

What is it? Approaches to developing shared meaning about the logistics and supply chain industries: lessons from the *EMPATHY Net-Works* project

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This study explores the impact of different learning strategies in a part-time postgraduate programme, managed by the *EMPATHY Net-Works* project, to encourage graduate women into the logistics and supply chain industries (LaSCI). We use an interpretivist approach and data were collected from the e-learning system, academic assignments, and the module evaluation process. The outcomes of this study illustrate the different ways in which participants develop their language and hence their knowledge of the LaSCI. Three approaches were shown to have a significant impact on participants' understanding of the industries: the logistics safari, an inquiry-based project, and guest speakers and e-mentors. Finally, we explore the *EMPATHY Net-Works* community of practice and illustrate how it spanned a number of traditional boundaries. We show that active participation within this community supports women's progression into and within the LaSCI.

1. Introduction

This study is located in the recognition of the growing importance of logistics and supply chain (LaSC) management, and the need to recruit and retain a skilled workforce. The study focuses on the challenges involved in introducing women to an industry which they may not have considered previously as a career option and one that has a masculine image. Women are under-represented in the logistics and supply chain industries (LaSCI) e.g. in the UK only 22% of employees are women and in the Yorkshire and Humber region this figure drops to 18% (Grey 2005). The *EMPATHY Net-Works* project (part-funded by the European Social Fund) was established to enable women to enter the LaSCI and so this study is limited to the experiences of these graduate women as they took part in an accredited Masters-level module and e-mentoring. Consequently, the findings may not be generalisable to men's language development of the LaSCI.

The aim of this study is to explore the outcomes of the strategies used to introduce women to the LaSCI in order to encourage them to gain employment within these industries. Our interest in this study focuses on three questions,

- How do women develop their language and hence their understanding of the LaSCI?
- What learning strategies support women's developing understanding of the LaSCI?
- How does membership of a networked learning community of practice (CoP) support women's progression into and within the LaSCI?

2. *EMPATHY Net-Works*

The *EMPATHY Net-Works* project developed from the previous projects within the University of Hull Business School e.g. the *EMPATHY* and *EMPATHY Edge* projects (Headlam-Wells et al.2006). *EMPATHY Net-Works* provides graduate or

professional women access to a management and career development programme established to encourage their employment and progression within the LaSCI in the Humber region. Once recruited onto the project, the women take part in the blended learning module delivered on a part-time flexible basis over a period of 10 weeks. This study, which is part of a wider research project, focuses on three aspects of the project: women's language development, impact of specific learning activities, and the role of CoP in enabling women to progress into the LaSCI. The study explores the experiences of the first two cohorts of participants (a total of 33 women) who joined the project in Spring 2007.

The project team developed a flexible and innovative blended module involving a mixture of face-to-face and online learning activities using the web platform: iCohere. The underlying pedagogic framework for the module was based on socio-cultural theories of learning and, in particular, the concept of CoP. Van Hoek (2001) highlights the risk involved in teaching LaSC management from textbooks rather than current practice. Consequently, this programme involved the following learning strategies: workshops, guest speakers (experienced women managers from LaSCI), individual e-learning activities, inquiry-based group activity on a LaSC theme (this is a variation of the problem-based learning strategy mentioned by Gudmundsson and Nijhuis 2001), podcasts of interviews with women managers, and a logistics safari *i.e.* site visits to LaSC organisations. Multiple choice tests were used to measure the women's language development in the field of LaSC management. Participants who successfully completed the academic requirements of the module achieved 10 credit points at postgraduate level. The *EMPATHY Net-Works* project also supported e-mentoring, where participants were matched with an experienced woman manager, and provided opportunities for the women to attend seminars and conferences organised by the Logistics Institute.

3. CoP and knowledge construction

Contemporary professional development programmes are increasingly located in social theories of learning including CoP (Gherardi 2000, Lave and Wenger 2001). The development of degree level qualifications in LaSC management is a relatively new phenomenon, and Mangan and Christopher's (2005) study of the development of supply chain managers highlights the importance of knowledge-based learning in this field. They found that students' learning preferences were (in decreasing order): case studies, lectures, simulations, and site visits. Gudmundsson and Nijhuis (2001) highlight the use of collaborative learning through problem-based learning and case study methods in logistics education. Another example of collaborative learning is through CoP.

Lave and Wenger's (1991) concept of CoP provides a discourse, based on socio-cultural learning theories, that underpins the design and learning processes involved in many learning communities. There is a shift in interest from free-flowing to managed CoP (Lewis and Allan 2005) and Pauleen and Yoong (2001) explore boundary crossing within networked communities. *EMPATHY Net-Works* is an example of a managed CoP, involving a blend of face-to-face and virtual communications, and crossing the boundaries of home, the university, and the workplace including the LaSCI.

Lave and Wenger (2001) explore the experiences of new members in a CoP and introduce the concept of 'legitimate peripheral participation' *i.e.* the process through which newcomers to the community move from a position of minimal participation or outsider status to one of full community membership and insider status. The process of becoming full members is a learning process where participants gain full knowledge and acquire proficiency in the practices of that community. This is relevant to the current study as it suggests that a boundary spanning community has the potential to enable participants to enter a new industry or sector. Wenger (2003) states that CoP recognises diversity and conflict between its members.

4. Developing a language for the LaSCI

Eckert and McConnell-Ginet (2000) use the concept of CoP as a theoretical framework to analyse language and communication. They suggest that CoP allows the connection of different theoretical abstractions, such as social and linguistic (*e.g.* gender and language) that provide a wider perspective of how people develop shared meanings within communities. In this study, we are using the same framework to discuss the use of language, within the *EMPATHY Net-Works* CoP. Language is a way of articulating knowledge, to bring it to life, and to express it. Through an examination of the use of language, we aim to understand the impact of the module's learning activities on participants as they develop their language and hence their understanding of the LaSCI. Our exploration of these social and linguistic constructs is restricted to the use of language in the written format because of the online nature of the CoP.

The concept of CoP is defined by its membership and by the practice in which that membership engages (Lave and Wenger 1991). Becoming a member of a CoP implies learning the practices of that community. For Wenger learning is a social process where members learn through participating in the community's activities. Practices involve among other things using the language of that community. As language is a 'social practice' (Bucholtz 1999), we can presume that community members also acquire 'sociolinguistic competence' (Holmes and Meyerhoff 1999).

Ahmad and Al-Sayed (2006) state that special language in CoP is consciously created to foster a sense of common purpose amongst a group of people and sometimes to exclude non members from CoP . Holmes and Meyerhoff (1999) explore the characteristics of CoP in relation to the use of language using three constructs.

- *Mutual engagement* is measured by the quantity and quality of interaction. It is the 'basis for the relationships that make the CoP possible' (Holmes and Meyerhoff 1999, p. 175). Mutual engagement allows members to learn the language repertoire and to participate in the negotiation of new ways of expressing themselves.
- *Joint negotiated enterprise* is a measure of negotiations and goal setting. This concept is relevant to understanding how the development of new language (LaSC language) is negotiated by online members.

- Shared repertoire of resources for negotiating meaning, e.g. text-based materials, podcasts, experts in the form of guest speakers, which enables the development of a shared set of ideas, practices and resources within a community.

These characteristics are used within this study to explore the development of the community. We carry out this exploration through an analysis of module assessments and the participants' use of language in their online learning environment. The developments in their use of LaSC language reveal an improvement of the women's understanding of the LaSCI.

In addition to the characteristics of CoP mentioned above, a linguistic and pragmatic examination of the characteristics of the online media is relevant as it affected participants' use of language and communication. Linguistics studies the structure and systems of language. Pragmatics is the branch of linguistics which is concerned with 'the study of meaning as communicated by the speaker and interpreted by the listener' (Yule 1996, p. 3). From a linguistics and pragmatic perspective, online communication can be defined as 'an hybrid form of interaction' or 'written conversation' (Marcoccia 2004, p. 2). That is, online communication possesses characteristics of both written and oral speech. These characteristics appear in different degrees depending on the online setting that is being used. For example, e-mail is closer to writing and chat groups are closer to spoken conversation (McDaniel *et al.* 1996, p. 39). Oral speech is 'time-bound' and 'spontaneous' (Crystal 2001, p. 26), whereas online communication allows more time to the speaker to think what he is saying, hence it is less spontaneous (Folkman Curasi 2001, p. 6). Oral speech is prosodically rich, whereas online communication lacks visual, audio, and social cues. Additionally, there are also some differences with written speech. Writing is 'contrived' (Crystal 2001, p. 26) and online communication is less formal. Writing is more structured and linear; online communication allows more dimensions (e.g. many conversations at the same time, links and bookmarks) so texts do not have to be read in sequence but in the order the reader prefers.

Online communication's lack of the visual and social cues often present in face-to-face conversations limits the interpretation of texts to the written statements (Sweet 2001). However, over time community members create 'conventions of communication' (Jacobson 1996) which help them overcome the limitations of the online media. Conventions of communication are rules that online participants develop and have to follow to make communication possible. In CoP, ambiguity and diversity are dealt with by negotiation. This results in the development of a shared meaning and linguistic style for the whole community.

5. Methodology

Hodgson and Watland (2004, p. 204), writing in the context of networked learning, state that 'much of the research that has been done has not adopted methodological perspectives and methods that are commensurate with the values and ideas of [specific approaches to learning] and is, therefore, not giving us the insights and findings that are as useful or helpful as they might be'. As the educational programme that is the focus of study here is based on social theories of learning and

the development of a CoP, it follows that our research methodology needs to be located within an interpretivist framework rather than a positivist one as commonly used in research into LaSCI.

There is a growing argument for using a multi-method approach to research into learning particularly in the context of e-learning and CoP e.g. De Laat and Lally (2003), Jones (2004), and Hodgson and Watland (2004). Informed by these ideas, the current study explores the experiences of women participating in the *EMPATHY Net-Works* module, which was developed using socio-cultural theories of learning, using an interpretivist approach involving a multi-method approach.

The *EMPATHY Net-Works* project was established within a UK university between August 2006 and January 2007. This study focuses on two cohorts of participants: Cohort 1 with 14 participants (one employed in LaSCI and 13 unemployed or not in the LaSCI); and Cohort 2 with 19 participants (four employed in LaSCI and 15 unemployed or not in LaSCI). We used a variety of data collection methods including: end of module personal action plans; two sets of 20 question online multiple choice logistics tests (delivered in weeks 4 and 10); online discussion group messages; and online learning environment tracking tools. Data analysis involved narrative analysis using NVivo. In the following sections, all the quotations are taken from discussion group messages. Names have been removed to protect confidentiality and maintain anonymity.

We recognise that there are complex relationships between the triggers that support language development such as learning activities, opportunities to practice this language e.g. through membership of a CoP, and evidence of the acquisition of language and increased understanding of a topic which in this context is the LaSCI. In addition, multiple choice tests are used to measure both use of language and also knowledge of the LaSCI, and it is impossible to analyse language and knowledge separately as they are inter-dependent. In the context of this study, we have worked on the assumption that appropriate use of a technical language, that of the LaSCI, by the women indicates that they understand this language and hence the subject.

6. Findings and discussion

Table 1, based on data collected from their end-of-module personal action plans, identifies the project outcomes *i.e.* the employment outcomes or career aspirations of the women ($n = 33$) in Cohorts 1 and 2. This table indicates that 76% of the women intend to follow a career or progress their career in the LaSCI. One comment made by a participant who decided to follow a different career states that 'I've discovered the logistics industry is too fast for me. I want to work in a slower-paced industry'. These initial results indicate that the project is successful in encouraging women into careers within the LaSCI.

6.1. Development of language and knowledge of LaSCI

This section explores the women's development of language and knowledge of the LaSCI. Our first approach to identifying language development was through the results of the online multiple choice logistics tests which the participants took in

weeks 4 and 10 of the module. This test measured their use of the language of the LaSCI. The mean improvement in grades for both Cohorts 1 and 2 between weeks 4 and 10 was 8%. This is illustrated in Figure 1.

In week 4, one participant commented in her experience of taking the test as follows:

I knew nothing about this subject area when we first started and I did the test blind, I thought about looking it up first, but thought it would be interesting to see how much I had absorbed. I was amazed that I got 16 right and the ones I did get wrong, now I have looked back at them I understand where I went wrong.

	Cohort 1	Cohort 2	Total	%
Number of participants	14	19	33	
Number employed in LaSCI at start of programme	1	4	5	15.15
Project outcomes				
Seeking employment in LaSCI	2	7	9	27.27
Seeking employment in other industries	1	1	2	6.06
Gained employment in LaSCI	1	1	2	6.06
Gained employment in other industries	1	0	1	3.03
Seeking progression within LaSCI	0	0	3	9.09
Gained promotion in LaSCI and other industries	5	3	8	24.24
Established own business (not related to LaSCI)	2	1	3	9.09
Taking further education	2	1	3	9.09
Withdrew and no progression into LaSCI	0	2	2	6.06

Table 1. Project Outcomes

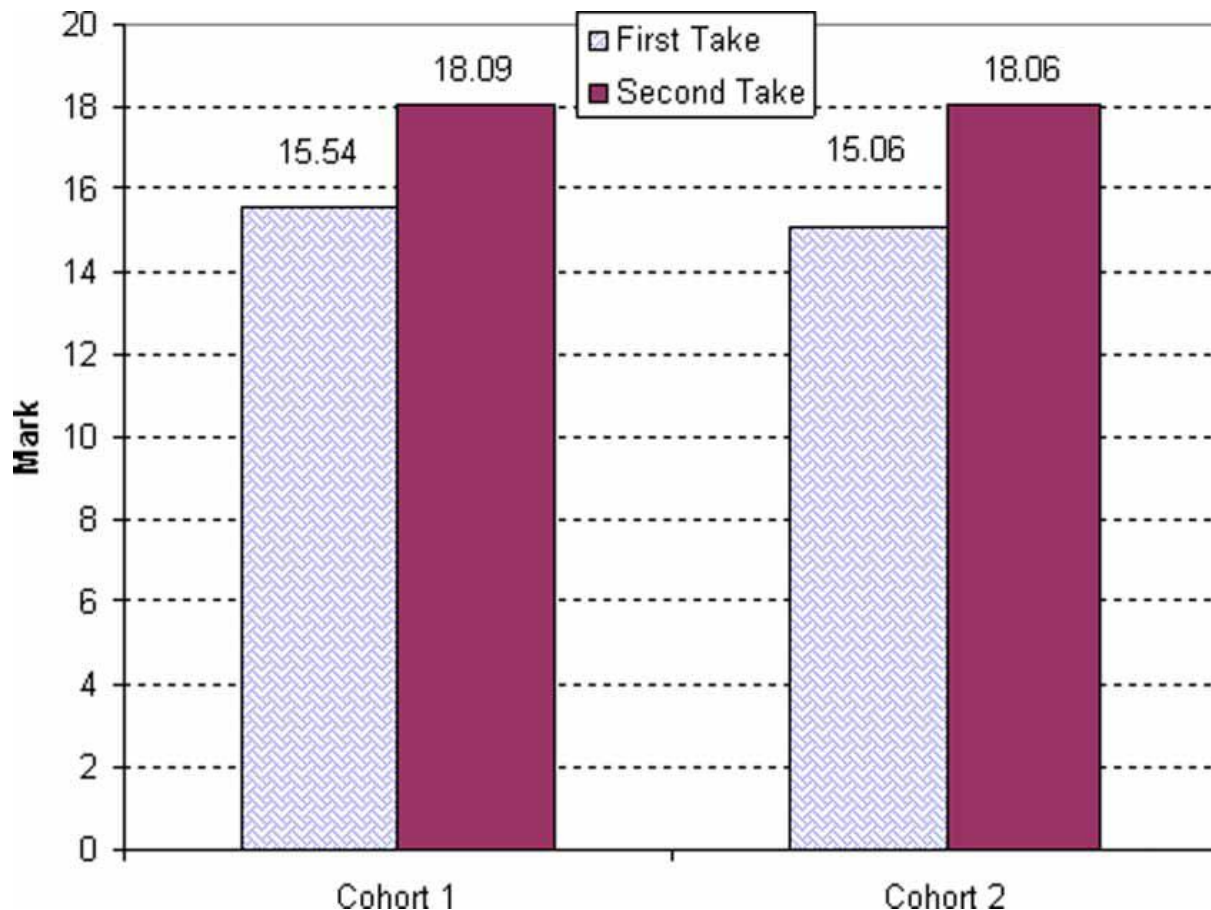


Figure 1. Language development as indicated by multiple choice logistics tests.

The test results and the quotation indicate that early in the module the participants are developing their language and understanding of the LaSCI.

Based on Holmes and Meyerhoff's (1999) three dimensions of CoP discussed earlier, we explore the use of language in *EMPATHY Net-works*. Language use throughout these dimensions exposes the participants' learning process and reflects the development of knowledge of LaSCI.

- *Mutual engagement*: Participants were able to engage in online and offline interactions as they shared common goals. All participants had enrolled on the programme aimed at encouraging them to gain employment in the LaSCI. The participants demonstrated their commitment to the programme and their peers through high levels of attendance (more than 95%) at face-to-face sessions and also high levels of participation in the online activities (see Figure 2). In addition, many participants attended additional activities e.g. seminars and conferences organised by the Logistics Institute.
- *Joint negotiated enterprise* is a process of negotiating practices and goals. The module involved a series of online activities in which participants had to negotiate their participation in groups and produce an outcome (i.e. an assessed report for the themed activity). Different uses of language were found during the following activities: group creation and organisation: participants subscribe to a group and elect a leader;

There are 3 of us interested in this theme. Any more takers? If I may, can I suggest that we start thinking of the strategy of how to tackle our project. Am online everyday from 9am. Hear from our girls. . . cheers!

content management: participants decide on the structure of their reports and assign sections to team members;

Hey everybody!
I shall put here what I have just put for my other group. A report needs:
An intro stating main points: 300 words
A main body, expanding on those points: a short paragraph on each one and where refs/diagrams are included (though not included in word count, obviously): 1200 words
A conclusion: summing up and returning to last points of introduction: 300
Obviously, nothing is written in stone.
I'm going to have a try today and there's still time. . .
Of course, if someone has produced a report over the weekend (XXX - midnight oil?!!!) then let's see it!

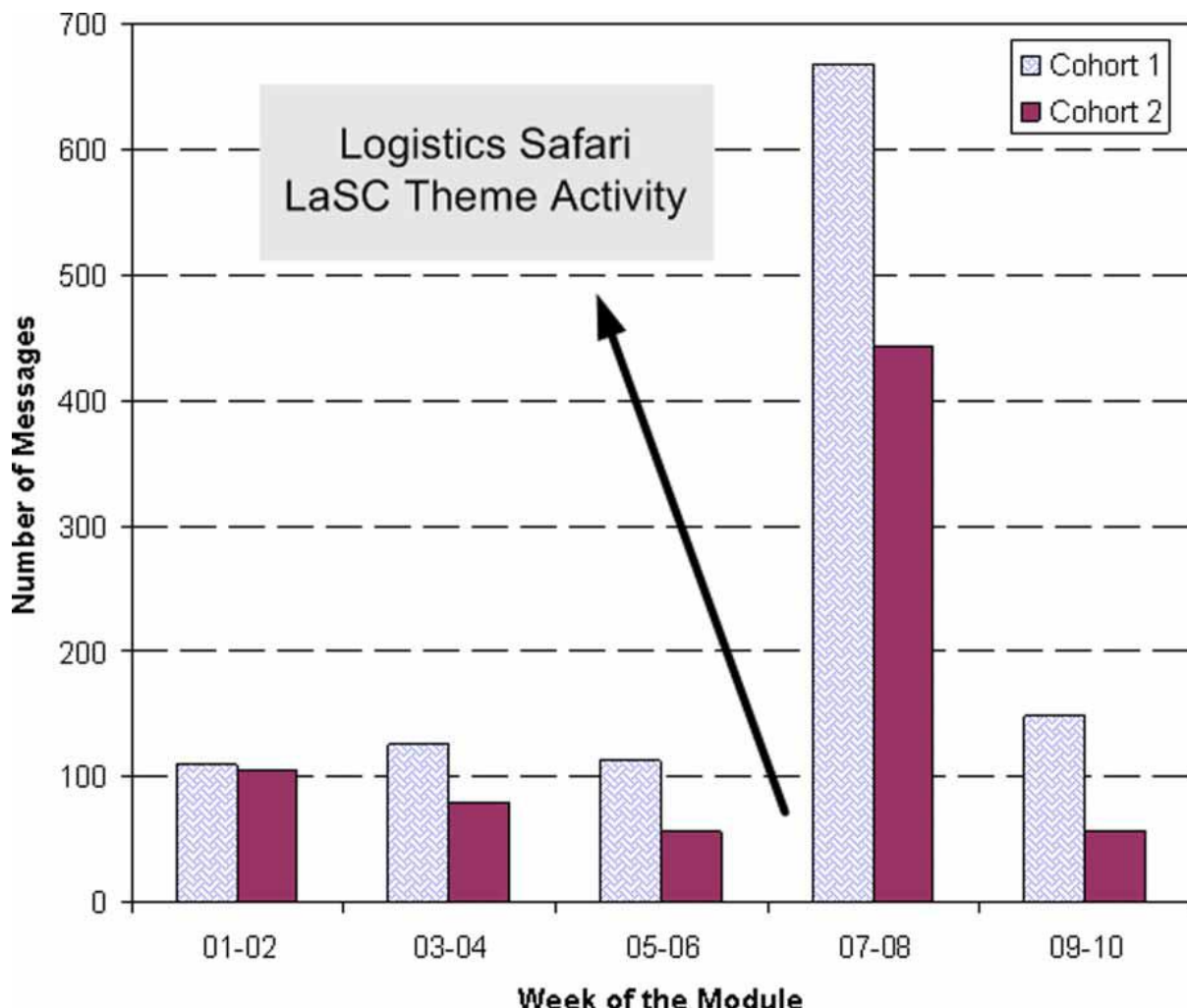


Figure 2. Number of discussion group messages posted during the life of the module.

negotiating understanding and meanings: participants' research and exchange ideas on LaSC concepts. This was achieved by using materials provided in the online community tool as well as e-journals. The women found it very useful to share their doubts and ideas in their online discussion group as indicated in the following example.

Student X: What is RFID?

Student Y: X, RFID stands for radio frequency identification. Basically they are tags which are attached to or put on products so that manufacturers are able to keep track of them . . . I hope that helps.

At the end of the module women were able to provide thoughtful reflections on their topics of research.

On reflection . . . The security of information, its accuracy and it's 'translatable' properties are all critical parts of logistics and the supply chain . . . I have learnt and am starting to use extra parts of this new vocabulary in work I am doing . . .

- *Shared repertoire of resources* for negotiating meaning including linguistics resources. The *EMPATHY Net-Works* project team provided a variety of online learning materials and participants were asked to access these materials in their own time so they could complete the module activities. As weeks passed by and from their online interactions, it became apparent that participants were starting to talk the same 'language'. The development of a shared repertoire is illustrated in the following discussion group messages.

So much in life is jargon. . . But having got my head round Logistics jargon so that I now automatically conjure up a picture of say, Supply Chain activity instead of working it out word by word for myself (which is 'learning', isn't it !!!??) . . .

The online nature of the project's learning environment caused some communication problems which affected participants understanding of the LaSC topics. Participants went through a learning curve during which they gained sociolinguistic competence at the level of effectively conveying and interpreting meaning through the online media and at mastering the LaSCI language. Initially, this proved to be a challenge for the participants.

. . . in face to face sessions you can express your views and opinion properly where through the Internet I think its quite difficult because you don't see the face of the person . . .

However, with time, participants were able to create 'conventions of communication' as outlined by Jacobson (1996) which helped them overcome the limitations of this media. These participants developed their own conventions while they learnt to use the online tool. Communication conventions involved the selection of media to communicate in particular occasions, for example, via chat room or e-mail. They also included ways to exchange certain resources such as journal papers, diagrams, and web links. Finally, as participants acquired sociolinguistic competence, they

developed LaSC language conventions which allowed them to understand each other.

It is clear that as producers constantly increase production capacity, pressure exists for SCM to keep pace. This in turn has brought about regular SCM reviews and improvements with ceaseless investments in storage facilities. The ultimate model seems to be linking the supplier and customer by pipeline (BPC to NG). Most producers have, for many years, enjoyed close relationships with suppliers, distributors and customers. This affiliation is important establishing trust and enabling prediction of market conditions.

Sociolinguistic competence is also illustrated by the average grade for the assessed theme activity being 64% (range 50–75%) indicating that these women had developed their use of LaSC language.

6.2. Impact of learning strategies

Feedback from the participants identified three pedagogic approaches as having a significant impact on their understanding of LaSC: the logistics safari, the LaSC theme activity, and guest lectures and communications with e-mentors. The impact of the logistics safari and the LaSC theme activity is illustrated in Figure 1, which shows that the number of online postings increased by approximately 600% for Cohort 1 and 300% for Cohort 2. As students' technical language develops through practice, e.g. obtained through discussion and feedback, this finding illustrates the potential power of these learning strategies.

The impact of guest speakers is difficult to quantify. However, after each guest speaker, we received positive comments in the online community as shown in the following example.

I found the guest speaker absolutely inspirational. A lot of what she said touched a 'chord in my heart.' I think that what I enjoyed most was the fact that she was so honest and down to earth and that she told us about all her struggles etc. . .

In addition, the opportunity to reflect upon and explore their impressions of the industries within the safe and confidential e-learning system enabled the participants to develop their personal career aspirations.

Throughout this course I have made a steady and progress development of not only my understanding of logistics and supply chain management, but also in personal confidence and self worth. Initially I had no true comprehension of what was exactly involved in logistics or supply chain management and although this has been a steep learning curve I have enjoyed every moment. I would never have considered a career in this area prior to taking this course.

I have been given the opportunity to not only study this subject are but develop personally, to the extent that I feel more confident and prepared to return to the working environment. In addition I also have a

whole new spectrum of possible career opportunities.

Without this course I would not have the confidence, knowledge or skills to even begin looking for a career within this sector of employment. I have discovered a true passion for the transport section and am now hoping to pursue a career in this area.

My e-mentor has been such a valuable source of information and encouragement that I am truly grateful. The entire course was concluded when my e-mentor gave me the opportunity for a week's work experience within her company. Of which I was truly grateful. Not only was I able to speak with individuals from every department and truly understand their careers, but have found a true passion for the transport section.

6.3. Impact of membership of networked learning community

Overall, the findings indicate that the *EMPATHY Net-Works* project encouraged participants to enter the LaSCI. This is a complex process involving boundary crossings e.g. from home, to university, to the LaSCI. Individual women need to negotiate and journey across different boundaries with the support of their peers, e-mentors, the project team, university, families and friends. Figure 3 illustrates the organisational boundaries crossed by many of the women and the location of the learning community as a boundary-spanning organisation.

Figure 3 presents a visual representation of the *EMPATHY Net-Works* learning community and this shows how it crosses a number of boundaries (home, university, workplace, LaSCI) and also communities. The *EMPATHY Net-Works* project team was clearly located within the university and worked collaboratively with a number of stakeholders: the Logistics Institute, ementors (who represented the LaSCI), the project steering group with members representing the university, Business School, LaSCI, and local business development organisations. Figure 3 does not attempt to illustrate the different roles that women took within the community.

In line with Lave and Wenger's (2002) concept of 'peripheral participation' individual participants engaged in the communities in different ways *i.e.* outsiders, peripheral participants, active, and core members. In this study, as is common in networked learning research (e.g. see Banks *et al.* 2006), we used the number of messages as an indicator of community engagement. Table 2 compares the number of messages posted by core members, peripheral members and 'outsiders'. The 'outsiders' included those participants who left the programme without completing it and without engaging with the community. An analysis of their engagement with the online community suggests that they each posted three or less messages in discussion boards compared with an average number of 51 messages posted by members of Cohorts 1 and 2 (this does not include other forms of contact e.g. chat room sessions or e-mails).

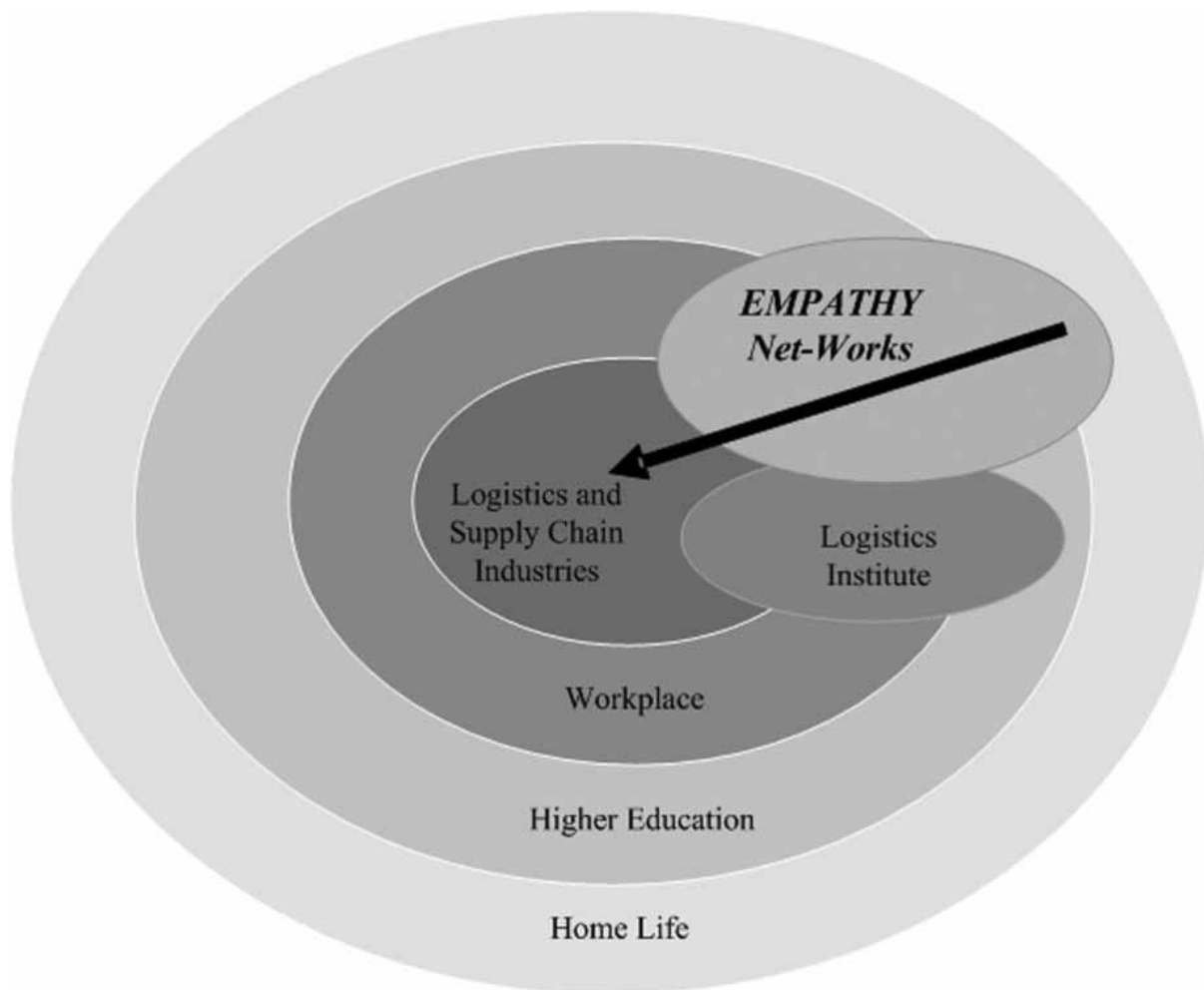


Figure 3. Conceptual map of the *EMPATHY Net-Works* CoP. Note: The arrow indicates the direction of the journey of more than 76% of the participants in Cohorts 1 and 2.

Core members		Peripheral members		Outsider members	
Student A	146	Student D	69	Student G	3
Student B	133	Student E	50	Student H	2
Student C	124	Student F	31	Student I	1

Table 2. Number of messages posted by core members and peripheral members.

E-mentoring is an important aspect of the *EMPATHY Net-Works* project and the e-mentors are members of the project's CoP. However, e-mentoring is a private process carried out in dyads and apart from the open CoP. At the time of writing, the participants who are the focus of this study are fully engaged with their e-mentoring process. The impact of their e-mentoring experiences on the knowledge and understanding of the LaSCI and also their career plans will be the focus of a later study.

7. Implications and further research

The findings from this study indicate that the strategy of encouraging women into the LaSCI by a postgraduate module based on social theories of learning appears to be effective. However, this study is based on the initial findings from a relatively small ($n = 33$) sample of women at the end of their programme of study. A future study will explore the impact of the programme on all the *EMPATHY Net-Works* participants ($n = 60$) both at the end of the module and also six months later. This will enable us to identify the longer-term impact of this intervention on their career.

The initial findings from the multiple choice logistics tests, assessed work e.g. LaSC theme activity and the online discussion group messages suggest that the women into logistics module does enable women to develop and use the LaSC language. At the end of the project, the linguistics analysis used in this study will be extended to include data from all 60 women.

A particularly useful finding from this study is that three learning strategies were shown to have a significant impact on the development of the women's language and hence their understanding of the LaSCI: the inquiry-based LaSC theme activity, a logistics safari, and the provision of role models via guest lectures and e-mentors. This finding supports the work of Gudmundsson and Nijhuis (2001), who highlight the use of collaborative learning in logistics education. The project team will continue to use these strategies with future cohorts of students. Further research is required in this area e.g. there may be gender differences in learning style preferences in studying LaSC management and/or these differences may relate to the students' prior experiences of these industries.

Finally, the strategy of developing a CoP appears to support women's progression across different boundaries. The concept of 'peripheral participation' illuminates aspects of the complex relationships between participation, community membership, and achievement of personal goals. Again, this will be an area that will be revisited and explored in more depth at the end of the project.

8. Conclusions

This study makes a contribution to the knowledge and practice of the LaSCI in a number of ways. First, it indicates that it is possible to encourage women into the industry by providing a supportive educational programme based on social theories of learning. The development of a supportive CoP provides a framework which enables the women to develop their language and hence their understanding of the LaSCI. Three learning strategies were shown to have a significant impact on participants' language of the industries: the inquiry based LaSC theme activity, a logistics safari, and the provision of role models via guest lectures and e-mentors. Finally, we conceptualise the *EMPATHY Net-Works* project as a learning community that spanned a number of traditional boundaries. We illustrate that active participation within this community supported women's progression into and within the LaSCI.

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