virtual world—thus providing an opportunity to reflect, negotiate, and learn, both individually and collaboratively.

10.7 Discussion

In both studies, we have identified and analyzed "effective" boundary practice and boundary objects that can mediate knowledge creation and sharing on all proposed levels and thus promote both transfer, translation, and transformation of knowledge (Carlile 2002, 2004). Further, the 3D avatar as boundary object added new dimensions to the academic learning environment providing space and tools for identity work, cheerfulness, design, play, and explorations. Table 10.3 provides an overview of the dominant boundary objects in the two studies.

The identified boundary objects mediate not only in and between different types of knowledge or domains, but also in and between different practices. Essentially the students in both cases met boundaries between their prior knowledge and their professional practices and the new knowledge and new practices of MIL. In both studies, the students were challenged; however, in study II the challenges also seemed to arise from the 3D environment and its particular affordances in itself.

Through collaborative building and synchronous presentation of their findings via their avatars, the students in study II were forced to reflect and negotiate boundaries pertaining to the domain, the academic practice, their relationships, *and* their own identities as learners and as professionals.

Table 10.3 Overview of boundary objects in the two studies

	Boundary objects in study I	Boundary objects in study II
Group products	Written project report	Oral project presentation and design products
Ideal types of frameworks, concept, and models	Exemplary literature in terms of domain-practice alignment	
Standards and guidelines	Reflecting the MIL culture and that of the group	Reflecting the Second Life culture, the MIL culture, and that of the groups
Communication infrastructure	Asynchronous conferences, incl. the group's own conferences (synchronous chat)	Synchronous space, incl. the groups' own sandboxes (asynchronous conferences)
Student representation	Logo and name	Avatar and pseudonym

In terms of student representation, we noted that the 3D learning arena and the avatar as boundary objects facilitated identification through what one might call "actionable imagination" in a way not possible in the 2D arena. Precisely because this space afforded more than discursive action and let the students reify their thoughts, ideas, etc. in a materialized manner, the students were challenged in their "creation of images of the world" (cf. Wenger 1998).

Combined with the change in the course dissemination (the group project), the boundary objects in the 3D arena seemed to facilitate abundant opportunities of boundary crossing, which for the most parts of the students lead to identification and a strong sense of belonging. This sense of belonging to the MIL community was also seen in the students' choice of names. During the project period, Second Life did not allow users to name their avatars with real-life names. Instead, new users were asked to pick names from predefined lists. Only 14% of the students chose names that resembled their real-life names (Riis 2016, p. 244). The rest chose names indicating some sort of affiliation with their personal interests and six students chose names indicating they were MIL students (e.g., Miling, Milo, Milano, and Milena).

In study I, Dirckinck-Holmfeld (2006) pointed out new relational dependencies of boundary objects, and based on our current analysis of study II, we observe how the 3D learning arena, with avatars and other virtual objects, functions as proxy for the material in ways not possible in the 2D learning arena, supporting that not only differences in, but dependencies of, the *materiality of the technology* also play an important role in ICT-based networked learning.

Moreover, based on our analysis of the findings from both case studies, we propose to extend the relational view on boundaries and boundary object to the ontological level of learning and knowledge sharing, suggesting that a socio-material perspective might be beneficial to understanding the phenomenon. According to several authors (Gourlay and Oliver 2016; Johiri 2014, 2011; Fenwick et al. 2011; Edwards 2011), socio-materiality points to the inseparability of the social and the material, and a study of technology in practice therefore needs to address this. A socio-material approach may provide new insights on knowledgeability, given that:

> [The] question of producing knowledge and learning shifts from a representational idiom, mapping and understanding a world that is out there, to a view that the world is doing things, full of agency. Not only humans act, because non-humans act on and with humans. (Fenwick et al. 2011, p. 3)

As such, in a socio-material perspective, the body of knowledge and complex relations would be more attentive towards the entanglement of material artifacts and the bodily performances of the learners, which still would be entwined with discourse. In a socio-material perspective, the avatar could be seen as the materialization of the students' identity struggles and as a medium of agency and performance. While the 3D learning arena has directed our attention to this materiality, it is important to point out that a stronger focus on the materiality of the 2D learning arena could be just as relevant in terms of finding and designing for new ICT-based networked learning opportunities.

Furthermore, a socio-material perspective would provide new insights into different modes of identification in terms of either disembodied or embodied engagement, imagination, and alignment (cf. Wenger-Trayner and Wenger-Trayner 2015; Wenger 1998). Relationships with other and self are always a matter of negotiation at and with the boundaries of practice, and a socio-material approach could uncover unexpected potentials for learning.

As described earlier, Akkerman and Bakker (2011) found that boundaries could be defined as *sociocultural* differences that lead to discontinuity in action or interaction based on a review of 181 previous studies. Based on our analyses, we therefore propose to extend the definition of boundaries to include a material perspective and enhancing the focus on agents (both human and nonhuman) as those who act and interact. In doing so, modes of identification through engagement, imagination, or alignment can be emphasized as important factors of boundary crossing and boundary work.

Nonetheless, in both studies the strongest dependency between learners and boundary objects occurred in relation to the situational and collaborative fabric of the learning designs, calling for a continued focus on the social aspects of design for learning in problem-oriented and problem-based networked learning.

References

S.F. Akkerman, A. Bakker, Boundary crossing and boundary objects. Rev. Educ. Res. **81**(2), 132–169 (2011)

P.R. Carlile, A pragmatic view of knowledge and boundaries: boundary objects in new product development. Organ. Sci. **13**(4), 442–455 (2002)

P.R. Carlile, Transferring, translating, and transforming: an integrative framework for managing knowledge across boundaries. Organ. Sci. **15**(5), 555–568 (2004)

L. Dirckinck-Holmfeld, Designing for collaboration and mutual negotiation of meaning: boundary objects in networked learning, ed. by S. Banks, V. Hodgson, C. Jones, B. Kemp, McConnell (eds.). *Proceedings of the fifth international conference on networked learning 2006: Symposium: Relations in networks and networked learning*, organised by Chris Jones. Lancaster University, p. 1–8, 2006

L. Dirckinck-Holmfeld, Networked learning and problem and project based learning – how they complement each other. *Proceedings of the 10th International Conference on Networked Learning 2016*, ed. by S Cranmer, N.B. Dohn, M. de Laat, T. Ryberg, J.A. Sime JA, Lancaster University, 2016

L. Dirckinck-Holmfeld, C. Jones, B. Lindström (eds.), *Analysing Networked Learning Practices in Higher Education and Continuing Professional Development*, Technology Enhanced Learning, vol 4 (Brill | Sense, Rotterdam, The Netherlands, 2009)

L. Dirckinck-Homfeld, Designing virtual learning environments based on problem oriented project pedagogy, in *Learning in Virtual Environments*, ed. by L. Dirckinck-Holmfeld, B. Fibiger, (Samfundslitteratur, Frederiksberg, 2002), pp. 31–54

A. Edwards, Building common knowledge at the boundaries between professional practices: relational agency and relational expertise in systems of distributed expertise. Int. J. Educ. Res. **50**(2011), 33–39 (2011)

T. Fenwick, R. Edwards, P. Sawchuk, *Emerging Approaches to Educational Research. Tracing the Sociomaterial* (Routledge, Abington, 2011)

B. Fibiger, J. Nielsen, M. Riis, E.K. Sorensen, L. Dirckinck-Holmfeld, O. Danielsen, B.H. Sørensen,. Master in ICT and learning – project pedagogy and collaboration in virtual e-learning. Contribution to the 3rd European Conference on e-learning. Paris, November 2004, 2005, ISBN: 9547096-7-5

A. Fjuk, Computer Support for Distributed Collaborative Learning. Exploring a Complex Problem Area. Dr. Scient. Thesis 5. Dep. of informatics. University of Oslo, 1998

C. Geertz, *The interpretation of cultures. Selected Essays* (Basic Books, Inc., Publishers, New York, 1973)

L. Gourlay, M. Oliver, It's not all about the learner: reframing students' digital literacy as sociomaterial practice, in *Research, Boundaries and Policy in Networked Learning*, ed. by T. Ryberg, C. Sinclair, S. Bayne, M. de Laat, (Springer, New York, 2016), pp. 77–92

L. Harasim, *Learning Theory and Online Technologies*, 2nd edn. (Routledge, Abington, 2017)

K. Herr, G.L. Anderson, *The Action Research Dissertation* (Sage, Thousand Oaks, 2005)

C. Hine, *Ethnography for the Internet: Embedded, Embodied and Everyday* (Bloomsbury, London, 2015)

I. Hutchby, Technologies, texts and affordances. Sociology **35**(2), 441–456 (2001)

A. Johiri, The socio-materiality of learning practices and implications for the field of learning technology. Res. Learn. Technol. **19**(3), 207–217 (2011)

A. Johiri, Engineering knowing in the digital workplace: aligning materiality and sociality through action, in *Reconceptualising Professional Learning. Sociomaterial Knowledges, Practices and Responsibilities*, ed. by T. Fenwick, M. Nerland, (Routledge, Abington, 2014), pp. 112–124

J. Lave, E. Wenger, *Situated Learning. Legitimate Peripheral Participation* (Cambridge University Press, Cambridge, 1991)

C.P. Lee, Boundary negotiating artifacts: unbinding the routine of boundary objects and embracing chaos in collaborative work. Comput. Supported Coop. Work **16**, 307–339 (2007)

K. Lindberg, L. Walter, E. Raviola, Performing boundary work: the emergence of a new practice in a hybrid operating room. Soc. Sci. Med. **182**(2017), 81–88 (2017)

J. McKay, P. Marshall, The dual imperative of action research. Inf. Technol. People **14**(1), 46–59 (2001)

C. Ondrejka, Education unleashed: participatory culture, education and innovation in second life, in *The Ecology of Games: Connecting Youth, Games, and Learning*, ed. by K. Salen, (The MIT Press, Cambridge, 2008), pp. 229–252

T. Rapley, Doing conversation, discourse and Document analysis, in *The SAGE Qualitative Research Kit*, (SAGE Publications, Cambridge, 2007)

M. Riis, *Avatar-mediation and transformation of practice in a 3D virtual world. Meaning, identity, and learning*. Ph.D. dissertation. Aalborg University Press, 2016

T. Ryberg, C. Sinclair, The relationship between policy, boundaries and research in networked learning, in *Research, Boundaries and Policy in Networked Learning*, ed. by T. Ryberg, C. Sinclair, S. Bayne, M. de Laat, (Springer, New York, 2016), pp. 1–21

S.L. Star, J.R. Griesemer, Institutional ecology, 'translations' and boundary objects: amateurs and professionals in Berkeley's museum of vertebrate zoology, 1907-39. Soc. Stud. **19**(1989), 387–420 (1989)

S. Timmis, J. Williams, Transitioning across networked, workplace and educational boundaries: shifting identities and chronotopic movements, in *Research, Boundaries and Policy in Networked Learning*, ed. by T. Ryberg, C. Sinclair, S. Bayne, M. de Laat, (Springer, New York, 2016), pp. 111–124

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

E. Wenger, Communities of practice and social learning systems: the career of a concept, in *Social Learning Systems and Communities of Practice*, ed. by C. Blackmore, (Springer, London, 2010)

E. Wenger-Trayner, B. Wenger-Trayner, Learning in a landscape of practice. A framework, in *Learning in Landscapes of Practice. Boundaries, Identity, and Knowledgeability in Practice-based Learning*, ed. by E. Wenger-Trayner, M. Fenton-O'Creevy, S. Hutchinson, C. Kubiak, B. Wenger-Trayner, (Routledge, Abington, 2015), pp. 13–29

B. Wenger-Trayner, E. Wenger-Trayner, J. Cameron, S. Eryigit-Madzwamuse, A. Hart, Boundaries and boundary objects: an evaluation framework for mixed methods research. J. Mixed Methods Res., 1–18 (2017). https://doi.org/10.1177/1558689817732225

Chapter 11
Laugh with Us, Not at Us: Parody and Networked Learning

Christine Sinclair

11.1 Preamble

Regular attenders at networked learning conferences will probably agree that there is already a great deal of laughter there, especially during informal breaks. This laughter can be generative, leading to community development, creativity and insights, as well as further networking. Stimulated by reading Bakhtin's observations on laughter and parody across several works, I wondered whether the use of parody to activate laughter could have a potential contribution to a better understanding of the networked learning community and its practices. The template guidelines in the second quotation above suggest that this would be a risky undertaking. But I decided nevertheless to make a minor attempt at parodying networked learning papers through imitation of their themes and structures to see whether they were recognisable and also whether thinking about parody might give us something to discuss about our dissemination practices.

My attempt to parody networked learning papers—and ask questions about why this does not happen more often—did provoke some interesting reactions at the Networked Learning Conference 2018. Throughout the conference, I appeared to need no introduction, even to people I had not met previously, because they had either attended or heard about 'that paper'. Many successive speakers felt obliged to preface their presentation by acknowledging that they had, or had not, included one of the tropes I seemed to have identified as 'essential' in a networked learning paper.

'Laughter makes things close and familiar.' M.M. Bakhtin (1986) From 'Notes made in 1970-71'
'Please note that humour and irony are difficult to translate.' Template/guidelines for NLC papers

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Parody does aim to get people talking, especially about conventions and cultural practices. In that sense, then, my paper was successful, even though (ironically) I had ended up concluding that my own attempt at parody was a failure. All I had managed to do was parody titles and subtitles of papers—and much of that parody would apply to papers at many academic conferences in the social sciences. It also seemed that parody is not something that networked learning participants often use in their writing. Yet using my titles as prompts did give me a way into talking about networked learning writing and practices and especially their intertextuality.

My main influence, Mikhail Bakhtin (1895–1975), was introduced to the west through the concept of intertextuality, coined by Julia Kristeva in the 1960s. Bakhtin (or his translators) did not use the word; however, his work on the dialogic and the notion of 'double-voiced discourse' influenced Kristeva (1967/1980) in developing her idea of intertextuality where one text is shaped through knowledge of another. Parody is just one form of intertextuality; its relationship to existing genres, conventions, institutions and practices relies on its ability to allude to these in a way that can be recognised, imitate them and provoke laughter.

Double-voiced discourse refers to two (or perhaps more) speakers in one utterance—each having different intentions. One is actually making the current utterance; the other's words are refracted through it (Bakhtin 1981a). The utterer might be a novelist presenting a character's view or perhaps an academic using a citation to make a point. In the case of parody, the parodist relies on the hearer's recognition of what is being parodied to make a new point with the refracting discourse. This may involve critique of what is being parodied but is equally likely to imply critique of something else. Parodying academic practices provides an opportunity to bring out constraints, influences or taboos in those practices—and to ask questions about them.

What follows is a slightly extended version of the paper submitted to the conference, updated to incorporate references to papers presented in Zagreb in May 2018 and to reflect the dialogic nature of the conference, its papers and its participants' work.

11.2 Introduction: How the Paper Was Planned

The paper was stimulated by a comment from a keynote speaker at the Networked Learning Conference in 2014, Steve Fuller. During the conference, he had said something along the lines of: 'Networked learning doesn't have a distinctive literature of its own'. One inference from this might be that networked learning does not present a unified field of study. It could also mean that the phenomenon of networked learning is not easily understood and its ways of thinking and practising (McCune and Hounsell 2005) are not obvious. The main message for me was that networked learning writing is not recognised as a separate field or genre, which would mean that it would not be easy to parody it. This, however, did not prevent Professor Fuller from attempting to parody the phenomenon of networked learning, gently making fun of the people who practise it and identifying us as a community. In his tribute to the lecture he speculated:

> I know nowadays, especially to people in your community, the lecture is a kind of obsolete thing, you know, that in some sense can be very easily replaced by MOOCs, and stuff like this…. https://www.youtube.com/watch?v=Ujdnmk2UH-U (13.23–14.00)

This is arguably travesty rather than parody, though parody is implicated and I hope to draw out the differences in order to make a point about some dangers of parody.

Though Fuller was not discussing parody, his observation and mimicry stuck with me and resurfaced as I was reading Bakhtin's work about parody and renewal. Bakhtin (1895–1975) is particularly noted for his work on dialogism and carnival in literature, extending beyond literary criticism (and indeed rejecting some of the precepts of formal criticism). His work has made valuable contributions to social philosophy, language, cultural studies and education, among other fields, though, as with all respected names and in keeping with his ideas, there are various debates about his meanings. For Bakhtin, parody plays a key role in resisting practices that tend to unify or be authoritarian, by bringing them to our attention through laughter. At its best, parody does not destroy its target but opens up the possibility of dialogic discourse and continuity, especially about aspects of a practice that have become invisible or taken for granted. I wondered whether such forms of renewal can be seen in our own field of networked learning and whether parody might be of value to our continuity, either for us to use to expose and challenge other practices or as a way to refresh our own.

A thought experiment on how to parody writing about networked learning then quickly led to my headings for this paper—though I was hesitant to claim the paper as itself more of a parody than any other academic paper is. The result can be seen in Fig. 11.1.

Parody used like this relies on over-elaborated imitation of recognisable practices—parody fails if its antecedents are not recognisable—with an implied critique or gentle teasing ultimately inviting people to laugh. While provoking recognition and some amusement was my main intention, I found my parody remarkably helpful in planning this paper quickly (though not, I have to say, for writing it quickly).

1 Agonise over definitions	Defining networked learning and parody
2 Cherry-pick antecedents from the community	Related themes in earlier papers
3 Come up with a novel metaphor	Where is the novel in networked learning?
4 Share examples of boundary crossing	Crossing the boundary into satire and travesty
5 Summarise in three categories	Genre, intertextuality and multimodality
6 Use/create expressions with post(-) as prefix	Pre-parodic networked learning
7 Set the study up as an alternative to tradition	What makes networked learning the new traditional?
	Inconclusion: unbounded territory
Plan for parody of networked learning paper	This paper's headings

Fig. 11.1 Parodying a genre to help plan academic writing

Fig. 11.2 Reading jester

These headings sometimes imitate other people's—and my own—style in networked learning writing. Sometimes the headings use a word's ambiguity (such as the word 'novel') or reverse what is typical (the prefix pre- instead of post-). A parodist looks for opportunities to subvert or draw attention to anything that looks like the 'authoritative' approach—or, alternatively, to anything that appears to be veering too far from the norm for no good reason. To parody the phenomenon of networked learning or networked learning as a field of study would not entail destroying it, but would imply opening it up to further development and renewal while constraining its worst excesses, if it has any. The ease of generating the headings did not surprise me: imitation is key to academic discourse, and I have used parody in my teaching sometimes to encourage students to 'try on the peculiar ways…' (Bartholomae 1985:134) of academic writing.

However, my parody here only served to create the plan of the paper. I did not really feel able to parody networked learning; rather, I was asking why it is not yet happening, or not much. I used the plan and its parodic observations to draw out my answers to this and consider the implications. I was also curious about whether writers in networked learning had ever used parody themselves. I accompanied my presentation with the image of the 'reading jester'[1] (Fig. 11.2) who questioned and provoked as appropriate, but fairly gently. The role of the fool or jester in education is recognisable—several people in the audience nodded when I mentioned it. It is risky though, and it may be important not to go too far as a jester-teacher even though it may help in creating an online presence (Macleod and Ross 2011), nor indeed as a jester-presenter, though it may make people look again at their practices. However, as Macleod and Ross also argue, some risk-taking is valuable and indeed may be unavoidable in teaching and presenting.

To help me with my limited parody, I drew on titles from previous conferences. In my presentation (though not in my original paper) I mentioned the pervasive use of colons in titles, itself a topic of academic study (Hartley 2007). A quick look at the 2018 conference's papers indicated that 50% of them contained a colon, which seems to be the average for education papers (Hartley 2007). This means that

[1] By Bill Nye (?) (Nye, Bill: "Bill Nye's History of England" (1900)) [Public domain], via Wikimedia Commons

networked learning as a field cannot really be distinguished on the basis of its 'titular colonicity' (Dillon 1981) even though its authors would clearly be on the right side of good academic practice in Dillon's own parodic work. I leave it to the reader to check the credentials of the authors in the current volume in this regard.

11.3 Defining Networked Learning and Parody

11.3.1 My Parody: Agonise over Definitions

Authors have been encouraged by editors and reviewers at various stages of the networked learning conference lifespan to be explicit about their understanding of networked learning. Many authors of networked learning papers allude to the following definition:

> Learning in which information and communication technology (ICT) is used to promote connections: between one learner and other learners; between learners and tutors; between a learning community and its learning resources. (Goodyear et al. 2004:1)

Some may express concerns about what this definition masks, such as 'complexity of the social nature' (Boon and Sinclair 2012: 275), and others may wish to augment it (e.g. Dohn 2016: 30, who added its mediating role between contexts). Nevertheless, the frequency of unequivocal citation of this definition does suggest its authority and the fact that writers feel on safe ground using it. Masking, mediating and responding to authority underpin some emergent themes in this paper, so the definition and commentaries serve as a useful starting point.

It is perhaps unkind of me to suggest that networked learning writers 'agonise over definitions' but I know that I do, as indicated by the Boon and Sinclair citation above. As a reviewer of networked learning papers, I have seen many papers that start this way. As an academic, I have also seen many student assignments that do this, often not so eloquently as the paper writers as it is a difficult task to master effectively. Defining is part of the practice of academic writing, probably across most academic fields. So, just like the colonic titles, agonising over definitions is not peculiar to the field of networked learning.

Definitions are continuing to be a challenge for this current study, though: 'the discussion of parody is bedevilled by disputes over definition, a fruitless form of argument unless there are matters of substance at stake' (Dentith 2000: 6) There are matters of substance. Writers on parody, for example, Dentith himself and also Margaret Rose (1993), allocate a considerable quantity of writing to definition, distinguishing parody from other forms of derivative work, and changes over times from ancient through medieval to postmodern. I use Fig. 11.3 here to show my own preoccupations and to indicate how my discussion of parody might veer into other topics. Some of these words can be found being used interchangeably in writing on this topic and also in dictionaries where parody may be defined as satire (for example) and vice versa. I shall suggest that the words on the right of the figure are those that may be cultivated by the networked learning community for positive ends.

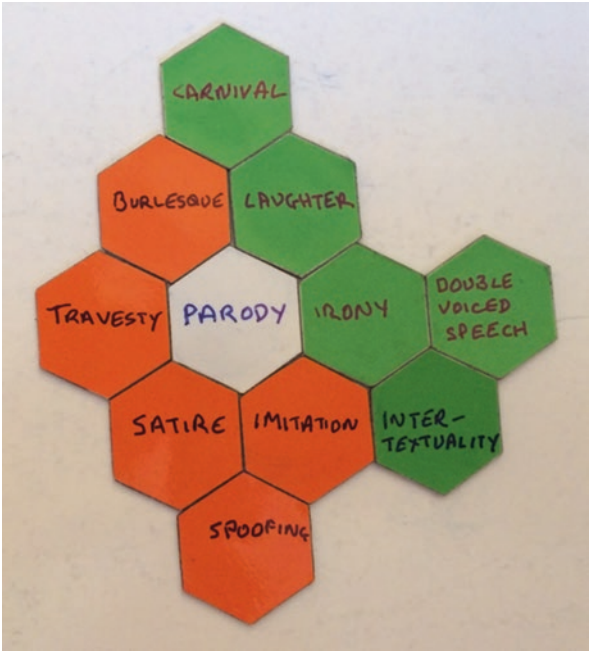

Fig. 11.3 Parody in relation to associated topics

I shall not rehearse all the definitions associated with this diagram here, but will make reference to some of them as I unfold my case. However, I shall take Dentith's preliminary definition as my own starting point, though it should be noted that he qualifies it through reference to a spectrum of cultural practices which may go under different names. He does also mention laughter a great deal in the build-up to the definition below:

> Parody includes any cultural practice which provides a relatively polemical allusive imitation of another cultural production or practice. (Dentith 2000: 8)

The cultural productions are my main focus: the writing associated with networked learning conferences. However, I have also added networked learning practices to my interest: the practices referred to in these publications and shared—or even experienced—at networked conferences themselves. Dialogue following the 2018 conference (in this case, with my editor) has alerted me to the value of distinguishing between the academic *field* and the *phenomenon* of networked learning, or indeed any other form of academic practice. While this was a concern throughout, it is useful to make it explicit and I had elided field and phenomenon in my original paper. We will not necessarily have a distinctive form of writing associated with a distinctive phenomenon or practice; however, it is worth asking 'why not?' As already mentioned, I have found parody to be a useful tool in my networked teaching practice; why might it not also be useful for writing in the field of study?

My main influence from the literature on parody is from Bakhtin who is also a strong (though not unchallenged) influence on Dentith. I shall turn to a closer examination of Bakhtin's work shortly, including reference to some of Dentith's reservations; first, I explore what it might be possible to say about networked learning and the use of parody (not a great deal yet, as it turns out).

11.4 Related Themes in Earlier Papers

11.4.1 My Parody: Cherry-Pick Antecedents from the Community

Cherry-picking (seeking examples to make an explicit point rather than ensuring representation) is frowned on in academic writing, but given such a prolific output from the networked learning community over two decades, what else can we do? A timely call from in the summer of 2017 for networked learning writers to reflect on the conference's values (Hodgson and McConnell 2018, and Chap. 1 of this volume) prompted my own recollections on the output from these conferences. Here is a section of my response:

> Perhaps there have been some paradigm wrestling matches – tussles between familiar theoretical perspectives and practices, deprecated ones, and emergent ones. There has been an interesting extension of focus and domains, first towards informal education and then towards activist perspectives. There has perhaps been a shift from technologies for teaching to technologies for coding – and what happens to the data from these. These are probably natural responses to some of the perceived threats to our institutions and values that have also featured strongly in recent years.

This speaks to a dynamic and responsive context likely at least to coincide with Bakhtin's preoccupations with the dialogic, if not specifically invoking parody. The conversations have built on each other over the years and a glance at indexes in the post-conference books will show much citation of key players—for example, Hodgson and Dirckinck-Holmfeld, among others. Yet the key writers do not overdominate; there is a healthy mix of established and newer voices and it is good to see how some of the latter start to earn their own place in the index. An index scan would not support my search for parody or laughter, though—but there is plenty on dialogue and boundaries (in some, though not all indexes) as suggested in my reflection above. So a search for papers in the post-conference books that might themselves involve parody or discussions of it proved fairly fruitless, yet I was aware of much laughter and some parody during the conferences themselves. I extended my search to include a quick review of paper topics. I found some promising looking titles from the previous three conferences:

- What did the Romans ever do for us? 'Next generation' networks and hybrid learning
- Becoming jelly: A call for gelatinous pedagogy within higher education

- The glow of unwork? Issues of portrayal in networked learning research
- Where have all the students gone? They are all on Facebook Now

I have added another from the 2018 conference:

- Making digital compost: place-responsive pedagogy at a distance

These are analysed below for the parodical promise suggested by the title.

What did the Romans ever do for us? 'Next generation' networks and hybrid learning resources. Elaine Thomas, Steve Walker. 2012 Conference.

This title caught my attention because the initial question would be instantly recognisable, to some, as coming from a parody (which was also a satire on religion), the Monty Python film 'Life of Brian' (1979). Used in this context, the question is an example of what Dentith (2000:7) refers to as one of 'those glancing parodic allusions which are to be found very widely in writing'. The reference to 'next generation' suggests that there may be some parodic work around old and new—and might even evoke memories of the TV programme *Star Trek*. Interestingly, in the full paper, the question is used no longer in parody, but instead for literally exploring how technologies might support people investigating artefacts from the Roman Empire. The lack of parody as a theme in the paper does not disappoint me, though: the discussion about blurring boundaries between technology and the physical world is fascinating.

*Be*coming jelly: A call for gelatinous pedagogy within higher education. Søren S.E. Bengtsen, Rikke T. N*ørgård. 2014 Conference.*

An unusual and counter-intuitive metaphor in a title is always an attention-grabber. It is an approach quite often used in networked learning contexts to signal a challenge to the current ways of doing things, particularly ways of talking. Here it is combined with enticing and beautiful images to help underline its points about the need to recognise the weird, the alluring, the terrifying and the mongrel aspects of networked education and help people to find a language that acknowledges this. It has some of the same polemical aims as parody, and it certainly contains many allusions to other cultural practices and texts, but it does not actually parody them to make its case, nor does it need to.

The glow of unwork? Issues of portrayal in networked learning research. Maggi Savin-Baden and Gemma Tombs. 2016 Conference.

'Unwork' is one of those inversions that suggest at least a challenge to contemporary practices and possibly, through parody, an alternative to them. A parody of 'work' might expose the reader to previously unseen aspects of it. Although parody is not directly used, such exposure is definitely the aim. Unwork here refers to invisible work that happens at interfaces, and the paper is concerned with the ways in which the participants in a piece of a research and their findings are portrayed. Like the previous example, it shows a concern for voices that need to be heard. It draws on interesting metaphors associated with space and place and points to many issues of friction and invisibility at boundaries—but it does not need to use parody to do this.

Where have all the students gone? They are all on Facebook Now. Dennis Landgrebe Thomsen, Mia Thyrre Sørensen, Thomas Ryberg 2016 Conference.

Rhetorical questions are a popular device in paper headings, and this one hints at a parody of familiar laments of loss and death that might be seen in examples such as Pete Seeger's folk song 'Where have all the flowers gone?'—a tradition sufficiently long standing to have a Latin name 'ubi sunt'. That might be the 'glancing allusion' that draws us in, but it is not really a parody of such songs, nor even of the current situation. It is instead an excellent title in that it succinctly summarises what it says—the answer to the question is there in the title. It is to be taken literally. The title and paper point to a contemporary problem—and the familiar, not really academic, site of the answer (Facebook) suggests that any parodic contribution might be of the conservative rather than the subversive kind (Dentith 2000: 9)—that is, it would attempt to draw attention to a new practice that is veering too far from the norm or tradition. Dentith highlights this normative or corrective function of parody in a way that is not so apparent in Bakhtin's work. We can, though, achieve this without parody.

Making digital compost: place-responsive pedagogy at a distance. Sharon Boyd. 2018 Conference.

This was a stand-out title in the 2018 conference, where the majority of titles were fairly literal. Compost is a metaphor that has the capacity to attract and amuse, with its association with waste products. But the appeal is not merely scatological; current ecological concerns predispose us to welcome the nourishing environment and renewed growth that compost offers. Compost might make us laugh, but equally it might offer us some hope. The use in the actual paper provides a valuable introduction to Haraway's (2016) idea that posthuman(ism) should be replaced by 'compost'. Boyd's main message is about the importance of emotional associations with environment and place for distance students. However, it is not a parodying paper and it is not using the idea of compost to make any polemical allusions.

This exploration of headings and topics suggests that a tendency to use playful language and ideas in writing about networked learning—at least in titles—is tempered with a careful unfolding of serious points, expressed in literal terms, especially in relation to papers intended for the public gaze, and a global public at that. It might be argued that there is no place in academic writing for parody; it is a serious business. It is also perhaps not up to us to parody ourselves in our academic papers; however, in our teaching practices and research interests, we are certainly up for the kinds of development and renewal that are associated with parody. Although my cherry-picking of networked learning titles has not given me much to say about the role of parody for our community, it has identified some related themes to weave into my argument: boundary crossing, renewal, allusions to other texts, use of metaphor and media and—present in all of the examples—new ways of doing, being and expressing 'voice' in education, all of which would be compatible with Bakhtin's dialogism.

But the analysis also shows the need to go beyond titles. I was aware that there had been laughter and decided to look at what happens during events. A closer examination of an event that took place at the 2014 conference, under the seemingly

innocuous title of 'Actor-Network Theory Double-Symposium', indicates that the spirit of parody is alive and well in networked learning conferences.

Actor-Network Theory Double-Symposium. Steve Wright, enrolled members of the ANT Facebook Group.

The symposium itself had some unexpected elements, while preserving—with transgressions—the genre of a conference symposium. Indeed, it even invoked the older form of the ancient Greek symposium, an ironic use of tradition to subvert the status quo. The Symposium Introduction shows some of the workings of what was planned, speaking directly to potential participants at the conference. It contains an explanation of its own breach of the template instructions for submitting a proposal to the conference. It exposes how agency is lost through such templates. It sets out what was to happen in the symposium, including talking, thinking and drinking (as happened in ancient Greece)—with a beer tasting, which was also used to demonstrate other practices associated with actor-network theory (ANT). The media, modes and materiality to be used indicate an intention to practise and enact phenomena and theories being considered—actor-network theory, communities of practice and cultural historical activity theory. Or as Steve put it succinctly: 'to speak truth to acronyms by representing this as an ANT having a CHAT with a COP'.

The laughter generated did not destroy the templates, theoretical perspectives, invisible rules of the conference and ways of writing about networked learning, but it did expose and challenge them. The combined parody of academic and ancient Greek symposia—including the material engagement often missing from papers *about* material engagement—provided an alternative approach that made us question what we do. I was not present at the symposium myself as I was an organiser; however, the list of requirements for the symposium sent in advance of the conference certainly gave me plenty to think about and challenged one or two 'accepted' ways of doing things in conference venues.

The parody in this final example is reminiscent of Bakhtin's exploration of laughter and parody (and indeed satire, travesty and burlesque) in the medieval carnival, particularly as portrayed by Rabelais (Bakhtin 1984b). Parody of official and religious orthodoxy through the language of the marketplace and folk humour provides a safe opportunity for disempowered people to vent opposition to authority and laugh at themselves in the process, but still challenge the status quo and leave the way open to renewal. For Bakhtin, 'Carnival existed not as a form of agency but as a reminder that agency was possible' (Renfrew 2015: 135). Actor-network theory provides another such reminder; so does the carnivalistic way it was enacted at the 2014 conference.

I am not suggesting that networked learning conferences are authoritarian or orthodox in organisation (though, having been involved in such organisation, I would understand if they were!). They certainly seem less so than some other educational conferences. However, well-established practices inevitably set up tensions, contradictions and constraints that people might want to challenge, especially if they are interested in doing something new. At the 2018 conference, at least according to some of the Twitterfeed, it seemed that participants relished the reminders—not only of past papers and symposia but also of the ways in which the community

operates and the opportunities to influence this. This impression was supported by the paper that now forms Chap. 1 of this book (Hodgson and McConnell 2018). Thus both the first and this last chapter of the book highlight that some participants particularly value the conference's opportunities to promote new thinking and new modes of participation.

11.5 Where Is the Novel in Networked Learning?

11.5.1 My Parody: Come Up with a Novel Metaphor

The reuse of tropes from other genres, lively metaphors and neologisms that suggest inversion or subversion are all present in the texts I identified above as well as in the symposium. Novel metaphors also appeared in 2018; as well as digital compost, there was 'architectural silence' (McMordie 2018) as a metaphor explaining the lack of managerialism in networked learning. There was novel use of metaphor in a 'multi-metaphorical framework' (Liashenko 2018) and neologisms such as 'mobilage' (Johnson 2018)—a portmanteau word for mobilities and bricolage. In this book too there are digital habitats, dashboards and boundary objects to name but a few, all recent or novel metaphors. But my own novel metaphor is the novel—and I only discovered this by playing with words (which shows how useful attempting to parody can be).

I had anticipated some novelty in approach to networked learning topics in my parody of a paper, and that led to my question about 'the novel' in the subtitle above. There is an ambiguity in this word—one that allows me to suggest 'the novel' (in its literary sense) as a possible metaphor or analogy for networked learning. There is potentially a strong resonance for networked learning with what Bakhtin has to say about the novel. As I work through the argument to this end, I draw on an example from 2018 (and this book) to support my case. There is a debate to be had about this analogy with the novel—it is by no means conclusive.

The first thing Bakhtin has to say about the novel is that there is a close association with parody:

> …it [the novel] is the archetype of what Bakhtin calls 'carnivalized literature'. Carnivalized literature takes from medieval carnival the inversion of power structures, the parodic debunking of all that a particular society takes seriously (including and in particular all that which it fears). (Morris 1994: 250 Glossary)

While no obvious parodic debunking tends to happen in networked learning conference papers (until now), Bakhtin himself says something else about the novel that highlights its importance for him and that sounds remarkably like some of the work that is being done by networked learning authors, though they generally seem to do it without parody in the form of polemic imitation.

> The novel parodies other genres (precisely in their role as genres); it exposes the conventionality of their forms and their language; it squeezes out some genres and incorporates others into its own peculiar structure, re-formulating and re-accentuating them. (Bakhtin 1981b: 5)

By repurposing Bourdieu's habitus as disposition, Michael Gallagher (Chap. 3) is surely incorporating, re-formulating and re-accentuating. He is also exposing conventionality of educational theory and practice by putting 'a human and familiar face' to it, albeit an imagined one. I am not certain that he is parodying; however, his work shares some features, and he is certainly using some related novelistic devices. But I think his intention is to illustrate rather than to make polemic allusion.

Parody usually depends on 'double-voiced' discourse, described at the start of this chapter. This means that the reader or listener experiences both what the original person and the parodist have to say, simultaneously. Usually the original voice retains its power, but the important factor is that the other voice is still heard. A major influence on Bakhtin's extended account of the dialogic was the work of Dostoevsky, because this was seen to permit multiple voices, as opposed to expressing a single authorial voice. The author is capable not only of hearing his hero but of answering him as well (Bakhtin 1984a). And Gallagher is doing this too with his imagined character, Amira. He knows enough about his composite character to comment on her experiences and their implications; his claims are not about the fictional character but rather about the practices she encounters. Although Gallagher is not attempting to provoke laughter—joyful, derisive or merely in recognition—he is taking similar risks to parodists in using fiction to make an academic point. He is certainly pushing at the boundaries of conventional forms, which is in the spirit of the networked learning phenomenon, if not, generally, its conference papers.

After categorising Dostoevsky as a unique writer, Bakhtin ironically went on in an essay entitled 'Discourse in the Novel' (Bakhtin 1981a) to create a unifying theoretical perspective both about the genre of the novel itself and the dialogical nature of all communication. As Renfrew observes, he quickly 'moves to universalize what he initially attributes to Dostoevsky' (Renfrew 2015: 79). Bakhtin's enthusiasm for the novel because it is not subject to closure as a genre (and therefore less amenable to parody) was expressed in his essay 'Epic and Novel':

> The novel has become the leading hero in the drama of literary development in our time precisely because it best of all reflects the tendencies of a new world still in the making; it is, after all, the only genre born of this new world and in total affinity with it. (Bakhtin 1981b: 7, originally written in 1941)

Decades later, we can be tempted to say the same about networked learning as a phenomenon of educational development. It too attempts to capture the multivoiced nature of contemporary communication. Authors who recognise this quality (e.g. Wegerif 2013) can build on Bakhtin's attention to 'unbounded' dialogic space. But if the analogy holds, then it may offer an explanation of little or no parodying of networked learning forms.

This word 'unbounded' may seem at odds with the boundary work I identified as my next target, but it turns out that it is not.

11.6 Crossing the Boundary into Satire and Travesty

11.6.1 My Parody: Share Examples of Boundary Crossing

I particularly associate networked learning papers with challenging boundaries: the book of the 2014 conference is entitled *Research, Boundaries and Policy in Networked Learning*, but boundaries recur frequently, including in this volume, especially in the work of Riis and Dirckinck-Holmfeld (Chap. 10). For Bakhtin, the novel differs from the epic (for example) as the latter genre is complete and closed. It is part of the definition of the epic that it is in the past and this boundary is impenetrable. Laughter aimed at the epic turns it into another genre—for example, satire. The novel can run up against boundaries but these are shifting and the novel can record those shifts as well as create them through appropriation and repurposing. Understanding what is going on at boundaries and using that knowledge to good effect is as key to Bakhtin's notion of the novel as it is to networked learning authors.

I found in writing this paper that attention to boundaries of the definition of parody was helpful in thinking about what might be bounded and what might not and how. At the start of the paper, I categorised Professor Fuller's comments about 'MOOCs and that kind of thing' as travesty rather than parody. Current uses of the word 'travesty' imply an attempt to reduce or diminish especially through a deliberately inadequate representation. There is a suggestion in Fuller's humour that the traditional will be swept away with thoughtless implementation of 'the latest thing'—a discourse familiar in discussions of MOOCs. There has probably been more written to deprecate the hype associated with MOOCs than there has about MOOCs' actual potential. If the MOOC has been trying to be a serious contender to be the main representation of networked learning, most people in networked learning circles would agree that this is not going to happen. But it is difficult to have a conversation about networked learning with this assumption as a starting point. Similarly, comments from colleagues who categorise themselves as luddites or traditionalists before going on to denigrate networked learning as 'whizzy' or superficial can be difficult to deal with precisely because the speaker 'doesn't get it'. Travesty can be dangerous because its reductive approach renders invisible some of the key values of the target, leaving nothing to talk about.

Satire is perhaps even more dangerous because it involves personal attacks, using parody to do so. Bakhtin saw satire as one of the precursors of the novel because it attacked the established literary and cultural conventions. Like parody, with which it is closely associated sometimes to the point of synonym, satire has developed over time and is widely used today with political and celebrity targets. When satire is very strong, it can displace its original; we no longer recognise the satirised targets of 'Don Quixote' which is often identified as the first modern novel, written in 1605. In our own time, satire about current events is in danger of becoming conflated with 'fake news', though as Cooke (2017)

points out, this is not a new phenomenon. In a study of metacoverage of satirical reporting, Brewer et al. (2013) draw attention to the need to recognise the intertextuality of accounts of political humour, its targets and fake news. Writing about how we satirise events can itself contribute to how those events are perceived, by drawing further attention to them. An extra layer is added to the double voicing, possibly reinforcing approval for the very practice that is supposed to be the target of derision. This may provide a reason for steering clear of such forms of cultural practice (which are often seen as debased). However, Brewer et al. (2013) suggest that intertextuality does increase personal efficacy with respect to knowledge of the news, which may support a case for talking more about satire and parody.

Thus parody might be a tool used mercilessly in relation to other genres. However, an important observation about parody is that 'we cannot decide in advance on the cultural politics of parody' (Dentith 2000: 186), so we cannot easily adopt it as a tool in a repertoire of cultural practice. We do not know how it will work in any given context—whether it is going to challenge authority, limit the excesses of new ideas or expose flaws in our current practices, or just simply let us laugh at ourselves and others. If the parallel with the novel can hold, then networked learning might indeed be dangerous to some traditional forms (or genres) of education. In re-formulating or re-accentuating them—we might add even add 'hacking' to this—we are going to create some disturbance. It is no wonder that we are interested in what happens at boundaries and how they are crossed—they are risky but fascinating places. However, if we accept that like the novel, networked learning is a genre that is 'born of this new world', it may not (yet) be itself subject to such displacement.

However, perhaps the persistent lack of parody, satire and laughter in our writing suggests that the parallels with Bakhtin's notion of the novel do not hold. We can cross boundaries and explore boundary objects without laughter; we can be dialogic without blatant parody. We may use parodic allusion in the titles of our papers and actual parody in our networked learning practices, but maybe we need to stick to the tried and tested forms of academic writing to give ourselves a safe haven. (I think we should be questioning this as a conclusion.)

11.7 Genre, Intertextuality and Multimodality

11.7.1 My Parody: Summarise in Three Categories

Finding three dimensions to capture one's findings, such as boundedness, familiarity of technologies and production (see Chap. 9), is a sensible way of proceeding. It makes the findings manageable for the writer, it is easy on the reader, and it avoids awkward binaries.

The ‘rule of three’ is a well-known rhetorical device in academic writing and public presentation in general—it is an easy target for imitation. Again, this means it is not unique to networked learning. The three themes in the subheading above seemed likely to belong both to networked learning and to a broader account of dialogism, so my ‘summary’ here is of the potential interrelationships between my theoretical framework and my theme of parody. My brief selection from the literature certainly highlighted intertextuality and multimodality. Genre and intertextuality have just been identified as significant for development in writing and other communicative practices, though both of these words may be problematic (Duff 2002). The notion of ‘genre’—a form limited by style and convention—might be troubled by exactly the kind of borders and boundaries that are open to resistance.

As might be expected, a combined Internet search for ‘networked learning’ and ‘intertextuality’ reveals far more examples than a similar search with parody. Networked learning may not need parody in order to recognise and exploit the nature of intertextuality; its texts can rely not only on explicit and implicit allusions and use of genre and referencing conventions, but also on its preoccupation with the flow of knowledge across boundaries. Writers in networked learning are well able to imitate, but do not need the laughter that accompanies imitation in parody. Parody—at least, in response to a quick search—seems not to be present in standard academic papers in networked learning and its contributing fields.

Even where I did find parody, the academic texts associated with the symposium were not written as parodies but in the recognisable genre of academic writing. Its introduction, where parody is in evidence, is a different kind of text from an academic one. The main difference with the symposium was in the range of practices involved, which were intensely multimodal as well as material. Multimodality intuitively feels as though it is not only opening up our academic communication practices, but also the potential for parody. Some reflection on this leads me to wonder whether there may be a connection between low levels of parody and fear of plagiarism. Academic texts have developed rigid conventions, including those that support prevention of plagiarism; some forms of intertexuality, including parody, run the risk of accusations of plagiarism. Although accusations do arise with multimodal forms (especially music), it is perhaps less foregrounded than it is in writing. This topic is beyond the scope of the current paper, though related to it, and is worthy of investigation.

For now, the main point is that multimodality is how networked learning augments texts and, occasionally, engages in parody. But this is networked learning as a phenomenon and not networked learning as a field of academic writing. Parody, and other experimental forms of writing, such as Gallagher’s use of a composite character in Chap. 3, run the risk of rejection by the academic community on the basis that they use something that is not demonstrably ‘the truth’ nor conforming to the ‘scientific method’. Yet truths may be exposed through a variety of methods, media and genres, including fiction and parody.

11.8 Pre-Parodic Networked Learning

11.8.1 My Parody: Use/Create Expressions with Post(-) as a Prefix

I thought it appropriate in my parody to allude to our tendency to use the prefix post (postmodern, posthuman, postdigital, etc.). At the 2018 conference, only two titles contained a post (posthuman and postdigital)—so this was not as well targeted as my dig at the colon.

In planning the paper, it seemed that by this stage I would want to say something about the current status of networked learning and how to make it more recognisable so that it can be parodied, so I inverted this prefix to create 'pre-parodic'. It is perhaps becoming obvious that I now see the pre-parodic state as a blessing and also wonder whether it could be posed as an inevitability in the light of my Bakhtinian perspective that encourages me to draw parallels with the novel. I think this is open for discussion; I have not yet identified any reason to claim that networked learning falls into this category any more than any other academic field. Indeed, when I eventually saw the full paper that now forms Chap. 1 of this book, I noted that Hodgson and McConnell (Hodgson and McConnell 2018) were careful to point out that networked learning is not a discipline, but rather a knowledge community and probably interdisciplinary. This, rather than its unique novelistic qualities, is perhaps a better explanation of why it is resistant to being a producer or the object of parody.

However, my analysis has highlighted the fact that the academic paper or book chapter continues to be the main form of currency in networked learning. Intertextuality in these forms of writing comes via the academic reference. Academic papers, including this one, are heavy with citations and the complex academic expressions derived from them. Perhaps networked learning as a movement might in future be associated with whatever replaces current forms of academic writing rather than with the closed and completed forms belonging to the 'Gutenberg parenthesis' (Pettit 2012). This view of the print era suggests that authoritative and monologic accounts as bounded forms have interrupted a naturally open and unbounded dialogic approach to human communication. While we are likely to incorporate some features of the past 500 years into what is ahead, there are undoubtedly newer forms of writing around (Fitzpatrick 2011). We may need to prepare ourselves for this—and even think of ourselves as potential pioneers in risky forms of academic writing.

Indeed, I reflected that I really ought to be practising what I was suggesting and find some new and parodic modes of expression for making my presentation and perhaps promoting dialogue. But paper and PowerPoint won out—the familiar approaches are after all so much easier to manage. As it was, I had to write the paper in little slivers of time available first thing in the morning—a familiar plight for all people working in higher education. Networked learning forms of writing possibly need to remain pre-parodic until we have more time and feel ready to take the risks.

11.9 What Makes Networked Learning the New Traditional?

11.9.1 My Parody: Set the Study Up as an Alternative to Tradition

The parody seems to have turned into self-parody. Far from establishing networked learning as the new traditional, my analysis suggested it as the new 'novel', which I am now taking pains to rein back. The 'new' is what everyone is perhaps seeking in their networked learning writing; there is a wish to challenge established genres of education, including online education. We do not need to parody these, just to critique them and seek boundaries to cross and dismantle. Yet some of the new alternatives of networked learning genres—of writing, theory or practice—might aspire to be part of the 'canon' for networked learning and even to displace other forms. The 'paradigm wrestling matches' that I noticed in my reflections on networked learning might suggest that renewal is happening anyway.

> Parodic stylizations of canonized genres and styles occupy an essential place in the novel.…
>
> But it is characteristic that the novel does not permit any of these various individual manifestations of itself to stabilize. (Bakhtin 1981b: 6)

There is perhaps a hint of that lack of stabilisation with some networked learning trends and practices. Just as Dickens', or even Dostoevsky's, work does not provide a blueprint for the novel, we are not going to be able to establish the genre of networked learning through or in response to parody. In a delayed riposte to Professor Fuller, the MOOC—in any of its canonised forms of certain approaches to education—is not going to 'be' networked learning. The expression 'the novel does not permit' is not about authoritarianism of fixed genre but is about the potential of unlimited genres. Similarly, networked learning cannot be easily imitated and belittled in its entirety, but emerges instead as 'an unbounded dialogic space' (Wegerif 2013: 49) (although of course it does still involve a lot of attention to boundaries).

11.10 Inconclusion: Unbounded Territory

The final heading is a parody of my whole approach—like other networked learning writers, I want to draw attention to the problem of conventional structures and boundaries. 'Inconclusion' is not a word—it is a signal that conclusions are sometimes inappropriate.

I have not succeeded in parodying networked learning—my parody has in the end been mainly of academic writing in the social sciences. When called on by reviewers to suggest what might be a parody of networked learning, I am unable to come up with anything. Instead, I have highlighted how wedded we are to academic writing conventions and suggested some explanations for us not wanting to

change this. I have also suggested an analogy between networked learning and the novel which might provide a more interesting explanation for our not being subject to parody.

My attempt at parody also proposes that parody is not currently needed in networked learning, even though the suggestion that it could happen did generate discussion and laughter at the 2018 conference. This does not mean we can avoid being parodied at some stage, and we will need to be aware of the direction of the laughter. We would also want to know how the laughter is mediated: might algorithms be involved, for example, with the results presented on a dashboard, as described in Chap. 4? And if we do decide to parody other genres ourselves, we need to be aware of the possible consequences. If laughter does not accompany our attempts, we might be accused of travesty, plagiarism or worse.

Even though there are hints in this chapter that we might want to extend our writing repertoire, there is nothing inherently wrong with our current forms of academic writing. We should perhaps hope that if we do have to be subject to parody, it will come in the form of 'homage' rather than travesty. A parody of networked learning could be a tribute to it. I hope that readers will recognise my own intention as being an example of this.

References

M.M. Bakhtin, Discourse in the Novel (C. Emerson, M. Holquist, Trans.). in *The Dialogic Imagination by M. M. Bakhtin*, ed. by M. Holquist, (Austin, University of Texas Press, 1981a)

M.M. Bakhtin, Epic and Novel (C. Emerson, & M. Holquist, Trans.). in *The Dialogic Imagination by M. M. Bakhtin*, ed. by M. Holquist, (Austin, University of Texas Press, 1981b)

M.M. Bakhtin, *Problems of Dostoevsky's Poetics* (C. Emerson, Trans.) (Minneaapolis, University of Minnesota Press, 1984a)

M.M. Bakhtin, *Rabelais and His World* (H. Iswolsky, Trans.) (Bloomington, Indiana University Press, 1984b)

D. Bartholomae, Inventing the university, in *When a Writer Can't Write*, ed. by M. Rose, (Guilford Press, New York and London, 1985)

S. Boon, C. Sinclair, Life behind the screen: taking the academic online, in *Exploring the Theory, Pedagogy and Practice of Networked Learning*, ed. by L. Dirckinck-Holmfeld, V. Hodgson, D. McConnell, (Springer, London, 2012)

P.R. Brewer, D.G. Young, M. Morreale, The Impact of Real News about "Fake News": Intertextual Processes and Political Satire. Int. J. Public Opin. Res. **25**(3), 323–343 (2013)

N. Cooke, Posttruth, truthiness, and alternative facts: information behavior and critical information consumption for a new age. Libr. Q. **87**(3), 211–221 (2017)

S. Dentith, *Parody* (Routledge, London, 2000)

J.T. Dillon, The emergence of the colon: an empirical correlate of scholarship. Am. Psychol. **36**(8), 879–894 (1981)

N.B. Dohn, A practice-grounded appropach to 'engagement' and 'motivation' in networked learning, in *Research, Boundarie and Policy in Networked Learning*, ed. by T. Ryberg, C. Sinclair, S. Bayne, M. De Laat, (Springer International Publishing, Cham, 2016)

D. Duff, Intertextuality versus genre theory; bakhtin, kristeva and the question of genre. Paragraph **25**(1), 54–73 (2002)

K. Fitzpatrick, The digital future of authorship: rethinking originality. Cult. Mach. **12**, 1–26 (2011)

P. Goodyear, S. Banks, V. Hodgson, D. McConnell, *Advances in Research in Networked Learning* (Klüwer Academic, Dordrecht, 2004)
D. Haraway, *Staying with the Trouble: Making Kin in the Chuthulecene* (Duke University Press, Durham, 2016)
J. Hartley, Planning that title: practices and preferences for titles with colons in academic articles. Libr. Inf. Sci. Res. **29**(4), 553–568 (2007)
V. Hodgson, D. McConnell, The Epistemic Practice of Networked Learning. in *Networked Learning Conference, Zagreb*, ed. by M. Bajic, N.B. Dohn, M. De Laat, P. Jandric, T. Ryberg, 2018
M. Johnson, Encounters with the mobilage (virtual or actual?). Paper presented at the Networked Learning Conference, Zagreb, 2018
J. Kristeva, Word, dialogue and the novel (T. Gora, A. Jardine, & L. Houdiez, Trans.). in *Desire in Language: A Semiotic Approach to Literature and Art*, ed. by L. Roudiez, (Oxford, Blackwell, 1967/1980)
M. Liashenko, Knowledge and learning in virtual communities of practice (VCOPs): theoretical underpinnings. Paper presented at the Networked Learning Conference, Zagreb, 2018
H. Macleod, J. Ross, Structure, authority and other noncepts, in *Digital Difference: Perspectives on Online Learning*, ed. by R. Land, S. Bayne, (Sense Publishers, Rotterdam, 2011)
V. McCune, D. Hounsell, The development of students' ways of thinking and practising in three final-year biology courses. High. Educ. **49**(3), 255–289 (2005)
S. McMordie, Networked Learning: Theorising a 'Management' Capability. Paper presented at the Networked Learning Conference, Zagreb, 2018
P. Morris (ed.), *The Bakhtin Reader: Selected Writings of Bakhtin, Medvedev, Voloshinov* (Hodder Arnold, London, 1994)
T. Pettit, Media dynamics and the lessons of history: the "gutenberg parenthesis" as restoration topos, in *A Companion to New Media Dynamics*, ed. by J. Hartley, J. Burgess, A. Bruns, (Wiley-Blackwell, Oxford, 2012)
A. Renfrew, *Mikhail Bakhtin* (Routledge, Abingdon, 2015)
M. Rose, *Parody: Ancient, Modern and Post-Modern* (Cambridge University Press, Cambridge, 1993)
R. Wegerif, *Dialogic: Education for the Internet Age* (Routledge, London, 2013)

Chapter 12
Conclusion: Mobility, Data and Learner Agency in Networked Learning

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This book has been structured into three main thematic parts: *Aspects of mobility for networked learning in a global world*, *Use and misuse of algorithms and learning analytics* and *Understanding and empowering learners*. The three parts were preceded by a first chapter reporting on a study of the contribution of the Networked Learning Conference (NLC) to the development of networked learning as an area of scholarship and research. The parts were set in relief by a final chapter humorously reflecting how the field and practice of networked learning research might be characterised through parody of the structure, strategies and tropes in its literature. The two chapters 'flanking' the thematic parts of the book provide a reflective perspective on the development and current state of networked learning.

In this concluding chapter, we pick up on the reflective perspective. Our aim is to point from the present state to issues emerging for the future. We start in the first section with an overview of the focus areas and main claims presented by the chapters in this book. In the second section of the chapter, this overview is used to identify questions, potentials and challenges for future research and practice within networked learning.

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12.1 Summaries of Issues and Perspectives in the Chapters

12.1.1 Intro

The book's first chapter, *Becoming a knowledge community: The epistemic practice of networked learning* by Vivien Hodgson and David McConnell, serves as an 'intro' to the book. It provides a characterisation of the field of networked learning, as represented by NLC, based on a study of participants' perspectives. The study was performed utilising a questionnaire sent to persons with close association with the conference (regular attendants of NLC, conference organizers, contributors to the book series 'Research in Networked Learning'). The aim was to investigate how NLC is viewed—as research, practice and community—from within. Four main themes arose from participants' responses: *a critical space for dialogue and learning, community*, *scholarship* and *developing the practice of networked learning*. These themes emphasise that, in the eyes of the participants, the conference itself enacts the values of networked learning. Hodgson and McConnell conclude that the themes together constitute 'key aspects to the way the NL Conference 'institutionalises' and is a practical accomplishment of networked learning' (Hodgson & McConnell, this volume).

The chapter is significant for the field of networked learning because it bears witness to the 'coming of age' of a community whose participants view themselves as mutually committed to a set of academic values. Upon reflection, however, it also sparks the question whether other knowledge communities might not characterise themselves in similar terms and whether, therefore, the field of networked learning is demarcated primarily by the people who over time have committed themselves to the community and its development, rather than by specific research questions, methods, theories or focus areas. It raises the question whether networked learning is *also* demarcated in terms of academic domain or *only* in terms of the epistemic practice of a community. The relevance of this question is brought to the fore by the fact that a repeated discussion at NLC, involving newcomer and old-timer participants alike, is precisely what characterises networked learning in distinction to other fields.

12.1.2 Aspects of Mobility for Networked Learning in a Global World

Part 1 centres on the first of the book's three central themes: *mobility*. It thus picks up on the issue of *mobility, new forms of openness and learning in the public arena*, identified as an emerging perspective in the last book from NLC (Dohn et al. 2018). The part's two chapters focus in particular on the aspect of mobility, as it appears in the contemporary global economy of higher education and touch more indirectly on the other two aspects through this lens. The chapters offer, respectively, a macro

political perspective on the inequalities of global online higher education and a micro perspective of individual negotiation of identity across geographically and culturally distant practices in today's globalised world.

The part opens with a chapter presented by Bronwen Swinnerton, Taryn Coop, Mariya Ivancheva, Laura Czerniewicz, Neil Morris, Rebecca Swartz, Sukaina Walji and Alan Cliff on *The Unbundled University: Researching emerging models in an unequal landscape*. The authors explore the changing higher education landscape, looking at the effects of financial pressures and market opportunities. Particularly they study the impact which online program management companies (OPM) and other providers have on public-private partnerships through the delivery of unbundled educational services. Unbundling is a process where educational modules are offered in higher education, yet they are developed and managed as individual, independent entities in partnership with educational institutions. Based on their data, the authors explore where these partnerships emerge and how this relates to differentiation in the higher education sector. Using pattern recognition, the authors conclude that OPMs predominantly partner with traditional well-established institutions, reinforcing existing asymmetrical relationships in society and in the higher education sector. The authors find that rather than disrupting education, these partnerships seem to echo and possibly reinforce existing differentiation in higher education. Further development and integration of private-public partnerships raise questions about drivers for change, opportunities to access education, student experience and equity in the educational system.

The significance of this chapter for networked learning centres on two aspects. First, the chapter provides a critical sociological account of the changing higher education landscape which supports the field in engaging further into discussions on equality, student experience and access to education. Of particular interest is the impact of unbundled education on the development or sustainability of (national) educational systems and the tensions that arise from institutional and OPM partnerships in an increasing global educational market. Secondly, the chapter may open up further inquiry into the role of OPMs and other unbundling arrangements in higher education and their impact or ability to drive pedagogical innovation (or not) for networked learning design and delivery. What roles and responsibilities will OPMs have in relation to educational design, what are their agendas/motivations for doing this and how successful will they be in a largely conservative environment?

In the following chapter called *Distilling complexity through metastability and mobilities: the networked learning of Amara*, Michael Gallagher uses a mobility and metastability framework to explore the complexity of connections and agency that exist within the networked learning practices as experienced by learners. The mobility focus provides an interesting lens to critically describe and demonstrate how these networked practices are enacted, experienced and structured by both the individual and larger structural relationalities outside the individual. Gallagher concludes that more research is needed to uncover how these practices develop and evolve interdependently and which impact (mobile) technology has on shaping them.

The way Gallagher positions a mobility framework to understand the range of connections which learners are confronted with on a day-to-day basis provides a valuable contribution to networked learning. Placing the emphasis on the networked agency of learners is a refreshing reminder when thinking about designing for networked learning. Gallagher's approach connects with the research done by Gourlay and Oliver (2016) and with Dohn's (2014) work on understanding the primary context and its significance for networked learners. These authors point out the relevance of understanding and taking the learner's situation and contextuality into account when designing for and engaging in networked learning practices. Especially from a networked learning perspective it will be interesting to find ways to connect more directly and explicitly with the learners' context and bring this into the frame of shared social learning activity. This will help in making the shift from supply-based education and learning to a more context-focused and demand-driven approach.

12.1.3 Use and Misuse of Algorithms and Learning Analytics

Part 2 addresses the second theme of the book, *data*. It thus explores a theme that until NLC 2018 had been surprisingly under-investigated within the field of networked learning. Despite its increasing prominence within higher education research more broadly, the issue of *learning analytics* and, in general, the use of algorithms are developing areas within networked learning research (Dohn et al. 2018). This part contains three chapters which between them show both potentials and risks of algorithmic analyses for research and learning. They highlight how such analyses can bring to the fore data and processes that would not otherwise be apparent. They also illustrate, however, that this may well be to the expense of hiding other perspectives and/or influencing learners (and teachers) in problematic (e.g. biased) ways.

The part's first chapter is written by Marc Esteve Del Valle, Anatoliy Gruzd, Priya Kumar and Sarah Gilbert. They contribute with a thought-provoking chapter, *Learning in the wild: Understanding networked ties in Reddit*, which illustrates the research potential of algorithmic analysis in an investigation of informal learning processes occurring in the social networking site Reddit. Analysing two Reddit online communities, AskStatistics and AskSocialScience, they empirically investigate the formation of ties amongst their users. Their study shows that informal learning processes in these online communities are affected by two main forces: properties of the network, such as reciprocity and transitivity, on the one hand, and users' individual position within the network, such as being a 'regular' user or a moderator, on the other hand.

This chapter analyses networked learning communities using the exponential random graph models (ERGM), a statistical tool designed to test various network-based hypotheses. This is done by generating a large set of random networks, based on a chosen set of network configurations and node attributes. These random

networks are then compared to an observed network. The chapter's contribution to the field of networked learning is (at least) twofold. Firstly, in relation to its research question, the chapter reveals that informal learning is formed at the intersections of network configurations and individual attributes. Secondly, the chapter represents a methodological contribution by illustrating the usefulness of applying network analytics and concepts based on social network analysis in research of informal networked learning processes.

In *Dashboard literacy: understanding students' response to learning analytic dashboards*, Liz Bennett and Sue Folley explore the graphical interfaces that manipulate and present data about students' learning behaviours. The chapter focuses on student interpretation of and response to dashboard representations of own learning. It is based on a small-scale study and informed by Sutton's (2012) three pillars of feedback literacy: knowing, becoming and acting. Bennett and Folley show that using dashboards should be understood as literacy practice and that such practice is closely related to students' sense of identity and being. Therefore, dashboards should be used with care and acknowledgment of their power to influence not only student learning but also their well-being.

In our age of rampant datafication of education, this work is significant for networked learning in several interconnected ways. First, the chapter shows that various ways of representing data about students, exemplified by dashboards, are far from neutral. Second, and more specifically, relationships between using dashboards and student sense of identity and being, as understood in the chapter, indicate that we need to examine our tools for data representation way beyond the narrow notion of literacy. Third, the chapter offers useful practical recommendations for the design and implementation of dashboards. Fourth, based on the general critical sociocultural approach of networked learning, the relevance of these recommendations for other digital tools is obvious and it should be quite easy to adapt to them.

Whose domain and whose ontology? Preserving human radical reflexivity over the efficiency of automatically generated feedback alone, by Amanda Russell Beattie and Sarah Hayes, reports an autoethnographic account of teaching and learning in relation to automated feedback. Authors make a distinction between 'human feedback' as information arriving directly from a human being and 'non-human feedback' which arrives from automated computer systems. They examine theory and practice of automated feedback in relation to universities and within the context of networked learning theory, challenging the uncritical application of algorithmic processes in teaching and learning. In conclusion they advocate for a radically reflexive interpretation of feedback, which reaches beyond a 'solutionist' view of digital technologies and which allows teachers and students to become co-producers of knowledge.

This chapter is closely linked to some key values of networked learning including but not limited to cooperation and collaboration in the learning processes, self-determination, trust and investment of self in the networked learning processes. With its autoethnographic approach, the chapter shows that automated feedback carries significant human (emotional) investment. The proposed solution, a radically

reflexive interpretation of feedback, significantly contributes to networked learning research by pointing towards the intersections between the automatic and the human, the calculated and the emotional. Offering alternative understandings of automated feedback, it rejects the notion of students as customers and invites academics to treat them as (potential) co-authors. This could be very valuable in teaching and learning of the future.

12.1.4 Understanding and Empowering Learners

Part 3 centres on the third theme of the book, *learner agency*. In so doing, it provides new perspectives to a recurrent theme within NLC, namely, *differences between participants and in participant experiences—and the implications for the practice of online educators* (Dohn et al. 2018). Many aspects of interaction have implications for how participants experience networked learning. The part's four chapters home in on four such aspects, addressing also their potential for empowering learners: *cognitive load* of learning environments, students as co-researchers of *semantic data*, *power* in student communities of practice and the role of *boundary objects* for students traversing between learning practices. Between them, the four chapters thus contribute with insights into individual, social and technical influences on participant experience.

The first chapter is *Understanding and identifying cognitive load in Networked Learning* by Benjamin Kehrwald and Brendan Bentley. It explores how cognitive load theory may be a framework informing networked learning design and understanding of student experience. Cognitive load theory has generally not received much attention in networked learning research and this paper raises some very interesting points about how this framework can be of use to minimise or reduce unnecessary cognitive load in networked learning situations. After identifying areas of cognitive load in common networked learning situations, the authors propose a research agenda on exploring instances of cognitive load, based on technical aspects of networked learning. Suggested research areas for this agenda are: presentation of information and user interface design, research into instructional design and student learning in networked learning practices and research in learning to learn in networked learning. Studying cognitive load experienced by novice learners for example will help the development of networked learning environments.

By connecting cognitive load theory with networked learning, Kehrwald and Bentley's chapter makes an important contribution to networked learning research as this approach has many implications for the design of networked learning environment and the understanding of (lack of) learner activity, depending on cognitive load. Their critical reflection of networked learning environments and suggested research agenda supplement the learner perspectives commonly found within networked learning with more cognitively focused explanations. We hope that this work will inspire a new strand of research within the networked learning community which can integrate cognitive, motivational and social dimensions of learner

experiences by bringing the field of cognitive load theory into the frame of networked learning and vice versa.

In the chapter *Networks of knowledge, students as producers, and politicised inquiry*, Patrick Carmichael and Frances Tracy explore the notion of 'students as producers' through cases investigating the educational potential of semantic web and linked open data. They critically challenge the notion of 'students as producers', framing their criticism from the perspective of an 'excess pedagogy' where 'students can be enabled to transcend the constraints of consumerism by overcoming the limits of what it is to be a student in higher education' (Neary and Hagyard 2010, p. 210). They illustrate 'pedagogies of excess' where students in charge of their own inquiries contribute knowledge artefacts to wider networks. This leads to the argument that students (and teachers) need to develop critical digital and data literacies going beyond a simplistic view of these as marketable competences for future jobs. Rather, students and teachers should become critical consumers and producers of data, knowledge and practices that are shared with wider networks, thus reconnecting with the radical and emancipatory purposes of higher education.

The chapter by Carmichael and Tracy provides a thoughtful critique of the Edumeme 'student as producers'. For as they discuss, this is an ambiguous concept that can cover widely different purposes ranging from students developing valuable competences for employment to the more radical idea of an 'excess pedagogy'. With this concept, the authors align with central values within networked learning such as collective inquiry, relational dialogue, collaboration and the need to develop a critical disposition. The concept of 'excess pedagogy' is thus highly relevant for networked learning, but something that—to our knowledge—has not yet been explored much within networked learning literature. Thus, the chapter with its discussion of an 'excess pedagogy', its analysis and case examples adds to developing a stronger vocabulary and theoretical underpinning to ideas of critical and emancipatory pedagogies.

In the chapter *Stewarding and power in networked learning*, Andrew Whitworth and Lee Webster investigate decision-making in groups and the emergence of negotiated information practices within learning networks. They do so to understand how power is integral to such processes and to shed light on the role of community in networked learning. The study builds on a large corpus of text generated by groups' discussions in a Blackboard forum. This is used to understand how students learn to steward their digital habitat, thus building on and substantiating the notion of stewards and digital habitats as initially developed by Wenger et al. (2009). The analysis sheds light on power as a force working internally in the groups, but equally as a regime instilled by the assessment requirements of the course which the group work is part of. The authors show how difference and diversity emerge across the groups as a result of the ways they adopt and conceptualise technologies.

This chapter speaks readily into the theme of 'learning spaces' that was also raised as an emerging issue in Dohn et al. (2018). Further, as pointed out by De Laat and Ryberg (2018) in the introductory chapter to the same book, the themes of communities of practice and social learning have been recurring and strong themes within networked learning research. However, the chapter by Whitworth and Webster adds further nuance and detail, for one thing by adopting the idea of how

students learn to steward their digital habitats and for another by drawing on analyses of power in the student groups. The analyses of how students take on stewardship in their own groups, while balancing and negotiating power issues arising both internally and externally, are insightful and add greatly to our current knowledge of how (partly) self-directed learners adopt networked technologies into their learning processes. Further, Whitworth and Lee's discussion of how power and external/internal constraints are not only limiting students but also serve as generative forces are important insights in relation to designing for networked learning.

In the chapter *Boundary practices and the use of boundary objects in collaborative networked learning*, Marianne Riis and Lone Dirckinck-Holmfeld explore issues of knowledgeability and identification in design for boundary practice in networked learning. Analysing two cases from an online programme (one set within a 2D virtual learning environment, the other within a 3D virtual world), they study participants' use of boundary objects. With inspiration from the hierarchical typology for boundary objects developed by Carlile (2002, 2004), they identify, in both cases, boundary objects aiming for transfer, translation and transformation. However, certain boundary objects in the 3D environment seem to promote embodied transformation that has implications for the identity formation of the participants. They suggest that boundaries and boundary objects should not only be understood as sociocultural entities, but also as socio-material differences and dependencies. For example, the materiality of the 3D environment and avatars provide new relational and performative opportunities for networked learning.

Much like the chapter by Whitworth and Webster, the chapter by Riis and Dirckinck-Holmfeld speaks into the theme of learning spaces and in many ways explore similar issues. Both chapters focus on students' appropriation of networked technologies in their learning, but equally on how other entities, such as curricula, avatar-mediation, standards and regulation, are important in shaping practices. Riis and Dirckinck-Holmfeld approach this from the perspective of boundary objects and boundary practices and suggest to adopt a socio-material perspective to better understand, for example, 'the entanglement of material artifacts and the bodily performances of the learners' (Riis and Dirckinck-Holmfeld, this volume). In this way the chapter speaks into the ongoing socio-material turn that we see taking place within the networked learning community (Ryberg and Sinclair 2016) and which we will return to. The chapter, although picking up the term 'virtual', also implicitly problematises this term and suggests that we understand entities such as avatars as socio-material entities, rather than view the virtual/online as a distinct realm of existence disconnected from the material world.

12.1.5 Outro

The final chapter before this concluding one is *Laugh with us, not at us: parody and networked learning* by Christine Sinclair. It serves as an 'outro', adding a further reflective stance to the book's 'intro' provided by Hodgson and McConnell's study of participants' perspectives on NLC (Chap. 1, cf. above). Sinclair's reflective

stance is taken by investigating whether the rhetoric structure, strategies and style of NLC papers are consistent enough despite differences in content to allow a characterisation by parody. She follows Bakhtin in stressing that parody supports recognition of common traits and opens for renewal of these traits through laughter. She humorously identifies a typical structure of an NLC paper and proceeds to reflect on networked learning research—and the degree to which parody is or should be present in it—through filling out each of these generic sections. This leads Sinclair to suggest 'the novel' in its literary sense as a possible metaphor for networked learning: Networked learning as educational development 'attempts to capture the multivoiced nature of contemporary communication' (Sinclair, this volume).

The importance of the chapter for the field of networked learning resides partly in its caringly critical call for reflection on the significance of a (standardised) rhetoric in NLC papers, partly in stimulating questions through this reflection that are similar to the ones raised in the book's 'intro' in Chap. 1. As regards identification of a standardised rhetoric, this on the one hand underlines a common epistemic practice of NLC. On the other hand, it raises the question to which extent format might tyrannise or hollow out content and, further, how one can transgress standardised rhetoric to ensure that relevance of content, not format, is decisive. This leads to the second point, namely, the question, again, whether demarcation of the field of networked learning might first and foremost be a matter of pointing to a community of people and their 'repertoire' (Wenger 1998) of rhetoric actions, rather than a matter of academic domain.

12.2 Emerging Issues for Further Research in Networked Learning

In the first section of this chapter, we summarised the main points of each of the book's chapters and highlighted the new perspectives and insights they provide—individually and together—to the field of networked learning. In this second section, we pick up on some of the points and show how they combine to, on the one hand, provide a characterisation of networked learning today and, on the other hand, to articulate questions and challenges for future research and practice within the field.

12.2.1 Demarcation and Characterisation of the Field of Networked Learning

As discussed, both the 'intro' and the 'outro' chapters (Chaps. 1 and 11) serve to characterise the networked learning field through identifying traits characteristic of its community. Chapter 1 thus highlights the academic values that, according to

participants at NLC, the conference practices as well as preaches. Chapter 11 pinpoints a typical rhetoric structure and style, along with typical rhetoric strategies of NLC papers, indicating part of the 'repertoire' of the community (Wenger 1998). From the chapters emerge a depiction of networked learning as coherent and cohesive at a meta-level, because the community welcomes openness of mind, critical reflection on own and others' presuppositions, involvement in dialogue, interest in (non-specified) theory and a humorous stance. Neither of the chapters, however, characterise the field at the domain level in terms of, e.g. academic focus area, methods, research questions or theories.

This is in part due to the research questions of the two chapters which are not centred on content issues. For the tenth anniversary Networked Learning Conference, De Laat and Ryberg conducted a trend analysis of the conference proceedings treated as a text corpus (De Laat and Ryberg 2018). This actually goes quite a way towards addressing the question of content characterisation: It provides an overview of, amongst others, the learning theories, methodologies and technologies which have been mentioned in the conference papers over the years. In this sense, the chapter serves as an ostensive, pragmatic, extensional delimitation of networked learning—indicating the field by showing what issues the researchers who participate in the conference have *de facto* dealt with. Still, a pragmatic, extensional delimitation of a field does not constitute definition of its intension (i.e. of its meaning). Nor does it relate to the *de facto* work of other research communities which—hypothetically—might have engaged with the same issues as the networked learning researchers. It therefore does not answer the questions which the chapters by Hodgson and McConnell and Sinclair quite naturally prompt: *What is the nature (are the natures) of Networked Learning?* and *(How) does Networked Learning differ domain-wise from other research within the fields of Education and Educational Technology?* These questions, for their part, call for a characterisation of networked learning in terms of, respectively, domain traits (internal characterisation of the research field's intension) and domain demarcations (what distinguishes it from other research fields). As indicated, the challenge to supply this kind of characterisation is a recurrent issue at NLC, posed by both newcomers and old-timers.

The challenge has, of course, been taken up numerous times. Usually, this is done by way of the definition provided by Goodyear et al. (2004)—where this definition is presented either as *answer* to the challenge or as outset for *criticising* or supplementing it. As Jones comments:

> *The … definition, having proved remarkably resilient in a fast changing field, remains a cornerstone for the networked learning conference series in many research studies, edited collections and this book series [the Springer Series on Research on Networked Learning].* (Jones 2015, p. 5)

Arguably, however, the definition has taken on this role more because of the research community than because of its unambiguous domain characterisation of the field of networked learning. The definition was initially crafted in 1998 as part of a successful research proposal in the UK (Carvalho and Goodyear 2014), out of which the Networked Learning Conference series has sprung, with the original grant holders

as core participants in the development of the conference. So in this sense, the story of the definition's persistence may as much be the story of the development of a specific research community—the focus of Hodgson and McConnell's chapter (this volume)—than of the definition's precise demarcation of a field.

Looking to the definition itself, it states that networked learning is

> *...learning in which information and communications technology (ICT) is used to promote connections: between one learner and other learners; between learners and tutors; between a learning community and its learning resources.* (Goodyear et al. 2004, p. 1)

On the face of it, the definition may seem to do the job of providing a domain characterisation of networked learning. Thus, apparently it specifies ICT as a crucial domain trait—which of course raises the question of domain demarcation from other ICT-focused approaches to learning such as e-learning, online learning, technology-enhanced learning (TEL) and computer-supported collaborative learning (CSCL). Proponents of the definition stress, however, that '[t]he key term in this definition is *connections* and the emphasis is on the interactions between people mediated by technology and between people and resources' (Jones 2015, p. 5) (cf. also Carvalho and Goodyear 2014; McConnell et al. 2012). This does provide some domain demarcation—at least by way of emphasis—from e-learning, online learning and TEL, though not so clearly from CSCL. On the other hand, it prompts the question what would then—at least in technology-rich countries—*not* count as networked learning today: Here, it is difficult to find situations where no ICT is involved in 'prompting' learners' connecting to one another, if only in the form of mobile texting each other to arrange when to meet.

The question is reinforced by statements to the effect that pure interaction with online materials is not sufficient to count as networked learning (Carvalho and Goodyear 2014; Jones 2015). It is further buttressed by considering that 'information and communications technology' is not well-defined. Nowadays, we take it unreflectively as referring to 'something with a computer'—or, depending on context, a mobile phone, a tablet, a GPS, a coffee machine/watch/lamp/any artefact connected to the Internet. This is clearly vague at best. If we try to circumvent the vagueness by insisting that what is of interest is technology that supports *information [sharing] and communication*, then, conversely, any technology that does this will fall within the remit. As Hansen (2018) points out: '... consider the medieval times... The lectern... was and is clearly a communication technology used to promote more of the connections mentioned in the definition' (p. 50). Chalk (Jones 2015), clay tablets (Carvalho and Goodyear 2014), and upside-down beer crates also work to this effect. Once one realises that recurring figures within the community of networked learning today (including at least one of the co-chairs, cf. De Laat 2012) do not view mediation by computers or the like even as a necessary condition for networked learning, the door to the claim that it is hard to find an example of learning that does not count as networked learning (Hansen 2018) is driven wide open. Upon realising this, one might be tempted to give up on providing a domain characterisation and accept a pragmatist community delimitation: 'Networked learning is what the community of

researchers who identify themselves with the community take it to be'. The trend analysis provided by De Laat and Ryberg (2018) could then be taken to depict this 'what' and its development over the years.

This would be going too far, however. There is no doubt that the field of networked learning has evolved in the 20+ years since the research proposal and the first NLC. Technological possibilities have evolved, the interests of researchers have shifted, and newcomers to the community have introduced new perspectives that worked to modify the conference's focus as they became old-timers. The overview provided by De Laat and Ryberg (2018) clearly illustrates this. But that does not mean that domain characterisations of intension are not possible. They may turn out to be partly in plural, though—designating a *set* of approaches—rather than a single perspective. This is as it should be—that is part of evolving academic practice.

In the concluding chapter to the previous book springing from the Networked Learning Conference (Dohn et al. 2018), we pointed to five different understandings of 'networked learning' emerging in our community. We explicated how they differed from each other in (A) the *type* of network they focus on, (B) how they view the network as *supportive of learning* and (C) what it means for learning to be *networked*. We identified the five approaches based on their view of (A) as:

1. The 'network' is one of both ICT infrastructure and social relationship (the original focus of the definition in Goodyear et al. 2004).
2. The 'network' is a network of people (exemplified by De Laat 2012).
3. The 'network' is a network of situations or contexts (e.g. Dohn 2014).
4. The 'network' is one of ICT infrastructure, enabling connections across space and time (e.g. Swinnerton et al., this volume).
5. The 'network' is one of human and in-human actants in symmetrical relationship to each other (e.g. Fox 2005).

Within each of these five approaches, it is possible to provide a definition of networked learning which serves to characterise it on its own terms and to distinguish it from the others (for approach 4, this requires a further characterisation of the role social justice plays in the approach's take on learning). In providing these definitions, we also draw on Dohn (2018) who discusses the role of networked learning in the networked world of today, pinpointing six interrelated senses in which the world of today may be said to be networked.

1. 'Networked learning' is learning from, through and with other people, where one is separated in time and/or space from these other people and where communication with them is mediated by digital information and communication technology. Learning is thus networked in the double sense of coming into being through ICT-mediated connections with other people.
2. 'Networked learning' is learning from and through other people and the access they provide to learning opportunities, including new ideas, ways of participating in practice and co-development of new practices.

3. 'Networked learning' is learning through connecting between situations and the occasion this connecting presents to resituate knowledge and skills from known situations to new ones.
4. 'Networked learning' is learning mediated by digital information and communication technology, where the situations of learning are separated in time and/or space. Typically, adherents of this definition will stress that a social-critical reflective perspective on learning situations is a necessary characteristic of this approach, too. That is, to be a 'networked learning study', one must focus on issues of social justice, empowerment, democratisation, etc. within the field of learning mediated by digital information and communication technology.
5. 'Networked learning' is any and all learning, because every instance of learning can be viewed as the result of concrete socio-material entanglement of physical, virtual and human actants. In other words, this approach requires that one takes a certain systemic, socio-materially informed approach to learning (cf. below).

The challenge is to provide traits and demarcations that cut across these different approaches, inclusive enough to embrace them all and precise enough to delimit the field from other fields. We view the comprehensive answer to this challenge as a task for future research papers but would like to propose some tentative suggestions.

Firstly, the different senses of network are united in an *underlying formal approach* where nodes and edges of the network can be represented in a mathematical model (Hansen 2018). Though this is often not an explicit focus for authors, our suggested definitions for the five approaches all hinge on the formal characterisation of a network in terms of nodes and edges.

Secondly, viewing learning as networked is a methodological stance which focuses on *relationships* between phenomena and on depicting and explaining learning in terms of these relationships. This contrasts with a methodological individualism which seats explanations in attributes of the individual (Hansen 2018). More specifically, Haythornthwaite and De Laat (2012) point out that taking a relational approach to learning entails focusing on questions such as *who learns what from whom, what kinds of interactions happen between people who learn together, which direction do resources flow, how frequently do learning interactions happen and how important are they for the people involved*. The conspicuousness of the relational approach varies, though, with some authors explicitly stating it as a defining characteristic (e.g. Jones et al. 2005) and others taking the relational perspective as outset for asking more individually focused questions. Kehrwald and Bentley's analysis (this volume) of the cognitive load of networked learning environments is an example of the latter.

Thirdly, the different approaches to networked learning all give priority to a *focus on learners, learning and design for learning*, rather than to the technology itself with which learning is facilitated.

Finally, as technology and practice have both developed, it is becoming increasingly arbitrary to restrict investigation of networked learning to communication within specific ICT-mediated online environments—'virtual learning spaces'. Quite

generally, learning and education have become postdigital (Jandrić et al. 2018) in the sense that digital resources, media and spaces are integrated parts of all learning spaces, not special ones sometimes added to physical learning spaces or chosen as special 'delivery modes'. Learners move in and across such hybrid physical-virtual spaces and negotiate their many interdependent practices in so doing. Accordingly, the interest in learners' connections with resources and with each other, articulated as anchorage points for networked learning in the definition from 2004 by Goodyear et al., is increasingly being pursued in the hybrid spaces in and across which learners engage, rather than in specific ICT-mediated online environments. Gallagher's exploration (this volume) of networked learning practices from a mobility point of view provides an interesting example. He illustrates how these practices should be viewed in a larger networked context so that even though individual agency is important, the interrelated dependencies through larger structures mean that the networked learner is never disconnected, but constantly multitasks across diverse learning spaces.

12.2.2 The Socio-Material Turn

Echoing the previous section, it seems hard to point at learning within higher education or professional development which does not in some way or another involve digital technologies (at least in technology-rich countries). Far back seem the days where we 'went online', 'surfed the web for information' or engaged with exotic 'virtual communities'. Digital technologies and the Internet, or what we perhaps should rather term 'connectivity', are pervasive in everyday life (in parts of the world): in the home, in education, at work and in transit. This, we would argue, underpins the socio-material turn which the field of networked learning seems to be undergoing at the moment. With this turn, there is an increased interest in 'hybrid' environments, materiality and place (Carvalho et al. 2017), and, as touched upon in the previous section, the question becomes pertinent whether networked learning even needs to be technology-mediated. There is an increased interest in networked learning (in senses 2, 3 and 5 above) taking place as campus learning, informal learning and learning on the move, as well as in issues such as transfer, boundaries and boundary crossing connected with these different learning arenas. Gallagher's chapter (this volume) illustrates the complex shifts which learners must accomplish to navigate a multitude of learning arenas. Furthermore, we see an increased focus on entanglements between 'the digital' and a range of nondigital phenomena (material as well as non-material), such as curricula, standards and guidelines, and other wider systemic influencers. This is highlighted in the chapters by Whitworth and Lee and by Riis and Dirckinck-Holmfeld.

By saying that networked learning is experiencing a socio-material turn, we do not necessarily mean that researchers are explicitly adopting socio-material or (post)-actor-network theories (though many do). Rather, we are pointing to wider

shifts in attention occurring over the years in the networked learning community. In the following we suggest and discuss four aspects around which these shifts revolve:

- The *educational contexts* of networked learning (from formal higher education and professional development to learning in 'the cracks')
- The *places* of networked learning (from 'here' to everywhere)
- The *technologies* of networked learning (from institutional technologies to learner-directed habitats)
- The *agencies* of networked learning (shifting boundaries between humans and technology)

In terms of *educational contexts*, networked learning has from its outset been focused particularly on higher education and professional development. This perspective has over the years widened to include *'research in education and organisations spanning formal and informal learning settings'* (http://networkedlearningconference.org.uk/). Particularly, the interest in 'informal learning' (see, e.g. Esteve Del Valle et al., this volume) and learning happening outside or in 'the cracks' of formal education seem to be on the rise, as noted by De Laat and Ryberg (2018):

> Through their connectivity and use of mobile devices, learners become even more aware that they are learning all the time and that they through their contributions are not only consumers of knowledge but indeed creators of knowledge. Using Twitter, Facebook and other social media, a lot of our learning takes place in the 'wild' and therefore increasingly outside of traditional educational institutions. (De Laat and Ryberg 2018, p. 18)

But even within the bounds of the formal education system, we see the move towards flexibility of learning and the subversion of rigidly defined full educational programmes. The flexibility is institutionalised—for good and for bad—in the unbundling of modules into independent entities from which learners can pick and choose to compile their own education, tailored to their interests and needs (cf. Swinnerton et al., this volume).

Furthermore, there are also many opportunities for learning in the 'wild' or in 'the cracks' even within the generally bundled formal educational programmes offered in-house in higher education. Learners can more easily find additional or alternative sources for their learning, consult MOOC courses, find lectures or tutorials on streaming video services and steward personal or shared 'digital habitats' as explored by Whitworth and Lee (this volume). Further, as Carmichael and Tracy (this volume) note, learners can also—within formal courses—be empowered to engage with and contribute their knowledge artefacts to wider networks, or formal courses can invite external participants into the ongoing conversations (which was one of the ideas behind the first cMOOCs in 2008). This idea is explored as hybrid course designs in a new volume in the Research in Networked Learning series, focusing on networked professional learning (Littlejohn et al. 2019).

These changes are intimately connected to the *places* for networked learning, and as noted in the citation from De Laat and Ryberg (2018), learning is less tightly bounded to specific places or 'heres', such as the campus, the library, the workplace

or the home. Rather, engaging with other learners, course materials and informal learning opportunities can happen 'everywhere' and connectivity allows and offers new opportunities also for how to embed mobility into formal education (Gallagher and Ihanainen 2016). This is not to suggest that learning becomes 'placeless' or takes place in a 'cyberspace' disconnected from social and material contexts, but rather that learning is potentially distributed across different places, bounded and affected by what those places afford, as explored, e.g. by Timmis and Williams (2016).

Another shift, we argue, is a shift from institutionally provided *technologies* to learner-directed habitats. While institutionally provided technologies, such as virtual learning environments, digital exam systems and the myriad of other administrative tools in educational institutions, are important for both learners and teachers, it is also clear that both students and teachers can seek out and work with multiple tools and resources outside the institution. Students in online or campus programmes are not strictly dependent on the institution to provide, for example, spaces for sharing files, systems for collaborative writing or videoconferencing tools for them to meet and discuss. As discussed by Whitworth and Lee and by Esteve Del Valle et al. (this volume), there are multiple technologies and online spaces available outside the institution, and students can steward their own 'constellations of technologies' (Ryberg et al. 2018). Often, they are able to draw on a much more complex ecology of technologies than what is provided by the institution (Caviglia et al. 2018).

Finally, we would suggest that there is also a shift in the *agencies* of networked learning which more specifically have to do with shifting boundaries between humans and technology. While networked learning has always been concerned with technology mediation, the agency of the intermediary link between learners, between learners and the resources they access and between learners and teachers/facilitators is becoming more complex. Dashboards and automated feedback as explored by Bennett and Folley and Beattie and Hayes (this volume) are deriving and processing data through difficult-to-grasp artificial intelligence and machine learning algorithms. The operations involved are well beyond the expertise of the vast majority of teachers, students and researchers to really understand and see through. While learning technologies have never been pedagogically neutral, the biases, implicit pedagogies and underpinning assumptions have become increasingly complex, black-boxed and inaccessible to critical inspection over the last decades. As illustrated in the chapters by Bennett and Folley and by Beattie and Hayes (this volume), this leads to non-transparent agency of technology and a diffusion of responsibility away from teachers and learners. The shift in agency can, however, equally be investigated from a more playful and experimental perspective, as exemplified by Ross (2017). Here, a Twitter chatbot was used as part of a MOOC (the E-learning and Digital Cultures Massive Open Online Course [EDCMOOC]) to explore and reflect on the changing agencies and boundaries between humans and technology. No matter whether we explore such changing agencies and boundaries through playful experimentation and/or critical enquiry, this is an important area for future research within networked learning. It raises questions such as how the changing relations between humans and technology transform the experience and meaning of being a teacher or a student (and perhaps also of being a chatbot) as well

as how the black-boxing of technology can be circumvented to empower learners and teachers alike. Such questions have become all the more pressing with the advent of so-called intelligent and adaptive technologies that mediate between learners and between learners and teachers.

Drawing together these four aspects of shifts in *educational contexts, places, technologies and agencies*, we wish to point out that the boundaries between the digital and analogue and between the online and offline have become increasingly messy and distributed in time and space—and with them the whole landscape of learning. With a biological metaphor we could think of these shifting boundaries as ecotones. Ecotones are:

> [...] a transition area between two biomes. It is where two communities meet and integrate. It may be narrow or wide, and it may be local (the zone between a field and forest) or regional (the transition between forest and grassland ecosystems). An ecotone may appear on the ground as a gradual blending of the two communities across a broad area, or it may manifest itself as a sharp boundary line. The word ecotone was coined from a combination of eco(logy) plus -tone, from the Greek tonos or tension – in other words, a place where ecologies are in tension. (https://en.wikipedia.org/wiki/Ecotone)

Ecotones can thus be marked by sharp divides, but equally as more organic, messy blends. Perhaps rather than thinking in terms of sharp divides between online/offline, digital/analogue and formal/informal, we can empirically explore various ecotones of networked learning, where different ecologies meet, bridge or cross boundaries between *educational context, places, technologies and agencies*.

12.2.3 Evolving Forms of Networked Learning Design and Assessment

Returning to the question of what characterises the research focus of networked learning across the different understandings of the field, at least one further common trait can be identified which cuts across the focus on technologies or social connections as the 'networking' aspect of networked learning: a keen pedagogical interest in designing for networked learning activity (Hodgson et al. 2014). This interest surfaces in attention to the underpinning principles and values for networked learning, with many researchers probing pedagogical implications and innovation for networked learning design. This significant work is continued in the present volume in chapters drawing on analytics as well as (new) learning theory and learning contexts to reflect on and inspire designs for networked learning and assessment.

In terms of learning theory, Kehrwald and Bentley (this volume) explore the potential of cognitive load theory to improve networked learning design and assessment. As indicated, this is an under-researched area in the networked learning community. In their chapter, they demonstrate how cognitive load theory can be a useful framework to facilitate focus on offloading unnecessary cognitive load from the learners so that they can focus more strongly on learning tasks at hand. Their work

may open up a new stream of pedagogical research on designing networked learning environments, instructional design and learner activities. This work is of particular interest when considering the changing student profile in higher education (Ortagus and Tanner 2019). Students in higher education are no longer predominantly novice learners in the age bracket of 18–25, studying full time and able to invest in learning to learn or engage in networked learning practices. Instead, many learners nowadays have to manage other work-life aspects and balance these with their ability to study. In consequence, they have less time to study and/or stretch their education over a longer timeframe, distribute costs and integrate learning with professional needs and opportunities. Reducing cognitive load to improve learners' experience and their chances of success is a key area to focus on for this target group.

Design may also be informed from forms of networked learning in other contexts. Esteve Del Valle et al. (this volume), for example, explore informal learning in the wild by looking at social network patterns and how participation and learning relationships shape the development of networked learning. Such studies of spontaneous learning in online communities are increasingly showing promise by providing knowledge about people's intentions, abilities and ways of learning. Participation in informal online learning may change people's opinion about learning and, importantly, also their approaches to and expectations of learning. These changes from learning experiences in the wild may well be carried over to expectations of learning in formal and non-formal settings as well. It is therefore of the upmost importance that studies outside of the formal educational context are carried out and that their findings are introduced into the broader discourse on teaching, learning and learning design. For instance, based on social network analysis, Esteve Del Valle et al. conclude that learning is affected by network properties such as reciprocity and transitivity as well as learner roles in the network. These insights are highly relevant for formal education as well. Gaining more knowledge about how these properties influence participation and learner success also in formal learning situations will facilitate design for development of digital skills and literacies. This in turn is important to support people's potential to engage in lifelong learning as well as their ability to collaboratively solve problems and create knowledge relevant to their interests and learning goals.

Another development is the increased use of data to inform decisions about learning and design (Viberg et al. 2018). Learning analytics is an emerging field in education, showing promise as regards the use of organisational and learner data to increase our awareness of learner engagement and behaviour. This may further help inform design to improve learner experience. Visualisation techniques are currently being researched to provide feedback about student learning. Here, the provision of dashboards has been a popular approach to channel feedback information to both the learner and the teacher. Use of dashboards may certainly impact the facilitation of learning but, as Bennett and Folley (this volume) point out, it also has consequences in terms of learners' ability to use and reflect on this information. Good use of dashboards is dependent on the learner's ability to process, assess and act upon the feedback that they receive. It is not only about raising awareness. It is also about stimulating literacy practices that enable students to develop meta-learning skills to

change their approach to learning. The authors point out that 'institutions need to work with students to develop their personal and reflective processes to enhance the way that dashboards are interpreted' (Bennett and Folley, this volume). The adoption of dashboards requires great care. Not only may it have a negative effect on students' well-being and self-efficacy, it can also add to an already high cognitive load.

Aspects of feedback are further researched and criticised by Beattie and Hayes (this volume). In their chapter they critically scrutinise forms of (automated) feedback and especially how machine-generated feedback is applied in education to the extent that it may push out human engagement with it. They rightly point out that as technology becomes deeper integrated into our lives, we need to be careful and, in particular, to be aware that feedback may not have a causal relationship with learning or follow a predefined path. Similar to the chapter by Bennett and Folley they argue that reflection on feedback practices are needed if literacies, agency and empowerment are to be supported based on assessment of learning. On the other hand, if utilised with reflective awareness, increased feedback can provide a way to improve self-critical navigation of learning. This may empower students to become more successful and self-determined in shaping their networked learning practices, as illustrated in Gallagher's chapter on mobilities (this volume).

12.3 Concluding Remarks

The aim of this chapter has been to draw out insights concerning the central themes of the book, i.e. the themes of *mobility*, *data* and *learner agency* in networked learning. In the first section, we pointed out how each of the chapters in the book's three sections dealt with one (or more) of these themes. This served to highlight different contemporary takes of the networked learning community on the themes. In combination with the 'intro' and the 'outro' chapters, which pinpoint networked learning research practice, the chapters thus provide a characterisation of the field of networked learning today, as seen through the lens of the book's three themes. In the second section of the conclusion, we have identified a set of issues emerging out of the community's work with these themes: *demarcation and characterisation of the field of networked learning*, *the socio-material turn* and *evolving forms of networked learning design and assessment*.

Looking to the next conference in the Networked Learning Conference series which takes place in Kolding, Denmark, in May 2020, the themes of the present book resonate in the Call for Papers' suggested topics, as do also the emerging issues pointed at in this conclusion (cf. http://www.networkedlearning.aau.dk/nlc2020/call-for-papers/). Amongst the topics are thus *Learning on the move, places and spaces for networked learning* (echoing *mobility* and *the social-material turn*); *Roles of learning analytics, big data, and artificial intelligence in Networked Learning* (echoing *data* and *evolving forms of assessment*); *Networked learning literacy and agency* (echoing *learner agency*); and *Situating networked learning*

historically systematically, conceptually, etc. (echoing *Demarcation and characterization of the field of Networked Learning*). Further topics such as *learning at scale, in the wild and across boundaries* and *transfer and transformation of knowledge, practice and networked learning* also take up threads discussed in the book's chapters. We look forward with excitement to the next conference—and to the book of selected papers following it—for the continued conversation about this book's perspectives.

References

P.R. Carlile, A pragmatic view of knowledge and boundaries: boundary objects in new product development. Organ. Sci. **13**(4), 442–455 (2002). https://doi.org/10.1287/orsc.13.4.442.2953

P.R. Carlile, Transferring, translating, and transforming: an integrative framework for managing knowledge across boundaries. Organ. Sci. **15**(5), 555–568 (2004). https://doi.org/10.1287/orsc.1040.0094

L. Carvalho, P. Goodyear (eds.), *The Architecture of Productive Learning Networks* (Routledge, New York, 2014)

L. Carvalho, P. Goodyear, M. de Laat (eds.), *Place-Based Spaces for Networked Learning* (Routledge, New York, 2017)

F. Caviglia, C. Dalsgaard, J. Davidsen, T. Ryberg, Studerendes digitale læringsmiljøer: læringsplatform eller medieøkologi? Tidsskriftet Læring og Medier (LOM) **10**(18) (2018). https://doi.org/10.7146/lom.v10i18.96928

M. De Laat, *Enabling Professional Development Networks: How Connected Are You?* (LOOK, Open Universteit of the Netherlands, Heerlen, 2012)

M. De Laat, T. Ryberg, Celebrating the tenth networked learning conference: looking back and moving forward, in *Networked Learning: Reflections and Challenges*, ed. by N. B. Dohn, S. Cranmer, J.-A. Sime, M. De Laat, T. Ryberg, (Springer International Publishing, Cham, 2018), pp. 1–20

N.B. Dohn, Implications for networked learning of the 'practice' side of social practice theories - a tacit-knowledge perspective, in *The Design, Experience and Practice of Networked Learning*, ed. by V. Hodgson, M. de Laat, D. McConnell, T. Ryberg, (Springer, Dordrecht, 2014), pp. 29–49

N.B. Dohn, Introduction: competence demands in today's networked world, in *Designing for Learning in a Networked World*, ed. by N. B. Dohn, (Routledge, Oxon, 2018), pp. 3–24

N.B. Dohn, J.-A. Sime, S. Cranmer, T. Ryberg, M. De Laat, Reflections and challenges in networked learning, in *Networked Learning: Reflections and Challenges*, ed. by N. B. Dohn, S. Cranmer, J.-A. Sime, T. Ryberg, M. De Laat, (Springer, Cham, 2018), pp. 187–212

S. Fox, An actor-network critique of community in higher education: implications for networked learning. Stud. High. Educ. **30**(1), 95–110 (2005). https://doi.org/10.1080/0307507052000307821

M.S. Gallagher, P. Ihanainen, Field activity and the pedagogy of simultaneity to support mobile learning in the open, in *Research, Boundaries, and Policy in Networked Learning*, ed. by T. Ryberg, C. Sinclair, S. Bayne, M. De Laat, (Springer, Cham, 2016), pp. 127–144

P. Goodyear, S. Banks, V. Hodgson, D. McConnell (eds.), *Advances in Research on Networked Learning* (Kluwer Academic, Dordrecht, 2004)

L. Gourlay, M. Oliver, Reflecting on things: sociomaterial perspectives on academic development, in *Theorising Learning to Teach in Higher Education*, ed. by B. Leibowitz, V. Bozalek, P. Kahn, (Routledge, Abingdon, 2016), pp. 50–64

S.B. Hansen, Networked learning in a networked world, in *Designing for Learning in a Networked World*, ed. by N. B. Dohn, (Routledge, Oxon, 2018), pp. 48–63

C. Haythornthwaite, M. De Laat, Social network informed design for learning with educational technology, in *Informed Design of Educational Technologies in Higher Education: Enhanced Learning and Teaching*, ed. by A. D. Olofson, O. Lindberg, (IGI Global, Hershey, 2012), pp. 352–374

V. Hodgson, M. de Laat, D. McConnell, T. Ryberg (eds.), *The Design, Experience and Practice of Networked Learning* (Springer, London, 2014)

P. Jandrić, J. Knox, T. Besley, T. Ryberg, J. Suoranta, S. Hayes, Postdigital science and education. Educ. Philos. Theory **50**(10), 893–899 (2018). https://doi.org/10.1080/00131857.2018.1454000

C. Jones, L. Dirckinck-Holmfeld, & B. Lindtröm, CSCL-the next ten years: a view from Europe. In T. Koschmann, D. Suthers, & T.-W. Chan (Eds.), Proceedings of th 2005 conference on Computer support for collaborative learning: learning (2005): the next 10 years! (pp. 237–246). Abingdon: Routledge.

C. Jones, *Networked Learning* (Springer Verlag, Cham, 2015)

A. Littlejohn, J. Jaldemark, E. Vrieling-Teunter, F. Nijland (eds.), *Networked Professional Learning - Emerging and Equitable Discourses for Professional Development* (Springer, Cham, 2019)

D. McConnell, V. Hodgson, L. Dirckinck-Holmfeld, Networked learning: a brief history and new trends, in *Exploring the Theory, Pedagogy and Practice of Networked Learning*, ed. by L. Dirckinck-Holmfeld, V. Hodgson, D. McConnell, (Springer, New York, NY, 2012), pp. 3–24

M. Neary, A. Hagyard, Pedagogy of excess: an alternative political economy of student life, in *The Marketisation of Higher Education and the Student as Consumer*, ed. by M. Molesworth, E. Nixon, R. Scullion, (Routledge, Abingdon, 2010), pp. 209–223

J.C. Ortagus, M.J. Tanner, Going to college without going to campus: a case study of online student recruitment. Innov. High. Educ. **44**(1), 53–67 (2019). https://doi.org/10.1007/s10755-018-9448-9

J. Ross, Speculative method in digital education research. Learn. Media Technol. **42**(2), 214–229 (2017). https://doi.org/10.1080/17439884.2016.1160927

T. Ryberg, C. Sinclair, The relationships between policy, boundaries and research in networked learning, in *Research, Boundaries, and Policy in Networked Learning*, ed. by T. Ryberg, C. Sinclair, S. Bayne, M. De Laat, (Springer International Publishing, Cham, 2016), pp. 1–20

T. Ryberg, J. Davidsen, V. Hodgson, Understanding nomadic collaborative learning groups. Br. J. Educ. Technol. **49**(2), 235–247 (2018). https://doi.org/10.1111/bjet.12584

P. Sutton, Conceptualizing feedback literacy: knowing, being, and acting. Innov. Educ. Teach. Int. **49**(1), 31–40 (2012). https://doi.org/10.1080/14703297.2012.647781

S. Timmis, J. Williams, Transitioning across networked, workplace and educational boundaries: Shifting identities and chronotopic movements, in *Research, Boundaries, and Policy in Networked Learning*, ed. by T. Ryberg, C. Sinclair, S. Bayne, M. De Laat, (Springer, Cham, 2016), pp. 111–124

O. Viberg, M. Hatakka, O. Bälter, A. Mavroudi, The current landscape of learning analytics in higher education. Comput. Hum. Behav. **89**, 98–110 (2018)

E. Wenger, *Communities of Practice* (Cambridge University Press, New York, 1998)

E. Wenger, N. White, J.D. Smith, *Digital Habitats: Stewarding Technology for Communities* (CPsquare, Portland, OR, 2009)

Endorsements

Ann Bygholm, Professor, E-learning Lab, Aalborg University, Denmark

This book gives a coherent, thorough and up-to-date account on research in networked learning. The volume is well structured in three parts, focusing on mobility for networked learning in a global world, use and misuse of algorithms and learning analytics, and empowering learners. Within this structure, individual chapters address an amount of interesting issues such as the changing landscape of higher education, learning in the wild and cognitive load in networked learning. Two chapters, serving as, respectively, intro and outro to the body of the book, present an analysis from within on how networked learning has developed into a field of research and practice. The concluding chapter explicates and discusses insights concerning the central themes of the book and uses these insights to point forward at emerging foci within the field of networked learning.

Martin Weller, Professor, Institute of Educational Technology, The Open University, UK

This book is an essential collection for anyone interested in networked learning. It manages to combine a broad coverage of the main areas of interest, with an in-depth, critical analysis of the topics. Through chapters examining unbundling in higher education, analytics and the role of the learner in networks, the key issues not just in networked learning but higher education more broadly are given thoughtful treatment. The introductory and concluding chapters provide a historical and critical reflection on the field of networked learning, which provides much-needed longitudinal context to a field that frequently suffers from amnesia.

N. Bonderup Dohn et al. (eds.), *Mobility, Data and Learner Agency in Networked Learning*, Research in Networked Learning,
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