

UNIFIED YET SEPARATED

Empirical Study on the Impact of Hierarchical Positions within
Communities of Learning

© Martin Rehm, the Netherlands, 2012

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form, or by any means. Electronic, mechanical, photocopying, recording or otherwise, without the prior permission in writing, from the author.

ISBN 978 90 8666 280 7

The cover picture is the collaborative effort of Eric Engelen, Ad Notten, Herman Pijpers, Maren Breuer-Rehm and Martin Rehm.

Publisher: Uitgeverij Boekenplan

UNIFIED YET SEPARATED

Empirical Study on the Impact of Hierarchical Positions within
Communities of Learning

DISSERTATION

to obtain the degree of doctor at the Maastricht University,
on the authority of the Rector Magnificus, Prof. dr. L.L.G. Soete
in accordance with the decision of the Board of Deans,
to be defended in public on 1, March, 2013, at 10:00 hours

by Martin Rehm

Supervisors:

Prof. dr. W. H. Gijsselaers

Prof. dr. M. S. R. Segers

Assessment Committee:

Prof. dr. Jeroen van Merriënboer (voorzitter)

Prof. dr. Mariëlle Heijltjes

Prof. dr. Piet van den Bossche

Prof. dr. David Gijbels (University of Antwerp)

Acknowledgments

At the end of this PhD thesis I really have to say ... I am very happy about all the (unconscious) decisions, contemplations and challenges that have led up to this. Moreover, I also consider myself lucky ... lucky to have met a lot of nice people on the way. And I would like to take this opportunity and thank a few of them:

Wim Gijsselaers and Mien Segers for fully supporting this dissertation, fostering my research skills, and sharing their invaluable insights throughout this research.

Henny Dankers and Eveline in de Braek for helping me with (numerous) administrative issues.

Bart Rienties, Bas Giesbers and Dirk Tempelaar for introducing me to the world of CSCL research.

Simon Beusaert for his kind help in creating a truly Euregional "Samenvatting".

Colleagues at the department of Educational Research and Development, as well as the department of Educational Development and Research for their cooperation in projects, fruitful discussions and fun times.

Colleagues from all over the UM, with whom I have the pleasure of working with.

Luc Soete, Harm Hospers, Chris de Neubourg, Annemarie Rima, Peter de Gijssel, Pascal Breuls and Mayke Pothof for providing the framework that allows me to work on a topic that I really like.

The UNU-MERIT Team for their warm welcome and highly appreciated support during numerous occasions.

Franziska Gassmann, Mindel van de Laar, Melissa Siegel, Zina Nimeh and Lutz Krebs for their support and collaboration during projects and events.

Anouk, Danny, Floor, Janneke, Mieke and Susan for more than just enjoyable coffee breaks.

Ad, Eric and Herman for laughter, (bike) advice, and tolerating my "yelling at the computer".

Florian for nice talks, pasta dinners and making music.

Friends from Aachen (and beyond) for countless great days and nights.

Family (present, past and beyond) for all the times we spent together.

Mutti and Vati for everything.

Felix for entering my life.

Maren for more than words can say.

Martin Rehm
Aachen, December 2012

Table of Content

| | | |
|---|---|-----------|
| 1 | INTRODUCTION | 1 |
| 1.1 | Introduction | 2 |
| 1.2 | Community of Learning (CoL) – Observations from a Practical Example | 3 |
| 1.2.1 | <i>First Observation</i> | 4 |
| 1.2.2 | <i>Second Observation</i> | 5 |
| 1.2.3 | <i>Third Observation</i> | 6 |
| 1.3 | Online Communities – The Black Box | 7 |
| 1.3.1 | <i>Collaborative Learning in (Online) Communities</i> | 8 |
| 1.3.2 | <i>The Impact of Diversity on (Learning) Communities within Organizations</i> | 9 |
| 1.4 | Opening the Black Box | 11 |
| 1.4.1 | <i>The Impact of Hierarchical Positions on CoL</i> | 11 |
| 1.4.2 | <i>The Transferability of Hierarchical Positions into Network Structures of CoL</i> | 12 |
| 1.4.3 | <i>The Impact of Hierarchical Positions on the Learning Processes within CoL</i> | 14 |
| 1.5 | Overview of this Dissertation | 15 |
| 1.6 | Note | 18 |
| 1.7 | References | 18 |
| 2 | UNIFIED IN LEARNING – SEPARATED BY SPACE | 25 |
| <small>The chapter is based on Rehm, M. (2009). Unified in Learning – Separated by Space: Case Study on a Global Learning Programme. <i>Industry and Higher Education</i>, 23(4).</small> | | |
| 2.1 | New Possibilities for Global Organizations | 26 |
| 2.2 | From Communities of Practice to Communities of Learning | 27 |
| 2.3 | Method | 30 |
| 2.3.1 | <i>Setting</i> | 30 |

| | | |
|-------|--|-----------|
| 2.3.2 | <i>Purpose and Structure of the e-Learning Phase</i> | 30 |
| 2.3.3 | <i>Online Discussion Groups</i> | 31 |
| 2.3.4 | <i>Participants</i> | 34 |
| 2.4 | Instruments | 34 |
| 2.4.1 | <i>Expectations and Goals before the Start of the e-Learning Phase</i> | 34 |
| 2.4.2 | <i>Intensity of Usage of the Discussion Forums</i> | 34 |
| 2.4.3 | <i>Participants' Satisfaction after the e-Learning Phase</i> | 35 |
| 2.5 | Results | 35 |
| 2.5.1 | <i>Prior Evaluation</i> | 35 |
| 2.5.2 | <i>Intensity of Usage</i> | 36 |
| 2.5.3 | <i>End Evaluation</i> | 37 |
| 2.6 | Discussion | 39 |
| 2.7 | Limitations and Future Research | 41 |
| 2.8 | Acknowledgments | 42 |
| 2.9 | References | 42 |

3 THE IMPACT OF HIERARCHICAL POSITIONS ON COMMUNITIES OF LEARNING **45**

Rehm, M., Gijsselaers, W. & Segers, M. (submitted). The Impact of Hierarchical Positions on Communities of Learning, *International Journal of Computer-Supported Collaborative Learning*
 Note: The chapter is based on *Diversity in Communities of Learning: The Influence of Hierarchical Position on Individuals' Activity and Performance*, presented at the AERA 2011 conference, New Orleans, USA, 08 – 12 April, 2011

| | | |
|-------|---|-----------|
| 3.1 | Introduction | 46 |
| 3.2 | Communities of Learning | 48 |
| 3.3 | Impact of Hierarchical Positions on Learning | 50 |
| 3.4 | Method | 52 |
| 3.4.1 | <i>Setting</i> | 52 |
| 3.4.2 | <i>Participants</i> | 53 |
| 3.5 | Instruments | 53 |
| 3.5.1 | <i>Data on Participants' Hierarchical Position</i> | 53 |
| 3.5.2 | <i>The Level of Activity</i> | 54 |
| 3.5.3 | <i>The Level of Performance</i> | 54 |
| 3.5.4 | <i>Data Analysis & Procedure</i> | 56 |
| 3.5.5 | <i>Control Measures</i> | 57 |

| | | |
|-------|---|-----------|
| 3.6 | Results | 58 |
| 3.6.1 | <i>Hypothesis Testing</i> | 58 |
| 3.6.2 | <i>Two-Step Cluster Analysis</i> | 60 |
| 3.6.3 | <i>Controlling for other Background Characteristics</i> | 63 |
| 3.7 | Discussion | 64 |
| 3.8 | Conclusions | 66 |
| 3.8.1 | <i>Limitations</i> | 66 |
| 3.8.2 | <i>Future Research</i> | 66 |
| 3.9 | References | 67 |

4 THE CENTRE OF ATTENTION?! – THE TRANSFERABILITY OF HIERARCHICAL POSITIONS INTO NETWORK STRUCTURES OF COMMUNITIES OF LEARNING **75**

The chapter is based on *Hierarchical positions and their influence on network structures within Communities of Learning*, presented at the EDINEB 2012 conference, Haarlem, The Netherlands, 02 – 04 May, 2012

| | | |
|-------|--|-----------|
| 4.1 | Introduction | 76 |
| 4.2 | Learning in Organizations – Still a Black Box? | 78 |
| 4.3 | Opening the Black Box – The Transferability of Hierarchical Positions into CoL | 79 |
| 4.4 | Method | 81 |
| 4.4.1 | <i>Setting</i> | 81 |
| 4.4.2 | <i>Participants</i> | 82 |
| 4.5 | Instruments | 82 |
| 4.5.1 | <i>Data on Participants' Hierarchical Position</i> | 82 |
| 4.5.2 | <i>Data Analysis & Procedure</i> | 83 |
| 4.5.3 | <i>Network Statistics</i> | 83 |
| 4.5.4 | <i>Hypotheses Testing</i> | 84 |
| 4.5.5 | <i>Control Measures</i> | 85 |
| 4.6 | Results | 86 |
| 4.6.1 | <i>Hypotheses 1 & 2</i> | 88 |
| 4.6.2 | <i>Hypotheses 3</i> | 89 |
| 4.6.3 | <i>Hypotheses 4</i> | 91 |
| 4.6.4 | <i>Control Measures</i> | 93 |

| | | |
|-------|------------------------|-----------|
| 4.7 | Discussion | 93 |
| 4.8 | Conclusions | 96 |
| 4.8.1 | <i>Limitations</i> | 96 |
| 4.8.2 | <i>Future Research</i> | 96 |
| 4.9 | Acknowledgements | 97 |
| 4.10 | References | 97 |

5 KNOWLEDGE CREATION WITHIN COMMUNITIES OF LEARNING – THE IMPACT OF HIERARCHICAL POSITIONS ON COMMUNICATION PROCESSES **103**

Rehm, M., Gijssels, W., & Segers, M. (submitted), Knowledge Creation within Communities of Learning - The Impact of Hierarchical Positions on Communication Processes, *Learning and Instruction*
 Note: The chapter is based on *Communities of Learning in Organizational Training: The influence of participants' hierarchical positions on communication behaviour and learning processes*, presented at the EARLI 2012 (SIG 14) conference, Antwerp, Belgium, 22 – 24 August, 2012

| | | |
|-------|--|------------|
| 5.1 | Introduction | 104 |
| 5.2 | Learning in Online Communities | 105 |
| 5.3 | Hierarchical Positions & Their Influence on Learning Processes | 106 |
| 5.4 | Method | 108 |
| 5.4.1 | <i>Setting</i> | 108 |
| 5.4.2 | <i>Participants</i> | 109 |
| 5.5 | Instruments | 110 |
| 5.5.1 | <i>Data on Participants' Hierarchical Position</i> | 110 |
| 5.5.2 | <i>Data Analysis & Procedure</i> | 110 |
| 5.5.3 | <i>Content Analysis</i> | 110 |
| 5.5.4 | <i>Social Network Analysis</i> | 111 |
| 5.5.5 | <i>Cluster Analysis</i> | 112 |
| 5.5.6 | <i>Hypotheses Testing</i> | 112 |
| 5.5.7 | <i>Control Measures</i> | 113 |
| 5.6 | Results | 113 |
| 5.6.1 | <i>General Results</i> | 113 |
| 5.6.2 | <i>Research Hypotheses</i> | 115 |
| 5.7 | Discussion | 119 |
| 5.8 | Limitations & Future Research | 121 |
| 5.9 | Acknowledgments | 121 |

| | | |
|----------|---|------------|
| 5.10 | References | 122 |
| 6 | CONCLUSIONS | 127 |
| 6.1 | Conclusions | 128 |
| 6.2 | Unravelling the Black Box – Overview of Empirical Evidence and Findings | 130 |
| 6.3 | Implementing CoL in a Global Learning Programme – A Positive Showcase (Chapter 2) | 130 |
| 6.4 | “You can take the man out of the hierarchy, but you can’t take the hierarchy out of the man” | 133 |
| 6.4.1 | <i>Impact of Hierarchical Positions on Individuals’ Level of Activity & Performance (Chapter 3)</i> | 133 |
| 6.4.2 | <i>The Transferability of Hierarchical Positions into Network Structures of CoL (Chapter 4)</i> | 135 |
| 6.4.3 | <i>The Impact of Hierarchical Positions on the Communication Patterns within CoL (Chapter 5)</i> | 137 |
| 6.5 | Practical Implications for future CoL | 139 |
| 6.5.1 | <i>Design of CoL</i> | 139 |
| 6.5.2 | <i>Facilitation of CoL</i> | 140 |
| 6.6 | Outlook – Next (Possible) Steps | 141 |
| 6.6.1 | <i>Investigating the nature of Stars</i> | 141 |
| 6.6.2 | <i>Determining the “Quality of Communication”</i> | 142 |
| 6.6.3 | <i>A Comparison between CoL for (Bachelor) Students and Working Professionals</i> | 142 |
| 6.6.4 | <i>The Impact of Facilitators on CoL for Working Professionals</i> | 143 |
| 6.7 | References | 144 |
| | SAMENVATTING | 151 |
| | MGSOG DISSERTATION SERIES | 167 |

List of Tables

| | |
|--|----|
| Table 2-1: Average Amount of Contributions per Type of Discussion Forum and Content | 36 |
| Table 2-2: Participants' End Evaluation of the Learning Programme's e-Learning Phase | 38 |
| Table 3-1: Overview of Correlations between Hierarchical Position and Activity Measures | 58 |
| Table 3-2: Results of Kruskal-Wallis and Jonckheere-Terpstra Tests for Activity Measures | 59 |
| Table 3-3: Overview of Correlations between Hierarchical Position and Performance Measures | 59 |
| Table 3-4: Results of Kruskal-Wallis and Jonckheere-Terpstra Tests for Performance Measures | 60 |
| Table 3-5: Frequencies of Hierarchical Positions: Two-Step Cluster Analysis on Activity Patterns | 61 |
| Table 3-6: Overview Results of Two-Step Cluster Analysis on Activity Patterns | 61 |
| Table 3-7: Frequencies of Hierarchical Positions: Two-Step Cluster Analysis on Activity Patterns | 61 |
| Table 3-8: Overview Results of Two-Step Cluster Analysis on Activity Patterns | 62 |
| Table 3-9: Overview of Correlations between Control Variables and Activity Measures | 63 |
| Table 3-10: Overview of Correlations between Control Variables and Performance Measures | 63 |
| Table 4-1: Results of Kruskal-Wallis and Jonckheere-Terpstra Tests for In- and Out-Degree Network Measures | 88 |
| Table 4-2: Results of Wilcoxon Signed Rank Test for In- and Out-Degree Measures (Reply Networks) | 89 |

| | |
|---|-----|
| Table 4-3: Results of Kruskal-Wallis and Jonckheere-Terpstra Tests for Centrality Network Measures | 90 |
| Table 4-4: Results of Wilcoxon Signed Rank Test for Centrality Measures (Reply Networks) | 91 |
| Table 4-5: Results of Kruskal-Wallis and Jonckheere-Terpstra Tests for Ego-Network Measures | 91 |
| Table 4-6: Results of Wilcoxon Signed Rank Test for Ego-Network Measures (Reply Networks) | 92 |
| Table 4-7: Overview of Correlations between Control Variables and Network Measures | 93 |
| Table 5-1: Overview of Non-Task & Task Related Communication within CoL | 114 |
| Table 5-2: Results of the Kruskal-Wallis and Jonckheere-Terpstra Tests for Type of Communication | 115 |
| Table 5-3: Results of the Wilcoxon Signed Ranks Test – Type of Communication | 116 |
| Table 5-4: Frequencies of Hierarchical Positions: Two-Step Cluster Analysis on Task Related Communication | 117 |
| Table 5-5: Overview Results of Two-Step Cluster Analysis on Task Related Communication | 118 |
| Table 5-6: Results of the Kruskal-Wallis and Jonckheere-Terpstra Tests Social Network Measures | 118 |

List of Figures

| | |
|---|-----|
| Figure 1-1: Screenshot of an Exemplary Discussion Forum within a CoL | 4 |
| Figure 1-2: Sociogram of an Exemplary (a) Read and (b) Reply Network | 5 |
| Figure 1-3: Overview of Dissertation | 18 |
| Figure 2-1: Example of an Asynchronous Discussion Forum within a Learning Community | 32 |
| Figure 2-2: Example of a “Café Talk” Discussion Forum within a Learning Community | 33 |
| Figure 2-3: Example of a Content-Driven Discussion Forum within a Learning Community | 33 |
| Figure 3-1: Conceptual Overview of Research Hypotheses | 50 |
| Figure 4-1: Read (a) and Reply (b) Network of an exemplary Community of Learning | 87 |
| Figure 4-2: Longitudinal Data on Average Density Scores for the Communities of Learning | 88 |
| Figure 5-1: Distribution of NTR Communication within CoL | 114 |
| Figure 5-2: Distribution of TR Communication within CoL | 114 |

CHAPTER 1

Introduction

1.1 Introduction

In a world that is changing at an ever-increasing pace, organizations are required to continuously enhance their ability to learn and acquire new knowledge and skills. This has been identified as one of the pivotal aspects contributing to the success and performance of organizations (e.g. Nonaka, 1994; Peltonen & Lamsa, 2004). It is no longer sufficient to consider education merely as a pre-requisite, or prelude to employment. Instead, employers and employees need to constantly update their knowledge and skills in order to be able to effectively face the challenges and tasks of today's turbulent economic environment (Chalmers & Keown, 2006). As a result, many organizations have undergone considerable efforts and dedicated sizable resources to facilitate learning processes (Kane & Alavi, 2007). More specifically, according to the American Society for Training & Development (ASTD), U.S. organizations alone have spent an approximate \$125.88 billion on training and development activities in 2009 (ASTD, 2010). When considering on what type of training activities this sizeable investment has been spent, the most prominent delivery method, with more than 60 percent of organizations and companies implementing it, continues to be (traditional) instructor-led classrooms, where participants are considered as "*a container for a commodity called knowledge*" (Webster-Wright, 2009, p. 713). Similarly, traditional learning programs are often associated with a top-down approach, focusing on knowledge that has to be absorbed and that is embedded in texts and databases, rather than a workplace context (Eraut, 2004). This methodology has been acknowledged to be well suited for providing a comprehensive background to continue with more refined and practically oriented training (Robey, Khoo, & Powers, 2000). However, scholars have started to criticize these traditional educational formats for offering knowledge that is neutral to circumstances and only has limited applicability in real-life working environments (Eraut, 2000). Moreover, these types of training are often associated with substantial *direct* and *indirect* costs. While *direct* costs are accrued by participants having to physically travel to the training venue, *indirect* costs are associated with forgone working time of employees (Rehm, 2009). Consequently, with ever growing time pressure and widely dispersed units, organizations need to find more dynamic and efficient ways for their workforces to learn and enhance their knowledge (Harun, 2001).

In this context, online collaborative learning has received a growing amount of attention among practitioners and researchers alike (Brower, 2003). More specifically, online *Communities of Learning* (CoL) have been suggested to foster the effective exchange of knowledge and experience between members of an organization's workforce (Stacey, Smith, & Barty, 2004). CoL are defined as groups of people that "*engage in collaborative learning and reflective practice involved in transformative learning*" (Paloff & Pratt, 2003, p. 17). They are therefore building

upon a growing amount of research that considers learning as an interactive process, where knowledge is being created while collaborating in social networks composed of diverse groups of people (Hakkarainen, Palonen, Paavola, & Lehtinen, 2004). In online environments, where asynchronous communication can overcome barriers of time and place, this setup can facilitate an interpersonal knowledge transfer among diverse groups of employees, e.g. across intra-organizational units, by creating a broader pool of nonoverlapping knowledge that stimulates participants to share information (Akkerman, Admiraal, Simons, & Niessen, 2006). As a result, CoL cannot only enhance the capacity and skills of individual employees, but also contribute to the overall learning process and performance of an entire organization (Bunderson & Sutcliffe, 2002). The following section provides an example of an international organization that has successfully used CoL to enhance the knowledge and skills of their employees. This will not only shed some light on how CoL work in practice. In addition, this also serves the purpose of already identifying some key issues that need to be considered when designing and implementing CoL within organizations.

1.2 Community of Learning (CoL) – Observations from a Practical Example

In order to embrace the fact that the world is permanently changing and new analyses and solutions are needed to address problems, an international organization, which operates on a global scale, was looking for new ways to update and enhance the knowledge and skills of its management staff. More specifically, the human resource department (HRD) envisioned an online (collaborative) learning approach that would not only train the organization's employees, but that would also allow to capitalize on the invaluable level of experience and insights of its global workforce. As a result, an online training program was designed and implemented twice over a timeframe of approximately 6 months. The content focused on five modules that dealt with different aspects of Economics. The program took place entirely online and over a time span of fourteen weeks, with no scheduled real-time meetings. All content materials and collaborative learning activities were hosted by a virtual learning environment. More specifically, each content module consisted of recorded lectures, formative multiple choice tests, and readings. The backbone of the training was comprised of Communities of Learning (CoL). CoL typically consists of small groups of people who engage into (online) collaborative learning with the main goal of enhancing their personal knowledge and effectively applying this knowledge within their own work situations (e.g. Shrivastava, 1999; Paloff & Pratt, 2003). Typically, the main channel of communication within these CoL is based on asynchronous computer conferencing. Overall, 337 participants were randomly assigned to 30

Chapter 1

CoL. The random assignment was chosen to circumvent the possibility of either the organization's HRD, or the training's organizers to subconsciously let their opinions and preferences influence the way in which participants were distributed amongst the CoL. Within these CoL participants collaboratively discussed real-life tasks via asynchronous discussion forums. CoL thereby capitalized on participants' different backgrounds, which stimulated them to engage into collaborative learning. Additionally, as the content of the tasks was placed in the everyday working environments of the participants, the organizers could effectively stimulate participants to apply the newly gained knowledge to their own circumstances. Each content module had a separate task and (content-driven) discussion forum. Participation in these forums was obligatory and taken into account for grading the performance of participants. In addition to these content-driven forums, each CoL also had a "Café-Talk" forum, where participants could get to know each other, socialize and exchanged private, non-content related information.

1.2.1 First Observation

Figure 1-1 below provides a typical example of how such a (content-driven) discussion looked like within a CoL.

| Subject | Author | Date | ? | ! | 📶 | & | 📧 | 📄 | 👤 | # |
|--|---------------|-------|---|---|-----|---|---|---|---|-----|
| <input type="checkbox"/> Impact of macroeconomic policies on _____ | Participant A | ----- | | | ▼ | | | | 👤 | 👤 1 |
| <input type="checkbox"/> more impacts of macro economic policies on _____ | Participant B | ----- | | | ▼ ▲ | | | | 👤 | 👤 0 |
| <input type="checkbox"/> Effects | Facilitator | ----- | | | | | | | 👤 | 👤 0 |
| <input type="checkbox"/> thanks _____ | Participant B | ----- | | | | | | | 👤 | 👤 1 |
| <input type="checkbox"/> Globalization is Inevitable | Participant C | ----- | | | | | | | 👤 | 👤 0 |
| <input type="checkbox"/> globalization with human face | Participant B | ----- | | | ▼ | | | | 👤 | 👤 0 |
| <input type="checkbox"/> Agreed | Participant C | ----- | | | | | | | 👤 | 👤 1 |
| <input type="checkbox"/> I agree but _____ | Participant B | ----- | | | ▼ | | | | 👤 | 👤 0 |
| <input type="checkbox"/> Globalisation challenges | Participant A | ----- | | | ▼ | | | | 👤 | 👤 0 |
| <input type="checkbox"/> what about WTO? | Participant B | ----- | | | ▼ ▲ | | | | 👤 | 👤 0 |
| <input type="checkbox"/> Meanings of the term 'globalization' | Participant D | ----- | | | | | | | 👤 | 👤 0 |
| <input type="checkbox"/> globalization | Facilitator | ----- | | | | | | | 👤 | 👤 0 |
| <input type="checkbox"/> globalization before and after WTO | Participant B | ----- | | | ▼ | | | | 👤 | 👤 0 |
| <input type="checkbox"/> Reads for this unit and thoughts about how to apply them to ou... | Participant E | ----- | | | ▼ | | | | 👤 | 👤 0 |
| <input type="checkbox"/> Hello _____! | Facilitator | ----- | | | | | | | 👤 | 👤 0 |
| <input type="checkbox"/> Remarks | Participant B | ----- | | | | ▲ | | | 👤 | 👤 0 |
| <input type="checkbox"/> Assessing Aid -- What Works, What Doesn't, and Why | Participant D | ----- | | | | | | | 👤 | 👤 0 |
| <input type="checkbox"/> Assessing aid | Participant E | ----- | | | | | | | 👤 | 👤 0 |
| <input type="checkbox"/> Away | Facilitator | ----- | | | | | | | 👤 | 👤 0 |
| <input type="checkbox"/> Very nice! | Facilitator | ----- | | | | | | | 👤 | 👤 0 |
| <input type="checkbox"/> Good | Facilitator | ----- | | | | | | | 👤 | 👤 0 |
| <input type="checkbox"/> According to you, what are the main (economic) challenges of g... | Facilitator | ----- | | | | | | | 👤 | 👤 0 |
| <input type="checkbox"/> Integration of world economies | Participant C | ----- | | | | | | | 👤 | 👤 2 |
| <input type="checkbox"/> globalization challenges | Participant F | ----- | | | ▼ | | | | 👤 | 👤 2 |
| <input type="checkbox"/> Hello _____! | Facilitator | ----- | | | | | | | 👤 | 👤 0 |
| <input type="checkbox"/> Hi _____ | Participant F | ----- | | | | ▲ | | | 👤 | 👤 0 |
| <input type="checkbox"/> Thank | Facilitator | ----- | | | | | | | 👤 | 👤 0 |
| <input type="checkbox"/> small and medium business | Participant B | ----- | | | | | | | 👤 | 👤 1 |

Figure 1-1: Screenshot of an Exemplary Discussion Forum within a CoL

Obviously, this type of communication significantly differs from any situation that is normally observed in face-to-face (learning) environments. Participants have no way of interpreting their counterparts' body language or facial expression after they have shared their views on a certain topic. Instead, they are forced to gain any insights on their colleagues' background characteristics, as well as how they perceive and value their contributions via written text. Additionally, from this figure it can be seen that some participants seem to be more prone to initiate discussions than others. For example, while Participant A started up two discussions, Participant B rather waited for colleagues to take the lead and then comment on their postings. These types of very general findings sparked a first interest in whether it would be possible to identify explanatory variables that could explain, and potentially even predict, how individual participants behave within CoL.

1.2.2 *Second Observation*

This interest grew further after an exploratory investigation of i) who was reading the postings of whom, and ii) who was replying to whom. As a way of providing a visual impression, Figure 1-2 below provides two exemplary sociograms that sketch a Read (a) and a Reply network (b).

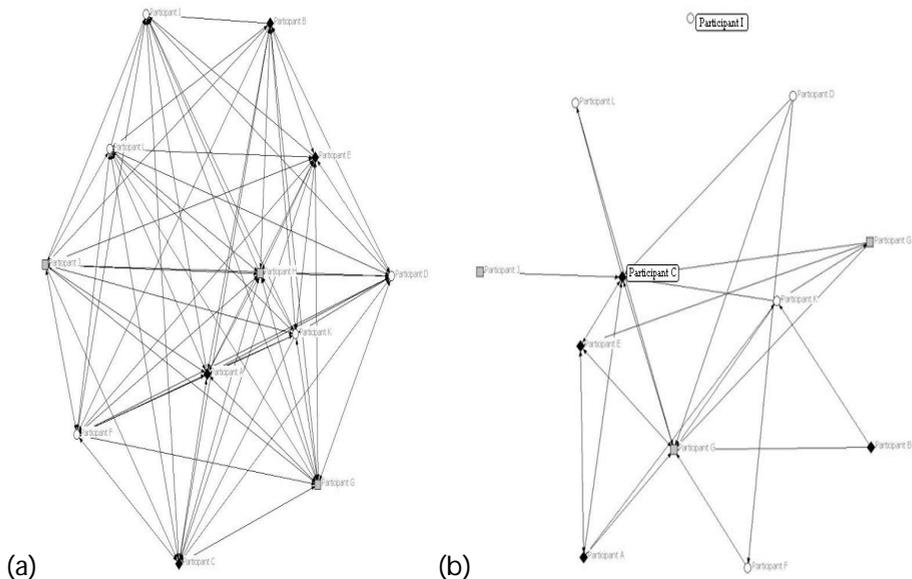


Figure 1-2: Sociogram of an Exemplary (a) Read and (b) Reply Network

As can be seen from the figure, there were considerable differences between the two types of networks. While everyone seemed to have closely followed their

Chapter 1

colleagues' contributions in terms of reading them, a considerably smaller number of participants actually replied to their colleagues. Even more so, while some participants were really positioned at the outer fringe of the network (e.g. Figure 1-2(b): Participant I), others attained (more) central positions (e.g. Figure 1-2(b): Participant C). If it were possible to relate these types of network positions to certain background characteristics of participants, it would be possible to provide more detailed suggestions on how to devise targeted interventions and facilitation strategies that can increase the potential benefits of CoL in organizations.

1.2.3 Third Observation

While the aforementioned observations focused on whether and to what extent participants engaged into collaborative learning activities of the CoL in question, they do not allow making inferences about the actual content of the discussion within the CoL. Clearly, considering the international organization's goal to enhance the knowledge and skills of their employees via CoL, this constitutes another fundamental aspect of CoL worthwhile investigating. As a starting point, please consider the two textboxes below, which are taken from exemplary discussion forums. Textbox 1-1 represents an abstract of a *Café-Talk* forum, where participants started an "introductory round" to get to know each other.

Textbox 1-1: Example of a Conversation within a "Café-Talk" Discussion Forum

| | |
|--|------------------------------|
| Author | Participants A |
| Subject | Warm wishes from [Country A] |
| Hi [everyone], Thanks to you all for starting the ball rolling. My name is [Participants A] but everyone calls me ... I was born in [Country B], but my nationality is [Country C]. [...] I am presently the [Job A] and my educational background is in political science and international relations. I must admit some of the formulae are beginning to give me a headache [...] I am not as photogenic as [Participant X] and [Participant Y] but for the sake of putting a name to a face see my mug shot! All the best to you all. | |
| Author | Participants B |
| Subject | Welcome |
| Welcome Participants A. I am sure you will bring warmth and spirit to the group and of course expertise. Best Participants B | |
| Author | Participants C |
| Subject | [Country D] joins the club |
| Hello from [Country D], Not only will the discussion not be a boys-only club, but it will include Asia as well as Africa! Since I have no internet at home, I will be trying to squeeze participation in the discussion forum into my work day...not easy! warm regards, Participants C | |

Interestingly, in the case at hand, participants not only introduced themselves to their colleagues. In addition, they tried to create a welcoming atmosphere (Participant B), and stressed their anticipated lack of time (Participant C). However, at face value, it remains unclear whether these types of communication were equally distributed among all participants, or whether certain individuals, e.g. based on their background characteristics, showed higher levels of *Café-Talk* as compared to others. Similarly, please consider Textbox 1-2 below, which provides an abstract of a discussion from a *content-driven* forum. While Participant A approaches the applicable problem from a rather theoretical viewpoint, Participant B already combines newly gained knowledge with practical experience. If an organization's HRD and organizers of CoL were be able to anticipate what type of participants tend to contribute what type of information, it would be possible to device collaborative learning activities that build upon the strength and weaknesses of all participants.

Textbox 1-2: Example of a Conversation within a “Content-Driven” Discussion Forum

| | |
|---|--|
| Author | Participant A |
| Subject | some elements of response |
| [...] the system may not necessarily to increase budgetary allocation but emphasize pressure from the clients / demand side. Concurrently, could increasing level of utility from [...], focusing on making their job better regarded by society (sense of pride) be an option? | |
| Author | Participant B |
| Subject | Some thoughts about post Soviet Union experience |
| I totally agree [with what has been mentioned before]. When I was reading all these wonderful articles on [...], I had a feeling that still we are missing something. I'll try to explain: after failure of Soviet Union everything changed dramatically in post Soviet countries. The salaries became extremely low, [...] | |
| Author | Participant C |
| Subject | Great example! |
| This is really interesting. Reality triumphs over theory everytime! . . . and you remind us that every society is different - and infinitely and uniquely complex | |

1.3 Online Communities – The Black Box

With the growing availability and potential of online learning tools and approaches, (global) organizations, such as Dell and Motorola, have increasingly started to successfully introduce online communities to foster the effective exchange of knowledge and experience between members of their workforce (Shrivastava, 1999). Furthermore, DaimlerChrysler initiated *tech clubs*, where employees collaborated to cut Research and Development (R&D) costs, and Hewlett-Packard provided product delivery consultants with an online platform to

discuss ways to further minimize computer downtime for customers (Wenger, McDermott, & Snyder, 2002). These initiatives largely build upon the notion of *Communities of Practice* (CoP). Conceptualized by Lave & Wenger (1991), CoP constitute “groups of people who share a concern, set of problems or passion about a topic and who deepen their knowledge and expertise in this area by interacting on an ongoing basis” (Wenger, et al., 2002, p. 4). Noteworthy attributes of such communities include that, although they might be externally initiated, they tend to develop organically over time. Furthermore, they do not exhibit clearly defined (time) boundaries and provide participants with a high degree of participatory freedom. As appealing this might be, scholars have argued that this concept does not properly apply for formal learning programs (Fowler & Mayes, 1999). In contrast to CoP, learning programs are designed for a clearly defined purpose, are limited to a certain timeframe and are accessible only to an exclusive group of participants (Nachmias, Mioduser, Oren, & Ram, 2000). As a result, it can be argued that while CoP contribute to the exchange of insights of experiences among individuals, they neglect aspects that foster the learning of new knowledge, require participants to apply the new knowledge to complex working environments, and determine the formal value of learning, e.g. as measured by grades. Departing from this notion, researchers have been promoting a shift towards more managed CoP (e.g. Allan & Lewis, 2006; Swan, Scarbrough, & Robertson, 2002), of which *Communities of Learning* (CoL) can be considered a specific derivative (Stacey, et al., 2004). The main additions and adjustments of this approach can be summarized by three main aspects. First, CoL have clearly established timelines and require individuals to participate on an ongoing basis. Second, CoL are actively facilitated by dedicated academic staff that provide (technical) guidance and monitor the learning process. Third, any kind of contribution within CoL is (automatically) validated, evaluated and graded, which is essential for formal learning activities within organizations.

1.3.1 Collaborative Learning in (Online) Communities

Based on their growing importance and popularity, a considerable amount of research has already investigated the nature and main characteristics of online communities (e.g. Stacey, et al., 2004). However, these studies were mainly concerned with issues such as how to create interactive online learning environments (Roblyer & Wiencke, 2003), or the technological tools being used (Alavi, Yoo, & Vogel, 1997). While this provided valuable findings on how to design online communities, it yielded only limited insights on whether individuals’ learning behaviours and outcomes might be affected by the learning community in which they are situated (e.g. Goldstein, 1999; Lave & Wenger, 1991). Yet, an increasing amount of researchers stipulated that the social and contextual

framework in which the learning takes place has a considerable influence on how participants behave and perform (e.g. de Laat & Lally, 2003). Similarly, research from institutes of higher education has indicated that online training is more complex and demanding for learners than participating in a face-to-face environment, leading participants to react differently to online learning (e.g. Arbaugh & Benbunan-Finch, 2006; Järvelä, Järvenoja, & Veermans, 2008). More specifically, while some participants are actively engaging into collaborative activities, others rather take on the role of observer and refrain from joining discussions (Caspi, Gorsky, & Chajut, 2003). This has become an issue of concern, since researchers like Cohen (1994) have proposed a significant positive relationship between the level of discourse and the achievement of participants. Yet, empirical research on the level of knowledge creation within online communities has only been able to find ambiguous results. On the one hand, some researchers have found high-level cognitive discussions within online communities (e.g. Järvelä & Häkkinen, 2002). On the other hand, researchers like Admiraal and colleagues (1998) reported that online discussions were mainly fuelled by social, emotional support. In an attempt to explain these later types of results, Bernard and colleagues (2000) proposed that as participants do not belong to one homogenous group that share a certain background characteristic, learning outcomes can vary based on the composition of online learning communities. Consequently, new insights are required on what factors influence online learning processes (Sambrook, 2005).

1.3.2 *The Impact of Diversity on (Learning) Communities within Organizations*

The creation of diverse groups for training purposes has become a common place phenomenon within organizations nowadays (Thomas-Hunt, Ogden, & Neale, 2003), where diversity is generally defined as the distribution of individuals across one or more attributes (e.g. Bunderson & Sutcliffe, 2002; Milliken & Martins, 1996). However, despite the general agreement on the potential sources of diversity, such as age, gender, and (prior) knowledge (e.g. Pelled, Eisenhardt, & Xin, 1999; Van den Bossche, Gijssels, Segers, & Kirschner, 2006), research continues to provide only mixed results on its impact on organizations (Simons, Pelled, & Smith, 1999), suggesting that diversity is a "*double-edged sword*" (Milliken & Martins, 1996, p. 403). In a study of 45 management teams in a *Fortune 100* consumer products company, Bunderson and Sutcliffe (2002) found that diversity can have a positive influence on the information sharing behaviour of team members. This result is in line with their expectations, as they asserted that diverse teams are less restricted by established in-team norms and therefore more motivated to openly share

Chapter 1

information. Moreover, their findings also indicated that diversity, mediated by the higher degree of information sharing, is positively related to the performance of the teams. Similarly, Jehn and Bezrukova (2004) were able to empirically show that diversity has a positive influence on the performance of teams. Investigating 1285 workgroups from a *Fortune* 500 information-processing company, the authors suggest that teams can effectively benefit from an atmosphere where members collaboratively share their knowledge and experiences. Conversely, empirical evidence by Jehn (1995), surveying 589 employees of a large freight transportation firm, showed that members' diverse backgrounds can cause varying degrees of anxiety among team members, making them feel uncomfortable in communicating with their colleagues and thereby inhibiting their cognitive functioning in processing new information. Based on these ambiguous findings, it has therefore been argued that new insights are required on how differences in participants' background characteristics affect their collaborative learning behaviour (Zack & McKenney, 1995).

Yet, previous studies on how organizational structures or participants' varying background characteristics influence online (collaborative) learning have been subject to three main shortcomings. First, previous research has largely been conducted in a laboratory or classroom setting, rather than in an organizational context (e.g. Edmondson, 2002; Schippers, den Hartog, Koopman, & Wienk, 2003). While this provides a solid foundation for understanding general principles and underlying mechanisms, as well as how participants behave and perform within institutes of (higher) education, it only provides limited insights on how such a scenario would look like in an actual organization. Second, previous research on diverse groups in organizations has mainly focused on work-related activities in regular face-to-face environments (e.g. Berger, Ridgeway, Fisek, & Norman, 1998). The issue here is that work-related activities are predominantly connected to performance measures that act as a direct mechanism to allocate rewards (Berger, et al., 1998). In contrast, while participating in a training program can enhance individuals' chances to perform better in the future, the nature and level of a potential direct effect remains to be debated (e.g. Kirwan & Birchall, 2006; Soden & Halliday, 2000). Additionally, the overall level of interdependence within online collaborative learning approaches, such as CoL, remains limited as participants' performance is largely assessed on the basis of their individual performance measures. Hence, while individuals can benefit from the insights and experiences from their colleagues, they do not stand in direct competition with each other in attaining high performance measures. Finally, although scholars like Salas and Kozlowski (2009) have suggested that the organizational context can be the "*800-pound gorilla*" (p. 468) that influences how staff members behave and perform during training, past research has largely neglected a very specific element within organizations that can have a considerable effect on learning processes, namely

hierarchical positions (e.g. Bunderson, 2003a; Krackhardt, 1990; Romme, 1996). While some researchers discovered a “*status equalization*” process (Sproull & Kiesler, 1986, p. 1507) when members of different hierarchical positions engaged into online communication, others have argued that top management will proactively set the tone and dominate collaborative activities (Yates & Orlikowski, 1992).

This dissertation will contribute to the discussion on this topic and address the indicated lacunas by providing empirical evidence from CoL of an online training program that was provided for staff members of a global organization. This setting can be considered as a ready-made laboratory for analysing collaboration in online (learning) communities over time (Haythornthwaite, 2001). More specifically, this dissertation specifically investigates the following main research question:

“What is the impact of hierarchical positions on participants’ learning behaviour and outcomes within Communities of Learning?”

1.4 Opening the Black Box

1.4.1 *The Impact of Hierarchical Positions on CoL*

Building upon asynchronous communication channels, CoL can facilitate a process wherein participants collaboratively process new information, while at the same time, irrespective of time and place, sharing practical experiences (Gunawardena, Lowe, & Anderson, 1997). Consequently, by connecting employees from diverse backgrounds, CoL have the potential of benefiting not only individual employees, but also contributing to the capacity of an entire organization (e.g. Bunderson & Sutcliffe, 2002; Jehn & Bezrukova, 2004). Yet, researchers like Jehn (1995) have proposed that participants can feel intimidated when communicating with colleagues from different backgrounds, e.g. hierarchical structures. Even more so, business thinkers like Gary Hamel have stressed that an organization’s hierarchical structure influences the way people communicate with each other (Hamel & Green, 2007). Furthermore, it has been increasingly acknowledged that participants’ hierarchical positions can have a considerable impact on collaborative learning processes (e.g. Bunderson, 2003a; Krackhardt, 1990; Romme, 1996). Generally, scholars have proposed that, depending on their hierarchical position, participants will display varying levels of activity within collaborative learning processes (e.g. Bird, 1994; Owens & Sutton, 1999). Yet, the exact direction of this trend continues to be debated. On the one hand, scholars like Weisband and colleagues (1995) have argued that computer-mediated communication should lead to a “*deindividuation*” (p. 1125) of participants, weakening social norms and reducing social inhibitions. On the other hand, other studies have suggested the

existence of a positive relationship between the hierarchical position of participants and their level of activity. In other words, higher level management tends to replicate their normal behaviour and also lead virtual communities. This mode of behaviour is suggested to stem from a drive to dominate discussions, in order to reinforce the prevailing status quo. For example, Yates & Orlikowski (1992) argued that top management will proactively set the tone, as they want to control virtual communities. Otherwise, it is proposed that top management worries to also potentially lose control of groups in the real world. Lower management, on the contrary, is believed to face a certain “*fear of speaking up and making mistakes in the group*” (Edmondson, 2002, p. 139), which prohibits them to actively participate. If these trends could be traced within CoL, this would be crucial to consider when designing similar activities, as the underlying collaborative activities heavily build upon the notion that participants openly discuss with each other and thereby contribute to each other’s learning process.

Generally, when considering what type of information will be shared by whom within organizations, researchers like Bunderson (2003b) stipulated that higher level managers are accustomed to integrating information from different disciplines and, based on their (considerable) work experience, are better at inferring upon new information. On the contrary, lower lever management has been said to provide more factual information and insights to discussions. Consequently, when participants’ performance is assessed on how well they can integrate new knowledge in their own working environments, this should then translate into a positive relationship between participants’ hierarchical position and their observed performance levels. However, despite these first indications on how hierarchical positions can possibly influence behaviour and performance within online collaborative learning, past empirical research has suffered from three main lacunas, namely i) a lack of empirical data from actual organizations (Edmondson, 2002), ii) a focus on groups that have had continuous face-to-face contact (e.g. Berger, et al., 1998), and iii) studies that have generally considered performance at the organizational level (Bunderson, 2003a). Consequently, previous findings can only provide suggestions and indications on how hierarchical positions influence participants’ level of activity and performance within CoL.

1.4.2 *The Transferability of Hierarchical Positions into Network Structures of CoL*

Regarding the structure and development of online learning networks, Erdős and Rényi (1960), in their seminal work on social networks, have suggested that they should evolve according to the concept of *random graph theory*, where all participating individuals would, on average, make the same number of

connections within a network. While this concept has had a profound impact on how scholars have thought about networks, it has also been critiqued on its highly theoretical assumptions. More specifically, if networks were indeed to just randomly evolve, providing everyone with equal chances to get connected, why can we then observe so many biased networks in the real world (Barabási, 2003)? Additionally, there seems to be a wide-spread consensus that the nature of social networks, as well as their development over time, is significantly affected by the background characteristics of its individual members (Barabási & Albert, 1999). In an organizational context, Holmqvist (2009) stated that dominant individuals, based on their more central role within an organization, will have a significant impact on all organizational learning processes. Focusing more on the opposite side of the hierarchical spectrum, Edmondson (2002) has shown that lower level management is particularly concerned about how colleagues perceive them and their work and therefore tend to limit their interaction with colleagues from higher hierarchical levels. Additionally, members of this group have been suggested to be generally more passive in discussions within training programs (Nembhard & Edmondson, 2006). Sutton (2001) departed from a similar notion and also proposed that members from lower hierarchical positions will mainly try to blend in while not upsetting the status quo. Moreover, Casciaro (1998) noted that occupying high-level positions within an organization provides individuals with an intrinsic attraction to lower level management. This can then create a vortex, where lower level management is trying to get connected and, over time, stay in contact with higher level management (Krackhardt, 1990). In contrast, as lower level management has only constrained access to valued resources, representatives of this group will be less likely to be contacted for information and should therefore hold more peripheral network positions (Borgatti & Cross, 2003). Yet, although past research has already contributed to our understanding on how organizational structures influence social networks, the focus has largely been on the static features of online communities (Panzarasa, Opsahl, & Carley, 2009). While this offers preliminary insights on the overall processes that take place within these communities, it lacks a more refined picture of how social relationships might develop over time (e.g. Haythornthwaite, 2001). Additionally, scholars have often neglected to distinguish between *active* and *passive* participation (Pozzi, Manca, Persico, & Sarti, 2007, p. 172). While *active* participants are clearly visible in online discussion forums (e.g. amount and length of contributions), *passive* participants are more difficult to spot. Even more so, colleagues like Zembylas and Vrasidas (2007) have used the term "*online silence*"(p.18) to describe the phenomenon of participants not actively engaging into discussion, while at the same time still benefiting from the contributions of their colleagues. Additionally, Vrasidas and Zembylas (2003) suggested that silence does not automatically equate to a lack of learning. Instead, some participants might be prone to reflect on content and

discussions, while keeping their views to themselves. Yet, when they are then tested for their knowledge (e.g. final exam), they are very well able to achieve good assessment scores. Consequently, in order to account for these types of participation and learning, it has been suggested to assess participants' *indirect* and *direct* network links (Daradoumis, Martínez-Monés, & Xhafa, 2004). *Indirect* links refer to passive connections that can take on the form of reading a colleague's contributions, but not replying to it. In case a participant actively reacted to another CoL member's contribution and replied, therefore establishing a *direct* link.

1.4.3 *The Impact of Hierarchical Positions on the Learning Processes within CoL*

Generally, scholars have identified two types of communication, namely *social* and *cognitive* communication (e.g. Veerman & Veldhuis-Diermanse, 2001). *Social* communication does not contribute to the understanding of a certain concept, but is rather process-related and can form relationships between participants, on the basis of which more cognitive discussions can follow (Nardi, 2005). *Cognitive* communication captures more content-related aspects of discussions and determines the level of knowledge creation. With respect to this type of communication, researchers again tend to differentiate between three sub-categories of knowledge, namely *basic*, e.g. facts and opinions, *intermediate*, e.g. combining and elaborating information, and *advanced*, e.g. integrating and evaluating information. Furthermore, previous research suggested that as participants interact over time, by sharing their individual experiences and knowledge, they will contribute to the learning process of their colleagues (Gunawardena, Lowe, & Anderson, 1997). Considering the impact of different backgrounds on participants' type of contributions, Armstrong and Anis (2008) stipulated that different backgrounds will result in different types of knowledge being exchanged among staff members. In relation to hierarchical positions, Bird (1994) stipulated that higher level management is responsible for sharing and clarifying the vision of the organization, while middle management acts as "*a nexus between the real and the ideal*" (p. 332) and lower lever management provides more factual information. A similar notion was developed in the work of scholars like Sutton and colleagues (2001), who stated that lower level management will aim at "*integrating into the group*" (p. 16), by focussing on sharing non-threatening factual information and social messages. If such a relationship between hierarchical positions and cognitive level of contributions could be validated, this would have a considerable impact on how collaborative learning should be designed within CoL. Considering the described types of content that are expected to be shared by participants, past research proposed that this would also have an impact on

individuals' network position within the CoL. Even more so, previous studies have even be able to show that course performance (Baldwin, Bedell, & Johnson, 1997), as well as the cognitive level of communication (Russo & Koesten, 2005) both had a positive impact on individuals' position within an online learning community. In other words, if an individual shares a lot of high-level cognitive contributions, this will make her an appealing person to get in touch with. As a result, a lot of colleagues will try to connect with her by actively replying to her contributions. This in turn would then translate into that individual becoming a (more) central participant within a CoL. Yet, taking into account the focus of previous studies, one has to note again that they often detached participants from the organizational context in which learning activities are taking place. Moreover, Akyol and Garrison (2010) criticized the widely used approach of assessing learning outcomes on the basis attained summative grades, as this neglects the actual process of knowledge creation.

1.5 Overview of this Dissertation

Based on empirical data from the training program briefly describe in Section 1.2, the goal of this dissertation is to investigate the following main research question

“What is the impact of hierarchical positions on participants' learning behaviour and outcomes within Communities of Learning?”

Building upon anecdotal evidence and preliminary observations from the training program in question, this manuscript identified four main challenges, on the basis of which the preceding chapters will cover different aspects of the overarching research question. More specifically, these challenges can be formulated as

- Challenge 1: What are participants' ex-ante and ex-post perceptions of CoL, and how intensively do they make use of their possibility to engage into discussions?
- Challenge 2: Do hierarchical positions affect participants' general level of activity and performance?
- Challenge 3: Over time, do individuals' hierarchical positions affect their network positions within CoL?
- Challenge 4: What is the impact of hierarchical positions on the cognitive level of participants' contributions within CoL?

The first challenge will be addressed by Chapter 2, which defines CoL and describes how they have been implemented in the aforementioned training

Chapter 1

program of a global organization. Additionally, empirical evidence will be provided on participants' views about their learning experience, which are measured via two types of questionnaires. First, prior to entering the CoL, participants were asked about their expectations and goals, which established an overview of the ex-ante situation before participants were subjected to the content and structure of the training program. Second, after having completed the learning activities, participants' completed an evaluation questionnaire, where they could indicate their degree of satisfaction with the training program. Finally, Chapter 2 will also introduce user statistics on the overall level of activity within the CoL and make general inference about the type of discussions that participants had. By combining the results of the two questionnaires and the overall activity levels, it will be possible to make inferences about how (global) organizations can effectively design and implement CoL for their employees.

The second challenge will be the focus of Chapter 3. Here this dissertation will explore the overall impact of hierarchical positions on participants' level of activity and performance within CoL, by conducting a range of nonparametric hypotheses test. The level of participants' activity is measured by their user statistics from discussion forums within CoL. Possible difference in performance levels are then determined on the basis of individuals' final exam scores, as well as the cognitive level of participants' contributions within the discussion forums. Additionally, in order to investigate possible patterns in the available data set that might have been overlooked by the previous method, a two-step cluster analysis is conducted to either further highlight the importance of hierarchical positions within CoL, or to discover additional relationships that need to be taken into account for future studies. Moreover, the results of Chapter 3 will help HRD to better anticipate participants' behaviour within CoL.

Chapter 4 considers how participants interacted with each other (e.g. Daradoumis, et al., 2004) and provides valuable information on how hierarchical positions influence the way participants from different hierarchical positions communicate with each other in the context of CoL. Who contacts who during discussions? Are participants from higher hierarchical positions more prone to be contacted than other colleagues? Is everybody reading what has been contributed to the discussions? In order to provide answers to these types of questions, this dissertation conducted a social network study (SNA). Generally, SNA has been suggested as a valuable tool for these types of investigations. More specifically, Garton and colleagues (1997) specifically suggested using SNA methods in the context of online learning networks. In more detail, chapter 4 will present the results of a longitudinal study on a range of different social network statistics, such as in- and out-degree ties, network density, centrality measures and ego-network characteristics. Moreover, following the work of Daradoumis and colleagues (2004), this manuscript specifically distinguished between indirect ties,

as captured via *Read-Networks*, and direct ties, represented in *Reply-Networks*. Additionally, by considering the applicable findings, it will be possible to provide more detailed suggestions on how to device collaborative activities that integrate and stimulate all participants within CoL.

The influence of participants' hierarchical positions on their cognitive level of communication, challenge 4, will be addressed in Chapter 5. In order to investigate this issue, the results of a content analysis will be discussed. This approach has been widely accepted to assess the quality of learning processes and outcomes (de Laat & Lally, 2003). Participants' contributions were coded using an instrument first developed by Veerman and Veldhuis-Diermanse (2001) and then later validated and extended by Schellens and Valcke (2005). Additionally, another set of two-step cluster analyses was conducted on the basis of participants' cognitive communication. The purpose of this exercise was to segment the data into homogenous subgroups of cases, which might have otherwise been overlooked by the other research methods. Furthermore, a longitudinal study was conducted to assess whether and to what extent participants' contributions might have changed over time. Whether the cognitive level of participants' contributions had an impact on their network position within CoL was assessed via another set of SNA. More specifically, this dissertation computed participants' in-degree connections and in-degree centrality scores. The results of these methods, in combination with the content analysis, then provide important insights on patterns of communication (Cramton & Hinds, 2005) that will help HRD managers to design collaborative learning activities and device facilitation strategies for future CoL that will build upon the strength and idiosyncrasies of all participants. Chapter 6 then concludes this dissertation by summarizing the main empirical results, formulating a range of practical implications that will assist HRD to design and implement future CoL, and providing an outlook of how future research can build upon the findings and stipulations of this manuscript to further enhance our understanding about how hierarchical positions influence CoL.

Figure 1-3 below provides an overview of how the individual chapters are interrelated with each other and highlights which particular aspect of the larger picture are covered by each individual chapter. In essence, chapter two to five all cover different aspects of CoL and how participants' hierarchical positions might influence their behaviour within CoL. This dissertation thereby takes a background characteristic that has already been suggested and proven to affect peoples' behaviour in regular face-to-face working environments (e.g. Berger, et al., 1998; Bunderson, 2003a; Simons, et al., 1999) and investigates its impact within a completely different context – online learning communities. Consequently, if this manuscript was able to indicate that hierarchical positions were transferred into the virtual realm, this would not only support the notion that the organizational context can be the “800-pound gorilla” (Salas & Kozlowski, 2009, p. 468) that

Chapter 1

influences how staff members behave and perform during training. It would also have far-reaching consequences on how CoL should be set up in the future.

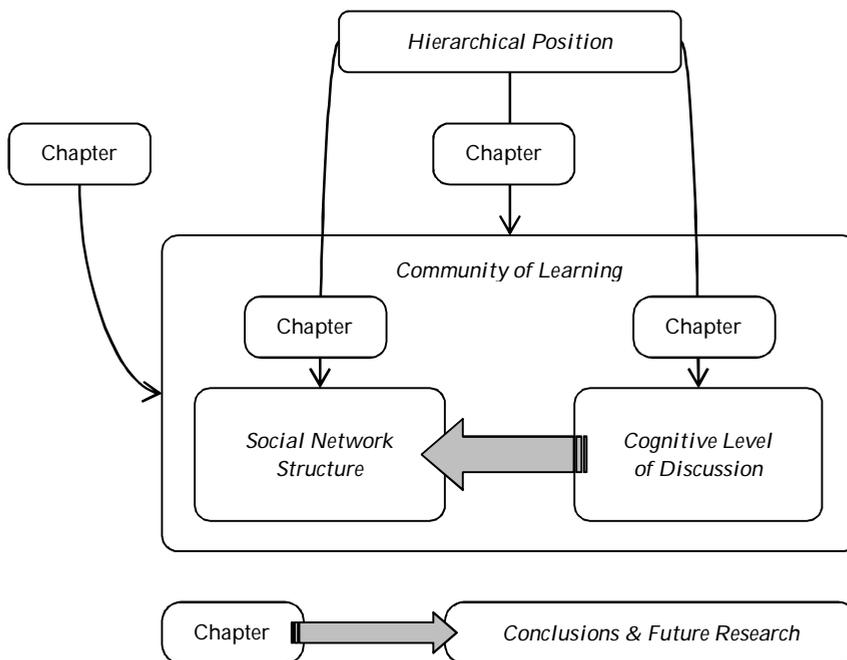


Figure 1-3: Overview of Dissertation

1.6 Note

This dissertation is based on a range of different, inter-related articles that investigate the impact of hierarchical positions on CoL from different angles and using different tools and types of analyses. As a result, every chapter is written to be read as a *stand-alone* piece of work. Consequently, any reoccurring topics and themes are not only inevitable, but also part of this dissertation's structure.

1.7 References

- Admiraal, W. F., Lockhorst, D., Wubbels, T., Korthagen, F. A. J., & Veen, W. (1998). Computer-Mediated communication in teacher education: Computer conferencing and the supervision of student teachers. *Journal of Learning Environment Research*, 1, pp. 59-74.
- Akkerman, S., Admiraal, W., Simons, R. J., & Niessen, T. (2006). Considering Diversity: Multivoicedness in International Academic Collaboration. *Culture Psychology*, 12(4), 461-485. doi: 10.1177/1354067x06069947

- Akyol, Z., & Garrison, D. R. (2010). Understanding cognitive presence in an online and blended community of inquiry: Assessing outcomes and processes for deep approaches to learning. *British Journal of Educational Technology, 42*(2), 233-250.
- Alavi, M., Yoo, Y., & Vogel, D. R. (1997). Using Information Technology to Add Value to Management Education. *The Academy of Management Journal, 40*(6), 1310-1333.
- Allan, B., & Lewis, D. (2006). The impact of membership of a virtual learning community on individual learning careers and professional identity. *British Journal of Educational Technology, 37*(6), 841-852.
- Arbaugh, J. B., & Benbunan-Finch, R. (2006). An Investigation of Epistemological and Social Dimensions of Teaching in Online Learning Environments. *Academy of Management Learning & Education, 5*(4), 435-447.
- Armstrong, S. J., & Anis, M. (2008). Experiential Learning and the Acquisition of Managerial Tacit Knowledge. *Academy of Management Learning & Education, 7*(2), 189-208.
- ASTD (2010). American Society for Training and Development: 2010 State of the Industry Report. Alexandria, VA: ASTD.
- Baldwin, T. T., Bedell, M. D., & Johnson, J. L. (1997). The Social Fabric of a Team-Based M.B.A. Program: Network Effects on Student Satisfaction and Performance. *Academy of Management Journal, 40*(6), 1369-1397.
- Barabási, A.-L. (2003). *Linked: How Everything is Connected to Everything Else and What it Means for Business, Science, and Everyday Life*. New York, NY: Plume.
- Barabási, A.-L., & Albert, R. (1999). Emergence of Scaling in Random Networks. *Science, 286*(5439), 509.
- Berger, J., Ridgeway, C. L., Fisek, M. H., & Norman, R. Z. (1998). The Legitimation and Delegitimation of Power and Prestige Orders. *American Sociological Review, 63*(3), 379-405.
- Bernard, R. M., Rojo de Rubalcava, B., & St-Pierre, D. (2000). Collaborative online distance learning: Issues for future practice and research. *Distance Education, 21*(2), 260-277.
- Bird, A. (1994). Careers as repositories of knowledge : a new perspective on boundaryless careers. *Journal of Organizational Behavior, 15*, 325-344.
- Borgatti, S. P., & Cross, R. (2003). A Relational View of Information Seeking and Learning in Social Networks. *Management Science, 49*(4), 432-445.
- Brower, H. H. (2003). On Emulating Classroom Discussion in a Distance-Delivered OBHR Course: Creating an On-Line Learning Community. *Academy of Management Learning & Education, 2*(1), 22-36.
- Bunderson, J. S. (2003a). Recognizing and Utilizing Expertise in Work Groups: A Status Characteristics Perspective. *Administrative Science Quarterly, 48*(4), 557-591.

Chapter 1

- Bunderson, J. S. (2003b). Team Member Functional Background and Involvement in Management Teams: Direct Effects and the Moderating Role of Power Centralization. *Academy of Management Journal*, 46(4), 458-474.
- Bunderson, J. S., & Sutcliffe, K. M. (2002). Comparing Alternative Conceptualizations of Functional Diversity in Management Teams: Process and Performance Effects. *Academy of Management Journal*, 45(5), 875-893.
- Casciaro, T. (1998). Seeing things clearly: social structure, personality, and accuracy in social network perception. *Social Networks*, 20(4), 331-351.
- Caspi, A., Gorsky, P., & Chajut, E. (2003). The influence of group size on nonmandatory asynchronous instructional discussion groups. *The Internet and Higher Education*, 6(3), pp. 227-240.
- Chalmers, L., & Keown, P. (2006). Communities of practice and professional development. *International Journal of Lifelong Education*, 25(2), 139 - 156.
- Cohen, E. G. (1994). Restructuring the Classroom: Conditions for Productive Small Groups. *Review of Educational Research*, 64(1), 1-35.
- Cramton, C. D., & Hinds, P. J. (2005). Subgroup Dynamics in Internationally Distributed Teams: Ethnocentrism or Cross-National Learning? *Research in Organizational Behavior*, 26, pp. 231-263.
- Daradoumis, T., Martínez-Monés, A., & Xhafa, F. (2004). An Integrated Approach for Analysing and Assessing the Performance of Virtual Learning Groups *Groupware: Design, Implementation and Use* (Vol. 3198, pp. 289-304): Springer Berlin / Heidelberg.
- de Laat, M., & Lally, V. (2003). Complexity, theory and praxis: Researching collaborative learning and tutoring processes in a networked learning community *Instructional Science*, 31(1-2), 7-39.
- Edmondson, A. C. (2002). The Local and Variegated Nature of Learning in Organizations: A Group-Level Perspective. *Organization Science*, 13(2), 128-146. doi: 10.1287/orsc.13.2.128.530
- Eraut, M. (2000). Non-formal learning and tacit knowledge in professional work. *British Journal of Educational Psychology*, 70, 113-136.
- Eraut, M. (2004). Informal learning in the workplace. *Studies in Continuing Education*, 26(2), 247 - 273.
- Erdős, P., & Rényi, A. (1960). On the evolution of random graphs. *Publications of the Mathematical Institute of the Hungarian Academy of Sciences*, 5, 17-61.
- Fowler, C. J. H., & Mayes, J. T. (1999). Learning relationships from theory to design. *ALT-J*, 7(3), 6 - 16.
- Garton, L., Haythornthwaite, C., & Wellman, B. (1997). Studying Online Social Networks. *Journal of Computer-Mediated Communication*, 3(1), 0-0. doi: 10.1111/j.1083-6101.1997.tb00062.x

- Goldstein, L. S. (1999). The Relational Zone: The Role of Caring Relationships in the Co-Construction of Mind. *American Educational Research Journal*, 36(3), 647-673. doi: 10.3102/00028312036003647
- Gunawardena, C. N., Lowe, C. A., & Anderson, T. (1997). Analysis Of A Global Online Debate And The Development Of An Interaction Analysis Model For Examining Social Construction Of Knowledge In Computer Conferencing. *Journal of Educational Computing Research*, 17(4), pp. 397-431.
- Hakkarainen, K., Palonen, T., Paavola, S., & Lehtinen, E. (2004). *Communities of networked expertise: Professional and educational perspectives*. Amsterdam: Elsevier.
- Hamel, G., & Green, B. (2007). *The Future of Management*: Harvard Business School Press.
- Harun, M. H. (2001). Integrating e-Learning into the workplace. *The Internet and Higher Education*, 4(3-4), 301-310.
- Haythornthwaite, C. (2001). Exploring Multiplexity: Social Network Structures in a Computer-Supported Distance Learning Class. *Information Society*, 17(3), 211-226.
- Holmqvist, M. (2009). Complicating the Organization: A New Prescription for the Learning. *Management Learning*, 40(3), 275-287.
- Järvelä, S., & Häkkinen, P. (2002). Web-based Cases in Teaching and Learning - the Quality of Discussions and a Stage of Perspective Taking in Asynchronous Communication. *Interactive Learning Environments*, 10(1), 1 - 22.
- Järvelä, S., Järvenoja, H., & Veermans, M. (2008). Understanding the dynamics of motivation in socially shared learning. *International Journal of Educational Research*, 47(2), 122-135.
- Jehn, K. A. (1995). A Multimethod Examination of the Benefits and Detriments of Intragroup Conflict. *Administrative Science Quarterly*, 40(2), 256-282.
- Jehn, K. A., & Bezrukova, K. (2004). A field study of group diversity, workgroup context, and performance. *Journal of Organizational Behavior*, 25(6), 703-729.
- Kane, G. C., & Alavi, M. (2007). Information Technology and Organizational Learning: An Investigation of Exploration and Exploitation Processes. *Organization Science*, 18(5), 796-812.
- Kirwan, C., & Birchall, D. (2006). Transfer of learning from management development programmes: testing the Holton model. *International Journal of Training & Development*, 10(4), 252-268.
- Krackhardt, D. (1990). Assessing the Political Landscape: Structure, Cognition, and Power in Organizations. *Administrative Science Quarterly*, 35, 342-369.
- Lave, J., & Wenger, E. (1991). *Situated learning: legitimate peripheral participation*: Cambridge University Press.

Chapter 1

- Milliken, F. J., & Martins, L. L. (1996). Searching for Common Threads: Understanding the Multiple Effects of Diversity in Organizational Groups. *Academy of Management Review*, 21(2), 402-433.
- Nachmias, R., Mioduser, D., Oren, A., & Ram, J. (2000). Web-Supported Emergent-Collaboration In Higher Education Courses. *Journal of Educational Technology & Society*, 3(3), 94-104.
- Nardi, B. (2005). Beyond Bandwidth: Dimensions of Connection in Interpersonal Communication. *Computer Supported Cooperative Work (CSCW)*, 14(2), 91-130. doi: 10.1007/s10606-004-8127-9
- Nembhard, I. M., & Edmondson, A. C. (2006). Making it safe: The effects of leader inclusiveness and professional status on psychological safety and improvement efforts in health care teams. *Journal of Organizational Behaviour*, 27, pp. 941-966.
- Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science*, 5(1), 14-37.
- Owens, D. A., & Sutton, R. I. (1999). Status Contests in Meetings: Negotiating the Informal Order. In M. E. Turner (Ed.), *Groups at Work: Advances in Theory and Research*. Mahwah, NJ: Lawrence Erlbaum and Associates.
- Paloff, R., & Pratt, K. (2003). *The virtual student: A profile and guide to working with online learners*. San Francisco: Jossey-Bass.
- Panzarasa, P., Opsahl, T., & Carley, K. M. (2009). Patterns and dynamics of users' behavior and interaction: Network analysis of an online community. *Journal of the American Society for Information Science and Technology*, 60(5), 911 - 932.
- Pelled, L. H., Eisenhardt, K. M., & Xin, K. R. (1999). Exploring the Black Box: An Analysis of Work Group Diversity, Conflict, and Performance. *Administrative Science Quarterly*, 44(1), 1-28.
- Peltonen, T., & Lamsa, T. (2004). 'Communities of Practice' and the Social Process of Knowledge Creation: Towards a New Vocabulary for Making Sense of Organizational Learning. *Problems and Perspectives in Management*(4), 249-262.
- Pozzi, F., Manca, S., Persico, D., & Sarti, L. (2007). A general framework for tracking and analysing learning processes in computer-supported collaborative learning environments. *Innovations in Education and Teaching International*, 44(2), 169-179. doi: 10.1080/14703290701240929
- Rehm, M. (2009). Unified in Learning – Separated by Space: Case Study on a Global Learning Programme. *Industry and Higher Education*, 23(4).
- Robey, D., Khoo, H., & Powers, C. (2000). Situated learning in cross-functional virtual teams. *Technical Communication*, 47(1), 51–66.

- Roblyer, M. D., & Wiencke, W. R. (2003). Design and Use of a Rubric to Assess and Encourage Interactive Qualities in Distance Courses. *American Journal of Distance Education, 17*(2), 77 - 98.
- Romme, A. G. L. (1996). A Note on the Hierarchy-Team Debate. *Strategic Management Journal, 17*(5), 411-417.
- Russo, T. C., & Koesten, J. (2005). Prestige, Centrality, and Learning: A Social Network Analysis of an Online Class. *Communication Education, 54*(3), 254 - 261.
- Salas, E., & Kozlowski, S. W. J. (2009). Learning, Training, and Development in Organizations: Much Progress and a Peek Over the Horizon. In E. Salas & S. W. J. Kozlowski (Eds.), *Learning, Training, and Development in Organizations*. New York, NY, United States of America: Routledge.
- Sambrook, S. (2005). Factors Influencing the Context and Process of Work-Related Learning: Synthesizing Findings from Two Research Projects. *Human Resource Development International, 8*(1), 101-119.
- Schellens, T., & Valcke, M. (2005). Collaborative learning in asynchronous discussion groups: What about the impact on cognitive processing? *Computers in Human Behavior, 21*(6), 957-975.
- Schippers, M. C., den Hartog, D. N., Koopman, P. L., & Wienk, J. A. (2003). Diversity and team outcomes: the moderating effects of outcome interdependence and group longevity and the mediating effect of reflexivity. *Journal of Organizational Behavior, 24*(6), 779-802.
- Shrivastava, P. (1999). Management Classes as Online Learning Communities. *Journal of Management Education, 23*(6), 691-702. doi: 10.1177/105256299902300607
- Simons, T., Pelled, L. S., & Smith, K. A. (1999). Making Use of Differences: Diversity, Debate, and Decision Comprehensiveness in Top Management Teams. *Academy of Management Journal, 42*(6), 662-673.
- Soden, R., & Halliday, J. (2000). Rethinking vocational education: a case study in care. *International Journal of Lifelong Education, 19*(2), 172 - 182.
- Sproull, L., & Kiesler, S. (1986). Reducing Social Context Cues: Electronic Mail in Organizational Communication. *Management Science, 32*(11), 1492-1512.
- Stacey, E., Smith, P. J., & Barty, K. (2004). Adult learners in the workplace: online learning and communities of practice. *Distance Education, 25*(1), 107 - 123.
- Sutton, L. A. (2001). The Principle of Vicarious Interaction in Computer-Mediated Communications. *International Journal of Educational Telecommunications, 7*(3), 223-242.
- Swan, J. A., Scarbrough, H., & Robertson, M. (2002). The Construction of 'Communities of Practice' in the Management of Innovation. *Management Learning, 33*(4), 477-496.

Chapter 1

- Thomas-Hunt, M. C., Ogden, T. Y., & Neale, M. A. (2003). Who's Really Sharing? Effects of Social and Expert Status on Knowledge Exchange Within Groups. *Management Science*, 49(4), 464–477.
- Van den Bossche, P., Gijssels, W. H., Segers, M., & Kirschner, P. A. (2006). Social and Cognitive Factors Driving Teamwork in Collaborative Learning Environments: Team Learning Beliefs and Behaviors. *Small Group Research*, 37(5), 490-521. doi: 10.1177/1046496406292938
- Veerman, A., & Veldhuis-Diermanse, E. (2001). Collaborative learning through computer-mediated communication in academic education. In P. Dillenbourg, A. Eurelings & K. Hakkarainen (Eds.), *European perspectives on computer-supported collaborative learning: proceedings of the first european conference on computer-supported collaborative learning* (pp. 625-632). Maastricht: McLuhan Institute University Maastricht.
- Vrasidas, C., & Zembylas, M. (2003). The Nature of Technology-mediated Interaction in Globalised Distance Education. *International Journal of Training and Development*, 7(4), 271-286.
- Webster-Wright, A. (2009). Reframing Professional Development Through Understanding Authentic Professional Learning. *Review of Educational Research*, 79(2), 702-739. doi: 10.3102/0034654308330970
- Weisband, S. P., Schneider, S. K., & Connolly, T. (1995). Computer Mediated Communication and Social Information: Status Salience and Status Differences. [Article]. *Academy of Management Journal*, 38(4), 1124-1151. doi: 10.2307/256623
- Wenger, E., McDermott, R., & Snyder, W. M. (2002). *Cultivating communities of practice*. Boston: Harvard University Press.
- Yates, J., & Orlikowski, W. J. (1992). Genres of Organizational Communication: A Structural Approach to Studying Communication and Media. *Academy of Management Review*, 17(2), 299-326.
- Zack, M. H., & McKenney, J. L. (1995). Social Context and Interaction in Ongoing Computer-supported Management Groups. [Article]. *Organization Science*, 6(4), 394-422.
- Zembylas, M., & Vrasidas, C. (2007). Listening for Silence in Text-Based, Online Encounters. *Distance Education*, 28(1), 5 - 24.

CHAPTER 2

Unified in Learning – Separated by Space Case Study on a Global Learning Programme¹

Abstract: The active growth of available online learning programmes has created a wide range of new possibilities for global organizations to effectively train their staff. Previously, global training was related to substantial costs for organizations that had to be endured in order to update their knowledge and skills of the workforce. In this context, (virtual) Communities of Learning (CoL), defined as a group of people “*engaging in collaborative learning and reflective practice involved in transformative learning*” (Paloff & Pratt, 2003, p. 17), become increasingly interesting for international organizations, as they have the potential of aiding them in the process of workplace practice and training. This article highlights how CoL for 174 staff, from 81 offices worldwide, of a large international organization (IO) has been developed and implemented by facilitating the collaborative exchange of knowledge and experiences. Based on the participants’ perceptions, several key insights will be provided that should be taken into account when engaging into CoL initiatives.

¹ The chapter is based on Rehm, M. (2009). Unified in Learning – Separated by Space: Case Study on a Global Learning Programme. *Industry and Higher Education*, 23(4).

2.1 New Possibilities for Global Organizations

As the availability of new online learning programmes and tools is constantly increasing, global organizations can choose from a wide range of new options to effectively train their workforce. Previously, global learning programmes were often associated with substantial costs that had to be endured in order to update the knowledge and skills of a workforce. Employees had to leave their workstations, creating numerous direct and indirect costs to an organization. Moreover, with people having to physically travel to training venues for short amounts of time, there is a limited scope to benefit from a truly international exchange of experiences and insights. Nowadays, organizations can readily create virtual communities of practice (CoP) (Wenger, 1998, p. 4) to teach and train their staff. In essence, CoP constitute “*groups of people, who share a concern, set of problems or passion about a topic and who deepen their knowledge and expertise in this area by interacting on an ongoing basis*” (Wenger, McDermott, & Snyder, 2002, p. 4). Given the availability and flexibility of such communities, there has been a notable increase in the occurrence of workplace practice and training (Schlager, Fusco, & Schank, 2002), which has been partly fuelled by the growing need to effectively provide new skills and knowledge for organizations not to lose their competitive edge (Bassi, Cheney, & Lewis, 1998). Hence, international organizations appear to be increasingly interested in setting up learning initiatives, which are related to their already existing communities of practice (Brown, Collins, & Duguid, 1989). Moreover, it has been widely accepted that the creation of such initiatives can be greatly supported by developing and implementing *situated learning* (e.g. Amin & Roberts, 2006; Bernard, Rojo de Rubalcava, & St-Pierre, 2000; Billet, 1996; Gannon-Leary & Fontainha, 2007; Lave & Wenger, 1991; Savery & Duffy, 1995; Woods & Ebersole, 2003). In this context, *situated learning* describes a situation in which people collaboratively engage with real-life problems and cases that are placed in their everyday working environments. Possible examples of such learning situations include face-to-face workshops and apprenticeship style job trainings. Given the increased importance and demand for CoP, a lot of work has already been done on identifying possible success factors (e.g. Amin & Roberts, 2006; Gannon-Leary & Fontainha, 2007; Huang, 2002; Hung & Der-Thang, 2001; Smith, 2001; Wenger, 1998; Woods & Ebersole, 2003). However, there has been concern that the concept of CoP might not be suited for formal learning programmes (Fowler & Mayes, 1999). Additionally, recent research of CoP is based on experimental groups from the educational sector, or communities that have very similar background characteristics (e.g. Chalmers & Keown, 2006; Hara, Bonk, & Angeli, 2000). Yet, limited research has been conducted among formal global learning programmes. Consequently, this article will introduce an adjusted methodological framework, which takes into account the specific requirements of

formal learning programmes. Subsequently, this article will highlight how this framework has been implemented in a global learning programme for a large international organization (IO), whose participants have a diverse educational and professional background. Finally, a range of descriptive statistics will be provided on the frequency in which educational tools, in the case at hand asynchronous discussion forums, have been used, as well as on how the course was perceived by the participants, both before and after its completion. This serves the purpose of providing possible answers to the underlying research question of:

“How can global organizations effectively design and implement Communities of Learning for their international staff?”

This in turn will help to identify key aspects that should be taken into account when engaging into such learning initiatives.

2.2 From Communities of Practice to Communities of Learning

(Virtual) Communities of Practice (CoP) belong to the most important and popular e-Learning methodologies that have been developed in the field of professional training in recent years (Allan & Lewis, 2006; Constant, Sproull, & Kiesler, 1996). Conceptualized by Lave and Wenger (1991), numerous organizations have implemented such communities to enhance the capacity of their staff (e.g. Amin & Roberts, 2006; Cousin & Deepwell, 2005; Fox, 2000; Gannon-Leary & Fontainha, 2007; Hung & Der-Thanq, 2001; Kelly, Gale, Wheeler, & Tucker, 2007; Moule, 2006; Schlager, et al., 2002; Schwen & Hara, 2003; Stacey, Smith, & Barty, 2004; Wenger, 1998; Wenger, et al., 2002). Noteworthy attributes of such communities include that they naturally evolve within the workplace, do not exhibit clearly defined boundaries and provide participants with a high degree of participatory freedom. As appealing this might be, scholars have argued that this concept does not properly apply for formal learning programmes (Fowler & Mayes, 1999). In contrast to CoP, learning programmes are designed for a specific purpose, are limited to a certain timeframe and are accessible only to an exclusive group of participants (Nachmias, Mioduser, Oren, & Ram, 2000).

Following this train of thought, scholars have been promoting a shift towards *managed CoP* (e.g. Allan & Lewis, 2006; Lewis & Allan, 2004; Swan, Scarbrough, & Robertson, 2002). One specific derivative of this movement is the notion of *Community of Learning* (CoL) (Stacey, et al., 2004). The main additions and adjustments of this approach can be categorized into three aspects. First, it acknowledges that organizational learning requires a certain amount of structure, so as to work effectively and yield the envisioned learning results. With no clearly defined boundaries and time limits, participants can easily lack the necessary drive

Chapter 2

to actively participate, share their knowledge and expand their expertise. Second, CoL incorporate the facilitation of participants by supporting staff into the methodology. This adds another dimension of structure and support that is of vital importance for organizational training initiatives. Finally, given the official nature of such training programmes, any kind of contribution within the community will automatically be checked, validated, which eventually legitimizes all newly gained knowledge and expertise. This results in different considerations that need to be taken into account when developing and implementing such a community.

Summarizing these efforts, and acknowledging the wide range of similarities with CoP, Amin and Roberts (2006) have developed a comprehensive overview of five aspects that need to be addressed. First, CoL should allow for an *open dialogue* that is not necessarily constrained by the borders of the organization. In other words, they should specifically introduce the possibility to engage into discussion with “outsiders”, who will confront participants with an alternative point of view and challenge them to re-think, or re-phrase their current views. As the IOs staff has to collaborate with partners from outside the organization on a daily basis, who often have a different vocabulary and a different method to analyse problems and situations, this was also of great importance. By subjecting participants to the differing views of their colleagues and academic staff, while at the same time teaching them the underlying principles, this can make a valuable contribution to the overall learning outcomes. If this aspect is well incorporated into a CoL, one would expect to see a high intensity of usage of the chosen collaborative learning tool. Second, participants will differ in their *levels of participation* and that participation will change over the course of the programme. This is an inherent characteristic of professional participants, as they will remain a vibrant part of their working environments during the programme. Consequently, it is of crucial importance to design a structure that allows for periods of absence, which neither have consequences on the overall group, nor on the performance of the individual. A possible way to do this is to incorporate collaborative learning tools, such as asynchronous discussion forums, to cater for this need. In this context, one would expect to witness fluctuating levels of activity in the discussion forums, rather than a constant level of input. Third, any CoL should provide both *public*, as well as *private community spaces*. The inclusion of public spaces will facilitate the overall exchange of knowledge and the creation of a shared repertoire of communal resources and tools. The private spaces allow for a more social type of communication between participants, but also between educators and participants. This creates a degree of commonality (Hung & Der-Thanq, 2001), which can help participants to identify the purpose of the collaboration in the CoL (Gannon-Leary & Fontainha, 2007) and help to establish and strengthen personal ties and relations. In either case, if well received by participants, one would expect that both types of forums will be actively used, again being reflected by a high

intensity of usage of the chosen collaborative learning tool. Fourth, and very closely linked to the aforementioned, Amin and Roberts (2006) point to the importance of including *spaces for informal discussions*, where participants can create an electronic personality (Woods & Ebersole, 2003), which is comparable to sharing autobiographies, and engage into online socialization (Smith, 2001), which generally takes the form of introducing oneself to the community and sharing personal information. This process can substantially contribute to the success of a CoL as it creates a sense of belonging and trust between the affected actors (Gannon-Leary & Fontainha, 2007), who should feel comfortable to actively contribute to the CoL. Similarly to the expectations for the previous aspect, the importance of including informal discussion spaces would be supported by observing a high level of activity within the chosen collaborative learning tool. Finally, participants should be challenged by *real-life and current problems*. It is the task of the designers to effectively combine familiar aspects of the daily routines with the challenges of new concepts, theories and mechanisms. This issue is related to the notion of *situated learning* (Hung & Der-Thang, 2001; Lave & Wenger, 1991). Moreover, Huang (2002) suggests this to be of special importance for adult learners, who want to apply the new gained knowledge in their regular working environments, while at the same time linking it with their practical experience. If this is done appropriately, one would expect to find a high level of appreciation for this type of assignments among participants, as this will assist them in putting the newly gained knowledge and skills into perspective.

Additionally, and to some extent linked to the aforementioned, it has been proven beneficial to also incorporate insights and findings from the *online remedial teaching model* developed by Rienties, and colleagues (2006). This model suggests four aspects that should be considered in setting up any type of online, collaborative learning programme. Firstly, participants should be able to access information and actively participate in the programme 24/7. This is of great importance, as it allows participants to access the learning programme irrespective of time and place. Secondly, virtual learning environments (VLEs) should allow for an *individualized learning path*, in order to allow for possible differences in participants prior knowledge levels, learning styles and preferences. Thirdly, and in line with concepts like *social constructivism* (Vygotsky, 1978) and *situated cognition* (Brown, et al., 1989; Hung & Der-Thang, 2001), online learning courses should stimulate the *interaction* between participants via the intensive use of communication tools, such as discussion forums, in order to bridge the geographical distance between them. Again, this will not only aid the dialogue between participants themselves, but also enhance the communication with the academic staff. Finally, students should always receive *rapid feedback*. As already identified by Vrasidas and Zembylas (2003), this will not only enhance the interaction between staff and students in general, but also increase the overall

Chapter 2

performance of the students. However, the initial setup of the model was based on the characteristics of regular students in higher education.

The remainder of this article will now focus on how these methodological considerations have been put into practice in a global CoL for a large IO. Moreover, by providing empirical results on the intensity of usage of collaborative learning tools, such as asynchronous discussion forums, as well as on the participants' perceived quality of the CoL, key aspects can be identified on how (global) organizations can effectively design and implement CoL for their international staff.

2.3 Method

2.3.1 *Setting*

The learning programme was provided for a large IO and has been implemented from June until December 2007. The ultimate objective of the programme was to secure the impact of the IO in its daily practice by enhancing the capacity and skills of its staff. Additionally, as the world is permanently changing and new analyses and solutions are needed to address the same problems, the IO wanted to embrace these developments by training their management staff accordingly. In terms of content, the learning programme specifically focused on updating the participants' understanding of new assessments of familiar problems and introducing vocabulary and theories currently used to analyse them. The programme built on a blended learning approach and was subdivided into two main phases, namely e-Learning and face-to-face. This article will neglect the Face-to-Face part of the programme and will focus on the e-Learning Phase.

2.3.2 *Purpose and Structure of the e-Learning Phase*

The duration of the e-Learning phase was fourteen weeks. Given the interdisciplinary background of the participants, the purpose of the e-Learning phase was to introduce and possibly refresh the more basic and standard knowledge of the learning programme's central topics. In a way, it created a *level playing field* for the second phase, where the participants really got challenged to put all aspects into perspective and implement them in real-life scenarios. The e-Learning phase began with an introductory stage, where participants could get accustomed to the structure and content, as well as the virtual learning environment (VLE), which hosted all required activities of the phase. Especially the latter part of this setup has been deemed important by researchers such as Kelly and colleagues (2007), who identified a certain degree of lacking experience in using ICT among adult learners. Additionally, Gannon-Leary and Fontainha (2007)

stipulate that many professionals are *strategic users of ITs*, being well capable of using standard text- and data-processing packages, but encountering noticeable difficulties in working with more advanced online tools.

Given the methodological considerations introduced above, the e-Learning phase required a VLE that was able not only to host all required “static” content materials and supporting documents, but also provide the opportunity for participants to engage into active discussions, sharing ideas and experiences. As a result, a Blackboard® powered VLE was chosen, which encompassed a wide range of characteristics that help to foster the crucial aspects of a successfully working CoL. More specifically, it allowed participants to complete online quizzes, providing automatic feedback on the results (Rienties, et al., 2006). Furthermore, Blackboard incorporates interactive communication tools, such as asynchronous discussion forums that can substantially contribute to open dialogue and the collaborative work on real-life cases and tasks irrespective of time and place. This also allowed for a more personal and informal exchange between participants (Amin & Roberts, 2006). The overall workload equalled an estimated five hours per week. In general, the content was oriented along the five focal areas of the entire programme. Each area constituted a content module that comprised lecture(s), readings, quizzes and task, which were collaboratively solved in online discussion groups.

2.3.3 *Online Discussion Groups*

This part constituted the backbone of the entire e-Learning phase and was subdivided into a general public space and many private spaces as recommended by Amin and Roberts (2006). The public, programme wide space facilitated a general exchange of knowledge across all participants. The involvement herein was voluntary. The private spaces were made up of fourteen separate *Learning Communities*, each consisting of about twelve randomly assigned participants. Both spaces contained asynchronous discussion forums, where participants could openly discuss the content of the modules. For a graphical representation of how such a forum space looked like within a Learning Community, please see Figure 2-1.

Additionally, two different types of forums were available. One forum specifically focused on group building processes, entitled “*Café Talk*”. Here, people could introduce themselves, post pictures and conduct informal chit-chat (Figure 2-2). By means of this forum it was possible to foster the creation of trust and a *common identity* (Hung & Der-Thanq, 2001; Woods & Ebersole, 2003). The other type of forum was really content-driven. Each focal area was assigned an individual discussion forum, which was based on a practical, real-life task, taken from the actual working environments of the participants. The challenge for

Chapter 2

participants was to apply the newly gained knowledge to the supposedly familiar surroundings. This setup constituted a type of *(neo-)apprenticeship style learning* (Gannon-Leary & Fontainha, 2007), which stimulated the interaction between colleagues with different backgrounds. Figure 2-3 provides a graphical overview of how such a discussion looked like and how it evolved over time. In this framework, experts were not necessarily defined on the basis of explicit knowledge, but more along the lines of tenure and tacit knowledge. By providing a forum for such a process, *spillover-effects* (Hung & Der-Thang, 2001) could be created where more senior staff shared their knowledge with more junior colleagues, while at the same time the latter group could introduce new thoughts and ideas to the organization. To facilitate the discussions a team of academic staff was assigned to each Learning Community. They monitored the discussions and answered content related questions. Moreover, they also acted as a kind of *sparring partner*, challenging participants to re-think their current practices, and implementing the newly gained knowledge to their actual environments (Amin & Roberts, 2006). The involvement in the content-driven forums was obligatory. The contributions were graded by the academic staff and constituted 50 percent of the final grade for the e-Learning phase. Finally, to accommodate the busy time schedules of the participants and to ensure that everyone had the opportunity to actively participate in all discussions, all forums remained accessible throughout the entire e-Learning Phase.

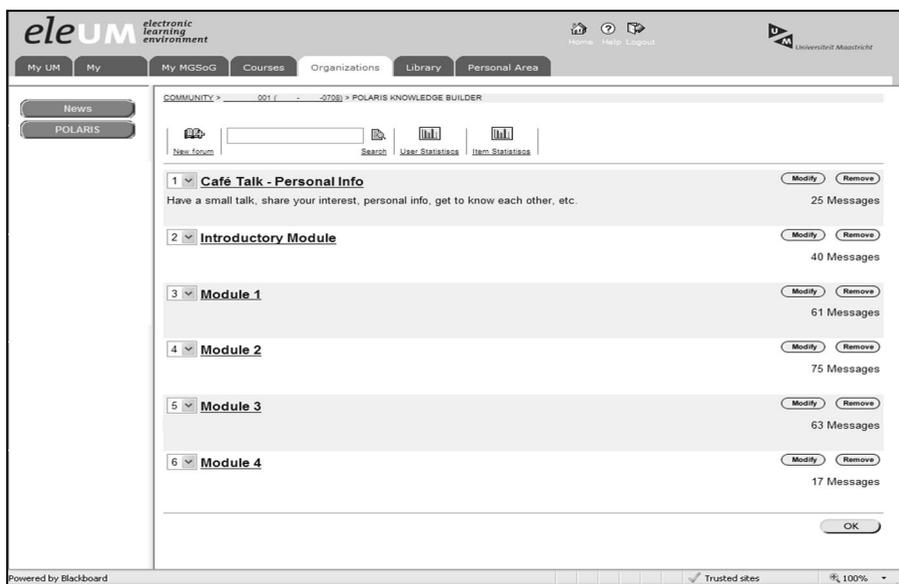


Figure 2-1: Example of an Asynchronous Discussion Forum within a Learning Community

| Start new Thread Entire thread Questions and Answers References Remove User Statistics Item Statistics <input type="text"/> Search | | | | | | | | | |
|--|--------|----------------|---|---|---|---|---|---|---|
| Forum: Café Talk - Personal Info | | | | | | | | | |
| Subject | Author | Date | ? | ! | 📶 | & | 🔍 | 🔒 | # |
| <input type="checkbox"/> back in business! | | 14-04-09 10:20 | | | | | | | 0 |
| <input type="checkbox"/> Hello from Côte d'Ivoire | | 15-04-09 19:49 | | | | | | | 0 |
| <input type="checkbox"/> welcome | | 16-04-09 9:48 | | | | | | | 0 |
| <input type="checkbox"/> Welcome ! | | 16-04-09 14:43 | | | | | | | 0 |
| <input type="checkbox"/> back in business | | 20-04-09 20:34 | | | | | | | 0 |
| <input type="checkbox"/> No Problem! | | 21-04-09 13:50 | | | | | | | 0 |
| <input type="checkbox"/> Easter Holiday | | 13-04-09 22:48 | | | | | | | 0 |
| <input type="checkbox"/> Easter Holiday | | 09-04-09 15:45 | | | | | | | 0 |
| <input type="checkbox"/> Introduction | | 08-04-09 0:09 | | | ▼ | | | | 0 |
| <input type="checkbox"/> Oupsss--Should be | | 08-04-09 0:12 | | | ▼ | | | | 0 |
| <input type="checkbox"/> Hello | | 08-04-09 12:48 | | | | | | | 0 |
| <input type="checkbox"/> Introduction | | 07-04-09 19:39 | | | | | | | 0 |
| <input type="checkbox"/> Nice to see you here ! | | 07-04-09 22:51 | | | | | | | 0 |
| <input type="checkbox"/> Hi ! | | 08-04-09 12:49 | | | | | | | 0 |
| <input type="checkbox"/> Hi | | 23-04-09 23:20 | | | | | | | 0 |
| <input type="checkbox"/> Overview of Participants in this Learning Community | | 06-04-09 14:45 | | | | | + | | 0 |
| <input type="checkbox"/> Hi! everybody | | 02-04-09 10:49 | | | ▼ | | | | 0 |
| <input type="checkbox"/> Hello ! | | 02-04-09 17:08 | | | | | | | 0 |
| <input type="checkbox"/> Background and experience | | 02-04-09 20:30 | | | | | | | 0 |
| <input type="checkbox"/> Thank you! | | 03-04-09 15:18 | | | | | | | 0 |
| <input type="checkbox"/> Attending a Workshop | | 29-03-09 14:46 | | | | | | | 0 |

Figure 2-2: Example of a “Café Talk” Discussion Forum within a Learning Community

| Start new Thread Entire thread Questions and Answers References Remove User Statistics Item Statistics <input type="text"/> Search | | | | | | | | | |
|--|--------|----------------|---|---|---|---|---|---|---|
| Forum: Module 1 | | | | | | | | | |
| Subject | Author | Date | ? | ! | 📶 | & | 🔍 | 🔒 | # |
| <input type="checkbox"/> Ideas on assessing and minimizing cost of absence | | 20-04-09 6:57 | | | ▼ | | | | 1 |
| <input type="checkbox"/> Thank you ! | | 20-04-09 16:47 | | | | | | | 0 |
| <input type="checkbox"/> I also welcome you... | | 25-04-09 22:21 | | | | | | | 0 |
| <input type="checkbox"/> Re: Welcome | | 27-04-09 13:08 | | | | | | | 0 |
| <input type="checkbox"/> Re: Thank you | | 27-04-09 13:00 | | | | | | | 0 |
| <input type="checkbox"/> Aha.... | | 27-04-09 15:02 | | | | | | | 0 |
| <input type="checkbox"/> Adding to ideas on assessing cost of | | 22-04-09 8:03 | | | ▲ | | | | 0 |
| <input type="checkbox"/> Adding to ideas of minimizing cost of | | 22-04-09 8:24 | | | ▲ | | | | 1 |
| <input type="checkbox"/> Are we on track? | | 17-04-09 13:36 | | | ▼ | | | | 0 |
| <input type="checkbox"/> Yes | | 17-04-09 17:16 | | | | | | | 0 |
| <input type="checkbox"/> I agree... | | 17-04-09 20:51 | | | | | | | 0 |
| <input type="checkbox"/> Thank you | | 18-04-09 6:04 | | | | | | | 0 |
| <input type="checkbox"/> Lecture 2b question | | 10-04-09 13:04 | | | ▼ | | | | 0 |
| <input type="checkbox"/> About your question... | | 14-04-09 19:33 | | | | | | | 0 |
| <input type="checkbox"/> How can the cost of be minimized? | | 10-03-09 15:16 | | | | | | | 0 |
| <input type="checkbox"/> Minimizing cost of | | 14-04-09 4:36 | | | | | | | 0 |
| <input type="checkbox"/> Clarification needed on Moral Hazard... | | 17-04-09 20:03 | | | | | | | 0 |
| <input type="checkbox"/> An answer to question? | | 17-04-09 20:13 | | | | | | | 0 |
| <input type="checkbox"/> Thanks ! | | 18-04-09 9:54 | | | | | | | 0 |
| <input type="checkbox"/> Comment on incentives | | 20-04-09 4:17 | | | | | | | 0 |
| <input type="checkbox"/> Proposed ideas at reducing the cost of absence.. | | 15-04-09 11:00 | | | ▲ | | | | 0 |

Figure 2-3: Example of a Content-Driven Discussion Forum within a Learning Community

2.3.4 *Participants*

Overall, 210 participants, from 81 offices world-wide started the e-Learning phase. Unfortunately, due to unforeseen circumstances and due to blocked working schedules 22 participants (10.48 %) had to drop out, leaving a total of 174 participants who completed the e-Learning phase. The gender distribution of the remaining group was slightly in favour of females (52.9%) and the average age of the participants was 44.4 years. When looking at the educational backgrounds, the majority of the participants held a Master's degree (68.2%), compared to PhD's (17.3%), Bachelor's (9.2%) and other degrees (5.3%). More specifically, their content-related backgrounds included, among others, Engineering, Health Sciences, Sociology, International Law and Geography.

2.4 Instruments

2.4.1 *Expectations and Goals before the Start of the e-Learning Phase*

Before the start of the e-Learning phase, participants were asked about their expectations and goals via an online questionnaire. This instrument was based on a previous version developed at Maastricht University (Giesbers, Rienties, Gijsselaers, Segers, & Tempelaar, 2009; Rienties, et al., 2006) and included some adjustments to fit the context of working professionals. The questionnaire consisted of 24 questions, subdivided into four categories, and was administered with a 7-point Likert scale ranging from 1 (not true for me at all) to 7 (completely true for me). The four categories were identical to the ones developed by Rienties et al. (2006) and included (the number of questions are reported in brackets): "*Reasons to join the course*" (6), "*Course design*" (4), "*Expectations and goals*" (10) and "*Group collaboration*" (4). The response rate for the questionnaire was 93.81 %. The purpose of this questionnaire was to establish an overview of the ex-ante situation before the participants were subjected to the content and structure of the e-Learning phase, including their attitude towards the scheduled collaborative activities.

2.4.2 *Intensity of Usage of the Discussion Forums*

Given the central role of the online discussion groups and their structural importance within the methodological framework, specific attention was paid to the intensity of usage of the discussion forums. In the current study, this takes the form of counting the number of contributions to the public, as well as private discussions forums. The purpose of this exercise was to estimate the degree in which participants openly discussed the content related topics. Moreover, in order

to investigate the importance of providing spaces for informal discussions, the distribution between the informal and the content-driven forums was determined.

2.4.3 *Participants' Satisfaction after the e-Learning Phase*

At the end of the e-Learning Phase, participants' satisfaction was estimated also via an online questionnaire. Similarly to the pre-evaluation, this instrument constituted an adapted version of an instrument specifically developed to evaluate similar learning initiatives at Maastricht University (Giesbers, et al., 2009; Rienties, et al., 2006). The underlying motivation for this questionnaire was to estimate how aspects such as the quality of the real-life tasks, the facilitation of the discussion forums and the overall structure of the phase were perceived by the participants. This in turn provided valuable input in determining whether and possibly to what extent the selected methodological framework has been effective. The questionnaire consisted of 42 questions, subdivided into six categories, and was administered with a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The six categories included (the number of questions are reported in brackets): "Assessment" (2), "Course design" (6), "Course material" (7), "Community of Learning" (6), "Group collaboration" (4), "Goals and tasks" (4), "Instruction" (6) and "Learning satisfaction" (6). Additionally, participants were asked to indicate the average number of hours they spent per week on the e-Learning Phase. Finally, the questionnaire included open question for comments. With the exception of "Community of Learning", which has been introduced to specifically investigate the fit of the methodological framework, these categories have again been identical with the ones developed by (Rienties, et al., 2006). The response rate was 51.15 %. This low response rate is likely to be caused by a short amount of time between the end of the e-Learning Phase and the proceeding residential workshop.

2.5 Results

2.5.1 *Prior Evaluation*

Briefly summarizing the main results of the prior evaluation, it can be stated that the IO's staff mainly participated to remediate potential gaps in their knowledge and skills that were covered in the learning programme. Moreover, participation also seemed to be linked to the participants' drive to improve their career perspectives. The participants' attitude towards group collaboration was generally positive, as participants believed that they were going to achieve better results by working collaboratively, as compared to individual efforts. In terms of course design, there was a considerable appreciation that the e-Learning phase could be followed online and irrespective of time and place. Taken together, this already

provides some preliminary evidence that the chosen structure and methodological framework constitute a fair representation of what adults learners expect and would like to see in a virtual Community of Learning.

2.5.2 Intensity of Usage

Table 2-1 illustrates the intensity of usage of the different types of discussion forums that were available to participants. As indicated in the theoretical section of this article, a high level of activity in these forums would provide evidence for the importance of incorporating public and private spaces, as well as spaces for informal discussion. Overall 306 messages were contributed to the public forums and, on average, 217.13 messages were posted in the private learning communities.

Table 2-1: Average Amount of Contributions per Type of Discussion Forum and Content

| Learning Community | CT (Total) | CD (Total) | Total |
|--------------------------------|------------|------------|--------|
| Public Space [*] | 146.00 | 160.00 | 306.00 |
| Private Space ^{†, **} | 47.20 | 169.93 | 217.13 |

Table 2-1 (continued): Average Amount of Contributions per Type of Discussion Forum and Content

| Learning Community | CD | | | | |
|--------------------------------|-------|-------|-------|-------|-------|
| | 1 | 2 | 3 | 4 | 5 |
| Public Space [*] | 60.00 | 61.00 | 26.00 | 7.00 | 6.00 |
| Private Space ^{†, **} | 25.33 | 35.93 | 46.73 | 42.33 | 19.60 |

Note: CT = Café-Talk Forums; CD = Content-Driven Forums;

[†] The values indicated constitute averages that have been calculated on the basis of the fourteen individual

"Learning Communities"; ^{*} N = 174; ^{**} N = 10.80

This results is roughly comparable with the outcomes found by Rienties and colleagues (2009), who conducted a similar study on an online course in economics for incoming bachelor students at Maastricht University. This also provides a first indication that both types of forums have been well-received by participants and have contributed to an open dialogue among participants. Interestingly, there have been quite some fluctuations in the amount of contributions for the different content-driven forums.

Additionally, it seems that the forums of focal area three generally experienced the highest degree of participation. This is noteworthy, as these discussions were mainly active during about mid-term of the e-Learning Phase. This provides some first evidence on the assumption that the participatory levels of

the participants will vary over the course of the e-Learning phase. Likewise, it is very interesting to compare participants' engagement in the informal discussion forums, which have been erected to stimulate a feeling of *commonality* (Hung & Der-Thanq, 2001), and the content-driven forums that aimed at discussing the newly gained knowledge and fostering the creation of a *(neo-)apprenticeship style learning* (Gannon-Leary & Fontainha, 2007). With the exception of the public space, where the distribution of messages has been roughly equal between the two types of forums, there is very clear evidence that the content-driven forums have been at the centre of attention within the learning communities. This can be compared with an earlier study by Schellens and Valcke (2005), who conducted a more thorough content analysis of asynchronous discussion groups among students of a freshman course in "*Instructional Science*". In their study they found a higher proportion of content-driven communication compared to informal discussions.

2.5.3 End Evaluation

Table 2-2 presents the results of the end evaluation. Overall, on a scale from 1 (very bad) – 10 (very good), the e-Learning phase was positively evaluated, both in terms of quality ($M = 7.07$, $SD = 1.58$), as well as in terms of the supporting staff ($M = 7.11$, $SD = 1.97$). More specifically, the results of the category "*Learning satisfaction*" (LS), clearly indicate that participants have a positive attitude towards the outcomes, indicating that the e-Learning phase was a valuable learning experience and that it has provided them with a better understanding of the new concepts and methods to assess their everyday work-related challenges. This notion is further strengthened by evidence that participants generally perceived the "*Course design*" (CD) of the e-Learning phase to be appropriate, translating into respectable scores for both the structure, as well as the content of the phase. The only noticeable drawback of the current setup has been the estimated amount of time required to prepare for the learning programme. In contrast to the envisioned five hours per week, participants spent, on average, eight hours per week on the e-Learning phase. When taking a closer look at the scores for the category "*Course materials*" (CM), one can generally state that participants are again positive about the CoL. In contrast, the results for the category "*Community of Learning*" (CoL) are more ambiguous. Although, the IO's staff thinks that they will attain better results in their careers, which is in line with their expectations prior to the learning programme, they are only mildly convinced that they will be able to better cooperate with other organizations. And although the initial evidence is promising, there still remains room for improvement for the CoL to really stimulate the collaboration among participants from different offices and regions.

One of the main objectives of the tasks was to stimulate an active discussion between the participants, possibly creating a certain degree of *(neo-)apprenticeship*

Chapter 2

style learning (Gannon-Leary & Fontainha, 2007). Yet, when looking at the outcomes for the category “*Goals and tasks*” (GT), participants only felt mildly stimulated to collaborate with their peers in order to complete the tasks. This notion is supported by the participants’ answers to questions of the category “*Group collaboration*” (GC). Although participants indicated in their prior evaluations that they believed to learn more collaboratively, as compared to individually, they were not convinced that the e-Learning phase fully capitalized on this aspect and stimulated them to really engage into discussions with their peers. In terms of “*Instruction*” (IN), participants were generally satisfied with the performance of the online facilitators and appreciated their enthusiasm in supporting them throughout the discussions. However, participants indicated that the facilitators should have taken a more active role in the guiding the discussions.

Table 2-2: Participants’ End Evaluation of the Learning Programme’s e-Learning Phase

| Domain | Question | M | SD |
|--------|---|------|------|
| AS | The Pre-Assessment was a good test to show me what I did know and what I did not know. | 5.55 | 1.69 |
| AS | The online assessments during the e-Learning Phase gave me a good picture of what I still had to study. | 5.64 | 1.33 |
| CD | The content of the e-Learning Phase was inspiring. | 5.49 | 1.62 |
| CD | The structure of the e-Learning Phase was good. | 5.44 | 1.37 |
| CD | The content of the e-Learning Phase was appropriate | 5.31 | 1.38 |
| CD | The e-Learning Phase was well organized. | 5.18 | 1.54 |
| CD | The allocated time was sufficient to study the subject matter. | 3.58 | 1.88 |
| CD | Please provide an overall grade for the quality of the e-Learning Phase (scale 1-10) | 7.07 | 1.58 |
| CM | The quality of the e-Learning materials was good. | 5.36 | 1.48 |
| CM | The e-Learning materials motivated me to keep up with the subject matter. | 5.53 | 1.55 |
| CM | The fundamental readings helped me to study the content of the e-Learning Phase. | 5.95 | 1.28 |
| CM | The applied readings helped me to study the content of the e-Learning Phase. | 5.93 | 1.11 |
| CM | The level of the applied readings was appropriate. | 5.55 | 1.19 |
| CM | The applied readings were too difficult. | 4.07 | 1.69 |
| CM | The amount of required literature was too much. | 4.61 | 1.88 |
| CoL | I have been encouraged to cooperate more effectively with my colleagues worldwide. | 4.86 | 1.39 |
| CoL | It was a nice possibility to meet colleagues from other offices online. | 5.02 | 1.39 |
| CoL | I have adjusted my skills to play a more active role within the organization. | 5.27 | 1.55 |
| CoL | I am more able to cooperate with other organizations. | 5.11 | 1.57 |

Unified in Learning – Separated by Space

| | | | |
|-----|--|------|------|
| CoL | I am more able to participate in the translation of the organization's global commitments into effective policies for our clients. | 5.32 | 1.60 |
| CoL | I will get better results in my career. | 5.30 | 1.39 |
| GC | The group in which I participated functioned well. | 4.59 | 1.76 |
| GC | I think I have learned more during the e-Learning Phase through collaboration with others than I would have learned, if I had to work alone. | 4.66 | 1.92 |
| GC | I participated actively in the online group discussions (within the Learning Community). | 5.16 | 1.51 |
| GC | I think I contributed to the discussions with valuable comments and suggestions for others. | 5.09 | 1.43 |
| GT | The goals of the e-Learning Phase were clear to me. | 5.67 | 0.90 |
| GT | It was clear to me what was expected of me during the e-Learning Phase. | 5.36 | 1.23 |
| GT | The assignments/tasks stimulated me to collaborate with the other group members (in the Learning Community). | 4.67 | 1.55 |
| GT | The assignments/tasks stimulated me to study. | 5.76 | 1.26 |
| IN | The academic facilitators were enthusiastic in coaching our Learning Community. | 4.95 | 1.93 |
| IN | I expected the academic facilitators to take a more active role in the learning process. | 4.59 | 2.22 |
| IN | The academic facilitators encouraged participation of all group members in the online group discussions (Learning Community). | 5.07 | 1.85 |
| IN | The lectures were of good quality. | 5.57 | 1.59 |
| IN | The lectures helped me to study the materials. | 5.52 | 1.27 |
| IN | Please provide an overall grade for the functioning of the academic e-Learning Team (scale 1-10) | 7.11 | 1.97 |
| LS | The e-Learning Phase of this Learning Programme was a valuable learning experience. | 6.16 | 1.36 |
| LS | It was fun that I could attend the e-Learning Phase via the internet. | 4.91 | 1.69 |
| LS | I am satisfied with what I learned in terms of knowledge. | 5.60 | 1.30 |
| LS | I am satisfied with what I learned in terms of insights. | 5.42 | 1.51 |
| LS | I have improved my evidence based analysis skills. | 5.34 | 1.16 |
| LS | I have learned how to use an evidence based approach. | 4.89 | 1.65 |
| | On average, how many hours per week did you work on the e-Learning Phase of this Learning Programme? | 8.20 | 6.69 |

Note: N = 89 (51.15%); AS = Assessment; CD = Course design, CM = Course material; CoL = Community of Learning; GC = Group collaboration; GT = Goals and tasks; IN = Instruction; LS = Learning satisfaction

2.6 Discussion

In this article, the notion of Community of Learning was used to analyse the (perceived) effectiveness of a global learning programme. In terms of a theoretical

Chapter 2

framework it has been argued that the most promising setup should incorporate the notion of Communities of Learning (CoL). Departing from this finding and building up on an *online remedial teaching model*, five aspects have been promoted that have a high potential of stimulating an effective and successful implementation of a CoL. First, they should encourage an *open dialogue* between all participating parties. Second, adult learners are likely to exhibit fluctuating *levels of participation*, due to their busy work schedules and an effective CoL should cater for this. Third, participants should have access to both *public and private spaces*. This will facilitate the creation of a shared repertoire of communal resources and tools and allow participants to develop a degree of *commonality* (Hung & Der-Thanq, 2001). Fourth, participants require spaces for *informal discussions*, in order to create a sense of belonging and trust, necessary to actively share information and contribute to the CoL. Finally, based on the notion of *situated learning*, adult learners will highly benefit from working on *real-life and current problems* to which they can relate to.

Overall, this study has confirmed the importance of the five aspects. Moreover, when looking at the scores of the e-Learning phase's evaluations, as well as the figures on the intensity of usage for the online discussion forums, it is apparent that the implementation of this framework has been successfully accomplished. The participants clearly indicated that they perceived the learning programme not only to be a valuable learning experience, but also that it assisted them in their future careers. The predominant role of online discussions and the collaborative work on real-life tasks was also very much appreciated, adding to the evidence that CoL provide an effective means for international organizations to engage their staff into training initiatives and capacity building activities.

In contrast, two broad topics could be identified that necessitate some critical adjustments. First, the factual workload and the estimated time to complete all required activities have apparently been underestimated. This has created difficulties for participants in preparing all activities and finding the time to actively contribute to the discussions. One possible solution to this problem is to better inform the participants' supervisors about the dimension of the learning programme, thereby allowing participants to better combine the programme with their regular working obligations. Alternatively, it may be considered to rethink the amount of content to be covered. However, this is likely to have negative consequences on the quality of the learning programme, which certainly is not in the interest of any of the participating parties. The second area for improvement is related to the facilitation of the discussion forums. Although online facilitators received positive scores, participants indicated that facilitators should take a more active role in the learning process. Finally, there remains room for improvement in stimulating participants to truly collaborate with their colleagues in the discussion forums. On the one hand this could be achieved by adjusting the real-life tasks in

such a fashion that collaboration is more specifically asked for. On the other hand, and closely related to the previous issue, online facilitators could be instructed to become more pro-active, effectively stimulating the discussions and encouraging participants to exchange their views and ideas about a certain topic.

2.7 Limitations and Future Research

The current study exhibits three main shortcomings that should be taken into account when interpreting the data and drawing conclusions for the validity of the theoretical framework of Communities of Learning. First, the analysis has been descriptive in nature and mainly considered the subjective perceptions of participants about the content, structure and outcomes of the e-Learning phase. Although this certainly provides a very useful first impression, it only captures part of the bigger picture. Moreover, the completion rate of the end-evaluation has been rather low, which can pose difficulties in generalizing the findings over the entire experimental population. Similarly, the majority of the evaluation scores show considerable standard deviations, which again poses difficulties in interpreting the results. However, based on the confirmatory Cronbach alphas, it can be stated that the conclusions drawn from the data can still be considered as representative.

Secondly, this study has solely focused on the e-Learning phase, and has neither taken into account any data from the face-to-face workshop, nor the overall results of the learning programme. This provides only an incomplete picture and might neglect important aspects that only become apparent at a later stage. Additionally, the learning programme has also been provided in 2006 and will again be implemented in 2009. It would be interesting to compare the three cohorts and investigate how they have evaluated the programme and whether it is possible to identify any significant differences between them.

Thirdly, in trying to assess the empirical relevance of *open dialogue, public and private spaces*, as well as *informal discussions*, again only descriptive data has been used. Again, while establishing a first understanding of the general validity of the concepts, it lacks a more thorough investigation. Future research should employ a more detailed multimethod approach to analyse the constellation and dynamics of the private learning communities and how these might have an impact on the learning outcomes. More specifically, by employing both social network analysis (e.g. de Laat, Lally, Lipponen, & Simons, 2007) and cognitive presence studies (e.g. Garrison, Anderson, & Archer, 1999; Schellens & Valcke, 2005) valuable insights can be gathered on how organizational structures can affect group dynamics and outcomes of professional communities of learning. In relation to *(neo-)apprenticeship style learning* this would not only stipulate possibilities for organizations to better capitalize on their inherent stock of practical experience and tacit knowledge, but

Chapter 2

also help to better understand how to compose learning communities that are likely to achieve the highest possible learning outcomes.

2.8 Acknowledgments

The author would like to thank Bas Giesbers, Bart Rienties and Dirk Tempelaar for their comments and feedback on earlier versions of this article.

2.9 References

- Allan, B., & Lewis, D. (2006). The impact of membership of a virtual learning community on individual learning careers and professional identity. *British Journal of Educational Technology*, 37(6), 841-852.
- Amin, A., & Roberts, J. (2006). Communities of Practice: Varieties of Situated Learning'. *EU Network of Excellence Dynamics of Institutions and Markets in Europe (DIME)*. Retrieved from http://www.dime-eu.org/files/active/0/Amin_Roberts.pdf
- Bassi, L., Cheney, S., & Lewis, E. (1998). Trends in workplace learning: Supply and demand in interesting times. *Training & Development*, 51(11), 156-165.
- Bernard, R. M., Rojo de Rubalcava, B., & St-Pierre, D. (2000). Collaborative online distance learning: Issues for future practice and research. *Distance Education* 21(2), 260-277.
- Billet, S. (1996). Situated learning: bridging sociocultural and cognitive theorising. *Learning and Instruction*, 6, 263-289.
- Brown, J. S., Collins, A., & Duguid, P. (1989). Situated Cognition and the Culture of Learning. *Educational Researcher*, 18(1), 32-42.
- Chalmers, L., & Keown, P. (2006). Communities of practice and professional development. *International Journal of Lifelong Education*, 25(2), 139 - 156.
- Constant, D., Sproull, L., & Kiesler, S. (1996). The Kindness of Strangers: The Usefulness of Electronic Weak Ties for Technical Advice. *Organization Science*, 7(2), 119-135.
- Cousin, G., & Deepwell, F. (2005). Designs for network learning: a communities of practice perspective. *Studies in Higher Education*, 30(1), 57 - 66.
- de Laat, M., Lally, V., Lipponen, L., & Simons, R.-J. (2007). Investigating patterns of interaction in networked learning and computer-supported collaborative learning: A role for Social Network Analysis. *Computer-Supported Collaborative Learning*, 2, 87-103.
- Fowler, C. J. H., & Mayes, J. T. (1999). Learning relationships from theory to design. *ALT-J*, 7(3), 6 - 16.
- Fox, S. (2000). Communities of Practice, Foucault and Actor-Network Theory. *Journal of Management Studies*, 37(6), 853-867.

- Gannon-Leary, P., & Fontainha, E. (2007). Communities of Practice and virtual learning communities: benefits, barriers and success factors. *eLearning Papers*, 5(September 2007).
- Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical Inquiry in a Text-Based Environment: Computer Conferencing in Higher Education. *The Internet and Higher Education*, 2(2-3), 87-105.
- Giesbers, B., Rienties, B., Gijssels, W., Segers, M., & Tempelaar, D. (2009). Social Presence, Web-videoconferencing and Learning in Virtual Teams. *Industry and Higher Education*, 23(4).
- Hara, N., Bonk, C. J., & Angeli, C. (2000). Content analysis of online discussion in an applied educational psychology course *Instructional Science*, 28(2), 115-152.
- Huang, H.-M. (2002). Toward constructivism for adult learners in online learning environments. *British Journal of Educational Technology*, 33(1), 27-37.
- Hung, D. W. L., & Der-Thang, C. (2001). Situated Cognition, Vygotskian Thought and Learning from the Communities of Practice Perspective: Implications for the Design of Web-Based Learning. *Educational Media International*, 38(1), 3-12.
- Kelly, P., Gale, K., Wheeler, S., & Tucker, V. (2007). Taking a stance: promoting deliberate action through online postgraduate professional development. *Technology, Pedagogy and Education*, 16(2), 153 - 176.
- Lave, J., & Wenger, E. (1991). *Situated learning: legitimate peripheral participation*: Cambridge University Press.
- Lewis, D., & Allan, B. (2004). *Virtual learning communities*. Maidenhead: Open University.
- Moule, P. (2006). Developing the Communities of Practice, Framework for On-Line Learning. *Electronic Journal of e-Learning*, 4(2).
- Nachmias, R., Mioduser, D., Oren, A., & Ram, J. (2000). Web-Supported Emergent-Collaboration In Higher Education Courses. *Journal of Educational Technology & Society*, 3(3), 94-104.
- Rienties, B., Tempelaar, D., Van den Bossche, P., Gijssels, W., & Segers, M. (2009). The role of academic motivation in Computer Supported Collaborative Learning. *Computers in Human Behaviour*, 25(6), pp. 1195-1206.
- Rienties, B., Tempelaar, D., Waterval, D., Rehm, M., & Gijssels, W. (2006). Remedial Online Teaching on a Summer Course. *Industry and Higher Education*, 20(5), 327-336.
- Savery, J. R., & Duffy, T. M. (1995). Problem Based Learning: An instructional model and its constructivist framework. *Educational Technology*, 35, 31-38.
- Schellens, T., & Valcke, M. (2005). Collaborative learning in asynchronous discussion groups: What about the impact on cognitive processing? *Computers in Human Behavior*, 21(6), 957-975.

Chapter 2

- Schlager, M., Fusco, J., & Schank, P. (2002). Evolution of an online education community of practice. In K. A. Renninger & W. Shumar (Eds.), *Building virtual communities: Learning and change in cyberspace* (pp. 129-158). New York: Cambridge University Press.
- Schwen, T. M., & Hara, N. (2003). Community of Practice: A Metaphor for Online Design. *The Information Society*, 19(3), 257-270.
- Smith, P. J. (2001). Enhancing flexible business training through computer-mediated communication. *Industrial & Commercial Training*, 33(4), 120-125.
- Stacey, E., Smith, P. J., & Barty, K. (2004). Adult learners in the workplace: online learning and communities of practice. *Distance Education*, 25(1), 107 - 123.
- Swan, J. A., Scarbrough, H., & Robertson, M. (2002). The Construction of 'Communities of Practice' in the Management of Innovation. *Management Learning*, 33(4), 477-496.
- Vrasidas, C., & Zembylas, M. (2003). The Nature of Technology-mediated Interaction in Globalised Distance Education. *International Journal of Training and Development*, 7(4), 271-286.
- Vygotsky, L. (1978). *Mind in Society*. Cambridge: Harvard University Press.
- Wenger, E. (Producer). (1998, June 30, 2008). Communities of Practice. Learning as a social system. *Systems Thinker*. Retrieved from <http://www.co-i-l.com/coil/knowledge-garden/cop/lss.shtml>
- Wenger, E., McDermott, R., & Snyder, W. M. (2002). *Cultivating communities of practice*. Boston: Harvard University Press.
- Woods, R., & Ebersole, S. (Producer). (2003). Becoming a "Communal Architect" in the Online Classroom - Integrating Cognitive and Affective Learning for Maximum Effect in Web-Based Learning. *Online Journal of Distance Learning Administration*. Retrieved from <http://www.westga.edu/~distance/ojdla/spring61/woods61.htm>

CHAPTER 3

The Impact of Hierarchical Positions on Communities of Learning²

Abstract: *Communities of Learning* (CoL) are an innovative methodological tool to stimulate knowledge creation and diffusion within organizations. However, little is known about how participants' hierarchical positions influence their behaviour within CoL. We provide empirical evidence on 25 CoL for a global training program, analysing user statistics from 249 staff members. Our results indicate that participants' level of activity and performance are significantly influenced by their hierarchical position. We also discover a duality among participants holding low hierarchical positions. The implications of these results and future research avenues are discussed.

² Rehm, M., Gijssels, W. & Segers, M. (submitted). The Impact of Hierarchical Positions on Communities of Learning, *International Journal of Computer-Supported Collaborative Learning*;

Note: The chapter is based on *Diversity in Communities of Learning: The Influence of Hierarchical Position on Individuals' Activity and Performance*, presented at the AERA 2011 conference, New Orleans, USA, 08 – 12 April, 2011

3.1 Introduction

Numerous researchers have highlighted the importance of training and development as a pivotal aspect in contributing to the competitive advantage of organizations (e.g. Argote & Ingram, 2000; Nonaka, 1994). In today's turbulent economic environment, employers and employees constantly need to update their knowledge and skills in order to face new challenges (Chalmers & Keown, 2006). As a result, many organizations have dedicated sizable resources to facilitate the training and development of their staff (Kane & Alavi, 2007). More specifically, according to the American Society for Training & Development (ASTD), U.S. organizations alone have spent an approximate \$125.88 billion on training and development activities in 2009 (ASTD, 2010). The most prominent delivery method among these activities, with more than 60 percent of organizations implementing it, has been instructor-led classrooms (Armstrong & Sadler-Smith, 2008). This method has been acknowledged to be well suited for laying the groundwork for more advanced learning (Soden & Halliday, 2000), and for providing a comprehensive background to continue with more refined and practically oriented training (Robey, Koo, & Powers, 2000). Yet, scholars have criticized this delivery method for offering knowledge that is neutral to circumstances and only has limited applicability in real-life working environments (Eraut, 2000). With organizations facing pressure towards the pursuit of more cost-effective and innovative learning methods, practitioners and researchers alike have started looking for new approaches to enhance the impact of training and development (Yamnill & McLean, 2001).

A common characteristic in such new approaches is the notion that learning is an interactive process, where knowledge is being created while collaborating in social networks composed of diverse groups of people (Hakkarainen, Palonen, Paavola, & Lehtinen, 2004). In this context, online Communities of Learning (CoL), which are groups of people "*engaging in collaborative learning and reflective practice involved in transformative learning*" (Paloff & Pratt, 2003, p. 17), have gained an increasing amount of attention (Stacey, Smith, & Barty, 2004). CoL foster online collaborative learning (Brower, 2003), by providing participants with the opportunity to collaboratively learn irrespective of time and place (Gunawardena, Lowe, & Anderson, 1997). Here, we define online learning as the use of technical media, e.g. asynchronous discussion forums, and a quasi-permanent separation of educational staff and participants throughout a training activity (Keegan, 1980). Previous research has stipulated that these types of CSDL environments foster "*learning due to the explicitation of individual knowledge elements [...] and the consecutive reorganization of knowledge elements in the course of social transactions.*" (de Wever, Schellens, Valcke, & van Keer, 2006, p. 7)

The Impact of Hierarchical Positions on Communities of Learning

Considering the implementation of such initiatives, previous studies have revealed that this can be an intricate endeavour. Research focusing on institutes of higher education, where similar approaches are increasingly part of regular educational activities, has indicated that online training is more complex and demanding for learners than participating in a face-to-face environment (e.g. Arbaugh & Benbunan-Finch, 2006; Järvelä, Järvenoja, & Veermans, 2008). More specifically, research has shown that individuals react differently to online learning. Depending on their background and motivation, participation in COL may differ. For example, Caspi and colleagues (2006) found empirical evidence that students' personality traits, e.g. whether someone is extrovert or neurotic, have an impact on how participants engage into online collaborative activities. Other studies have shown that performance levels are affected by participants' academic motivation levels (Rienties, Tempelaar, Van den Bossche, Gijsselaers, & Segers, 2009).

Similarly, stimulating employees with diverse backgrounds to learn collaboratively also bears risks. The impact of diversity on organizations has been the subject of many studies, covering its effect on general group dynamics (van der Vegt, Bunderson, & Oosterhof, 2006), performance (Webber & Donahue, 2001), as well as learning activities (Foldy, Rivard, & Buckley, 2009). And although potential benefits have been identified (Bunderson & Sutcliffe, 2002), empirical studies have provided mixed results (e.g. Jehn, Northcraft, & Neale, 1999; Simons, Pelled, & Smith, 1999), suggesting that diversity, defined as the distribution of individuals across one or more attributes, is a "*double-edged sword*" (Milliken & Martins, 1996, p. 403). Bunderson and Sutcliffe (2002) found highly significant and positive effects of differences in individuals' functional backgrounds on their information sharing behaviour. In contrast, empirical work by Jehn (1995) shows that differences in members' personality traits can cause varying degrees of anxiety among team members, making them feel uncomfortable in communicating with their colleagues and thereby inhibiting their cognitive functioning in processing new information. Therefore, specific attention needs to be paid to the underlying mechanisms of interpersonal processes that can influence, and have an impact on, learning (Foldy, et al., 2009).

The purpose of our study is to focus on a specific source of diversity that has been increasingly acknowledged to have a considerable impact on collaborative learning processes, namely the hierarchical position of individuals (e.g. Bunderson, 2003b; Krackhardt, 1990; Romme, 1996). More specifically, the present study investigates how individuals' level of activity and performance within online CoL are influenced by their hierarchical positions. The CoL, which form the basis for this empirical study, are taken from a global organizational training program, where 249 participants from three hierarchical positions (within the same organization) collaboratively enhanced their knowledge and skills. The results of

this analysis will provide important insights on patterns of communication (Cramton & Hinds, 2005) that will help HRD managers to better anticipate participant behaviour and devise training activities that stimulate participants to actively engage (Foldy, et al., 2009).

3.2 Communities of Learning

In an online setting, where asynchronous communication can overcome barriers of time and place, participants can help each other to get acquainted with the practical *ins-and-outs* of a certain content domain, while sharing experiences and creating new ideas that can help to improve the business process (Leonard & Sensiper, 1998). In this context, CoL have emerged as a promising methodology used by organizations to foster the effective exchange of knowledge and experience between members of their workforce (Stacey, et al., 2004). By providing participants with the means to collaboratively enhance their knowledge and skills irrespective of time and place and across intra-organizational boundaries, such as business units or job positions, organizations can create a *hothouse* for new ideas and thoughts (Schlager, Fusco, & Schank, 2002). Similarly, past research has stipulated that connecting employees with different background characteristics can create a fruitful atmosphere for them to share their experiences, while acquiring various job-related skills and effectively processing new information (Jehn & Bezrukova, 2004). This, in turn, not only has the potential to contribute to the capacity of individual employees, but also to the knowledge creation of an entire organization.

CoL can either be provided by organizations themselves, or implemented in collaboration with contracted training institutes, such as universities. Furthermore, CoL are rooted in the concept of *Communities of Practice* (CoP). Conceptualized by Lave & Wenger (1991), CoP constitute "*groups of people who share a concern, set of problems or passion about a topic and who deepen their knowledge and expertise in this area by interacting on an ongoing basis*" (Wenger, McDermott, & Snyder, 2002, p. 4). However, researchers have argued that CoL provide a better fit with training in organizations (Nachmias, Mioduser, Oren, & Ram, 2000), as they have a clear learning connotation and exhibit a higher degree of structure and formality (Zhang, Fang, Wei, & Chen, 2010). Moreover, we consider CoL to be comprised of small *team-like* groups. In contrast, researchers often consider CoP to be *teams* (Schlager, et al., 2002). This distinction is of great importance, as teams are generally defined as "*a collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems*" (Cohen & Bailey, 1997, p. 241). However, while participants in CoL can learn and benefit from the insights and experiences of their colleagues, they remain responsible for their own

learning outcomes. In contrast CoP are responsible for learning as group, team or community.

Generally, past research on online communities was often concerned with the conditions for effective online collaborative learning. These studies looked at issues such as how to create interactive online learning environments (Roblyer & Wiencke, 2003), the impact of group size on online learning (Vrasidas & Zembylas, 2003), or the technological tools being used (Alavi, Yoo, & Vogel, 1997). However, an ever-growing amount of the literature also investigated how individuals' learning behaviours and outcomes are affected by the learning community in which they are situated (e.g. Goldstein, 1999; Lave & Wenger, 1991). Based on this research it has been stipulated that the social and contextual framework in which the learning takes place has a considerable influence on how participants behave and perform (de Laat & Lally, 2003). Similarly, research on online graduate management education suggests that a positive atmosphere within a learning community leads to higher levels of satisfaction and cognitive attainment among individuals (Garrison & Arbaugh, 2007). Moreover, a study by Beuchot and Bullen (2005) suggests that interaction among participants is stimulated when individuals feel comfortable in openly engaging into discussions. Reviewing literature on learning communities in graduate education, Smith and Bath (2006) also advocate that a supportive learning atmosphere, where everybody feels comfortable to openly share their thoughts and ideas, encourages participants to broaden their perspective and foster a better understanding of how to apply the newly gained knowledge in actual business situations.

Yet, previous studies have also shown that participants react differently to online learning. While some participants actively join online discussions, others have a tendency to withdraw and become passive observers (Caspi, Gorsky, & Chajut, 2003). Additionally, while some participants are triggered to achieve high performance levels, others show signs of underperformance (Rienties, et al., 2009). This has become an issue of concern, especially since a significant positive relationship between the level of discourse and the achievement of participants has been identified (Cohen, 1994). Similarly, work by Caspi and his colleagues indicates interaction as a decisive factor in determining whether training is successful in enhancing the knowledge and skills of participants (Caspi, Chajut, Saporta, & Beyth-Marom, 2006). Consequently, new insights are required on what factors influence online learning processes (Sambrook, 2005) and how differences in participants' background characteristics affect their collaborative behaviour (Zack & McKenney, 1995).

3.3 Impact of Hierarchical Positions on Learning

The creation of diverse groups of employees for training purposes has become a common place phenomenon within organizations (Thomas-Hunt, Ogden, & Neale, 2003). The underlying intention is to create a broader pool of nonoverlapping knowledge that stimulates participants to share information. This, in turn, can enhance employees' capacity and skills, and contribute to the overall performance of an organization (Bunderson & Sutcliffe, 2002). Yet, participants can feel intimidated when communicating with colleagues from different backgrounds (Jehn, 1995). Hence, researchers suggested that the organizational context can be the "800-pound gorilla" (Salas & Kozlowski, 2009, p. 468) that influences how staff members behave and perform during training. In this respect, business thinkers like Gary Hamel have stressed that an organization's hierarchical structure influences the way people communicate with each other (Hamel & Green, 2007). Taking into these stipulations, Figure 3-1 provides a conceptual overview of the underlying variables that have been used to analyse the research hypotheses of the current study, and which will be introduced below.

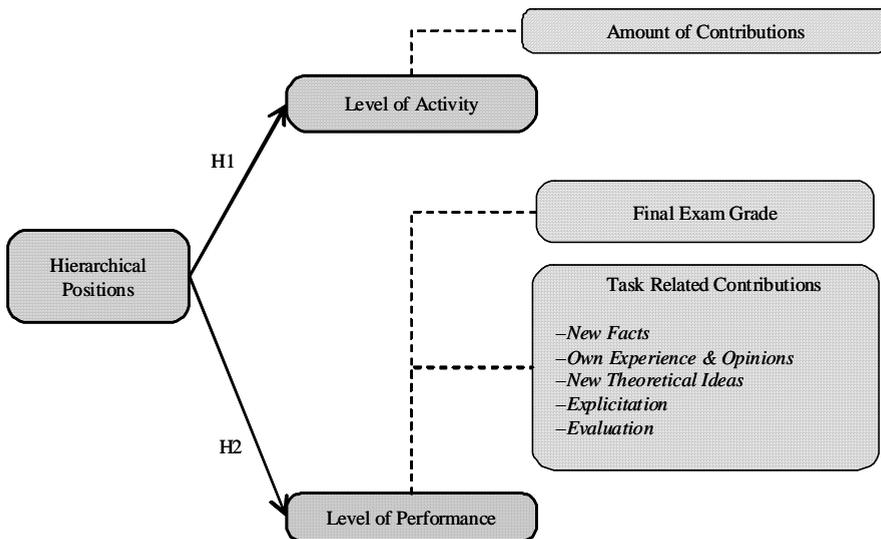


Figure 3-1: Conceptual Overview of Research Hypotheses

Depending on their hierarchical position, participants will display varying levels of activity within collaborative learning processes (Bird, 1994). Analysing the electronic mail community of a *Fortune 500* office equipment firm, Sproull and Kiesler (1986) discovered a "status equalization" process (p. 1507). They attribute this result to the reduced amount of social context cues in asynchronous

The Impact of Hierarchical Positions on Communities of Learning

communication. Without direct exposure to their supervisor during discussions, employees might feel more comfortable in sharing information. Weisband and colleagues (1995) also argue that computer-mediated communication should lead to a “*deindividuation*” (p. 1125) that weakens social norms and reduces social inhibitions. However, based on three experiments with 269 M.B.A. students, Weisband and colleagues (1995) revealed that higher level participants were more active in discussions than their lower level colleagues. Additionally, based on qualitative data from on-going workgroups, and focusing on the level of participation within learning teams, Sutton and colleagues (2000) also suggest a positive relationship between the hierarchical position of participants and their level of activity. Hence, members from lower hierarchical positions will mainly follow discussions and rarely interject. This behaviour is triggered by a propensity to integrate into the group. On the contrary, representatives from higher up in an organization’s hierarchy tend to replicate their normal behaviour and also lead virtual teams. This mode of behaviour is suggested to stem from a drive to dominate discussions, in order to reinforce the prevailing status quo (Yates & Orlikowski, 1992). Other research has suggested that lower management is subject to a certain “*fear of speaking up and making mistakes in the group*” (Edmondson, 2002, p. 139), leading them to underestimate their contributions and to exhibit more passive behaviour during discussions (Nembhard & Edmondson, 2006). Consequently, taking into account these considerations, our first research hypothesis is

H1 – Participants’ level of activity within CoL is positively related to their hierarchical position.

In order to make more complete inferences on the impact of hierarchical positions on CoL, we extend our analysis to incorporate also participants’ performance measures. Previous studies on the impact of hierarchical positions on performance have focused on teams and generally considered performance at the organizational level, for example in terms of profitability or sales (Simons, et al., 1999), at the team level (Bunderson, 2003a), or as a mechanism to allocate rewards within a team (Berger, Ridgeway, Fisek, & Norman, 1998). However, while participants can benefit from the insights and experiences from their colleagues within CoL, their overall level of interdependence remains limited and their performance is largely assessed based on their individual efforts and output. Yet, to the best of our knowledge, there are no studies on small *team-like* groups within the context of organizational training. Consequently, we decided to draw upon the work from team research, as this can provide valuable insights on how performance levels can generally be affected by hierarchal positions. More specifically, Bunderson (2003b), using survey data from 45 business unit

Chapter 3

management teams in a *Fortune* 100 consumer products company, stipulates that senior managers are accustomed to integrating information from different functional areas and disciplines. Similarly, Arts and colleagues (2006), based on a study of 115 subjects, ranging from undergraduates to senior managers with over 25 years of work experience, show that individuals, who have been working for more than 12 years, are driven by their experiences and are better able to effectively infer upon new information. Moreover, compared to their more junior colleagues, they are less likely to make mistakes and provide more accurate solutions to new problems. Based on these findings, and taking into account previous research that has established work experience as a significant predictor for the hierarchical position of an individual (Tachibanaki, 1988), we transfer the analogy into the case at hand. Consequently, when participants' performance is assessed on how well they can integrate new knowledge in their own working environments, our second research hypothesis is

H2 – Participants' level of performance within CoL is positively related to their hierarchical position.

3.4 Method

3.4.1 Setting

The present study collected data from an online training program, whose aim was to enhance the capacity and skills of a global organization's staff in daily work. The training program was delivered twice during a 6-month timeframe and specifically focused on five pre-defined content modules. These modules covered different aspects of Economics (e.g. Microeconomics and International Trade). The program was built on a blended learning approach. The first part, on which our study will focus, took place entirely online and over the span of fourteen weeks, with no scheduled synchronous meetings. Upon successful completion, participants could attain a certificate of participation, together with academic credits that were based on the European Credit Transfer and Accumulation System (ECTS).

Participants engaged into two types of learning activities. First, using (multimedia) learning materials, such as web lectures and online quizzes, participants conducted self-study. Second, and constituting the backbone of the online part, participants collaboratively discussed real-life tasks via asynchronous discussion forums. The forums were situated in dedicated CoL, each consisting of 10 – 15 participants. Each content module had a separate task and discussion forum. Participation in these forums was obligatory and taken into account for determining participants' eligibility for receiving their certificate of participation. The latter was accomplished by assigning two academic staff members to each CoL. They were responsible for grading participants' contributions, facilitating

discussions, and providing help in case of technical difficulties. The facilitators were trained in working with online discussion groups and received elaborate guidelines and answers keys for all training activities.

In addition to the obligatory, content-driven discussion forums, each CoL also had its own “*Café-Talk*” forum, where participants could socialize and exchange private information (Nonaka, 1994). More specifically, at the beginning of the training program, participants were stimulated to share a short, personal introduction within their applicable “*Café-Talk*”, including information on their personal (e.g. family), as well as professional background (office, region, job responsibilities). These voluntary introductions provided the only opportunity for participants to get to know each other’s hierarchical position. Unless they provided this information themselves, their fellow CoL members had no way of knowing this particular detail. At the end of the online part, participants had to complete a final exam and received a final grade. A more detailed description of the grading procedure will be provided in the next section.

3.4.2 *Participants*

Staff members had to be nominated by their supervisors to be eligible to participate. Overall, 337 participants were randomly assigned to 30 CoL. Additionally, in order to ensure that participants could benefit from the insights and experiences of colleagues from other offices and regions, a dedicated filter was instated to increase this type of variability among participants. The present study analyses a subset of 25 CoL and 249 participants (73.88%). This was due to incomplete datasets of some participants and biased CoL, where not all applicable hierarchical positions were represented. The 25 CoL had an average of 9.96 members (SD = 1.72, range = 7 – 13). The average age was 43.92 (SD = 7.33, range = 27 – 58) and 54.61 % of the participants were female. Overall, 79 nationalities and 8 operational regions, in which the organization is conducting business, were represented. The participants’ educational backgrounds included Master’s (71.37 %), PhD’s (14.51 %), Bachelor’s (7.26 %) and other degrees (6.85 %). The underlying disciplines of the latter included, Health Sciences and International Law.

3.5 Instruments

3.5.1 *Data on Participants’ Hierarchical Position*

Participants reported their own hierarchical position via the training’s official registration form. The indicated options were subject to the organization’s official job categories. Based on the target group of the training program, three main

categories were identified, namely “Low”-, “Middle”- and “High”-level hierarchical positions. Generally, representatives of the “Low” group were associated with project level work, contributing to sub-parts of the overall product. Members of the “Middle” group were leaders of such projects. Finally, participants from the “High” group were responsible for departments and often entire regions in which the organization was operating. With respect to the amount of participants from the different hierarchical positions, 82 participants held low hierarchical positions (32.93 %), compared to 93 (37.35 %) and 74 (29.71 %) for middle and high hierarchical positions respectively.

3.5.2 *The Level of Activity*

In accordance with previous research, we defined the overall level of activity as the quantitative contributions within discussion forums, measured by the amount of individual participant’s threads (Strijbos, Martens, Prins, & Jochems, 2006). Here, threads refer to posts in discussion forums that are both, new contributions to the discussion, as well as replies to already existing posts. By analysing these types of user statistics from the discussion forums, this approach provided valuable insights into the interaction patterns, without interrupting the actual learning process (Zembylas & Vrasidas, 2007). Furthermore, in order to gather more detailed insights on the type of activities participants engaged in within CoL, we further distinguished between threads that were posted in the “Café-Talk” (social) or the content-driven discussion forums.

3.5.3 *The Level of Performance*

In order to assess participants’ performance within CoL, we employed a two-tier approach. At base-level, we followed the work of Cho and colleagues (2007), who investigated performance levels of graduate students in online learning communities, and estimated performance levels by participants’ grade for an open-question type final exam. The exam was based on the topics discussed in the forums and constituted 50 % of the final grade. The remaining 50 % were based on participants’ contributions within the discussion forums. For the purpose of this study we focused on the final exam grade, as this was solely based on the quality of participants’ answers. In contrast, the participation grade also incorporated elements such as the quantity of posts, which provides only limited insight on the quality of participants’ posts. Both grades were determined by the academic staff facilitating the CoL and administered on a scale from 1 (very poor) to 10 (very good). The minimum requirement to pass was 5.5. The general guideline for the grading procedure was to assign higher grades for more complex contributions. Hence, if participants were able to replicate knowledge, for example citing

definitions of key terms, they received comparatively low grades. In contrast, when participants showed that they were capable of interpreting new information and applying it to their own working environments, they received higher grades. This approach is well suited to attain a first impression of the underlying situation. However, it has been suggested to suffer from more performance irrelevant variance than objective measures, caused by rater-bias (DeChurch & Mesmer-Magnus, 2010). Additionally, it does not allow for more refined conclusions on what really has been discussed within the forums. Consequently, we also conducted a content analysis of the discussion forums.

In the context of this study, we chose for a coding procedure which was first developed by Veerman and Veldhuis-Diermanse (2001) and then subsequently validated and extended by Schellens and Valcke (2005). The instrument distinguishes between *non-task related* and *task related* contributions. While non-task related contributions are considered as social and informal in nature, task related messages capture the cognitive level of participants' contributions. Consequently, as we investigated participants' performance levels, we focused on the task related category of the underlying coding scheme. The task related contributions are comprised of five sub-categories, namely *New Facts* (e.g. reference to data findings), *Own Experience & Opinions* (e.g. sharing professional experience on the topic), *New Theoretical Ideas* (e.g. definitions of domain-specific terms and methodologies), *Explicitation* (e.g. refining information shared before) and *Evaluation* (e.g. combining and critically discussing previous contributions). Within these types of contributions, increasing cognitive levels are assigned to participants' messages. More specifically, *New Fact* represents the lowest and *Evaluation* the highest attainable cognitive level participants can achieve. According to de Wever and colleagues (2006) this approach is well suited to gain an overview of the general cognitive processes that take place within learning communities.

Previous studies have generally based their coding procedure on either each individual sentence, a unit of meaning within a message, or complete messages (de Wever, et al., 2006). For this study, we chose to implement the unit of meaning approach, as this technique addresses the limitations of fixed syntactical units, such as a sentence, or a complete message, which run the risk of ignoring meaningful aspects of a communicative construct (Rourke, Anderson, Garrison, & Archer, 2000). Furthermore, the unit of meaning approach accounts for the possibility that a single message can contain more than one theme or idea (de Wever, et al., 2006). Finally, this methodology has been recommended by researchers like Gunawardena and colleagues (1997) as the most appropriate tool for evaluating the quality of learning in online discussion groups.

All contributions within the discussion forums were assessed by two independent coders. The coders were trained on the basis of two test cases,

consisting of 67 and 74 messages respectively, that were randomly selected from CoL that were not included in the final coding procedure. After the first coding exercise, the Cronbach alpha (α) and Cohen's kappa (κ) were .68 and .45 ($p < .01$) respectively. Considering the generally established absolute minimum threshold for these two measures, namely .7 for Cronbach alpha (Cortina, 1993) and .4 for Cohen's kappa (Banerjee, Capozzoli, McSweeney, & Sinha, 1999), this constituted an unsatisfactory amount of inter-rater reliability. Consequently, both coders were invited to discuss discrepancies in their coding, which is inherently part of these subjective procedures (de Laat & Lally, 2003). The results of the second test case were then $\alpha = .93$ and $\kappa = .65$ ($p < .01$). Based on this confirmatory result, the actual coding procedure was then initiated. The inter-rater reliability then was $\alpha = .92$, and $\kappa = .73$ ($p < .01$), which indicated very good agreement beyond chance (e.g. Banerjee, et al., 1999; de Wever, et al., 2006).

3.5.4 *Data Analysis & Procedure*

The main data analysis was based on individual levels. However, participants were nested within different CoL. Depending on their specific composition, with respect to participants' hierarchical positions, this could have led to different dynamics and results. As a result, it would not have been possible to compare results across CoL. Hence, in order to account for possible differences across CoL with respect to hierarchical positions, we used the Shannon Equitability Index (Magurran, 1988). The average score of equitability index for the investigated 25 CoL was .44 (SD = .05, range = .35 – .55). Taking into account the low standard deviation, we therefore concluded that the CoL provided representative and comparable samples.

In order to test for our research hypotheses we employed two different approaches. First, hypothesis testing was used to investigate the validity of the research statements H1 and H2. Testing for the normality of the data's distribution revealed a violation of the parametric assumption for all measured variables. Consequently, we used Spearman's rho (r_s) to determine correlations; Kruskal-Wallis tests (H) to assess differences between groups; and Jonckheere-Terpstra tests (J-T) to identify any possible linear trends. The occurrence of possible patterns underlying the H-test results was determined by post-hoc Mann-Whitney (U) tests. Being designed to only measure differences between two independent conditions, the U-test results were corrected by the Bonferroni method. As a result, our adjusted critical value of significance was .016 for this part of the analysis. Finally, we also estimated the effect size of our findings. However, the vast majority of effect size measures are only suitable for parametric data (Snyder & Lawson, 1993). Consequently, we followed the suggestion of Rosenthal (1991) and approximated the effect size (r) on the basis of

the U-results. This measure takes on values from 0 to 1, where small, medium and large effects are associated with .10, .30 and .50, respectively (Cohen, 1992).

Second, and taking into account that the underlying data consists of a mixture of categorical and continuous variables, we used two-step cluster analysis (Banfield & Raftery, 1993). The underlying reason was to investigate patterns in the available data set that might have been overlooked by the previous method. By segmenting the data into homogenous subgroups of cases, the two-step cluster analysis could either provide further supportive evidence for the claim that hierarchical positions are an important factor in CoL, or highlight additional relationships that need to be taken into account for future studies. The optimal amount of clusters was based on the Schwarz's Bayesian criterion (BIC) and log-likelihood was used as the distance measure.

3.5.5 Control Measures

We acknowledge that hierarchical positions constitute one very specific source of diversity that can influence how individuals participate and perform within CoL. Consequently, in order to be able to make the appropriate inferences about the findings of our study, we controlled for a range of characteristics that have been suggested by previous research as influencing factors on online collaborative learning. These characteristics include *age*, *gender*, *educational background* and *prior knowledge*. In this study, participants' age, gender and educational background were self-reported as part of the training programs official registration form

Age. With respect to age, Garavan and colleagues (2010) found that older employees tend to participate less in online training activities. Additionally, Pelled, Eisenhardt and Xin (1999) stipulated, and were able to empirically show, that age similarity had the potential to trigger emotional conflicts within groups, resulting in lower participation rates.

Gender. Im and Lee (2004) suggested that if females feel intimidated by males in a regular face-to-face environment, this is also likely to carry over to an online environment. In contrast, some studies were able to show that online training environments were able to eliminate this tendency (Joinson, 2001). However, research by Wolfe (1999) showed that women engaged into less discourse in online collaborative training, compared to their male colleagues.

Educational Background. For educational background, participants were asked to indicate their highest attained educational degree, including Bachelor, Master, PhD and Other (e.g. vocational training). Previous studies have indicated that differences in these aspects can increase the likelihood of groups being able to draw on more diverse sets of insights and experiences (Jehn, et al., 1999). As a result, individuals will be stimulated to engage into discussions with their colleagues. Additionally, the potential impact of participants' prior knowledge on

their behaviour and performance within learning initiatives has been highlighted by authors like Dochy and McDowell (1997).

Prior Knowledge. This item was measured via a diagnostic test, consisting of 25 multiple choice questions. All five pre-defined content modules were assessed based on five dedicated questions each. These questions were created by academic experts and related to the working environment of the participants. The response rate for the questionnaire was 88.76 %. There has been a growing consensus that individuals' prior knowledge constitutes an important variable in learning activities, including participants' activity and performance patterns (Dochy, Segers, & Buehl, 1999). If a participant already possesses a considerable amount of prior knowledge about a certain topic, it can be expected that she will be more comfortable in contributing to discussions and dealing with the content matter, thereby positively influencing her general activity and performance levels.

3.6 Results

3.6.1 Hypothesis Testing

The correlation analysis, summarized in Table 3-1, revealed a distinctive positive relationship between participants' hierarchical position and their level of activity, as measured by their total amount of contributions ($r_s = .18, p < .01$). Moreover, this relationship was clearly driven by the amount of contributions in the content-driven forums ($r_s = .18, p < .01$). The result of the Kruskal-Wallis test provided further evidence that participants' hierarchical position had a significant impact on their level of activity. As can be seen in Table 3-2, this difference can again be solely attributed to the activity in the content-driven forums. Additionally, a Jonckheere-Terpstra test validated the positive relationship between hierarchical position and the level of activity. In follow-up to these findings, and now focusing on the content-driven forums, the results of the Mann-Whitney tests showed that the difference in contributions was especially pronounced between "Low" and "High" ($U = 2,279.00, p = .01$), as well as "Low" and "Middle" ($U = 2,941.50, p = .01$). In contrast, the comparison of "Middle" and "High" ($U = 3,317.00, p = .69$) yielded no significant result.

Table 3-1: Overview of Correlations between Hierarchical Position and Activity Measures

| | 1 | 2 | 3 | 4 |
|--|-------|-------|-------|---|
| 1 Hierarchical Position | 1 | | | |
| 2 Total Contributions in Discussion Forums | .18** | 1 | | |
| 3 Contributions in <i>Café-Talk</i> Forums | .02 | .39** | 1 | |
| 4 Contributions in Content-Driven Forums | .18** | .98** | .26** | 1 |

** $p < .01$

The Impact of Hierarchical Positions on Communities of Learning

Table 3-2: Results of Kruskal-Wallis and Jonckheere-Terpstra Tests for Activity Measures

| | Kruskal-Wallis | | Jonckheere-Terpstra | | |
|-----------------------|----------------|----|---------------------|-----|--------|
| | χ^2 | df | # of Levels | N | J-T |
| Total Contributions | 9.41** | 2 | 3 | 249 | 2.84** |
| Café-Talk Forums | 1.30 | 2 | 3 | 249 | .32 |
| Content-Driven Forums | 9.35** | 2 | 3 | 249 | 2.91** |

** p < .01

We therefore stipulated that there is a positive and significant relationship between the hierarchical position of a participant and their level of activity within a CoL. However, this did not yet provide any indication about the actual strength of this relationship. Consequently, we also calculated the applicable effect sizes. The results showed again that the impact of hierarchical positions on participants' levels of activity was most pronounced between "Low" and "High", where we find reasonable effect sizes for total amount of contributions ($r = .22$). Overall, we therefore accept our first research hypothesis (H1), that the higher the hierarchical position of a participant, the higher their level of activity will be within a CoL.

The second research hypothesis (H2) focused on the impact of hierarchical positions on participants' performance levels. Using a similar approach as for hypothesis one, we first conducted a correlation analysis. The results are summarized in Table 3-3 and clearly indicate a significant and positive relationship between hierarchical position and final exam, overall task related communication, *New Facts*, *Explicitation* and *Evaluation*. In determining whether differences in the scores were significant, a Kruskal-Wallis test yielded significant results for final exam, overall task related communication, *New Facts* and *Evaluation*.

Table 3-3: Overview of Correlations between Hierarchical Position and Performance Measures

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--|-------|-------|-------|-------|-------|-------|-------|---|
| 1 Hierarchical Position | 1 | | | | | | | |
| 2 Final Exam Grade | .11 | 1 | | | | | | |
| 3 Task Related Communication | .19** | .21** | 1 | | | | | |
| 4 <i>New Facts</i> | .20** | .14* | .67** | 1 | | | | |
| 5 <i>Own Experience & Opinions</i> | .10 | .05 | .71** | .44** | 1 | | | |
| 6 <i>New Theoretical Ideas</i> | .01 | .13 | .37** | .35** | .30** | 1 | | |
| 7 <i>Explicitation</i> | .14* | .20** | .93** | .46** | .53** | .26** | 1 | |
| 8 <i>Evaluation</i> | .22** | .20** | .60** | .40** | .39** | .17** | .37** | 1 |

* p < .05, ** p < .01

Moreover, as can be seen in Table 3-4, the underlying trend of the main effect clearly suggests a positive relationship between hierarchical position and the indicated measures of performance. In order to determine the component parts of

Chapter 3

the main effect, another range of Mann-Whitney tests was conducted. Here, we again found significant differences in the aforementioned variables, especially when comparing “Low” and “Middle”, as well as “Low” and “High”. Contrasting “Middle” and “High” did not yield significant results. When considering the effect sizes, we found pronounced results for overall task related communication and *New Facts*, when comparing “Low” and “Middle”, which yielding effect sizes of $r = -.22$ and $r = -.30$, respectively. Furthermore, the contrast between “Low” and “High” also exhibited noticeable effect sizes for overall task related communication ($r = -.20$) and *Evaluation* ($r = -.21$). Based on these findings, we accept our second research hypothesis (H2).

Table 3-4: Results of Kruskal-Wallis and Jonckheere-Terpstra Tests for Performance Measures

| | Kruskal-Wallis | | Jonckheere-Terpstra | | |
|--------------------------------------|---------------------|----|---------------------|-----|-------------------------|
| | χ^2 | df | # of Levels | N | J-T |
| Final Exam Grade | 7.64 [*] | 2 | 3 | 234 | 10,501.00 [*] |
| Task Related Communication | 9.93 ^{**} | 2 | 3 | 249 | 11,952.00 ^{**} |
| <i>New Facts</i> | 14.45 ^{**} | 2 | 3 | 249 | 11,932.50 ^{**} |
| <i>Own Experience & Opinions</i> | 4.37 | 2 | 3 | 249 | 10,823.50 |
| <i>New Theoretical Ideas</i> | 3.02 | 2 | 3 | 249 | 10,599.00 |
| <i>Explicitation</i> | 3.72 | 2 | 3 | 249 | 11,320.50 |
| <i>Evaluation</i> | 9.76 ^{**} | 2 | 3 | 249 | 11,920.00 ^{**} |

^{*} $p < .05$, ^{**} $p < .01$

3.6.2 Two-Step Cluster Analysis

In line with our research hypotheses, we employed two sets of two-step cluster analysis, namely one on the activity and one on the performance levels. The first set considered participants’ overall amount of contributions, contributions posted in “Café-Talk” and content-driven forums, as well as participants’ hierarchical position. Based on the BIC values, this resulted in an optimal amount of clusters of four. Table 3-5 summarizes how the hierarchical positions were distributed across the clusters. Interestingly, each hierarchical position was assigned to a separate cluster. Additionally, a new group, namely cluster 4, was identified and labelled as *Stars*. Table 3-6 shows that participants from this particular cluster were leading their CoL in terms of quantitative contributions irrespective of their hierarchal position. This striking finding suggests that especially the “Low” group might be more complex than initially stipulated. Whereas the majority of the respective groups continued to confirm expectations and mainly followed discussions, a small subset of participants was able to *break out* of the common pattern and, in the case of “Low”, not exhibit a *fear of speaking up*. However, the standard deviations for

The Impact of Hierarchical Positions on Communities of Learning

individual measures within the *Star* group were sizeable, suggesting that this group was not as homogenous in their behaviour as the other clusters.

Table 3-5: Frequencies of Hierarchical Positions: Two-Step Cluster Analysis on Activity Patterns

| Cluster | "Low" | | "Middle" | | "High" | | Total |
|---------|-------|-------|----------|-------|--------|-------|-------|
| | N | % | N | % | N | % | |
| 1 | 79 | 96.34 | 0 | | 0 | | 79 |
| 2 | | 0 | 81 | 87.10 | | 0 | 89 |
| 3 | | 0 | | 0 | 63 | 85.14 | 69 |
| 4 | 3 | 3.66 | 12 | 12.90 | 11 | 14.86 | 12 |

Table 3-6: Overview Results of Two-Step Cluster Analysis on Activity Patterns

| Cluster | Cafe-Talk Forum | | Content-Driven Forums | | Total Contributions | |
|---------|-----------------|-------|-----------------------|-------|---------------------|-------|
| | M | SD | M | SD | M | SD |
| | 1 | 3.28 | 3.16 | 7.33 | 5.98 | 10.61 |
| 2 | 4.57 | 3.97 | 9.91 | 7.25 | 14.48 | 9.92 |
| 3 | 4.86 | 5.36 | 9.21 | 6.43 | 14.06 | 9.93 |
| 4 | 17.27 | 17.27 | 26.62 | 13.90 | 43.88 | 26.28 |

The second cluster analysis focused on performance levels and included final exam grades, as well as all subcategories of the task related coding procedure: *New Facts, Own Experience & Opinions, New Theoretical Ideas, Explicitation and Evaluation*. Here, the BIC results indicated an optimal number of five clusters. The summative results are provided in Tables 3-7 and 3-8.

Table 3-7: Frequencies of Hierarchical Positions: Two-Step Cluster Analysis on Activity Patterns

| Cluster | "Low" | | "Middle" | | "High" | | Total |
|---------|-------|-------|----------|-------|--------|-------|-------|
| | N | % | N | % | N | % | |
| 1 | 53 | 68.83 | | .00 | | .00 | 53 |
| 2 | | .00 | 75 | 84.27 | | .00 | 75 |
| 3 | | .00 | | .00 | 38 | 55.88 | 38 |
| 4 | 22 | 28.57 | | .00 | 21 | 30.88 | 43 |
| 5 | 2 | 2.60 | 14 | 15.73 | 9 | 13.24 | 25 |

Table 3-8: Overview Results of Two-Step Cluster Analysis on Activity Patterns

| Cluster | Task Related Communication | | | | | | | | | | | |
|---------|----------------------------|------|------|------|------|------|-----|-----|-------|------|------|------|
| | Exam | | 1 | | 2 | | 3 | | 4 | | 5 | |
| | M | SD | M | SD | M | SD | M | SD | M | SD | M | SD |
| 1 | 7.29 | .79 | .51 | .75 | .55 | .80 | .02 | .14 | 5.15 | 4.16 | .62 | .99 |
| 2 | 7.59 | .85 | 1.21 | 1.36 | .80 | 1.00 | .00 | .00 | 6.56 | 4.95 | .92 | 1.19 |
| 3 | 7.46 | .85 | 1.74 | 2.19 | .63 | .88 | .05 | .23 | 6.55 | 5.00 | 1.21 | 1.73 |
| 4 | 7.40 | 1.92 | .88 | 1.00 | .74 | .85 | .00 | .00 | 8.02 | 6.26 | .91 | 1.29 |
| 5 | 7.62 | 1.80 | 4.08 | 2.55 | 3.80 | 3.93 | .56 | .71 | 14.36 | 9.30 | 4.24 | 3.55 |

Note: 1 = New Facts; 2 = Own Experience & Opinions; 3 = New Theoretical Ideas; 4 = Explicitation; 5 = Evaluation

Similarly to our findings from the hypothesis tests, we again found evidence that participants' hierarchical position explained differences in observed performance levels. However, the cluster analysis also revealed that this relationship is more complex than initially stipulated. More specifically, we were able to gain valuable new insights on the participants from the "Low" and "High" groups. The majority of these groups performed in accordance with the previously developed theoretical framework (Clusters 1 and 3). More specifically, the higher an individual's hierarchical position, the higher her performance measures. However, about a third of all members of the "Low" group, as well as about half of the participants from the "High" group belonged to either cluster 4 or 5. The distinctive feature of cluster 4 was a higher level of messages that could be coded as *Explicitation*, as well as a tendency to attain higher grades. However, in terms of the latter factor, the observed standard deviation was quite considerable. Members of cluster 5 exhibited higher cognitive levels for their contributions and also attained higher grades than their colleagues. Moreover, although the standard deviations were also noticeable, this cluster really constituted a pendant to the previously discovered *Star* cluster. In order to test for the statistical significance of this preliminary impression, we employed another correlation analysis to test for a possible relationship between membership of the *Star* cluster and membership of cluster 5. The applicable correlation coefficient was $r_s = .33$ ($p < .01$), which indicated that a certain group of participants (*Stars*) really dominated their CoL, both in terms of the quantity and quality of their contributions. Taken together, the two-step cluster analyses therefore provided a more refined and multifaceted picture of how hierarchical positions influence individuals in CoL.

3.6.3 Controlling for other Background Characteristics

The investigation of whether participants differed in terms of age, gender, educational background, or prior knowledge, subject to their hierarchical positions, revealed no significant results. However, we also conducted two additional sets of correlation analysis, where we neglected hierarchical positions and solely considered the potential relations between our control measures and the activity and performance indicators. The findings are summarized in Tables 3-9 and 3-10, which revealed that age, as well as prior knowledge should be taken into account when interpreting the main findings of this study.

Table 3-9: Overview of Correlations between Control Variables and Activity Measures

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--------------------------|-------|------|------|------|-------|-------|---|
| 1 Age | 1 | | | | | | |
| 2 Gender | .16* | 1 | | | | | |
| 3 Educational Background | .22** | .13* | 1 | | | | |
| 4 Prior Knowledge | -.11 | .04 | -.02 | 1 | | | |
| 5 Total Contributions | .14* | -.04 | -.06 | .10 | 1 | | |
| 6 "Café-Talk" Forums | .06 | -.11 | -.07 | -.02 | .39** | 1 | |
| 7 Content-Driven Forums | .14* | -.02 | -.05 | .11 | .99** | .26** | 1 |

* p < .05, ** p < .01

Table 3-10: Overview of Correlations between Control Variables and Performance Measures

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---------------------------------------|-------|------|------|-------|-------|-------|-------|-------|------|-------|----|
| 1 Age | 1 | | | | | | | | | | |
| 2 Gender | .16* | 1 | | | | | | | | | |
| 3 Educational Background | .22** | .13* | 1 | | | | | | | | |
| 4 Prior Knowledge | -.11 | .04 | -.02 | 1 | | | | | | | |
| 5 Final Exam Grade Task Related | -.01 | -.11 | -.05 | .14* | 1 | | | | | | |
| 6 Communication | .13* | .00 | -.01 | .15* | .23** | 1 | | | | | |
| 7 New Facts Own Experience & Opinions | .08 | .01 | -.04 | .16* | .18** | .66** | 1 | | | | |
| 8 New Theoretical Ideas | .00 | -.06 | -.03 | -.03 | .05 | .54** | .41** | 1 | | | |
| 9 Explicitation | .09 | .04 | .05 | -.05 | .14* | .22** | .27** | .18** | 1 | | |
| 10 Evaluation | .16* | .03 | .03 | .12 | .20** | .93** | .47** | .38** | .16* | 1 | |
| 11 | -.01 | -.03 | -.07 | .18** | .19** | .56** | .36** | .26** | .08 | .38** | 1 |

* p < .05, ** p < .01

More specifically, age was found to be positively correlated with participants' total amount of contributions, contributions in content-driven forums,

task related communication and *Explicitation*. Additionally, prior knowledge correlated positively with final exam, task related communication, *New Facts* and *Evaluation*. Considering these findings, we can therefore stipulate that any possible observed differences in activity or performance levels between the different hierarchical positions cannot be explained by our control measures. However, when interpreting the results of our study, we have to take into account that participants' age and prior knowledge were significantly correlated with some of individuals' activity and performance measures.

3.7 Discussion

This study contributes to the growing body of research that addresses the impact of diversity on training processes within organizations. Moreover, past research has either focused on regular working environments (Jehn & Bezrukova, 2004), or failed to acknowledge the important role of hierarchical positions in mediating collaborative learning (Romme, 1996). Our study addresses these shortcomings by providing empirical evidence on how hierarchical positions influence the behaviour of participants within CoL of a global online training program. Our results provide evidence for a significant positive relationship between the hierarchical position of an individual and their level of activity (H1). This validates the work of researchers like Yates and Orlikowski (1992), who argued that top management will proactively set the tone during discussions. In contrast, our findings fit the study of Edmondson (2002), who suggested that participants holding lower hierarchical positions will behave more passively when engaging in communication with colleagues from higher up on the hierarchical ladder. Even more so, in the study of Edmondson, participants were already familiar with each other. In the context of this study, participants were brought together from different units and regions, and they had to voluntarily share this information with each other. Consequently, being able to validate the behavioural patterns of lower management, this suggests even more far-reaching consequences. More specifically, hierarchical positions really do seem to constitute an "*800-pound gorilla*" (Salas & Kozlowski, 2009, p. 468) that influences how staff members collaborate. It can therefore be concluded that specific attention should be paid to these types of interpersonal processes, as they can have a great impact on learning initiatives within organizations (e.g. Foldy, et al., 2009).

Based on the work of Bunderson (2003b), we hypothesized that participants' hierarchical position will have a positive influence on their performance levels (H2), and our empirical results provide justification for this claim. Additionally, we are able to refine our understanding of this relationship. While the majority of the "*Low*" group performed well, a sizeable subset was able to excel, attain high grades and contribute high quality posts to the discussion forums. This can be interpreted

as an indication that learning has taken place, irrespective of the group's generally low level of activity. This also supports the work of Nonaka (1994), who argued that participants holding lower hierarchical positions can learn a lot from their more senior colleagues by simply being subjected to their knowledge and experiences. Consequently, in combination with our finding that the majority of the "Low" group exhibits a certain degree of anxiety when being asked to contribute to the open discussion, they appear to closely follow the discussion and take their time to digest and evaluate what has been contributed by their colleagues; ultimately contributing fewer, but qualitatively valuable contributions. We also revealed the existence of a group of *Stars* that dominated their CoL, both in terms of the quantity and quality of their contributions, irrespective of their hierarchical position. This suggests a certain degree of "*status equalization*" (Sproull & Kiesler, 1986, p. 1507). However, this finding also needs to be qualified. Our results clearly indicate that it is possible for some lower level management to *get out of the shackles* and actively contribute to the learning process of CoL. However, the findings also suggest that this possibility is directly connected to individual's ability to make themselves heard, both in terms of the quantity and quality of their contributions. Otherwise, hierarchical positions continue to have a considerable impact on interpersonal processes within organizations.

When controlling for other background characteristics, we found that participants' age and prior knowledge were positively correlated with some of our activity and performance measures. With respect to age, a possible explanation for this is provided by the work of Pelled and colleagues (1999), who showed that age is a career-related attribute. Hence, an employee's age tends to be a predictor of her hierarchical position within an organization. The potential impact of participants' prior knowledge on their behaviour and performance within learning initiatives has been highlighted by numerous studies (Dochy & McDowell, 1997). Even more so, there has been a growing consensus that individuals' prior knowledge constitutes an essential variable in learning (Dochy, et al., 1999). Hence, this could therefore partially explain why some participants have been to achieve a *Star* status within their CoL.

In summary, the results of our study allow to better anticipate active participants and stimulate them to engage their colleagues into knowledge sharing. In practice, this could translate into assigning different roles within the CoL. For example, HRD managers could also consider assigning roles not according to perceived strengths, but rather on the basis of anticipated weaknesses. In practice, this would translate into members of the "Low" group being *discussions leaders*, while their colleagues from the "High" group would be asked to take on the role of *minute-taker*. This provides members of the "Low" group with a kick-start, as they already would be at the centre of attention. Consequently, they may find it easier to share their knowledge and skills and therefore attain a more central position in

the learning process. A possible, positive side-effect would be that they also immediately would train their *leadership* skills. Moreover, organizers of future CoL should incorporate participants' background characteristics, e.g. content expertise, into their placement decision of participants within CoL. This has been suggested to greatly contribute to the learning experience and outcomes of participants (Dochy & McDowell, 1997). In terms of participants' prior knowledge and professional experience, it might also be worthwhile considering publishing this information before the start of a training activity. The potential benefit would be to provide participants with a clear overview of whom they are collaborating with. After all, creating a *hothouse* for new ideas and thoughts is a valuable contribution to training within organizations (Schlager, et al., 2002). However, the atmosphere can be improved when you know who your neighbours are (Cohen & Zhou, 1991).

3.8 Conclusions

3.8.1 *Limitations*

The current study exhibits two main limitations that should be taken into account when interpreting the presented findings. First, participants' activity was analysed based on the level of their contributions. Although this provides a valuable approximation of the underlying relationships, it has limited overall explanatory power. The discussions within the CoL have also been recorded via transcribed log-files, providing information on whether contributions have been read by colleagues, or whether they have remained unnoticed. Analysing this data would provide additional insights on how participants from different hierarchical positions behave in relation to each other within CoL. Second, and closely related to the previous limitation, the current study does not consider how participants are connected with each other and whether their hierarchical positions might help to predict social network positions within CoL. This in turn would provide valuable insights about the nature of CoL and whether they are organic entities, with everyone being connected and thereby having a chance to access the knowledge and experiences of others, or whether they are scatter plots, with its members mainly indulging in monologues that are not considered by their colleagues.

3.8.2 *Future Research*

Building upon the findings of this study, future research should further investigate the nature of the identified *Stars*. This group, which is not bound by a single hierarchical position, can be considered as the driving force behind CoL. A better understanding of these members' characteristics and traits would therefore greatly contribute to our understanding of how organizers can compose future CoL, so as

to increase the chances of achieving high quality learning outcomes. Finally, future research should conduct a more exhaustive content analysis, also incorporating the non-task related contributions within the CoL. These types of posts have been suggested to influence the learning processes within CoL (Veerman & Veldhuis-Diermanse, 2001), by contributing to the atmosphere within collaborative learning environments (Hung & Der-Thang, 2001). Consequently, incorporating this data would shed additional light on whether and to what extent hierarchical positions might influence the way with which participants engage into discussions within CoL.

3.9 References

- Alavi, M., Yoo, Y., & Vogel, D. R. (1997). Using Information Technology to Add Value to Management Education. *The Academy of Management Journal*, 40(6), 1310-1333.
- Arbaugh, J. B., & Benbunan-Finch, R. (2006). An Investigation of Epistemological and Social Dimensions of Teaching in Online Learning Environments. *Academy of Management Learning & Education*, 5(4), 435-447.
- Argote, L., & Ingram, P. (2000). Knowledge Transfer: A Basis for Competitive Advantage in Firms. *Organizational Behavior and Human Decision Processes*, 82(1), 150-169.
- Armstrong, S. J., & Sadler-Smith, E. (2008). Learning on Demand, at Your Own Pace, in Rapid Bite-Sized Chunks: The Future Shape of Management Development? *Academy of Management Learning & Education*, 7(4), 571-586.
- Arts, J. A., Gijssels, W. H., & Boshuizen, H. (2006). Understanding managerial problem-solving, knowledge use and information processing: Investigating stages from school to the workplace. *Contemporary Educational Psychology*, 31(4), pp. 387-410.
- ASTD (2010). American Society for Training and Development: 2010 State of the Industry Report. Alexandria, VA: ASTD.
- Banerjee, M., Capozzoli, M., McSweeney, L., & Sinha, D. (1999). Beyond Kappa: A Review of Interrater Agreement Measures. *The Canadian Journal of Statistics / La Revue Canadienne de Statistique*, 27(1), 3-23.
- Banfield, J. D., & Raftery, A. E. (1993). Model-based Gaussian and non-Gaussian clustering. *Biometrics*, 49, 803-821.
- Berger, J., Ridgeway, C. L., Fisek, M. H., & Norman, R. Z. (1998). The Legitimation and Delegitimation of Power and Prestige Orders. *American Sociological Review*, 63(3), 379-405.
- Beuchot, A., & Bullen, M. (2005). Interaction and interpersonality in online discussion forums. *Distance Education*, 26(1), 67-87. doi: 10.1080/01587910500081285

Chapter 3

- Bird, A. (1994). Careers as repositories of knowledge : a new perspective on boundaryless careers. *Journal of Organizational Behavior*, 15, 325-344.
- Brower, H. H. (2003). On Emulating Classroom Discussion in a Distance-Delivered OBHR Course: Creating an On-Line Learning Community. *Academy of Management Learning & Education*, 2(1), 22-36.
- Bunderson, J. S. (2003a). Recognizing and Utilizing Expertise in Work Groups: A Status Characteristics Perspective. *Administrative Science Quarterly*, 48(4), 557-591.
- Bunderson, J. S. (2003b). Team Memeber Functional Background and Involvement in Management Teams: Direct Effects and the Moderating Role of Power Centralization. *Academy of Management Journal*, 46(4), 458-474.
- Bunderson, J. S., & Sutcliffe, K. M. (2002). Comparing Alternative Conceptualizations of Functional Diversity in Management Teams: Process and Performance Effects. *Academy of Management Journal*, 45(5), 875-893.
- Caspi, A., Chajut, E., Saporta, K., & Beyth-Marom, R. (2006). The influence of personality on social participation in learning environments. *Learning and Individual Differences*, 16, 129-144.
- Caspi, A., Gorsky, P., & Chajut, E. (2003). The influence of group size on nonmandatory asynchronous instructional discussion groups. *The Internet and Higher Education*, 6(3), pp. 227-240.
- Chalmers, L., & Keown, P. (2006). Communities of practice and professional development. *International Journal of Lifelong Education*, 25(2), 139 - 156.
- Cho, H., Gay, G., Davidson, B., & Ingraffea, A. (2007). Social Networks, communication styles, and learning performance in a CSDL community. *Computers & Education*, 49, 309-329.
- Cohen, B. P., & Zhou, X. (1991). Status Processes in Enduring Work Groups. *American Sociological Review*, 56(2), 179-188.
- Cohen, E. G. (1994). Restructuring the Classroom: Conditions for Productive Small Groups. *Review of Educational Research*, 64(1), 1-35.
- Cohen, J. (1992). Statistics a power primer. *Psychology Bulletin*, 112, 155–159.
- Cohen, S. G., & Bailey, D. E. (1997). What makes teams work: Group effectiveness research from the shop floor to the executive suite. *Journal of Management*, 23, 239-290.
- Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology*, 78(1), 98-104.
- Cramton, C. D., & Hinds, P. J. (2005). Subgroup Dynamics in Internationally Distributed Teams: Ethnocentrism or Cross-National Learning? *Research in Organizational Behavior*, 26, 231-263.
- de Laat, M., & Lally, V. (2003). Complexity, theory and praxis: Researching collaborative learning and tutoring processes in a networked learning community *Instructional Science*, 31(1-2), 7-39.

The Impact of Hierarchical Positions on Communities of Learning

- de Wever, B., Schellens, T., Valcke, M., & Van Keer, H. (2006). Content analysis schemes to analyze transcripts of online asynchronous discussion groups: A review. *Computers & Education*, 46(1), 6-28.
- DeChurch, L. A., & Mesmer-Magnus, J. R. (2010). The cognitive underpinnings of effective teamwork: A meta-analysis. *Journal of Applied Psychology*, 95(1), 32-53.
- Dochy, F., & McDowell, L. (1997). Assessment as a tool for learning. *Studies In Educational Evaluation*, 23(4), 279-298.
- Dochy, F., Segers, M., & Buehl, M. M. (1999). The Relation Between Assessment Practices and Outcomes of Studies: The Case of Research on Prior Knowledge. *Review of Educational Research*, 69(2), 145-186. doi: 10.3102/00346543069002145
- Edmondson, A. C. (2002). The Local and Variegated Nature of Learning in Organizations: A Group-Level Perspective. *Organization Science*, 13(2), 128-146. doi: 10.1287/orsc.13.2.128.530
- Eraut, M. (2000). Non-formal learning and tacit knowledge in professional work. *British Journal of Educational Psychology*, 70, 113-136.
- Foldy, G. E., Rivard, P., & Buckley, T. R. (2009). Power, Safety, and Learning in Racially Diverse Groups. *Academy of Management Learning & Education*, 8(1), 25-41.
- Garavan, T. N., Carbery, R., O'Malley, G., & O'Donnell, D. (2010). Understanding participation in e-learning in organizations: a large-scale empirical study of employees. *International Journal of Training and Development*, 14(3), 155-168. doi: 10.1111/j.1468-2419.2010.00349.x
- Garrison, D. R., & Arbaugh, J. B. (2007). Researching the community of inquiry framework: Review, issues, and future directions. *The Internet and Higher Education*, 10(3), 157-172.
- Goldstein, L. S. (1999). The Relational Zone: The Role of Caring Relationships in the Co-Construction of Mind. *American Educational Research Journal*, 36(3), 647-673. doi: 10.3102/00028312036003647
- Gunawardena, C. N., Lowe, C. A., & Anderson, T. (1997). Analysis Of A Global Online Debate And The Development Of An Interaction Analysis Model For Examining Social Construction Of Knowledge In Computer Conferencing. *Journal of Educational Computing Research*, 17(4), pp. 397-431.
- Gunawardena, C. N., & Zittle, F. J. (1997). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *American Journal of Distance Education*, 11(3), 8-26. doi: 10.1080/08923649709526970
- Hakkarainen, K., Palonen, T., Paavola, S., & Lehtinen, E. (2004). *Communities of networked expertise: Professional and educational perspectives*. Amsterdam: Elsevier.

Chapter 3

- Hamel, G., & Green, B. (2007). *The Future of Management*: Harvard Business School Press.
- Hung, D. W. L., & Der-Thang, C. (2001). Situated Cognition, Vygotskian Thought and Learning from the Communities of Practice Perspective: Implications for the Design of Web-Based Learning. *Educational Media International*, 38(1), 3-12.
- Im, Y., & Lee, O. (2004). Pedagogical implications of online discussion for preservice teacher training. *Journal of Research on Technology in Education*, 36(2), 155-170.
- Järvelä, S., Järvenoja, H., & Veermans, M. (2008). Understanding the dynamics of motivation in socially shared learning. *International Journal of Educational Research*, 47(2), 122-135.
- Jehn, K. A. (1995). A Multimethod Examination of the Benefits and Detriments of Intragroup Conflict. *Administrative Science Quarterly*, 40(2), 256-282.
- Jehn, K. A., & Bezrukova, K. (2004). A field study of group diversity, workgroup context, and performance. *Journal of Organizational Behavior*, 25(6), 703-729.
- Jehn, K. A., Northcraft, G. B., & Neale, M. A. (1999). Why Differences Make a Difference: A Field Study of Diversity, Conflict, and Performance in Workgroups. *Administrative Science Quarterly*, 44(4), 741-763.
- Joinson, A. N. (2001). Self disclosure in computer mediated communication: The role of self awareness and visual anonymity. *European Journal of Social Psychology*, 31(2), 177-192.
- Kane, G. C., & Alavi, M. (2007). Information Technology and Organizational Learning: An Investigation of Exploration and Exploitation Processes. *Organization Science*, 18(5), 796-812.
- Keegan, D. (1980). On defining distance education. *Distance Education*, 1(1), pp 13-36.
- Krackhardt, D. (1990). Assessing the Political Landscape: Structure, Cognition, and Power in Organizations. *Administrative Science Quarterly*, 35, 342-369.
- Lave, J., & Wenger, E. (1991). *Situated learning: legitimate peripheral participation*: Cambridge University Press.
- Leonard, D., & Sensiper, S. (1998). The Role of Tacit Knowledge in Group Innovation. *California Management Review*, 40(3), 112-132.
- Magurran, A. E. (1988). *Ecological diversity and its measurement*. Princeton, NJ, USA: Princeton University Press.
- Milliken, F. J., & Martins, L. L. (1996). Searching for Common Threads: Understanding the Multiple Effects of Diversity in Organizational Groups. *Academy of Management Review*, 21(2), 402-433.
- Nachmias, R., Mioduser, D., Oren, A., & Ram, J. (2000). Web-Supported Emergent-Collaboration In Higher Education Courses. *Journal of Educational Technology & Society*, 3(3), 94-104.

The Impact of Hierarchical Positions on Communities of Learning

- Nembhard, I. M., & Edmondson, A. C. (2006). Making it safe: The effects of leader inclusiveness and professional status on psychological safety and improvement efforts in health care teams. *Journal of Organizational Behaviour, 27*, pp. 941-966.
- Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science, 5*(1), 14-37.
- Pelled, L. H., Eisenhardt, K. M., & Xin, K. R. (1999). Exploring the Black Box: An Analysis of Work Group Diversity, Conflict, and Performance. *Administrative Science Quarterly, 44*(1), 1-28.
- Rienties, B., Tempelaar, D., Van den Bossche, P., Gijssels, W., & Segers, M. (2009). The role of academic motivation in Computer Supported Collaborative Learning. *Computers in Human Behaviour, 25*(6), 1195-1206.
- Robey, D., Khoo, H., & Powers, C. (2000). Situated learning in cross-functional virtual teams. *Technical Communication, 47*(1), 51-66.
- Roblyer, M. D., & Wiencke, W. R. (2003). Design and Use of a Rubric to Assess and Encourage Interactive Qualities in Distance Courses. *American Journal of Distance Education, 17*(2), 77 - 98.
- Romme, A. G. L. (1996). A Note on the Hierarchy-Team Debate. *Strategic Management Journal, 17*(5), 411-417.
- Rosenthal, R. (1991). *Meta-analytic procedures for social research*. Newbury Park, CA: Sage.
- Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (2000). Methodological Issues in the Content Analysis of Computer Conference Transcripts. *International Journal of Artificial Intelligence in Education, 11*, pp. 8-22.
- Salas, E., & Kozlowski, S. W. J. (2009). Learning, Training, and Development in Organizations: Much Progress and a Peek Over the Horizon. In E. Salas & S. W. J. Kozlowski (Eds.), *Learning, Training, and Development in Organizations* (pp. 461-476). New York, NY: Routledge.
- Sambrook, S. (2005). Factors Influencing the Context and Process of Work-Related Learning: Synthesizing Findings from Two Research Projects. *Human Resource Development International, 8*(1), 101-119.
- Schellens, T., & Valcke, M. (2005). Collaborative learning in asynchronous discussion groups: What about the impact on cognitive processing? *Computers in Human Behavior, 21*(6), 957-975.
- Schlager, M., Fusco, J., & Schank, P. (2002). Evolution of an online education community of practice. In K. A. Renninger & W. Shumar (Eds.), *Building virtual communities: Learning and change in cyberspace* (pp. 129-158). New York: Cambridge University Press.
- Simons, T., Pelled, L. S., & Smith, K. A. (1999). Making Use of Differences: Diversity, Debate, and Decision Comprehensiveness in Top Management Teams. *Academy of Management Journal, 42*(6), 662-673.

Chapter 3

- Smith, C., & Bath, D. (2006). The Role of the Learning Community in the Development of Discipline Knowledge and Generic Graduate Outcomes. *Higher Education, 51*(2), 259-286. doi: 10.1007/s10734-004-6389-2
- Snyder, P., & Lawson, S. (1993). Evaluating Results Using Corrected and Uncorrected Effect Size Estimates. *The Journal of Experimental Education, 61*(4), 334-349.
- Soden, R., & Halliday, J. (2000). Rethinking vocational education: a case study in care. *International Journal of Lifelong Education, 19*(2), 172 - 182.
- Sproull, L., & Kiesler, S. (1986). Reducing Social Context Cues: Electronic Mail in Organizational Communication. *Management Science, 32*(11), 1492-1512.
- Stacey, E., Smith, P. J., & Barty, K. (2004). Adult learners in the workplace: online learning and communities of practice. *Distance Education, 25*(1), 107 - 123.
- Strijbos, J.-W., Martens, R. L., Prins, F. J., & Jochems, W. M. G. (2006). Content analysis: What are they talking about? *Computers & Education, 46*(1), 29–48.
- Sutton, R., Neale, M. A., & Owens, D. (2000). Technologies of Status Negotiation: Status Dynamics in Email Discussion Groups: Stanford University, Graduate School of Business.
- Tachibanaki, T. (1988). Education, occupation, hierarchy and earnings. *Economics of Education Review, 7*(2), 221-229.
- Thomas-Hunt, M. C., Ogden, T. Y., & Neale, M. A. (2003). Who's Really Sharing? Effects of Social and Expert Status on Knowledge Exchange Within Groups. *Management Science, 49*(4), 464–477.
- van der Vegt, G. S., Bunderson, J. S., & Oosterhof, A. (2006). Expertness diversity and interpersonal helping in teams: Why those who need the most help end up getting the least. *Academy of Management Journal, 49*(5), 877-893.
- Veerman, A., & Veldhuis-Diermanse, E. (2001). *Collaborative learning through computer-mediated communication in academic education*. Paper presented at the In EURO CSCL 2001. Maastricht: McLuhan Institute. University Maastricht.
- Vrasidas, C., & Zembylas, M. (2003). The Nature of Technology-mediated Interaction in Globalised Distance Education. *International Journal of Training and Development, 7*(4), 271-286.
- Webber, S. S., & Donahue, L. M. (2001). Impact of highly and less job-related diversity on work group cohesion and performance: a meta-analysis. *Journal of Management, 27*(2), 141-162. doi: 10.1177/014920630102700202
- Weisband, S. P., Schneider, S. K., & Connolly, T. (1995). Computer Mediated Communication and Social Information: Status Salience and Status Differences. [Article]. *Academy of Management Journal, 38*(4), 1124-1151. doi: 10.2307/256623
- Wenger, E., McDermott, R., & Snyder, W. M. (2002). *Cultivating communities of practice*. Boston: Harvard University Press.

The Impact of Hierarchical Positions on Communities of Learning

- Wolfe, J. L. (1999). Why do women feel Ignored? gender differences in computer-mediated classroom interactions. *Computers and Composition, 16*(1), 153-166.
- Yamhill, S., & McLean, G. N. (2001). Theories supporting transfer of training. *Human Resource Development Quarterly, 12*(2), 195-208. doi: 10.1002/hrdq.7
- Yates, J., & Orlikowski, W. J. (1992). Genres of Organizational Communication: A Structural Approach to Studying Communication and Media. *Academy of Management Review, 17*(2), 299-326.
- Zack, M. H., & McKenney, J. L. (1995). Social Context and Interaction in Ongoing Computer-supported Management Groups. [Article]. *Organization Science, 6*(4), 394-422.
- Zembylas, M., & Vrasidas, C. (2007). Listening for Silence in Text-Based, Online Encounters. *Distance Education, 28*(1), 5 - 24.
- Zhang, Y., Fang, Y., Wei, K.-K., & Chen, H. (2010). Exploring the role of psychological safety in promoting the intention to continue sharing knowledge in virtual communities. *International Journal of Information Management, 30*(5), 425-436. doi: 10.1016/j.ijinfomgt.2010.02.003

CHAPTER 4

The Centre of Attention?! – The Transferability of Hierarchical Positions into Network Structures of Communities of Learning³

Abstract: *Communities of Learning* (CoL) are promoted to foster interpersonal knowledge transfer among participants of organizational training initiatives. However, past research has provided only limited data from actual organizations and largely neglected hierarchical positions as a major obstacle to collaborative learning processes. The current study addresses these shortcomings by providing empirical evidence from 25 CoL of a global organization. Our results show significant differences in participants' network behaviour and position based on their hierarchical position. By incorporating these insights into future CoL, Human Resource Development (HRD) managers can better design collaborative learning activities within CoL that create a valuable learning experience for all participants.

³ The chapter is based on *Hierarchical Positions and their Influence on Network Structures within Communities of Learning*, presented at the EDiNEB 2012 conference, Haarlem, The Netherlands, 02 – 04 May, 2012

4.1 Introduction

Researchers have stipulated that organizations are transactive knowledge systems, where the vast majority of knowledge is stored in the heads of individual employees (Cross, Borgatti, & Parker, 2001). Consequently, it has been suggested that facilitating an interpersonal knowledge transfer among employees constitutes a key building block in setting up organizational training initiatives (Argote & Ingram, 2000). This notion is further supported by researchers who stipulated that knowledge is being created while collaborating in social networks composed of diverse groups of people like (e.g. Hakkarainen, Palonen, Paavola, & Lehtinen, 2004; Paavola, Lipponen, & Hakkarainen, 2004). In practice, this process of connecting people greatly builds upon the extensive use of electronic communication tools, such as asynchronous discussion forums. These types of communication channels have been proposed by researchers to effectively enable the establishment and development of new ways in which training can build upon networked communities (e.g. Venkatraman, 1994). Yet, organizations cannot assume that once a technology is introduced and the appropriate structure has been designed the rest will follow. Instead, previous research has established that for social (learning) networks to achieve their intended goals, a clear understanding is needed of how existing organizational structures influence not only the adoption of electronic communication tools, but also their implementation (Zack & McKenney, 1995).

With practitioners and researchers starting to increasingly look for new approaches to design and implement organizational training programs (Yamhill & McLean, 2001), online collaborative learning has received a growing amount of attention in recent years (Brower, 2003). According to Garavan and colleagues (2010), in 2009 the American training industry spent \$ 20 billion, out of a total expenditure of \$ 90 billion, on online workplace learning. Furthermore, this market is forecasted to be worth € 40 billion by 2012. In the context of this study, we consider (online) collaborative learning as settings where "*[participants] are working in groups on a shared task or problem, in which they are expected to have equal contributions and participation*" (de Laat, Lally, Simons, & Wenger, 2006, p. 103). One promising methodology that has been developed within this framework is the concept of virtual Communities of Learning (CoL). Being defined as groups of people "*engaging in collaborative learning and reflective practice involved in transformative learning*" (Paloff & Pratt, 2003, p. 17), CoL have been proposed to foster the effective exchange of knowledge and experience between members of an organizations workforce (e.g. Stacey, Smith, & Barty, 2004). Moreover, online communities, like CoL, have been considered as an almost ready-made laboratory for analysing collaboration in social (learning) networks over time (Haythornthwaite, 2001).

In order to conduct these types of analysis, numerous researchers have suggested social network analysis (SNA) as a valuable tool for describing and understanding whether and how members of a (learning) network interact with each other (e.g. Daradoumis, Martínez-Monés, & Xhafa, 2004; de Laat, Lally, Lipponen, & Simons, 2007). According to Aviv, Erlich, Ravid and Geva (2003) a social network can be defined as “*a group of collaborating (and/or) competing entities that are related to each other*” (p. 4). SNA has been used to analyse various networks from several academic domains, ranging from social sciences, communication studies, economics, to computer networks and different other fields (Aviv, et al., 2003). Moreover, Garton and colleagues (1997) specifically suggest using SNA methods in the context of online learning networks. When considering their structure and development, and following the seminal work of Erdős and Rényi (1960), social networks should evolve according to the concept of random graph theory. In essence, the underlying supposition of this theory is that while some participants of a network might get in touch with more people than others, on average everyone should have made the same amount of contacts, similar to a random distribution of connections. In other words, all participants of a network should have an equal chance of making connections (Rienties, Tempelaar, Giesbers, Segers, & Gijsselaers, 2012). However, if everyone did indeed have equal chances of getting connected with others, why can we then observe so many biased networks in the real world (Barabási, 2003)?

More specifically, based on numerous studies of newly emerging online communities, researchers have found that a small minority of participants (15%) is gravitating around the centre of their community’s activity, while a considerable larger group (40%) is barely engaging into communication with their colleagues (e.g. Cross, Laseter, Parker, & Velasquez, 2006). In order to explain these observed patterns, some researchers have referred to the fact that communication is an inherently social act (Pearce, 1976). New tools and methodologies can only reach their full potential, if organizers fully understand how existing social relationships influence communication patterns and participants’ behaviour therein (Wellman, 2001). Moreover, de Laat and Lally (2003) stipulate that the social and contextual framework in which the learning takes place has a considerable influence on how participants behave and perform within online learning networks. Furthermore, the nature of social networks, as well as their development over time, is significantly affected by the background characteristics of its individual members (e.g. Barabási & Albert, 1999). Yet, past research was largely concerned with the static features of online communities (Panzarasa, Opsahl, & Carley, 2009). While this offers preliminary insights on the overall processes that take place within these communities, it lacks a more refined picture of how social relationships might develop over time (e.g. Aviv, et al., 2003; Haythornthwaite, 2001). Additionally, the vast amount of research has neglected a particular background characteristic of

Chapter 4

participants that can have a severe effect on the underlying learning processes, namely participants' hierarchical positions (Carley, 1992; Griffith & Neale, 2001; Romme, 1996).

The present study addresses these shortcomings by providing empirical evidence from 25 CoL of an online training program that was provided for 249 staff members of a global organization. Each CoL consisted of 7 – 13 participants and was centred on asynchronous discussion forums, where participants from different parts of the organization's hierarchical ladder collaboratively enhanced their knowledge and skills. In order to analyse whether participants' network behaviour was influenced by their hierarchical position, social network analysis (SNA) was employed. The great benefit of SNA is that it provides an x-ray of how (learning) networks are structured (Cross, et al., 2006), and that it allows an analysis of whether and to what extent real-life social relationships are transferred into the virtual realm (Van den Bossche, Segers, & Jansen, 2010). Based on the resulting findings of our study, organizers of CoL will be able to anticipate (groups of) individuals holding crucial positions and design actions targeted at participants who tend to be situated more towards the fringe of the network (Hatala, 2006). Moreover, incorporating our findings into the design and implementation strategies of future CoL will allow a more refined setup that contributes to employees' learning experience and can foster the knowledge creation within an entire organization.

4.2 Learning in Organizations – Still a Black Box?

Kane and Alavi (2007) defined organizational learning as *“the dynamic process of creating knowledge and transferring it to where it is needed and used, resulting in the creation of new knowledge for later transfer and use.”* (p. 796). In this context, *Communities of Learning* (CoL) have received a growing amount of attention. In essence, CoL provide participants with the means to share their practical experiences, while applying the newly gained knowledge to their own working environments. This allows each individual participant to contribute their own piece to the overall puzzle, which has the potential to contribute to the success of the entire organization (Kozlowski, Chao, & Jensen, 2009). When employees from across business units and regions can engage in online collaborative learning, they can help each other in understanding the specific details of a certain content domain, while sharing experiences and creating new ideas that can help to improve the business process (Leonard & Sensiper, 1998).

Based on their growing amount of importance and popularity, a considerable amount of research has already investigated the nature and main characteristics of online communities (e.g. Stacey, et al., 2004). More specifically, research on similar settings within institutes of higher education has indicated that

online training is more complex and demanding for learners than participating in a face-to-face environment (e.g. Arbaugh & Benbunan-Finch, 2006; Järvelä, Järvenoja, & Veermans, 2008). While some researchers indicated that the size of an online community can have an impact on the applicable learning activities (Caspi, Gorsky, & Chajut, 2003), others have been able to show that participants' background characteristics, such as motivation, significantly influenced the type of interaction within learning networks (Rienties, et al., 2012). The latter finding is particularly important, as researchers suggested that interaction is a key factor in determining the success of training program in contributing to the knowledge and skills of individuals (e.g. Caspi, et al., 2006; Mazur, Doran, & Doran, 2010). As a result, it is of crucial importance to gain a better understanding of how collaborative online learning processes are influenced by external factors, in general (Sambrook, 2005), and by background characteristics of individual participants (Zack & McKenney, 1995), in particular. However, past research has only provided limited empirical evidence from actual organizations (Edmondson, 2002). The goal of this study is to address this gap and contribute to the discussion, by investigating whether and to what extent hierarchical positions are transferred into the CoL of a global organization's training initiative.

4.3 Opening the Black Box – The Transferability of Hierarchical Positions into CoL

One of the key elements of online (learning) communities is that they allow for an open dialogue between participants (Amin & Roberts, 2006). Yet, when considering the findings and experiences from real-life communities within organizations, there is increasing evidence that information flows are constrained by underlying organizational structures, such as departments, units and hierarchical positions (Cross, Laseter, Parker, & Velasquez, 2004). One possible explanation for this finding has been put forth by authors like Drazin (1990), who stipulates that professionals might not join communities with the intention of learning. Instead, individuals would primarily engage into discussion with colleagues, in order to secure their role, and gain access to and control over information. Holmqvist (2009) indicates that all organizational learning processes are subject to the influence of a dominant individual or group of individuals. In his view, this dominance also stems from formal, organizational structures, such as hierarchical positions, and is supported by the attitude and behaviour of the subordinate group. Similarly, work by Yates and Orlikowski (1992) argue that top management will spend more time to proactively setting the tone, as they are concerned with losing control of online groups, which could potentially feed through to the real world. Based on these considerations, and taking into the

Chapter 4

suggestions of previous studies that called for more longitudinal research (e.g. Haythornthwaite, 2001), we can formulate our first research hypothesis as

H1 – Over time, participants' ability to attract connections from other colleagues will be positively related to their hierarchical position.

Focusing more on the opposite side of the hierarchical spectrum, Edmondson (2002) has shown that lower level management is particularly concerned about how colleagues perceive them and their work, and therefore tend to limit their interaction with colleagues from higher hierarchical levels. Additionally, members of this group have been suggested to be generally more passive in discussions within training programs (Nembhard & Edmondson, 2006). Fox (2000) has described this situation as being "*caught in a dilemma*" (p. 856). On the one hand, individuals would like to establish a reputation of being knowledgeable. On the other hand, they also need to consider the existing rules of conduct. Sutton and colleagues (2000) follow this notion and propose that members from lower hierarchical positions will mainly try to blend in while not upsetting the status quo. In practice, this then translates into activities such as flattering, where lower level management frequently contacts their colleagues from higher hierarchical positions (Bird, 1994). Consequently, our second research hypothesis is

H2 – Over time, participants' propensity to actively contact other colleagues will be positively influenced by their hierarchical position.

Overall, it has been established that the structure of a network is related to the access to valued resources (e.g. Ibarra & Andrews, 1993; Sparrowe, Liden, Wayne, & Kraimer, 2001). Casciaro (1998) noted that occupying high-level positions within an organization provides individuals with an intrinsic attraction to lower level management. Studying three research centres of an Italian university, the author implied that, given their position within the organization, higher level management has privileged access to (vital) information and knowledge sources that are relevant for all employees. Moreover, this power can create a type of vortex, where lower level management is trying to get connected and, over time, stay in contact with higher level management (Krackhardt, 1990). Additionally, Borgatti and Cross (2003) have argued that lower level management, with only constrained access to valued resources, will be less likely to be contacted for information. As a result, they should hold more peripheral network positions. Johnson-Cramer, Parise and Cross (2007) have found empirical evidence for this argument. In their study of a consumer electronic company, they were able to show that higher level management held more central positions in the

organization's information sharing network. On the contrary, lower level management primarily occupied positions at the outer fringe of the same network. Consequently, in light of these findings and suggestions, we formulate our third research hypothesis as

H3 – Over time, the higher a participant's hierarchical position, the higher her degree of centrality within CoL.

The previous hypotheses considered individuals' overall behaviour and position within networks as a whole. While this provides valuable insights into underlying network structures, it does not provide more specific insights on the local circumstances that an individual faces within a larger network (Bernard, Johnsen, Killworth, & Robinson, 1991). Consequently, it has been suggested to also consider ego(-centred) networks (Newman, 2003), in order to assess the nature of an individual's network (Hatala, 2006). In the context of this study, we draw on the definition of (Everett & Borgatti, 2005) and consider ego networks as "*networks consisting of a single actor (ego) together with the actors they are connected to (alters) [...].*" (p. 31). Departing from this definition, and drawing on the argumentation of our previous research hypothesis, we argue that individuals' overall network behaviour and position will feed through into individuals' ego networks. More specifically, if an individual is contacted frequently and actively initiates conversations, this is directly related to the amount of connections an ego has with alters. Moreover, if an individual holds a central position within the overall network, this will translate into the structure of her ego network. Hence, our fourth research hypothesis stipulates that

H4 – Over time, participants' hierarchical position will positively influence the nature of their ego networks.

4.4 Method

4.4.1 Setting

The underlying data of this study was collected from an online training program that aimed at enhancing the capacity and skills of a global organization's staff. The training program was delivered twice over a time-span of 14 weeks and covered five pre-defined content modules on the general topic of Economics. Participants engaged into two types of learning activities, namely self-study and collaborative learning. The self-study element included (multimedia) learning materials, such as web lectures and online quizzes. During the collaborative learning activities, which constituted the backbone of the training program, participants discussed real-life

Chapter 4

tasks via asynchronous discussion forums. The forums were nested in dedicated CoL that consisted of 10 – 15 randomly assigned participants. Each of the five content modules had a separate task, which were discussed within dedicated forums in chronological order. Participation in these forums was obligatory and taken into account for determining participants' eligibility for receiving a certificate of participation. The latter was assessed by academic staff members, who monitored the CoL. More specifically, a team of two academic staff members was assigned to one CoL each. These facilitators graded participants' contributions, facilitated the discussions, and provides technical assistance. Before engaging with their assigned CoL, all facilitators were trained on how to work with online discussion groups and received elaborate guidelines and answers keys for all collaborative learning activities. Next to the obligatory, content-driven discussion forums, participants also had the opportunity to exchange private information and socialize via a so-called "*Café-Talk*" forum.

4.4.2 *Participants*

Overall, 337 participants were then randomly assigned to 30 CoL. However, the present study analyses a subset of 25 CoL and 249 participants (73.88%). This underlying reason for this smaller subset is twofold. On the one hand, we had incomplete datasets of some participants. On the other hand, we discovered that some CoL were biased, in the sense that not all applicable hierarchical positions were represented. Consequently, we dropped the applicable CoL from the analyses. The remaining 25 CoL had an average of 9.96 members (SD = 1.72, range = 7 – 13), the average age was 43.92 (SD = 7.33, range = 27 – 58), and 54.61 % of the participants were female. The educational backgrounds of participants were categorized into Master's (71.37 %), PhD's (14.51 %), Bachelor's (7.26 %), to other degrees (6.85 %). Particular examples of the latter category included, Health Sciences and International Law. Following the official job categories of the organization in question, participants' could be subdivided into low (n = 82, 32.93 %), middle (n = 93, 37.35 %) and high hierarchical positions (n = 74, 29.71 %).

4.5 Instruments

4.5.1 *Data on Participants' Hierarchical Position*

Participants reported their own hierarchical position via the training's official registration form. The indicated options were subject to the organization's official job categories. Based on the target group of the training program, three main categories were identified, namely "*Low*"-, "*Middle*"- and "*High*"-level hierarchical positions. Generally, representatives of the "*Low*" group were associated with

project level work, contributing to sub-parts of the overall product. Members of the “*Middle*” group were leaders of such projects. Finally, participants from the “*High*” group were responsible for departments and often entire regions in which the organization was operating.

4.5.2 *Data Analysis & Procedure*

The analyses of this study focus on data from individual participants. However, these participants were distributed over different CoL. Depending on the specific composition of a particular CoL, with respect to participants’ hierarchical position, this could have led to different dynamics and results. As a result, the validity of comparing across different learning networks might have been reduced. Hence, in order to account for possible differences in group compositions across CoL, we employed the Shannon Equitability Index (Magurran, 1988). The index ranges from 0 to 1 and indicates the percentage share of diversity in relation to the maximal possible diversity within a given CoL. Focusing on participants’ hierarchical positions as a source of diversity, the average score for the investigated 25 CoL was .44 (SD = .05, range = .35 – .55). Based on this value and the low standard deviation, we concluded that the CoL represented comparable sample for our analysis.

4.5.3 *Network Statistics*

All network statistics were computed with the help of UCINET 6.357 (Borgatti, Everett, & Freeman, 2002). The visualization of an exemplary CoL network, in terms of sociograms, was conducted with the help of the incorporated visualization software NetDraw (Borgatti, 2002). The underlying data was based on the user statistics from the discussion forums within the different CoL.

Network Density. In order to determine the basic nature of the networks structures, we measured the CoL *network density scores*. The density measure is based on the amount of actual ties, divided by the amount possible ties within a CoL. Consequently, it provides an indication of how well-connected participants within a particular CoL generally are (Hanneman & Riddle, 2005).

In- and Out-Degree Connections. The amount and nature of an individual’s network connections was determined via *in- and out-degree measures*. In-degree network connections indicate how often and by how many colleagues a particular individual has been contacted from within a CoL. Therefore, this constituted our main variable to check our first research hypothesis. The out-degree measure accounts for all those links that originate from a focal individual and summarizes how often that individual has contacted her colleagues within the CoL. Consequently, this measure formed the basis for testing the validity of our first research hypothesis. Both values were determined on the basis of the mean

number of ties, instead of nominal ties, as this allowed to control for the different sizes of the individual CoL.

Centrality Scores. The analysis of our third research hypothesis was based on the *Freeman Degree Centrality* measure. Again taking into account that we were dealing with multiple CoL, we used the standardized measures (Hanneman & Riddle, 2005). Additionally, we subdivided centrality into *out- and in-degree measures*. In contrast to the more general network connections, these particular values provided more profound insights on how an individual's network ties affected their overall network position within their CoL.

Ego(-Centred) Network Structures. In order to determine the nature of ego networks, which was the focus of our fourth research hypothesis, we assessed individuals' ego network's size and density, which are commonly used measures for these purposes (Rienties, et al., 2012). The size of an ego network is represented by the number of participants (alters) that are directly connected to an individual (ego), plus the individual herself. The density measure is based on the amount of actual ties, divided by the amount possible ties within a CoL. In other words, it indicates whether and to what extent an individual has connected with all her colleagues within a CoL.

Differentiating between Read and Reply Networks. Following the work of Daradoumis and colleagues (2004), we subdivided the data according two different types of network links, namely *indirect* and *direct* links. Indirect links refer to passive connections that can take on the form of reading a colleague's contributions, but not replying to it. This was captured via *Read-Networks*. In case a participant actively reacted to another CoL member's contribution and replied, therefore establishing a direct link, this was included in *Reply-Networks*. Based on this distinction it was then possible to make inferences about the type of learning actions underlying a certain network connection.

4.5.4 Hypotheses Testing

In order to test for the parametric assumption of normality of the data's distribution Kolmogorov-Smirnov tests (K-S) were conducted. The results revealed a violation of the normality assumption for all measured variables, which translated into statistically significant K-S results at the .01 level. Consequently non-parametric tests were used to examine the research hypotheses. More specifically, correlations were determined with the Spearman's rho measure (r_s). Kruskal-Wallis tests (H) were used to assess differences between groups and Jonckheere-Terpstra tests (J-T) to identify any possible linear trends. The occurrence of possible patterns underlying the H-test results was determined by post-hoc Mann-Whitney (U) tests. Being designed to only measure differences between two independent conditions, the U-test results were corrected by the

Bonferroni method. As a result, our adjusted critical value of significance was .016 for this part of the analysis. In order to test for any possible changes in participants' network measures over time, a range of Wilcoxon Signed Rank test were used. The chosen points in time for the longitudinal study were based on the work of previous studies, who conducted similar research on networked learning within teacher education (de Laat, et al., 2007). The authors of these studies chose for the beginning, the middle and the end phases of online (learning) community. In the context of this study, we decided to subdivide the overall duration of the underlying CoL of 14 weeks into six time intervals of about two weeks each. This allowed to capture a short *transition period*, during which the focus of the discussions changed from one content module to the next. We therefore then considered Intervals 1 (beginning), 3 (middle) and 6 (end) for our analysis. Finally, we also estimated the effect size of our findings. However, the vast majority of effect size measures are only suitable for parametric data (Snyder & Lawson, 1993). Consequently, we followed the suggestion of Rosenthal (1991) and approximated the effect size (r) on the basis of the U-results. This measure takes on values from 0 to 1, where small, medium and large effects are associated with .10, .30 and .50, respectively (Cohen, 1992).

4.5.5 *Control Measures*

Although the focus of this research is on the impact of hierarchical positions, we acknowledge that this aspect might only explain parts of possible observed differences between participants. Consequently, we controlled for age, gender, educational background and prior knowledge, which have been suggested to influence online collaborative learning. With respect to age, some researchers have suggested that older employees tend to participate less in online training activities (e.g. Garavan, et al., 2010). Additionally, other empirical studies have been able to show that age similarity had the potential to trigger emotional conflicts within groups, resulting in lower participation rates (Pelled, Eisenhardt, & Xin, 1999). Regarding gender, Im and Lee (2004) stipulated that if males dominate women in a regular face-to-face environment, this is also likely to carry over to an online environment. In contrast, Joinson (2001) was able to show that online training environments had an equalizing effect on participants. When considering participants' educational background and prior knowledge, previous studies have highlighted the potential impact of participants' prior knowledge on their behaviour within learning initiatives (Dochy & McDowell, 1997). Even more so, there has been a growing consensus that individuals' prior knowledge constitutes an important variable in participants' activity patterns (Dochy, Segers, & Buehl, 1999). If a participant already possesses a considerable amount of prior knowledge about a certain topic, it can be expected that she will be more

Chapter 4

comfortable in contributing to discussions, thereby positively influencing her general activity and performance levels.

In this study, participants' age, gender and educational background were self-reported as part of the training programs official registration form. For educational background, participants were asked to indicate their highest attained educational degree, including Bachelor, Master, PhD and Other (e.g. vocational training). Prior knowledge was measured via a diagnostic test, consisting of 25 multiple choice questions. All five pre-defined content modules were assessed based on five dedicated questions each. These questions were created by academic experts and related to the working environment of the participants. The response rate for the questionnaire was 88.76 % and the internal consistency of participants' answers was acceptable (Cronbach $\alpha = .81$) (Cortina, 1993).

4.6 Results

In order to provide a preliminary overview of the underlying data, Figure 4-1 represents a graphical depiction of the final *Read-* and *Reply-Network* of an exemplary CoL. A first glance already indicated a great amount of divergence between these two types of networks. Participants were highly connected and exhibited very similar communication patterns with respect to their reading behaviour (Figure 4-1a). However, considerable differences prevailed on whether and how participants replied to each other (Figure 4-1b). Furthermore, a closer look at the figure also revealed a first preliminary sign that participants behaviour and network position were related to their hierarchical position within the organization.

An overall picture of the longitudinal nature of our data is depicted in Figure 4-2, which captures the average density values of the CoL across time. As can be seen from the applicable figure, the average density per time interval of the *Read-Networks* is about 10-times higher than those of the *Reply-Networks*. Yet, while the average density of the *Read-Networks* declined over time, the *Reply-Networks* increased in terms of density. Nonetheless, at the end of the CoL, the average density for the *Read-Networks* remained considerably higher at a value of 62.27 (range = 26.36 – 86.36), as compared to a final value of 11.54 (range = 0 – 28.21) for the *Reply-Networks*.

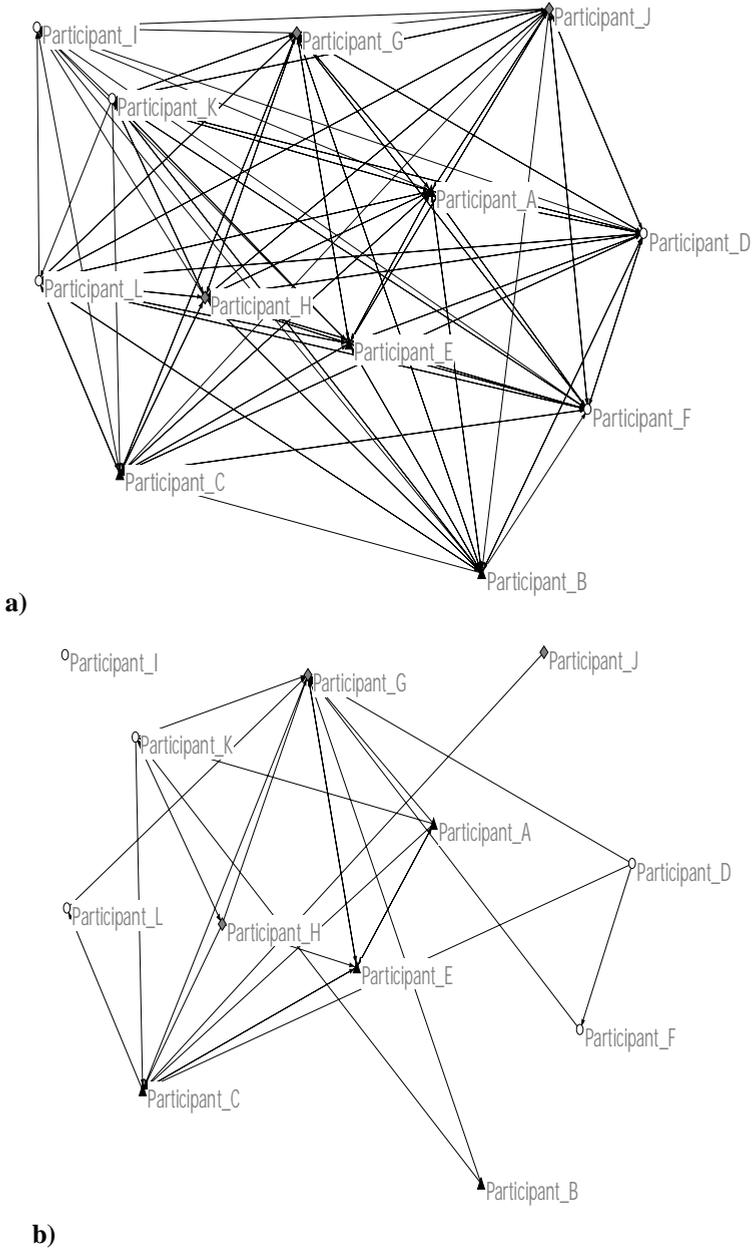


Figure 4-1: Read (a) and Reply (b) Network of an exemplary Community of Learning

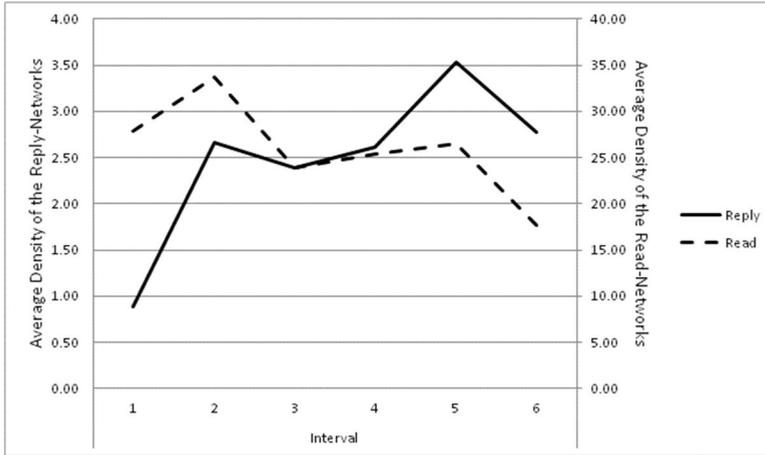


Figure 4-2: Longitudinal Data on Average Density Scores for the Communities of Learning

4.6.1 Hypotheses 1 & 2

Table 4-1 summarizes the results of participants’ overall in- and out-degree network ties for both types of networks. As can be seen from the table, all measures for the *Read-Networks* were statistically insignificant, which led us to reject research hypotheses 1 and 2 for these types of network. In contrast, our Kruskal-Wallis tests clearly indicated significant differences between hierarchical positions and the degree with which participants’ either replied to their colleagues, or attracted replies themselves. Moreover, the Jonckheere-Terpstra tests showed a clear trend that the amount of both in- and out-degree ties were both positively related to participants’ hierarchical position. Additionally, an investigation of the underlying patterns revealed that the observed differences were especially pronounced between the “*Low*” and “*High*” groups (In-degree: $U = 2,261.50$, $p < .01$; Out-degree: $U = 2,338.00$, $p < .05$), which is also reflected in the observed effect sizes ($r_{\text{in-degree}} = -.23$; $r_{\text{out-degree}} = -.20$).

Table 4-1: Results of Kruskal-Wallis and Jonckheere-Terpstra Tests for In- and Out-Degree Network Measures

| | Kruskal-Wallis | | Jonckheere-Terpstra | | |
|--------------------|----------------|----|---------------------|-----|-------------|
| | χ^2 | df | # of Levels | N | J-T |
| In-Degree (Reply) | 8.89* | 2 | 3 | 249 | 11,938.50** |
| Out-Degree (Reply) | 6.66* | 2 | 3 | 249 | 11,819.00* |
| In-Degree (Read) | 1.16 | 2 | 3 | 249 | 10,898.00 |
| Out-Degree (Read) | 0.10 | 2 | 3 | 249 | 10,131.50 |

* $p < .05$; ** $p < .01$

The results of our longitudinal analysis are represented in Table 4-2. As participants' behaviour within the *Read-Networks* did not show any signs of statistically significant differences, these networks were neglected from the analysis. Our results indicated a significant increase of in- and out-degree ties for the "Middle" and "High" groups over the entire duration of the CoL. The "Low" group did not exhibit a common, noticeable trend. Moreover, the evidence indicated that the increases for the "Middle" and "High" groups were mainly situated in the first half of the CoL (in between Interval 1 and 3). During the second half, only members of the "High" group showed significant signs of continued contact-seeking with their colleagues, as measured by their out-degree measures ($z_{3-6} = -2.05$, $p < .05$). Taken together, these findings indicate that, over time, managers from higher hierarchical levels were contacted more frequently than lower level management (H1). Moreover, our evidence also supported the supposition that over the duration of the CoL, participants from higher hierarchical positions were also more likely to actively contact other CoL members, than lower level management (H2).

Table 4-2: Results of Wilcoxon Signed Rank Test for In- and Out-Degree Measures (Reply Networks)

| Hierarchical Position | Timeframe (Intervals) | Z Score | |
|-----------------------|------------------------|-----------------------|-----------------------|
| | | In-Degree | Out-Degree |
| "Low" | 1-6 (Overall Duration) | -1.69 ^a | -1.11 ^a |
| | 1-3 (First Half) | -1.82 ^a | -1.31 ^a |
| | 3-6 (Second Half) | -.02 ^b | -.58 ^a |
| "Middle" | 1-6 (Overall Duration) | -2.96 ^{a,**} | -2.60 ^{a,**} |
| | 1-3 (First Half) | -3.50 ^{a,**} | -2.87 ^{a,**} |
| | 3-6 (Second Half) | -.02 ^a | -.40 ^b |
| "High" | 1-6 (Overall Duration) | -2.72 ^{a,**} | -4.01 ^{a,**} |
| | 1-3 (First Half) | -2.32 ^{a,*} | -2.39 ^{a,*} |
| | 3-6 (Second Half) | -1.30 ^a | -2.05 ^{a,*} |

^a based on negative ranks; ^b based on positive ranks; * $p < .05$; ** $p < .01$

4.6.2 Hypotheses 3

Similarly to the previous findings, we again found no significant differences between hierarchical positions within the *Read-Networks*. However, as can be seen from Table 4-3, our results for the *Reply-Networks* did again sketch another picture.

Table 4-3: Results of Kruskal-Wallis and Jonckheere-Terpstra Tests for Centrality Network Measures

| | Kruskal-Wallis | | Jonckheere-Terpstra | | |
|-------------------------------|----------------|----|---------------------|-----|-------------|
| | χ^2 | df | # of Levels | N | J-T |
| In-Degree Centrality (Reply) | 9.82** | 2 | 3 | 248 | 11,958.50** |
| Out-Degree Centrality (Reply) | 8.90* | 2 | 3 | 248 | 11,930.50** |
| In-Degree Centrality (Read) | .83 | 2 | 3 | 248 | 10,064.00 |
| Out-Degree Centrality (Read) | 2.67 | 2 | 3 | 248 | 11,205.00 |

* $p < .05$; ** $p < .01$

More specifically, the Kruskal-Wallis tests revealed significant in- and out-degree centrality measure differences between hierarchical positions. Another set of Jonckheere-Terpstra tests was then conducted to determine a possible underlying trend. The results showed that whether participants hold a central position within their network was significantly and positively influenced by their hierarchical position. In order to determine the pattern of the main effect we conducted another range of Mann-Whitney tests. Similarly to the first two hypotheses, the most pronounced difference was again found between the “Low” and “High” groups (In-degree: $U = 2,202.50$, $p < .01$; $r_{\text{centrality-in}} = -.23$; Out-degree: $U = 2,234.50$, $p < .05$; $r_{\text{centrality-out}} = -.24$).

For the longitudinal analysis, based on the described results, we again decided to focus on the *Reply-Networks*. Table 4-4 summarizes the main results of the applicable analyses. As in the case of the more general network statistics, we did not find any significant results for the “Low” group. In contrast, participants from the “High” group attained higher out-degree centrality measures over the duration of the CoL ($z_{1-6} = -2.96$, $p < .01$). Finally, members of “Middle” group exhibited significant increases in both their network measures when comparing the beginning and ending stages of the CoL (In-Degree₁₋₆: $z = -2.58$, $p < .01$; Out-Degree₁₋₆: $z = -2.12$, $p < .05$). The main acceleration for the observed developments again appeared to be situated in the first half of the CoL (from Interval 1 to 3). Taking into account that the *Read-Networks* did again not yield any significant results, we did not find convincing support for the notion that, over time, higher level management will per se hold more central positions in their CoL network, compared to their colleagues from lower positions (H3). However, based on the statistically significant findings for the *Reply-Networks*, we tentatively accepted our third research hypothesis for these types of CoL networks.

Table 4-4: Results of Wilcoxon Signed Rank Test for Centrality Measures (Reply Networks)

| Hierarchical Position | Timeframe (Intervals) | Z Score | |
|-----------------------|--------------------------|-----------------------|-----------------------|
| | | In-Degree | Out-Degree |
| "Low" | 1-6 (Overall Duration) | -.83 ^a | -.63 ^a |
| | 1-3 (First Half) | -.95 ^a | -.59 ^a |
| | 3-6 (Second Half) | -.09 ^b | -.49 ^a |
| "Middle" | 1-6 (Overall Duration) | -2.58 ^{a,**} | -2.12 ^{a,*} |
| | 1-3 (First Half) | -3.12 ^{a,**} | -2.66 ^{a,**} |
| | 3-6 (Second Half) | -.25 ^b | -.98 ^b |
| "High" | 1-6 (Overall Duration) | -1.80 ^a | -2.96 ^{a,**} |
| | 1-3 (First Half) | -2.28 ^{a,*} | -2.10 ^{a,*} |
| | 3-6 (Second Half) | -.49 ^b | -.87 ^b |

^a based on negative ranks; ^b based on positive ranks; * p < .05; ** p < .01

4.6.3 Hypotheses 4

Considering the *Read-Networks*, and following the general trend that already developed on the basis of our other analyses, we found no significant differences in ego-network size or density between participants from the different hierarchical positions. Consequently, we rejected our applicable hypothesis for these types of CoL networks. The applicable results are summarized in Table 4-5 below.

Table 4-5: Results of Kruskal-Wallis and Jonckheere-Terpstra Tests for Ego-Network Measures

| | Kruskal-Wallis | | Jonckheere-Terpstra | | |
|-----------------|----------------|----|---------------------|-----|------------|
| | χ^2 | df | # of Levels | N | J-T |
| Size (Reply) | 8.13** | 2 | 3 | 249 | 11,966.5** |
| Density (Reply) | 5.98* | 2 | 3 | 223 | 9,246.00* |
| Size (Read) | 2.50 | 2 | 3 | 248 | 9,325.50 |
| Density (Read) | 1.01 | 2 | 3 | 248 | 10,844.00 |

* p < .05; ** p < .01

From this table, it is also apparent that the *Reply-Networks* did again exhibit a different type of behaviour from participants. The results of the Kruskal-Wallis tests clearly indicated statistically significant differences between hierarchical positions for both the size and the density of individual's ego-networks. Furthermore, the Jonckheere-Terpstra test results again showed a positive, underlying trend. Hence, participants holding higher hierarchical positions were

more embedded in their CoL. Comparing the individual hierarchical positions with each other, using Mann-Whitney tests, revealed yet again the most significant differences between members of the “Low” and “High” groups. However, in contrast to our previous findings this was confined to only one of the measured variables, namely participants’ ego network size ($U = 2,267.00, p < .01; r = -.22$).

The results on whether participants’ ego-network measures might have changed over the course of the CoL are provided in Table 4-6. Similarly to our previous approach, and based again on our non-significant findings for the *Read-Networks*, we centred the longitudinal analysis on the *Reply-Networks*. While members from all hierarchical positions were able to increase the size of their ego-networks in the first half (from Interval 1 to 3), only the “Middle” and “High” groups were able to preserve this trend over the entire duration of the CoL. Moreover, the “High” group even exhibited an increase in their ego-network size during the second half of the CoL ($z_{3-6} = -2.43, p < .05$). When considering the density of the ego-networks, only the “High” group attained significant increases in the applicable measure over time (from Interval 1 to 6). Additionally, and in contrast to our earlier findings, this effect mainly took place in the second half of the CoL. Our results therefore confirmed that the nature of participants’ ego networks is positively affected by their hierarchical positions (H4). In other words, the higher the hierarchical position of a participant, the larger the size and the higher the density of their ego networks. In light of these findings, we therefore accepted our fourth research hypothesis for the *Reply-Networks*.

Table 4-6: Results of Wilcoxon Signed Rank Test for Ego-Network Measures (Reply Networks)

| Hierarchical Position | Timeframe (Intervals) | Z Score | |
|-----------------------|------------------------|-----------------------|-----------------------|
| | | Ego-Size | Ego-Density |
| "Low" | 1-6 (Overall Duration) | -1.76 ^a | -.37 ^a |
| | 1-3 (First Half) | -2.55 ^{a,*} | .00 ^c |
| | 3-6 (Second Half) | -.33 ^b | -.54 ^b |
| "Middle" | 1-6 (Overall Duration) | -3.60 ^{a,**} | -.16 ^b |
| | 1-3 (First Half) | -4.13 ^{a,**} | -.45 ^b |
| | 3-6 (Second Half) | -.47 ^a | -1.38 ^a |
| "High" | 1-6 (Overall Duration) | -4.39 ^{a,**} | -2.83 ^{a,**} |
| | 1-3 (First Half) | -3.52 ^{a,**} | -1.41 ^a |
| | 3-6 (Second Half) | -2.43 ^{a,*} | -2.41 ^{a,*} |

^a based on negative ranks; ^b based on positive ranks;
^c the sum of negative ranks equals the sum of positive ranks;
^{*} $p < .05$; ^{**} $p < .01$

4.6.4 Control Measures

The investigation of whether participants differed in terms of age, gender, educational background, or prior knowledge, subject to their hierarchical positions, revealed no significant results. However, we also conducted a separate correlation analysis, where we neglected hierarchical positions and solely considered the potential relations between our control measures and the chosen network measures. Additionally, as our evidence clearly indicated that all measures for the *Read-Networks* were evenly distributed, we focused on the *Reply-Networks*. As can be seen from Table 4-7, age was positively correlated with the general in-degree measures, as well as the out-degree centrality values. Hence, when interpreting the main results of this research, these findings need to be taken into account. Moreover, a closer look at the results also revealed that all measured network statistics were highly and significantly correlated with each other. In other words, if an individual participant attain a high amount of in-degree ties, for example, she would also be very likely to initiate a high amount out-degree ties, be central in her CoL network and achieve a comparatively high degree of density within her ego network. As we have been able to show that hierarchical positions have a strong effect on each one of these measures, this provides additional support for our supposition that hierarchical positions have a significant impact on network structures within CoL.

Table 4-7: Overview of Correlations between Control Variables and Network Measures

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---------------------------------|-------|------|------|-----|-------|-------|-------|-------|-------|----|
| 1 Age | 1 | | | | | | | | | |
| 2 Gender | .16* | 1 | | | | | | | | |
| 3 Educational Background | .22** | .13* | 1 | | | | | | | |
| 4 Prior Knowledge | -.11 | .04 | -.02 | 1 | | | | | | |
| 5 In-Degree (Reply) | .13* | -.05 | .07 | .04 | 1 | | | | | |
| 6 Out-Degree (Reply) | .06 | .02 | -.03 | .06 | .59** | 1 | | | | |
| 7 In-Degree Centrality (Reply) | .05 | .01 | -.01 | .07 | .57** | .94** | 1 | | | |
| 8 Out-Degree Centrality (Reply) | .13* | -.07 | .06 | .06 | .94** | .57** | .58** | 1 | | |
| 9 Ego-Network (Size) | .10 | .00 | .00 | .07 | .83** | .86** | .81** | .79** | 1 | |
| 10 Ego-Network (Density) | .13 | .08 | .03 | .02 | .54** | .55** | .53** | .49** | .60** | 1 |

* $p < .05$; ** $p < .01$

4.7 Discussion

The purpose of this study was to determine whether and to what extent participants' hierarchical positions influence the network structures of CoL. We

Chapter 4

thereby were able to address a number of shortcomings in current research and contributed to the discussion about how existing organizational structures can affect training initiatives. In order to investigate the relationship between hierarchical positions and network structures, we employed social network analysis and conducted a range of hypotheses test that aimed at providing a valuable contribution to the discussion.

In the context of the investigated *Read-Networks*, we did not find any evidence suggesting that participants, depending on the hierarchical position, differ in terms of their behaviour. However, when considering the *Reply-Networks*, our results clearly indicated that higher level management attracted more attention, contacted more colleagues, attained more central positions within the overall CoL, and had larger, denser ego networks, as compared to their colleagues from lower level positions. Additionally, based on longitudinal analyses of all network measures, we were able to show that the overall impact generally increased over time, and in particular during the first half of the training program in question.

In terms of the *Read-Networks*, which capture passive connections between participants (Daradoumis, et al., 2004), this can be considered as a preliminary indication that CoL have the potential to stimulate an interpersonal knowledge transfer among participants (Argote & Ingram, 2000). However, the observed range of density scores across the different CoL varied considerably. Moreover, while the average overall density score of 62.27 can be regarded as acceptable, there still remains a considerable gap to be filled in order to achieve a situation where “everyone reads everything”. Regarding the *Reply-Networks*, we were able to validate our first research hypothesis, which stated that over time, participants’ ability to attract connections from other colleagues will be positively related to their hierarchical position (H1). This confirms the work of Yates and Orlikowski (1992), who argued that higher level management will proactively set the tone in online discussions. Additionally, our evidence suggested that there exists a vortex that allows higher level management to attract more attention and connections from their colleagues (H2), which supports the work of Krackhardt (1990). We were also able to show that while higher level management held central positions, lower level management was located more towards the fringes of their CoL (H3) (Borgatti & Cross, 2003). Furthermore, our results indicated significant differences in participants ego networks, based on their hierarchical position (H4). More specifically, higher level management had larger ego networks that also exhibited higher levels of density, as compared to their colleagues from lower level management positions. Finally, when conducting a longitudinal analysis of the underlying data, our results indicated that the observed general patterns increased over the duration of the CoL (e.g. Bird, 1994; Sutton, et al., 2000). Additionally, this

positive trend was particularly pronounced during the first half of the training program.

Considering these findings, we can draw conclusions about how collaborative learning activities within CoL should be designed and facilitated, in order to provide employees with a valuable learning experience. For example, acknowledging the considerable influence of hierarchical positions on CoL, organizers can devise targeted interventions that increase the potential benefits of such initiatives (Cross, et al., 2006). More specifically, higher level management could be stimulated to actively draw upon the input of their colleagues, thereby allowing participants from lower level management to gradually move towards the centre of the CoL network. In practice, this could be achieved via two main approaches. On the one hand, facilitators could try to foster a (more) active exchange of information between members of these two opposing parts of the organization. The potential benefit of this approach would be that connections between participants would be initiated and supported by an *external party*. This in turn could relax underlying norms and regulation that govern how members from different hierarchical positions communicate with each other.

Alternatively, participants could be asked to complete assignments that build upon a type of *mentoring system*. With higher level management occupying more central positions, these participants could *take their colleagues from lower hierarchical positions by the hand* and actively include them in the discussions. This could create a *pull-effect*, whereby participants, who generally tend to occupy positions towards the fringe of a learning network, are drawn closer towards the centre. This not only has the potential to make them a more integral part of the CoL. It also would provide them with better opportunities to share their knowledge and insights. Using the analogy of Kozlowski and colleagues (2009), they could thereby more easily share their own piece to the overall puzzle, which can contribute to the success of an entire organization. Higher level management also showed to be more embedded within their learning networks. As a result, this group could be supported by facilitators to act as *intermediaries* between otherwise disconnected participants (Cross, et al., 2006). We know from our analyses that the majority of participants has read the contributions of their colleagues. Again, this is a promising finding to support the notion of CoL. However, the potential benefits could be even more enhanced, if participants were to engage into more active discussions. Hence, in case participants do not actively pick up on each other's contributions, higher level management could capitalize on their position and foster a more open and direct discussion among participants.

Finally, considering the longitudinal findings of our research, we have highlighted the importance of CoL *initiation phase*. During the beginning stages of the learning process, participants get to know each other's background characteristics, including professional experience and prior knowledge.

Chapter 4

Additionally, participants will also exchange either directly (as part of their introduction to the CoL), or indirectly (by making appropriate references) information about their hierarchical positions. This in turn will significantly influence their behaviour towards each other throughout the CoL. Consequently, facilitators of such communities should pay specific attention to this initiation process, in order to be able to possibly intervene in the discussions and assist the central participants to engage the entire group into the discussions.

4.8 Conclusions

4.8.1 *Limitations*

The current study exhibits two main limitations that should be taken into account when considering our results. First, we have based our social network statistics purely on observed links between participants. In contrast, previous studies have also commonly incorporated familiarity measures in the context of social network analysis (e.g. Krackhardt, 1990). These measures allow to control for the degree with which participants already might be acquainted with each other. This in turn might have influenced the comfort level of participants' and thereby affected their behaviour within CoL. Second, connections between participants did not take into account the content of the shared information. Consequently, network ties between individual participants might have reflected personal commonalities that have no direct link with the actual content of the training and are therefore difficult to control for by organizers of similar initiatives.

4.8.2 *Future Research*

Building upon the findings of this study, future research should conduct a content analysis (CA) of the underlying discussions forums within CoL. This approach is widely accepted to assess the quality of learning processes and outcomes (de Laat & Lally, 2003) and allows to draw a more refined picture of the actual level of content and knowledge that has been exchanged between participants. Moreover, by mapping the CA results against the findings of a SNA analysis, it would be possible to provide detailed insights of who has been in contact with whom, what they talked about, and whether this has had an impact on their network position (de Laat, et al., 2007). Additionally, future research should incorporate the role of the CoL facilitators into the analysis of CoL. Previous research has suggested that online learning communities must be cherished and protected in order to become an effective educational resource (Paloff & Pratt, 2003). In other words, facilitators' involvement can have a considerable influence on how learning networks develop and evolve over time (Anderson, Rourke, Garrison, & Archer, 2001). Yet, although

a considerable amount of research has already investigated how online facilitation can affect learning processes, the vast majority of these studies has focused on the context of higher education (e.g. Berge, 1995; de Laat, et al., 2006; Garrison, Anderson, & Archer, 2010) and largely neglected the field of training within organizations. By investigating the role of facilitators in CoL, it would be possible to provide profound insights that can serve as a springboard for facilitators to design and implement an effective teaching strategy for CoL. Consequently, the quality and quantity of learning process could be further augmented.

4.9 Acknowledgements

The authors would like to thank Maarten van Wesel for his support in transforming the source data from the discussion forums into a format suitable for the analyses undertaken in this study.

4.10 References

- Amin, A., & Roberts, J. (2006). Communities of Practice: Varieties of Situated Learning'. *EU Network of Excellence Dynamics of Institutions and Markets in Europe (DIME)*. Retrieved from http://www.dime-eu.org/files/active/0/Amin_Roberts.pdf
- Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, 5(2), 1-17.
- Arbaugh, J. B., & Benbunan-Finch, R. (2006). An Investigation of Epistemological and Social Dimensions of Teaching in Online Learning Environments. *Academy of Management Learning & Education*, 5(4), 435-447.
- Argote, L., & Ingram, P. (2000). Knowledge Transfer: A Basis for Competitive Advantage in Firms. *Organizational Behavior and Human Decision Processes*, 82(1), 150-169.
- Aviv, R., Erlich, Z., Ravid, G., & Geva, A. (2003). Network Analysis of Knowledge Construction in Asynchronous Learning Networks. *Journal of Asynchronous Learning Networks*, 7(3), pp. 1-23.
- Barabási, A.-L. (2003). Linked : How Everything Is Connected to Everything Else and What It Means for Business, Science, and Everyday Life, from <http://quijote.biblio.iteso.mx/dc/ver.aspx?ns=000149871>
- Barabási, A.-L., & Albert, R. (1999). Emergence of Scaling in Random Networks. *Science*, 286(5439), 509.
- Berge, Z. L. (1995). Facilitating computer conferencing: Recommendations from the field. *Educational Technology*, 15(1), 22-30.

Chapter 4

- Bernard, R. H., Johnsen, E. C., Killworth, P. D., & Robinson, S. (1991). Estimating the size of an average personal network and of an event subpopulation: Some empirical results. *Social Science Research, 20*(2), 109-121.
- Bird, A. (1994). Careers as repositories of knowledge : a new perspective on boundaryless careers. *Journal of Organizational Behavior, 15*, 325-344.
- Borgatti, S., & Cross, R. (2003). A Relational View of Information Seeking and Learning in Social Networks. *Management Science, 49*(4), 432-445.
- Borgatti, S. P. (2002). *NetDraw: Graph visualization software*. Harvard, MA: Analytic Technologies.
- Borgatti, S. P., Everett, M. G., & Freeman, L. C. (2002). *Ucinet for Windows: Software for Social Network Analysis*. Harvard, MA: Analytic Technologies.
- Brower, H. H. (2003). On Emulating Classroom Discussion in a Distance-Delivered OBHR Course: Creating an On-Line Learning Community. *Academy of Management Learning & Education, 2*(1), 22-36.
- Carley, K. (1992). Organizational Learning and Personnel Turnover. *Organization Science, 3*(1), 20-46.
- Casciaro, T. (1998). Seeing things clearly: social structure, personality, and accuracy in social network perception. *Social Networks, 20*(4), 331-351.
- Caspi, A., Chajut, E., Saporta, K., & Beyth-Marom, R. (2006). The influence of personality on social participation in learning environments. *Learning and Individual Differences, 16*, 129-144.
- Caspi, A., Gorsky, P., & Chajut, E. (2003). The influence of group size on nonmandatory asynchronous instructional discussion groups. *The Internet and Higher Education, 6*(3), pp. 227-240.
- Cohen, J. (1992). Statistics a power primer. *Psychology Bulletin, 112*, 155–159.
- Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology, 78*(1), 98-104.
- Cross, R., Borgatti, S. P., & Parker, A. (2001). Beyond Answers: Dimensions of the Advice Network. *Social Networks, 23*(3), 215-235.
- Cross, R., Laseter, T., Parker, A., & Velasquez, G. (2004). *Assessing and Improving Communities of Practice with Organizational Network Analysis*. Paper presented at the The Network Roundtable at the University of Virginia, Virginia.
- Cross, R., Laseter, T., Parker, A., & Velasquez, G. (2006). Using Social Network Analysis to Improve Communities of Practice. *California Management Review, 49*(1), 32-60.
- Daradoumis, T., Martínez-Monés, A., & Xhafa, F. (2004). An Integrated Approach for Analysing and Assessing the Performance of Virtual Learning Groups *Groupware: Design, Implementation and Use* (Vol. 3198, pp. 289-304): Springer Berlin / Heidelberg.

- de Laat, M., & Lally, V. (2003). Complexity, theory and praxis: Researching collaborative learning and tutoring processes in a networked learning community. *Instructional Science*, 31(1-2), 7-39.
- de Laat, M., Lally, V., Lipponen, L., & Simons, R.-J. (2007). Investigating patterns of interaction in networked learning and computer-supported collaborative learning: A role for Social Network Analysis. *Computer-Supported Collaborative Learning*, 2, 87-103.
- de Laat, M., Lally, V., Simons, R.-J., & Wenger, E. (2006). A selective analysis of empirical findings in networked learning research in higher education: Questing for coherence. *Educational Research Review*, 1(2), 99-111.
- Dochy, F., Segers, M., & Buehl, M. M. (1999). The Relation Between Assessment Practices and Outcomes of Studies: The Case of Research on Prior Knowledge. *Review of Educational Research*, 69(2), 145-186. doi: 10.3102/00346543069002145
- Dochy, F. J. R. C., & McDowell, L. (1997). Assessment as a tool for learning. *Studies In Educational Evaluation*, 23(4), 279-298.
- Drazin, R. (1990). Professionals and Innovation: Structural-Functional versus Radical-Structural Perspectives. *Journal of Management Studies*, 27(3), 245-263.
- Edmondson, A. C. (2002). The Local and Variegated Nature of Learning in Organizations: A Group-Level Perspective. *Organization Science*, 13(2), 128-146. doi: 10.1287/orsc.13.2.128.530
- Erdős, P., & Rényi, A. (1960). On the evolution of random graphs. *Publications of the Mathematical Institute of the Hungarian Academy of Sciences*, 5, 17-61.
- Everett, M., & Borgatti, S. P. (2005). Ego network betweenness. *Social Networks*, 27(1), 31-38.
- Fox, S. (2000). Communities of Practice, Foucault and Actor-Network Theory. *Journal of Management Studies*, 37(6), 853-867.
- Garavan, T. N., Carbery, R., O'Malley, G., & O'Donnell, D. (2010). Understanding participation in e-learning in organizations: a large-scale empirical study of employees. *International Journal of Training and Development*, 14(3), 155-168. doi: 10.1111/j.1468-2419.2010.00349.x
- Garrison, D. R., Anderson, T., & Archer, W. (2010). The first decade of the community of inquiry framework: A retrospective. *The Internet and Higher Education*, 13(1-2), 5-9.
- Garton, L., Haythornthwaite, C., & Wellman, B. (1997). Studying Online Social Networks. *Journal of Computer-Mediated Communication*, 3(1), 0-0. doi: 10.1111/j.1083-6101.1997.tb00062.x
- Griffith, T. L., & Neale, M. A. (2001). Information processing in traditional, hybrid, and virtual teams: From nascent knowledge to transactive memory. *Research in Organizational Behavior*, 23, 379-421.

Chapter 4

- Hakkarainen, K., Palonen, T., Paavola, S., & Lehtinen, E. (2004). *Communities of networked expertise: Professional and educational perspectives*. Amsterdam: Elsevier.
- Hanneman, R. A., & Riddle, M. (2005). *Introduction to Social Network Methods*. Riverside, CA: University of California.
- Hatala, J.-P. (2006). Social Network Analysis in Human Resource Development: A New Methodology. *Human Resource Development Review*, 5(1), 45-71. doi: 10.1177/1534484305284318
- Haythornthwaite, C. (2001). Exploring Multiplexity: Social Network Structures in a Computer-Supported Distance Learning Class. *Information Society*, 17(3), 211-226.
- Holmqvist, M. (2009). Complicating the Organization: A New Prescription for the Learning. *Management Learning*, 40(3), 275-287.
- Ibarra, H., & Andrews, S. B. (1993). Power, Social Influence, and Sense Making: Effects of Network Centrality and Proximity on Employee Perceptions. *Administrative Science Quarterly*, 38(2), 277-303.
- Im, Y., & Lee, O. (2004). Pedagogical implications of online discussion for preservice teacher training. *Journal of Research on Technology in Education*, 36(2), 155-170.
- Järvelä, S., Järvenoja, H., & Veermans, M. (2008). Understanding the dynamics of motivation in socially shared learning. *International Journal of Educational Research*, 47(2), 122-135.
- Johnson-Cramer, M., Parise, S., & Cross, R. (2007). Managing Change through Networks and Values. *California Management Review*, 49(3), 85-109.
- Joinson, A. N. (2001). Self disclosure in computer mediated communication: The role of self awareness and visual anonymity. *European Journal of Social Psychology*, 31(2), 177-192.
- Kane, G. C., & Alavi, M. (2007). Information Technology and Organizational Learning: An Investigation of Exploration and Exploitation Processes. *Organization Science*, 18(5), 796-812.
- Kozlowski, S. W. J., Chao, G. T., & Jensen, J. M. (2009). Building an Infrastructure for Organizational Learning: A Multilevel Approach. In E. Salas & S. W. J. Kozlowski (Eds.), *Learning, Training, and Development in Organizations*. New York, NY, United States of America: Routledge.
- Krackhardt, D. (1990). Assessing the Political Landscape: Structure, Cognition, and Power in Organizations. *Administrative Science Quarterly*, 35, 342-369.
- Leonard, D., & Sensiper, S. (1998). The Role of Tacit Knowledge in Group Innovation. *California Management Review*, 40(3), 112-132.
- Magurran, A. E. (1988). *Ecological diversity and its measurement*. Princeton, NJ, USA: Princeton University Press.

- Mazur, A., Doran, C., & Doran, P. (2010). *The use of social network analysis software to analyze communication patterns and interaction in online collaborative environments*. Paper presented at the International Conference on Education, Training and Informatics, (ICETI 2010), Orlando, FL.
- Nembhard, I. M., & Edmondson, A. C. (2006). Making it safe: The effects of leader inclusiveness and professional status on psychological safety and improvement efforts in health care teams. *Journal of Organizational Behaviour, 27*, pp. 941-966.
- Newman, M. E. J. (2003). The Structure and Function of Complex Networks. *SIAM Review, 45*(2), 167-256.
- Paavola, S., Lipponen, L., & Hakkarainen, K. (2004). Models of Innovative Knowledge Communities and Three Metaphors of Learning. *Review of Educational Research, 74*(4), 557-576. doi: 10.3102/00346543074004557
- Paloff, R., & Pratt, K. (2003). *The virtual student: A profile and guide to working with online learners*. San Francisco: Jossey-Bass.
- Panzarasa, P., Opsahl, T., & Carley, K. M. (2009). Patterns and dynamics of users' behavior and interaction: Network analysis of an online community. *Journal of the American Society for Information Science and Technology, 60*(5), 911 - 932.
- Pearce, W. B. (1976). The Coordinated Management of Meaning: A Rules-Based Theory of Interpersonal Communication. In G. R. Miller (Ed.), *Explorations in Interpersonal Communication* (pp. 17-35). Beverly Hills, CA: Sage Publications.
- Pelled, L. H., Eisenhardt, K. M., & Xin, K. R. (1999). Exploring the Black Box: An Analysis of Work Group Diversity, Conflict, and Performance. *Administrative Science Quarterly, 44*(1), 1-28.
- Rienties, B., Giesbers, B., Tempelaar, D. T., Lygo-Baker, S., Segers, M., & Gijssels, W. H. (2012). The role of scaffolding and motivation in CSCL. *Computers & Education, 4*. doi: 10.1016/j.compedu.2012.1004.1010.
- Romme, A. G. L. (1996). A Note on the Hierarchy-Team Debate. *Strategic Management Journal, 17*(5), 411-417.
- Rosenthal, R. (1991). *Meta-analytic procedures for social research*. Newbury Park, CA: Sage.
- Sambrook, S. (2005). Factors Influencing the Context and Process of Work-Related Learning: Synthesizing Findings from Two Research Projects. *Human Resource Development International, 8*(1), 101-119.
- Snyder, P., & Lawson, S. (1993). Evaluating Results Using Corrected and Uncorrected Effect Size Estimates. *The Journal of Experimental Education, 61*(4), 334-349.

Chapter 4

- Sparrowe, R. T., Liden, R. C., Wayne, S. J., & Kraimer, M. L. (2001). Social Networks and the Performance of Individuals and Groups. *Academy of Management Journal*, 44(2), 316-325.
- Stacey, E., Smith, P. J., & Barty, K. (2004). Adult learners in the workplace: online learning and communities of practice. *Distance Education*, 25(1), 107 - 123.
- Sutton, R., Neale, M. A., & Owens, D. (2000). Technologies of Status Negotiation: Status Dynamics in Email Discussion Groups: Stanford University, Graduate School of Business.
- Van den Bossche, P., Segers, M., & Jansen, N. (2010). Transfer of training: the role of feedback in supportive social networks. *International Journal of Training and Development*, 14(2), 81-94. doi: 10.1111/j.1468-2419.2010.00343.x
- Venkatraman, N. (1994). IT-Enabled Business Transformation: From Automation to Business Scope Redefinition. *Sloan Management Review*, 35(2).
- Wellman, B. (2001). Computer Networks as Social Networks. *Computers and Science*, 293, 2031-2034.
- Yamhill, S., & McLean, G. N. (2001). Theories supporting transfer of training. *Human Resource Development Quarterly*, 12(2), 195-208. doi: 10.1002/hrdq.7
- Yates, J., & Orlikowski, W. J. (1992). Genres of Organizational Communication: A Structural Approach to Studying Communication and Media. *Academy of Management Review*, 17(2), 299-326.
- Zack, M. H., & McKenney, J. L. (1995). Social Context and Interaction in Ongoing Computer-supported Management Groups. *Organization Science*, 6(4), 394-422.

CHAPTER 5

Knowledge Creation within Communities of Learning – The Impact of Hierarchical Positions on Communication Processes⁴

Abstract: *Communities of Learning* (CoL) have been suggested to facilitate the co-construction of knowledge among participants of online trainings. Yet, previous studies often detached participants from the social context in which learning took place. The present study addresses this shortcoming by providing empirical evidence from 25 CoL of a global organization, where 249 staff members from different hierarchical positions collaboratively enhanced their knowledge via asynchronous discussion forums. Our results clearly indicate that the higher participants' hierarchical position, the higher their amount of social and cognitive messages, which in turn positively influenced their network position within CoL. However, we also identified a sub-group of *Stars* that outperformed their colleagues and who were at the centre of CoL, irrespective of their hierarchical positions. Based on these findings, we suggest Human Resource Development (HRD) practitioners to design and facilitate collaborative learning activities that build upon the strength and weaknesses of all participants.

⁴ Rehm, M., Gijsselaers, W., & Segers, M. (submitted), Knowledge Creation within Communities of Learning - The Impact of Hierarchical Positions on Communication Processes, *Learning and Instruction*
Note: The chapter is based on *Communities of Learning in Organizational Training: The Influence of Participants' Hierarchical Positions on Communication Behaviour and Learning Processes*, presented at the EARLI 2012 (SIG 14) conference, Antwerp, Belgium, 22 – 24 August, 2012

5.1 Introduction

Online collaborative learning has been suggested as a promising (new) methodology to foster learning processes among participants irrespective of time and place (e.g. Volet, Summers, & Thurman, 2009). The underlying considerations depart from the notion that learning should be considered as an interactive process, where participants collaboratively create knowledge within online communities (Hakkarainen, Palonen, Paavola, & Lehtinen, 2004). Hence, online *Communities of Learning* (CoL) have received a growing amount of attention (Stacey, Smith, & Barty, 2004). Being defined as groups of people “*engaging in collaborative learning and reflective practice involved in transformative learning*” (Paloff & Pratt, 2003, p. 17), CoL have been proposed to create a broader pool of knowledge by connecting people from diverse backgrounds, which has the potential of facilitating the co-construction of knowledge. The process of connecting people via CoL builds on the (extensive) use of technical media, e.g. asynchronous discussion forums. On the one hand, these types of communication channels have been proposed to foster effective learning within online communities by stimulating individuals to externalize their thoughts and critically reflect on their own practices (e.g. Lehtinen, 2003; Venkatraman, 1994). On the other hand, empirical research has shown that online collaborative learning does not necessarily lead to higher levels of understanding and knowledge creation (Naidu & Järvelä, 2006). Based on these latter types of findings, it has therefore been suggested that online learning is a demanding task for learners (Järvelä, Järvenoja, & Veermans, 2008), which takes place within complex social situations that can have a significant impact on how individuals behave and learn within online communities (e.g. Arvaja, Salovaara, Häkkinen, & Järvelä, 2007; Järvelä, 1995). Consequently, using the words of Anna Sfard (1998), “*talk about [...] “decontextualized learning” becomes as pointless as the attempts to define lungs or muscles without a reference to the living body within which they both exist and function.*” (p. 6).

While these underlying aspects have been recognized across various settings, e.g. institutes of higher education, this has particularly caught the attention of practitioners from (international) organizations, where CoL are increasingly used to enhance the knowledge and skills of employees across intra-organizational boundaries (Schlager, Fusco, & Schank, 2002). Zack and McKenny (1995) called for a better understanding of how existing organizational structures influence the use of online communication formats, in order for them to achieve their intended goals. Similarly, Akkerman and colleagues (2006) reported that differing background characteristics of participants can create considerable constraints on the mutual understanding of individual learners. Consequently, organizers of CoL need to be aware that existing social relationships can have a

significant impact on conversational patterns within collaborative learning initiatives (Van den Bossche, Gijsselaers, Segers, Woltjer, & Kirschner, 2011).

Moreover, former research on online collaborative learning has received a lot of criticism. First, previous studies have largely been conducted in a laboratory setting, rather than in a practical context (Schippers, den Hartog, Koopman, & Wienk, 2003), which might question the validity of their findings. Second, Akyol and Garrison (2010) criticized the widely used approach of assessing learning outcomes on the basis of attained summative grades, thereby neglecting the actual process of knowledge creation. Third, online communities have been considered as a ready-made laboratory for analysing collaboration in online (learning) communities over time. Yet, only few studies have actually conducted research on the type of communication that is exchanged within these communities (Haythornthwaite, 2001). Finally, despite the general consensus that organizational structures can influence how individuals communicate with each other, past research has largely overlooked hierarchical positions as a major obstacle to learning processes (Romme, 1996).

Taking into account the call for addressing the role of existing social relationships in online learning communities as well as the aforementioned shortcomings of previous research, this study presents empirical evidence from 25 CoL which were part of an online training program that was provided for 249 staff members of a global organization. Each CoL consisted of 7 – 13 participants and was centred on asynchronous discussion forums, where participants from different hierarchical positions collaboratively increased their understanding of topics in the domain of Economics. For the purpose of this study, we specifically investigated the influence of participants' hierarchical positions over time on their creation of knowledge and to what extent this might have influenced their network position within CoL. In this way, we are able to provide valuable insights on patterns of communication (Cramton & Hinds, 2005) within CoL that will help organizers to design collaborative activities that foster the active exchange of diverse insights and experiences nested in the members from all hierarchical positions.

5.2 Learning in Online Communities

Generally, past research has distinguished between two general types of communication within online collaborative learning environments, namely *social* and *cognitive* communication (e.g. de Wever, Schellens, Valcke, & Van Keer, 2006). *Social* communication refers to contributions that do not directly contribute to the actual learning process. Instead, they rather form the foundation for a relationship between participants, which allows for more cognitive discussions to follow. The *cognitive* dimension refers to communication that is specifically related to the content of discussions and captures aspects of knowledge creation. Here,

researchers differentiate between sub-categories that describe different levels of knowledge creation. More specifically, Gunawardena and colleagues (1997) proposed *surface level*, e.g. sharing factual information, and *in-depth* processing of information, e.g. negotiating meaning. Similarly, Veerman and Veldhuis-Diermanse (2001) categorized knowledge creation into three broad levels, namely *basic*, e.g. facts and opinions, *intermediate*, e.g. combining and elaborating information, *advanced*, e.g. integrating and evaluating information.

Numerous scholars have highlighted that online (asynchronous) communication fosters *cognitive* communication and knowledge creation, by allowing participants to more deeply reflect on what has been discussed (e.g. de Laat, Lally, Simons, & Wenger, 2006). However, ongoing research has only produced mixed results. While some researchers have found *advanced* level cognitive discussions (e.g. Järvelä & Häkkinen, 2002), others reported that discussions were mainly fuelled by emotional support (Admiraal, Lockhorst, Wubbels, Korthagen, & Veen, 1998), or simply did not yield higher levels knowledge creation (Naidu & Järvelä, 2006). As a possible explanation for these types of results, Bernard and colleagues (2000) proposed that as participants do not belong to one homogenous group that share a certain background characteristic, learning outcomes can vary based on the composition of online learning communities. Additionally, Webster-Wright (2009) stipulated that the organizational context, e.g. workplace culture, or the support during training, can have a significant impact on what is learned from training initiatives. However, the author also noted that participants have often been separated from the context in which learning takes place. Consequently, new insights are required on how differences in participants' background characteristics affect their collaborative learning behaviour (Zack & McKenney, 1995). In this respect, hierarchical positions have been argued as being a powerful influencing factor.

5.3 Hierarchical Positions & Their Influence on Learning Processes

A growing amount of research has argued that participants' hierarchical positions will have an impact on their communication behaviours within (online) collaborative learning activities (e.g. Edmondson, Bohmer, & Pisano, 2001). Some scholars, like Weisband and colleagues (1995), suggested that computer-mediated communication would weaken underlying social norms and inhibitions. Additionally, Bhappu and colleagues (1997) provided empirical evidence for a reduction of possible communication barriers between members of different hierarchical positions. In contrast, Griffith and Neale (2001) stipulated that hierarchical relationships from the real world are translated into the virtual realm. This notion is supported by Ahuja and Carley (1998), who conducted an empirical

analysis of email messages that have been exchanged within the *Soar Group*, which constitutes an international consortium of researchers and developers from academia, as well as corporations. Their results showed a tendency for existing relationships to transfer into online formats, even in cases of otherwise non-hierarchical organizations. More specifically, while the consortium had a decentralized structure, the empirical results showed that hierarchical positions influenced the observed flows of communication. This can be explained by work of Jehn (1995), suggesting that participants can feel intimidated when communicating with colleagues from different backgrounds. As a result, participants might reduce their engagement into an open and constructive discussion with their colleagues, which jeopardizes the entire learning process (Nembhard & Edmondson, 2006).

With respect to hierarchical positions, Bird (1994) suggested that higher level management is responsible for "*creating conditions which stimulate knowledge creation at lower levels of the organization*" (pp. 332-333), as well as for combining and evaluating the information provided by others. In contrast, middle management acts as "*nexus between the real and the ideal*" (p. 333), which translates into providing clarifications and elaborating on previously shared information. Furthermore, lower level management is expected to provide a larger amount of factual information and share experiences that can add to the overall understanding of new challenges. Hence, when applying the three categories of knowledge creation by Veerman and Veldhuis-Diermanse (2001), lower level management is expected to mainly share *basic* information, while middle and higher level management are expected to share a higher amount of *intermediate* and *advanced* levels of knowledge to the discussions, respectively. In this respect, Arts and colleagues (2006), based on a study of 115 subjects, ranging from undergraduates to senior managers with over 25 years of work experience, showed that individuals, who have been working for more than 12 years, are driven by their experiences and are better able to effectively infer upon new information. Taking into account previous research that identified work experience as a significant predictor for an individual's hierarchical position (Tachibanaki, 1988), this again suggests a positive relationship between participants' hierarchical positions and their amount and level of knowledge creation. Additionally, previous research has proposed that lower level management will exhibit a tendency to focus on sharing non-threatening, social messages that aim at integrating into the group, which increases their chances of being acknowledged by higher level management (Sutton, Neale, & Owens, 2000). Similarly, Li and Gao (2003) stated that employees might hold back valuable information, because of reasons related to organizational customs and structures, such as lower level management not being expected to openly question their supervisors. Based on these findings and considerations, and taking into the call for more longitudinal research (Haythornthwaite, 2001), we formulate our first two research hypotheses as

Chapter 5

H1 – Over time, the higher the hierarchical position of a participant, the higher their amount of cognitive communication within CoL.

H2 – Over time, the lower the hierarchical position of participants, the higher their amount of social communication within CoL.

Additionally, a growing amount of literature has suggested that social network analysis (SNA), in combination with content analysis, can provide a more refined picture of the underlying learning and communication processes (e.g. Hurme, Palonen, & Järvelä, 2006). For example, based on a wide range of studies of newly emerging online communities in organizations, Cross and colleagues have found that a small minority of participants (15%) is gravitating around the centre of their community's activity, while a considerable larger group (40%) is situated more towards the fringes of their learning network (Cross, Laseter, Parker, & Velasquez, 2006). In this context, Sparrowe and colleagues (2001), who conducted a field study on 190 employees from 38 work groups and across five different organizations, have linked the centrality of some participants to their performance on the job. Russo and Koesten (2005) suggested the existence of "*crucial cog[s]*" (p. 256), who hold central positions in their learning networks, based on the cognitive level of their communication. These participants are perceived as being knowledgeable, which triggers their colleagues to regularly seek information from them. Taking into account these considerations, and translating them into two concepts often used in SNA, namely *in-degree network ties* and *network centrality* measures (Hatala, 2006), we therefore formulate our third and fourth research hypotheses as:

H3 – The higher the amount of participants' cognitive communication, the higher their in-degree network ties within CoL.

H4 – The higher the amount of participants' cognitive communication, the higher their level of network centrality within CoL.

5.4 Method

5.4.1 Setting

The present study collected data from an online training program, whose aim was to enhance the knowledge and skills of a global organization's staff, operating in the sector of economic development. The program was delivered twice during a 6-month timeframe and specifically focused on five content modules from the

domain of Economics. The program took place entirely online and over a time span of fourteen weeks, with no scheduled synchronous meetings. Upon successful completion, participants attained a certificate of participation, together with academic credits that were based on the European Credit Transfer and Accumulation System (ECTS).

Participants engaged into two types of learning activities. First, using (multimedia) learning materials, participants engaged in self-study. Second, and constituting the backbone of the training, participants collaboratively learned via asynchronous discussion forums. The estimated workload was 5 hours per week, of which two-thirds were envisioned to be spent on participating in the forums. The forums were situated in dedicated CoL, consisting of 10 – 15 randomly assigned participants. Here, two types of forums were available. On the one hand, participants could voluntarily contribute to a “*Café-Talk*”, where they were provided with an opportunity to socialize and exchange private information. This forum was the only chance for participants to get to know each other’s hierarchical position. Unless they provided this information themselves, their fellow CoL members had no way of knowing this particular detail. On the other hand, content-driven forums were provided that were based on the identified content modules. Participation in these forums was obligatory and taken into account for determining participants’ eligibility for receiving their certificate of participation. The latter was accomplished by assigning two academic staff members to each CoL. They were responsible for grading participants’ contributions, facilitating discussions, and providing help in case of technical difficulties. The facilitators were trained in working with CoL and received elaborate guidelines for all training activities.

5.4.2 *Participants*

Overall, 337 participants were then randomly assigned to 30 CoL. The present study analyses a subset of 25 CoL and 249 participants (73.88%). This was due to incomplete datasets of some participants and biased CoL, where not all applicable hierarchical positions were represented. The 25 CoL had an average of 9.96 members (SD = 1.72, range = 7 – 13). The average age was 43.92 (SD = 7.33, range = 27 – 58) and 54.61 % of the participants were female. The participants’ educational backgrounds included Master’s (71.37 %), PhD’s (14.51 %), Bachelor’s (7.26 %) and other degrees (6.85 %). The underlying disciplines of the latter included, Health Sciences and International Law. 82 participants held low hierarchical positions (32.93 %), compared to 93 (37.35 %) and 74 (29.71 %) for middle and high hierarchical positions, respectively.

5.5 Instruments

5.5.1 *Data on Participants' Hierarchical Position*

Participants self-reported their official hierarchical positions via the training's official registration form, which were then sub-divided into "Low"-, "Middle"- and "High"-level hierarchical positions. Members of the "Low" were generally associated with project level work, contributing to sub-parts of the overall product. The "Middle" group was composed of project leaders. Finally, participants from the "High" group were responsible for departments and often entire regions in which the organization was operating.

5.5.2 *Data Analysis & Procedure*

Although the data analysis of this study focuses on individual levels, participants were distributed over different CoL. Hence, depending on the composition of a particular CoL, this could have led to different dynamics and results. In order to control for this possibility, we used the Shannon Equitability Index (Magurran, 1988). The index ranges from 0 (complete diversity) to 1 (complete evenness) and provides a summary measure of how divers a group is. Focusing on the aforementioned three hierarchical positions, the average score for the investigated 25 CoL was .44 (SD = .05, range = .35 – .55). In consideration of this value and the low observed standard deviation, we concluded that the CoL were subject to considerable hierarchical diversity and that the combined data from the different CoL constituted a comparable sample for our analysis.

5.5.3 *Content Analysis*

The content within the discussion forums was coded using a procedure first developed by Veerman and Veldhuis-Diermanse (2001) and then subsequently validated and extended by Schellens and Valcke (2005). The instrument distinguishes between *non-task related* and *task related* contributions. *Non-task related* (NTR), refers to contributions that can be coded as i) *Planning* (e.g. establishing rules for the progress of the discussion), ii) *Technical* (e.g. issues concerning the use of the discussion forums), iii) *Social* (e.g. acknowledgement of each other's contributions), and iv) *Nonsense* (e.g. conversations about hobbies). *Task related* (TR) contributions, which encompass *cognitive* communication, consist of i) *New Facts* (e.g. reference to data), ii) *Own Experience & Opinions* (e.g. sharing professional experience), iii) *New Theoretical Ideas* (e.g. definitions of domain-specific terms and methodologies), iv) *Explicitation* (e.g. refining information shared before) and v) *Evaluation* (e.g. combining and critically discussing previous contributions). For

the TR contributions, increasing levels of knowledge creation are assigned to participants' messages, with TR i) – iii) representing *basic*, TR iv) capturing *intermediate*, and TR v) constituting *advanced* cognitive levels. According to de Wever and colleagues (2006) this approach is well suited to gain an overview of the general cognitive processes that take place within learning communities.

When coding the content of discussions, we chose for the *unit of meaning* approach, as this technique addresses the limitations of fixed syntactical units, such as a sentence, or a complete message, which run the risk of ignoring meaningful aspects of a communicative construct (Rourke, Anderson, Garrison, & Archer, 2000). Furthermore, this approach accounts for the possibility that a single message can contain more than one *theme* or *idea* (de Wever, et al., 2006). Finally, this methodology has been recommended by researchers like Gunawardena and colleagues (1997) as the most appropriate unit of analysis for evaluating the level of knowledge creation within online learning communities.

All messages were assessed by two independent coders. The coders were trained on the basis of two test cases, consisting of 67 and 74 messages respectively. The cases were randomly selected from CoL that were not included in the actual dataset. After the first coding exercise, the Cronbach alpha (α) and Cohen's kappa (κ) were .68 and .45 ($p < .01$) respectively. As this was considered to be unsatisfactory, both coders were invited to discuss discrepancies in their coding, before proceeding with the second test case. The results then increased to $\alpha = .93$ and $\kappa = .65$ ($p < .01$). Based on these confirmatory results, the actual coding procedure was initiated, which resulted in inter-rater reliabilities of $\alpha = .92$, and $\kappa = .73$ ($p < .01$), indicating very good agreement beyond chance (e.g. de Wever, et al., 2006).

5.5.4 Social Network Analysis

All network statistics were computed with the help of UCINET 6.357 (Borgatti, Everett, & Freeman, 2002). The amount of replies participants received was determined via *in-degree measures*. *In-degree measures* indicate how often and by how many colleagues a particular individual has been contacted from within a CoL. The applicable values were determined on the basis of the mean number of ties as this allowed to factor in the size of the network. The overall position of individual participants within their CoL was based on the *Freeman Degree Centrality* measure. As we were dealing with multiple CoL, we used the standardized measures (Hanneman & Riddle, 2005).

5.5.5 *Cluster Analysis*

Taking into account that the underlying data consists of a mixture of categorical and continuous variables, we employed two-step cluster analysis (Banfield & Raftery, 1993). The underlying reason was to investigate whether patterns could be identified in the available dataset, based on participants' hierarchical positions, as well as their amount and type of TR communication. By segmenting the data into homogenous subgroups of cases, the results of the two-step cluster analysis could then be used to combine with the findings of our social network analysis and determine whether the content of participants' contributions had an impact on their network position with CoL. The optimal amount of clusters was based on the Schwarz's Bayesian criterion (BIC) and log-likelihood was used as the distance measure.

5.5.6 *Hypotheses Testing*

Testing for the normality of the data's distribution revealed a violation of the parametric assumption for all measured variables. Consequently, we used Spearman's rho (r_s) to determine correlations; Kruskal-Wallis tests (H) to assess differences between groups; and Jonckheere-Terpstra tests (J-T) to identify any possible linear trends. The occurrence of possible patterns underlying the H-test results was determined by post-hoc Mann-Whitney (U) tests. In order to account for the fact that we dealt with more than two independent conditions, we corrected the results by using the Bonferroni method, which yielded an adjusted critical value of significance of .016. Possible changes over time were assessed via a range of Wilcoxon Signed Rank test. The chosen points in time for the longitudinal study considered the work of de Laat and Lally (2003), who differentiated between *beginning*, *middle* and *end* phases of online (learning) communities. Consequently, we decided to categorize the overall duration of 14 weeks into six time intervals of about two weeks each, which also captured a short *transition period*, where the focus of the discussions changed from one content module to the next. Consequently, we considered Intervals 1 (beginning), 3 (middle) and 6 (end) for our analyses. Finally, we also estimated the effect size of our findings. Taking into account the nonparametric nature of our dataset, we followed the suggestion of Rosenthal (1991) and approximated the effect size (r) on the basis of the U-results, where small, medium and large effects are associated with .10, .30 and .50, respectively (Cohen, 1992).

5.5.7 *Control Measures*

We acknowledge that hierarchical positions might only explain part of possible observed differences. Hence, in order to make more complete inferences about our findings, we controlled for other background characteristics that have been suggested to affect online collaborative learning. These characteristics include age and prior knowledge. Regarding age, Garavan and colleagues (2010) suggested that older employees were less likely to be active during online training activities. Additionally, Pelled, Eisenhardt and Xin (1999) were able to empirically show that age similarity between participants can trigger emotional conflicts within groups, resulting in lower participation rates. In terms of participants' prior knowledge, previous studies highlighted the potential impact of this variable on participants' behaviour within learning initiatives (Dochy & McDowell, 1997). Additionally, a growing amount of research claims that individuals' prior knowledge constitutes an important variable in participants' activity patterns (Dochy, Segers, & Buehl, 1999). When possessing prior knowledge about a certain topic, participants can be expected to feel more comfortable in engaging into discussions with colleagues. As a result, it can be argued that this positively influences their general level of activity and performance. For the purpose of this study, we collected data on participants' age via the training programs official registration form. Participants' prior knowledge was assessed via an online diagnostic test, consisting of 25 multiple choice questions. All five pre-defined content modules were assessed based on five questions each. The response rate for the questionnaire was 88.76 % and the internal consistency of participants' answers was $\alpha = .81$.

5.6 Results

5.6.1 *General Results*

In total, 3389 messages were posted in the discussion forums of the 25 CoL, of which 3184 were considered codeable (93.95%). Based on the work of the two independent coders this translated into 4038 units of meaning (UoM). 1384 UoM (34.27%) were NTR and 2654 UoM (65.73%) TR contributions. Table 5-1 provides an overview of how the overall amount of units was distributed over NTR and TR communication. A first glance already indicated that while participants mainly exchanged NTR communication (98.49%) during the first interval, they generally focused their attention on TR communication, which peaked in Interval 4 and thereafter decreased again to levels already observed in Interval 2. Figure 5-1 provides a depiction of the underlying sub-categories of NTR communication over time. As can be seen, NTR communication was mainly driven by *Social* and *Planning* messages. Additionally, an increasing trend for *Planning* and a decreasing trend for *Social* were observed. The distribution of TR communication over time

Chapter 5

within CoL is summarized in Figure 5-2. The driving force for this type of communication was *Explicitation*, while *New Theoretical Ideas* only constituted a negligible part of participants' discussions.

Table 5-1: Overview of Non-Task & Task Related Communication within CoL

| | Interval | | | | | | Totals ^g |
|------------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------------|
| | 1 ^a | 2 ^b | 3 ^c | 4 ^d | 5 ^e | 6 ^f | |
| Non-Task Related | 98.49% | 36.07% | 29.69% | 17.92% | 17.16% | 28.57% | 34.27% |
| Task Related | 1.51% | 63.93% | 70.31% | 82.08% | 82.84% | 71.43% | 65.73% |

a = 530; b = 535; c = 916; d = 954; e = 781; f = 322; g = 4038

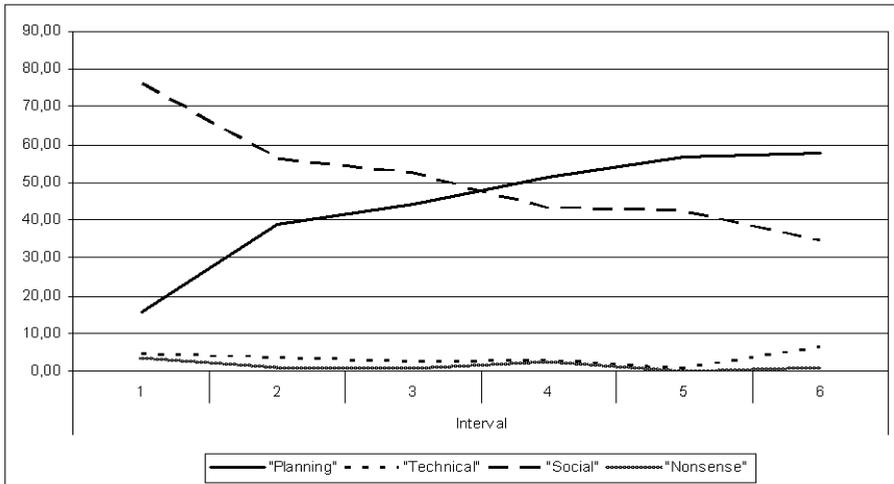


Figure 5-1: Distribution of NTR Communication within CoL

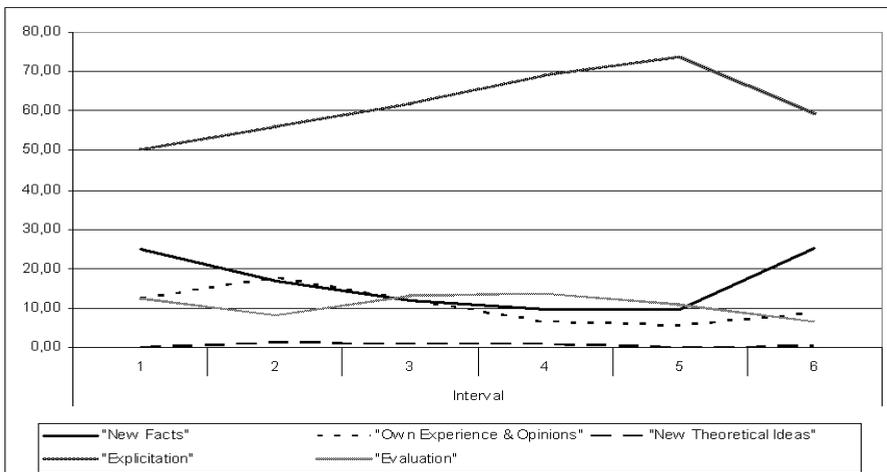


Figure 5-2: Distribution of TR Communication within CoL

5.6.2 Research Hypotheses

The Impact of Hierarchical Positions on the Type of Communication within CoL

The results of our Spearman’s rho correlation analyses revealed a distinctive positive relationship between participants’ hierarchical position and their type of communication within CoL. More specifically, the higher the hierarchical position of a participants, the higher their amount of NTR ($r_s = .18, p < .01$), as well as TR communication ($r_s = .17, p < .01$). The result of the Kruskal-Wallis and Jonckheere-Terpstra tests, summarized in Table 5-2, further supported this first indication.

Table 5-2: Results of the Kruskal-Wallis and Jonckheere-Terpstra Tests for Type of Communication

| | Kruskal-Wallis | | Jonckheere-Terpstra | | |
|--------------------------------------|----------------|----|---------------------|-----|-------------|
| | χ^2 | df | # of Levels | N | J-T |
| Total | 12.37** | 2 | 3 | 249 | 12,148.00** |
| Non-Task Related | 10.89** | 2 | 3 | 249 | 12,049.00** |
| <i>Planning</i> | 6.33* | 2 | 3 | 249 | 11,677.50* |
| <i>Technical</i> | 5.08† | 2 | 3 | 249 | 11,052.50* |
| <i>Social</i> | 9.32** | 2 | 3 | 249 | 11,733.50* |
| <i>Nonsense</i> | 0.03 | 2 | 3 | 249 | 10,263.00 |
| Task Related | 9.93** | 2 | 3 | 249 | 11,952.00** |
| <i>New Facts</i> | 14.45** | 2 | 3 | 249 | 11,932.50** |
| <i>Own Experience & Opinions</i> | 4.37 | 2 | 3 | 249 | 10,823.50 |
| <i>New Theoretical Ideas</i> | 3.02 | 2 | 3 | 249 | 10,599.00 |
| <i>Explicitation</i> | 3.72 | 2 | 3 | 249 | 11,320.50† |
| <i>Evaluation</i> | 9.76** | 2 | 3 | 249 | 11,920.00** |

† $p < .1$; * $p < .05$; ** $p < .01$

The differences between the hierarchical positions were statistically significant for both main categories of communication. Moreover, a detailed look at the NTR sub-categories revealed that this was particularly the case for *Planning* and *Social* messages. For TR communication the decisive sub-categories were *New Facts* and *Evaluation*. Additionally, the higher the hierarchical position of an individual participant, the higher their propensity to contribute more messages that include aspects of *Planning*, *Social*, *New Facts* and *Evaluation*. In order to determine whether the observed differences would be particularly pronounced between certain pairs of hierarchical positions, we also conducted a range of Mann-Whitney tests. The results showed that the type of communication particularly varied between “*Low*” and “*Middle*” (NTR: $U = 2,865.00, p < .01, r = -.22$; TR: $U = 2,855.50, p < .01, r = -.22$), as well as “*Low*” and “*High*”

(NTR: $U = 2,232.50$, $p < .01$, $r = -.23$; TR: $U = 2,310.50$, $p = .01$, $r = -.21$). In contrast, the comparison of "Middle" and "High" yielded no significant results. Finally, we determined the extent to which these observed trends might have changed over time. The applicable results are summarized in Table 5-3 below.

Table 5-3: Results of the Wilcoxon Signed Ranks Test – Type of Communication

| Type of Communication | Timeframe (Intervals) | Z Scores | | |
|---|------------------------|------------------------|------------------------|------------------------|
| | | "Low" | "Middle" | "High" |
| Non-Task Related | 1-6 (Overall Duration) | -7.07 ^{a, **} | -6.64 ^{a, **} | -5.56 ^{a, **} |
| | 1-3 (First Half) | -5.26 ^{a, **} | -4.32 ^{a, **} | -2.21 ^{a, *} |
| | 3-6 (Second Half) | -3.42 ^{a, **} | -4.33 ^{a, **} | -2.73 ^{a, **} |
| Task Related (TR) | 1-6 (Overall Duration) | -4.37 ^{b, **} | -5.63 ^{b, **} | -5.29 ^{b, **} |
| | 1-3 (First Half) | -6.19 ^{b, **} | -7.56 ^{b, **} | -6.66 ^{b, **} |
| | 3-6 (Second Half) | -5.36 ^{a, **} | -5.44 ^{a, **} | -5.08 ^{a, **} |
| <i>New Facts (TR)</i> | 1-6 (Overall Duration) | -2.17 ^{b, *} | -4.11 ^{b, **} | -3.21 ^{b, **} |
| | 1-3 (First Half) | -3.50 ^{b, **} | -4.31 ^{b, **} | -4.67 ^{b, **} |
| | 3-6 (Second Half) | -1.01 ^a | -.28 ^b | -1.90 ^a |
| <i>Own Experience & Opinions (TR)</i> | 1-6 (Overall Duration) | -1.13 ^b | -2.83 ^{b, **} | -2.27 ^{b, *} |
| | 1-3 (First Half) | -2.65 ^{b, **} | -4.78 ^{b, **} | -4.09 ^{b, **} |
| | 3-6 (Second Half) | -1.66 ^a | -3.60 ^{a, **} | -2.76 ^{a, **} |
| <i>New Theoretical Ideas (TR)</i> | 1-6 (Overall Duration) | .00 ^c | -1.00 ^b | .00 ^c |
| | 1-3 (First Half) | .00 ^c | -1.73 ^b | -1.41 ^b |
| | 3-6 (Second Half) | .00 ^c | -1.00 ^a | -1.41 ^a |
| <i>Explicitation (TR)</i> | 1-6 (Overall Duration) | -3.40 ^{b, **} | -4.74 ^{b, **} | .00 ^c |
| | 1-3 (First Half) | -6.11 ^{b, **} | -7.17 ^{b, **} | -1.41 ^b |
| | 3-6 (Second Half) | -4.94 ^{a, **} | -5.33 ^{a, **} | -1.41 ^a |
| <i>Evaluation (TR)</i> | 1-6 (Overall Duration) | .00 ^c | -1.89 ^b | -2.53 ^{b, *} |
| | 1-3 (First Half) | -3.79 ^{b, **} | -4.88 ^{b, **} | -4.13 ^{b, **} |
| | 3-6 (Second Half) | -3.95 ^{a, **} | -4.08 ^{a, **} | -2.75 ^{a, **} |

^a based on positive ranks; ^b based on negative ranks; ^c the sum of negative ranks equals the sum of positive ranks; * $p < .05$; ** $p < .01$

Overall, while all participants decreased their amount of NTR communication, they increased their TR contributions. Moreover, while this tendency was valid throughout the entire duration of CoL for NTR messages, the amount of TR contributions peaked in the first half of the training program (from Interval 1 to 3). We also considered the development over time of the individual sub-categories of NTR and TR communication. Here, we saw that only *Social*

messages significantly changed as the CoL progressed. More specifically, they decreased for members of all hierarchical positions (“Low”: $z = -7.43, p < .01$; “Middle”: $z = -7.16, p < .01$; “High”: $z = -6.33, p < .01$). Moreover, while the “Low” ($z = 4.00, p < .01$) and “Middle” ($z = 4.74, p < .01$) groups showed significant growth in their *Explicitation* contributions, members of the “High” group barely engaged into this type of communication. Instead, higher level management increased their *Evaluation* contributions over the course of the CoL ($z = 2.53, p < .05$).

Based on these findings we therefore tentatively accepted our first research hypothesis (H1). Our general results clearly indicated that higher level management contributed higher amounts of *cognitive* communication than their colleagues from lower hierarchical positions. However, a more detailed look revealed that this effect was particularly driven by *New Facts* and *Evaluation*. Similarly, while the longitudinal results provided some evidence for our research hypothesis, it also revealed that *cognitive* communication increased for all hierarchical groups. Considering our second research hypothesis (H2), we had to reject our claim that the lower the hierarchical position of participants, the higher their amount of *social* communication within CoL. Instead, the overall trend was again comparable for all participants. Even more so, in total, participants from lower hierarchical positions did not contribute more *social* communication than colleagues from higher up the hierarchical ladder.

The Impact of Participants’ Communication on their Social Network Position

In order to assess the impact of participants’ type and level of communication on their network positions, we first conducted a two-step cluster analysis. The underlying measures for this analysis were based on participants’ contributions in the different TR sub-categories, as well as participants’ hierarchical position. Based on the BIC values, this resulted in an optimal amount of clusters of four. Table 5-4 summarizes how the hierarchical positions were distributed across the clusters.

Table 5-4: Frequencies of Hierarchical Positions: Two-Step Cluster Analysis on Task Related Communication

| Cluster | "Low" | | "Middle" | | "High" | | Total |
|---------|-------|-------|----------|-------|--------|-------|-------|
| | N | % | N | % | N | % | |
| 1 | 79 | 96.34 | 0 | 0 | 0 | 0 | 79 |
| 2 | 0 | 0 | 78 | 83.87 | 0 | 0 | 78 |
| 3 | 0 | 0 | 0 | 0 | 54 | 72.97 | 54 |
| 4 | 3 | 3.66 | 15 | 16.13 | 20 | 27.03 | 38 |

Noticeably, each hierarchical position was assigned to a separate cluster. This provides additional support for our claim that hierarchical positions have a

significant impact on participants' type of communication. Furthermore, a new group was identified and labelled as *Stars* (Cluster 4), which was comprised of members from all hierarchical positions. The choice of words becomes apparent when considering the results provided in Table 5-5. The participants that were assigned to cluster 4 clearly outperform their colleagues in terms of all aspects of TR communication.

Table 5-5: Overview Results of Two-Step Cluster Analysis on Task Related Communication

| Cluster | Task Related | | | | | Total |
|---------|--------------|---------------------------|-----------------------|-------------|------------|-------|
| | New Facts | Own Experience & Opinions | New Theoretical Ideas | Explication | Evaluation | |
| 1 | .59 | .57 | .00 | 5.70 | .62 | 7.48 |
| 2 | 1.23 | .85 | .00 | 6.51 | .94 | 9.53 |
| 3 | .70 | .52 | .00 | 5.43 | .93 | 7.57 |
| 4 | 3.95 | 2.87 | .47 | 13.16 | 3.53 | 23.97 |

The identified clusters were then used as a basis for a consecutive SNA, for which Table 5-6 highlights the main findings. As can be seen from the table, the J-T results showed a significant positive trend, which suggested that as the amount of TR communication within a cluster increased, so did the applicable network characteristic.

Table 5-6: Results of the Kruskal-Wallis and Jonckheere-Terpstra Tests Social Network Measures

| Measure | Kruskal-Wallis | | Jonckheere-Terpstra | | |
|----------------------|--------------------|----|---------------------|-----|------------------------|
| | χ^2 | df | # of Levels | N | J-T |
| In-Degree Connection | 21.31 ^a | 3 | 4 | 249 | 13,762.00 ^a |
| In-Degree Centrality | 18.70 ^a | 3 | 4 | 248 | 13,515.50 ^a |

^a p < .01

More specifically, members of cluster 4 received significantly more replies from their colleagues and held more central positions within their CoL. Consequently, we accepted our third and fourth research hypotheses, which suggested that the higher participants' amount of cognitive communication, the higher their in-degree network ties (H3), as well as their network centrality measures (H4).

Controlling for other Background Characteristics

The investigation of whether participants differed in terms of age, or prior knowledge, subject to their hierarchical positions, revealed no significant results.

However, we also conducted two additional sets of correlation analysis, where we solely considered the potential relations between our control measures and the NTR and TR measures. More specifically, age was found to be positively correlated with participants' total amount of TR communication ($r_s = .13, p < .05$), as well as contributions that were labelled as *Technical* ($r_s = .15, p < .05$), and *Explicitation* ($r_s = .16, p < .05$). Additionally, prior knowledge correlated positively with participants' total amount of TR communication ($r_s = .15, p < .05$), *New Facts* ($r_s = .16, p < .05$), and *Evaluation* ($r_s = .18, p < .05$). Consequently, when interpreting the results of our study, we have to take into account that participants' age and prior knowledge were significantly correlated with certain aspects of individuals' amount and type of communication.

5.7 Discussion

This study investigated whether and to what extent hierarchical positions influenced learning processes within CoL, by assessing participants' amount and type of communication. We addressed this issue by providing empirical evidence on 25 CoL of an online training program, which was provided for 249 employees of a global organization. Our first research hypothesis stipulated that, over time, the higher a participant's hierarchical position, the higher his/her amount of *cognitive* communication. While our general findings clearly supported this notion, a more detailed look at the applicable sub-categories revealed that the observed effect was mainly driven by *New Facts* and *Evaluation*. Moreover, the amount of *cognitive* communication increased for all hierarchical groups. Contrary to our expectations, we were not able to verify our second research hypothesis, which stated that the lower the hierarchical position of participants, the higher their amount of *social* communication. Instead, our findings suggest that exactly the opposite is true. Again, while a general trend was apparent for all participants, in this case it was negative, higher level management contributed significantly more *Social* messages. These were very interesting findings, as they suggested that top management not only engaged into the co-construction of knowledge, but also tended to engage into activities that were aimed more at group-processes, e.g. contributing to a fruitful atmosphere to exchange thoughts and ideas. Additionally, when considering that the amount and level of *cognitive* communication increased over the course of time, this can be considered as evidence for *(neo-)apprenticeship style learning* (Schlager, et al., 2002) within CoL. By providing participants with the possibility to collaboratively learn and share experiences, participants from different backgrounds really seemed to benefit from each other's input and support each other's learning process.

The evidence provided in this study also contributed to our understanding of how individuals' amount of *cognitive* communication influenced their network

positions within CoL. More specifically, we hypothesized that the higher the amount of participants' *cognitive* communication, the higher their in-degree network ties, as well as their network centrality within CoL. While we were able to statistically validate these claims, we were also able to identify a sub-group of participants (*Stars*) that outperformed their colleagues in terms of TR contributions, and who really were at the centre of their CoL networks. Interestingly, this group was not confined to members of an individual hierarchical position. Instead, this group was compiled of participants from all positions. This constituted a very interesting finding, as it somehow contradicted with our other results. The other types of analysis clearly indicated that higher level management really dominated their CoL. The existence of the *Star* cluster therefore refined our understanding of how CoL were affected by hierarchical positions. More specifically, the *Stars* suggested that it is possible for anyone to take a leading role in collaborative learning processes, irrespective of their background. Admittedly, this clearly seemed to be an exception, as even within the *Star* cluster the majority of participants was comprised of members from higher level management. Nonetheless, organizers should certainly take this finding into account, as it can have far-reaching consequences on how CoL should be set up in the future.

Overall, and taking into account the significant influence of hierarchical positions on CoL, organizers can design collaborative learning activities and device facilitation strategies for future CoL that will build upon the strength and weaknesses of all participants. In practice, this could translate into scaffolding activities that structure the learning and interaction processes of participants (e.g. Weinberger & Fischer, 2006). At the beginning of every module, participants could be asked to first gather all relevant (factual) information and clarify any necessary concepts. This would provide lower level management with an opportunity to share their applicable knowledge, while allowing them to contribute information that is *non-threatening* for higher level management. Additionally, as the results of our study suggest that higher level management also tends to share these types of information, this could also create an initial *level playing field*, where all participants can equally contribute relevant information. Once this stage has been completed, participants could then be required to combine, refine and elaborate on all available information. While this part of the discussions would likely be dominated by higher level management, organizers of future CoL could try to counterbalance this by asking facilitators to foster a (more) active exchange of information between members from all hierarchical positions. As a result, it might also be possible to increase the amount of lower level members of the *Star* group. On the one hand, our findings show that anyone can take a leading role in CoL, if they get the chance to share their content expertise. On the other hand, it might have still been the case that the majority of participants from lower level positions felt held back by the organizational context in which the training was conducted.

Hence, it can be argued that an intervention by a facilitator, who can be considered as an *external party*, can alleviate this (social) pressure and provide more participants with the opportunity to show their full potential. This not only has the potential to contribute to the learning process of the individual, but also to the knowledge creation process of the entire CoL.

5.8 Limitations & Future Research

The current study exhibits three main limitations. First, although the employed coding scheme has been validated and assessed to be well suited to gain an overview of the general cognitive processes (de Wever, et al., 2006), it does not allow to make inferences about whether there have been reciprocal discussions and participants really *left their comfort zone* and critically re-considered their own practices. Coding schemes, like the three stage model by Järvelä & Häkkinen (2002), specifically focus on these types of knowledge diffusion between participants. Future research should therefore also build upon this type of content analysis, to further contribute to our understanding of how CoL can foster the co-construction of knowledge among participants. Second, the current study focused on “active” participation (Pozzi, Manca, Persico, & Sarti, 2007). While this captures the clearly visible activities within online communities, it does not take into more passive behaviour, such reading the contributions of others. Hence, future research should follow the work of Daradoumis and colleagues (2004) and subdivide data according to *indirect* and *direct* links. *Indirect* links refer to passive connections that can take on the form of reading, but not replying to a colleague’s contributions. *Direct* links capture whether a participant actively reacted to another CoL member’s contributions by replying. Third, the current study focused on the impact of hierarchical positions on participants’ amount and level of communication. This certainly provides a very important building block in understanding how CoL can contribute to learning processes. However, it does not account for the presence of academic staff that facilitated the CoL. The importance of facilitators, who will provide opportunities for *social*, as well as *cognitive* communication, has emerged as a critical element that conditions and sustains collaborative knowledge building within CoL (Anderson, Rourke, Garrison, & Archer, 2001). Future research should therefore consider the role and impact of facilitators on CoL, as this would greatly contribute to our understanding of how facilitators can influence the co-construction of knowledge within CoL.

5.9 Acknowledgments

The authors would like to thank the two independent coders, Anna Galazka and Omar Habets, for their work and contributions to this research.

5.10 References

- Admiraal, W. F., Lockhorst, D., Wubbels, T., Korthagen, F. A. J., & Veen, W. (1998). Computer-Mediated communication in teacher education: Computer conferencing and the supervision of student teachers. *Journal of Learning Environment Research*, 1, pp. 59-74.
- Ahuja, M. K., & Carley, K. M. (1998). Network Structure in Virtual Organizations. *Journal of Computer-Mediated Communication*, 3(4). doi: 10.1111/j.1083-6101.1998.tb00079.x
- Akkerman, S., Admiraal, W., Simons, R. J., & Niessen, T. (2006). Considering Diversity: Multivoicedness in International Academic Collaboration. *Culture Psychology*, 12(4), 461-485. doi: 10.1177/1354067x06069947
- Akyol, Z., & Garrison, D. R. (2010). Understanding cognitive presence in an online and blended community of inquiry: Assessing outcomes and processes for deep approaches to learning. *British Journal of Educational Technology*, 42(2), 233-250.
- Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, 5(2), 1-17.
- Arts, J. A. R., Gijssels, W. H., & Boshuizen, H. P. A. (2006). Understanding managerial problem-solving, knowledge use and information processing: Investigating stages from school to the workplace. *Contemporary Educational Psychology*, 31(4), 387-410.
- Arvaja, M., Salovaara, H., Häkkinen, P., & Järvelä, S. (2007). Combining individual and group-level perspectives for studying collaborative knowledge construction in context. *Learning and Instruction*, 17(4), 448-459.
- Banfield, J. D., & Raftery, A. E. (1993). Model-based Gaussian and non-Gaussian clustering. *Biometrics*, 49, 803-821.
- Bernard, R. M., Rojo de Rubalcava, B., & St-Pierre, D. (2000). Collaborative online distance learning: Issues for future practice and research. *Distance Education*, 21(2), 260-277.
- Bhappu, A., Griffith, T. L., & Northcraft, G. B. (1997). Media Effects and Communication Bias in Diverse Groups. *Organizational Behaviour and Human Decision Processes*, 70(3), pp. 199-205.
- Bird, A. (1994). Careers as repositories of knowledge : a new perspective on boundaryless careers. *Journal of Organizational Behaviour*, 15, 325-344.
- Borgatti, S. P., Everett, M. G., & Freeman, L. C. (2002). *Ucinet for Windows: Software for Social Network Analysis*. Harvard, MA: Analytic Technologies.
- Cohen, J. (1992). Statistics a power primer. *Psychology Bulletin*, 112, 155–159.

- Cramton, C. D., & Hinds, P. J. (2005). Subgroup Dynamics in Internationally Distributed Teams: Ethnocentrism or Cross-National Learning? *Research in Organizational Behaviour*, 26, pp. 231-263.
- Cross, R., Laseter, T., Parker, A., & Velasquez, G. (2006). Using Social Network Analysis to Improve Communities of Practice. *California Management Review*, 49(1), 32-60.
- Daradoumis, T., Martínez-Monés, A., & Xhafa, F. (2004). An Integrated Approach for Analysing and Assessing the Performance of Virtual Learning Groups *Groupware: Design, Implementation and Use* (Vol. 3198, pp. 289-304): Springer Berlin / Heidelberg.
- de Laat, M., & Lally, V. (2003). Complexity, theory and praxis: Researching collaborative learning and tutoring processes in a networked learning community *Instructional Science*, 31(1-2), 7-39.
- de Laat, M., Lally, V., Simons, R.-J., & Wenger, E. (2006). A selective analysis of empirical findings in networked learning research in higher education: Questing for coherence. *Educational Research Review*, 1(2), 99-111.
- de Wever, B., Schellens, T., Valcke, M., & Van Keer, H. (2006). Content analysis schemes to analyze transcripts of online asynchronous discussion groups: A review. *Computers & Education*, 46(1), 6-28.
- Dochy, F., & McDowell, L. (1997). Assessment as a tool for learning. *Studies In Educational Evaluation*, 23(4), 279-298.
- Dochy, F., Segers, M., & Buehl, M. M. (1999). The Relation Between Assessment Practices and Outcomes of Studies: The Case of Research on Prior Knowledge. *Review of Educational Research*, 69(2), 145-186. doi: 10.3102/00346543069002145
- Edmondson, A. C., Bohmer, R. M., & Pisano, G. P. (2001). Disrupted Routines: Team Learning and New Technology Implementation in Hospitals. *Administrative Science Quarterly*, 46(4), 685-716.
- Garavan, T. N., Carbery, R., O'Malley, G., & O'Donnell, D. (2010). Understanding participation in e-learning in organizations: a large-scale empirical study of employees. *International Journal of Training and Development*, 14(3), 155-168. doi: 10.1111/j.1468-2419.2010.00349.x
- Griffith, T. L., & Neale, M. A. (2001). 8. Information processing in traditional, hybrid, and virtual teams: From nascent knowledge to transactive memory. *Research in Organizational Behaviour*, 23, 379-421.
- Gunawardena, C. N., Lowe, C. A., & Anderson, T. (1997). Analysis Of A Global Online Debate And The Development Of An Interaction Analysis Model For Examining Social Construction Of Knowledge In Computer Conferencing. *Journal of Educational Computing Research*, 17(4), pp. 397-431.

Chapter 5

- Hakkarainen, K., Palonen, T., Paavola, S., & Lehtinen, E. (2004). *Communities of networked expertise: Professional and educational perspectives*. Amsterdam: Elsevier.
- Hanneman, R. A., & Riddle, M. (2005). *Introduction to Social Network Methods*. Riverside, CA: University of California.
- Hatala, J.-P. (2006). Social Network Analysis in Human Resource Development: A New Methodology. *Human Resource Development Review*, 5(1), 45-71. doi: 10.1177/1534484305284318
- Haythornthwaite, C. (2001). Exploring Multiplexity: Social Network Structures in a Computer-Supported Distance Learning Class. *Information Society*, 17(3), 211-226.
- Hurme, T., Palonen, T., & Järvelä, S. (2006). Metacognition in joint discussions: an analysis of the patterns of interaction and the metacognitive content of the networked discussions in mathematics. *Metacognition and Learning*, 1(2), pp 181-200.
- Järvelä, S. (1995). The cognitive apprenticeship model in a technologically rich learning environment: Interpreting the learning interaction. *Learning and Instruction*, 5(3), 237-259.
- Järvelä, S., & Häkkinen, P. (2002). Web-based Cases in Teaching and Learning - the Quality of Discussions and a Stage of Perspective Taking in Asynchronous Communication. *Interactive Learning Environments*, 10(1), 1 - 22.
- Järvelä, S., Järvenoja, H., & Veermans, M. (2008). Understanding the dynamics of motivation in socially shared learning. *International Journal of Educational Research*, 47(2), 122-135.
- Jehn, K. A. (1995). A Multimethod Examination of the Benefits and Detriments of Intragroup Conflict. *Administrative Science Quarterly*, 40(2), 256-282.
- Lehtinen, E. (2003). Computer supported collaborative learning: an approach to powerful learning environments. . In E. D. Corte, L. Verschaffel, N. Entwistle & J. V. Merriënboer (Eds.), *Unraveling basic components and dimensions of powerful learning environments* (pp. 35-53). Amsterdam: Elsevier.
- Li, M., & Gao, F. (2003). Why Nonaka highlights tacit knowledge: a critical review. *Journal of Knowledge Management*, 7(4), 6-14.
- Magurran, A. E. (1988). *Ecological diversity and its measurement*. Princeton, NJ, USA: Princeton University Press.
- Naidu, S., & Järvelä, S. (2006). Analyzing CMC content for what? *Computers & Education*, 46(1), pp. 96–103.
- Nembhard, I. M., & Edmondson, A. C. (2006). Making it safe: The effects of leader inclusiveness and professional status on psychological safety and improvement efforts in health care teams. *Journal of Organizational Behaviour*, 27, pp. 941-966.

- Paloff, R., & Pratt, K. (2003). *The virtual student: A profile and guide to working with online learners*. San Francisco: Jossey-Bass.
- Pelled, L. H., Eisenhardt, K. M., & Xin, K. R. (1999). Exploring the Black Box: An Analysis of Work Group Diversity, Conflict, and Performance. *Administrative Science Quarterly*, 44(1), 1-28.
- Pozzi, F., Manca, S., Persico, D., & Sarti, L. (2007). A general framework for tracking and analysing learning processes in computer-supported collaborative learning environments. *Innovations in Education and Teaching International*, 44(2), 169-179. doi: 10.1080/14703290701240929
- Romme, A. G. L. (1996). A Note on the Hierarchy-Team Debate. *Strategic Management Journal*, 17(5), 411-417.
- Rosenthal, R. (1991). *Meta-analytic procedures for social research*. Newbury Park, CA: Sage.
- Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (2000). Methodological Issues in the Content Analysis of Computer Conference Transcripts. *International Journal of Artificial Intelligence in Education*, 11, pp. 8-22.
- Russo, T. C., & Koesten, J. (2005). Prestige, Centrality, and Learning: A Social Network Analysis of an Online Class. *Communication Education*, 54(3), 254 - 261.
- Schellens, T., & Valcke, M. (2005). Collaborative learning in asynchronous discussion groups: What about the impact on cognitive processing? *Computers in Human Behaviour*, 21(6), 957-975.
- Schippers, M. C., den Hartog, D. N., Koopman, P. L., & Wienk, J. A. (2003). Diversity and team outcomes: the moderating effects of outcome interdependence and group longevity and the mediating effect of reflexivity. *Journal of Organizational Behaviour*, 24(6), 779-802.
- Schlager, M., Fusco, J., & Schank, P. (2002). Evolution of an online education community of practice. In K. A. Renninger & W. Shumar (Eds.), *Building virtual communities: Learning and change in cyberspace* (pp. 129-158). New York: Cambridge University Press.
- Sfard, A. (1998). On Two Metaphors for Learning and the Dangers of Choosing Just One. *Educational Researcher*, 27(2), 4-13.
- Sparrowe, R. T., Liden, R. C., Wayne, S. J., & Kraimer, M. L. (2001). Social Networks and the Performance of Individuals and Groups. *Academy of Management Journal*, 44(2), 316-325.
- Stacey, E., Smith, P. J., & Barty, K. (2004). Adult learners in the workplace: online learning and communities of practice. *Distance Education*, 25(1), 107 - 123.
- Sutton, R., Neale, M. A., & Owens, D. (2000). Technologies of Status Negotiation: Status Dynamics in Email Discussion Groups: Stanford University, Graduate School of Business.

Chapter 5

- Tachibanaki, T. (1988). Education, occupation, hierarchy and earnings. *Economics of Education Review*, 7(2), 221-229.
- Van den Bossche, P., Gijssels, W., Segers, M., Woltjer, G., & Kirschner, P. (2011). Team learning: building shared mental models. *Instructional Science*, 39(3), 283-301. doi: 10.1007/s11251-010-9128-3
- Veerman, A., & Veldhuis-Diermanse, E. (2001). Collaborative learning through computer-mediated communication in academic education. In P. Dillenbourg, A. Eurelings & K. Hakkarainen (Eds.), *European perspectives on computer-supported collaborative learning: proceedings of the first european conference on computer-supported collaborative learning* (pp. 625-632). Maastricht: McLuhan Institute University Maastricht.
- Venkatraman, N. (1994). IT-Enabled Business Transformation: From Automation to Business Scope Redefinition. *Sloan Management Review*, 35(2).
- Volet, S., Summers, M., & Thurman, J. (2009). High-level co-regulation in collaborative learning: How does it emerge and how is it sustained? *Learning and Instruction*, 19(2), 128-143.
- Webster-Wright, A. (2009). Reframing Professional Development Through Understanding Authentic Professional Learning. *Review of Educational Research*, 79(2), 702-739. doi: 10.3102/0034654308330970
- Weinberger, A., & Fischer, F. (2006). A framework to analyze argumentative knowledge construction in computer-supported collaborative learning. *Computers & Education*, 46(1), 71-95.
- Weisband, S. P., Schneider, S. K., & Connolly, T. (1995). Computer Mediated Communication and Social Information: Status Salience and Status Differences. [Article]. *Academy of Management Journal*, 38(4), 1124-1151. doi: 10.2307/256623
- Zack, M. H., & McKenney, J. L. (1995). Social Context and Interaction in Ongoing Computer-supported Management Groups. [Article]. *Organization Science*, 6(4), 394-422.

CHAPTER 6

Conclusions

6.1 Conclusions

Driven by today's knowledge economy, many organizations have identified learning and the acquisition of knowledge as a key resource in maintaining their competitive advantage (Nonaka, 1994; Peltonen & Lamsa, 2004). As a result, many organizations have undergone considerable efforts and dedicated sizable resources to facilitate learning amongst their employees (Kane & Alavi, 2007). However, the vast majority of the efforts, e.g. instructor-led classrooms, have mainly considered education as a commodity that is consumed by the human mind (Anis, Armstrong, & Zhu, 2004), or provided knowledge that is not applicable to participants everyday working environments (Eraut, 2000). Paired with ever growing time pressure and widely dispersed organizational units, this has resulted in a growing demand for more dynamic and efficient ways to train and teach workforces (Yamhill & McLean, 2001). In this context, some researchers have proclaimed that online collaborative learning methods have a great potential for contributing to the learning process of adult learners (e.g. Armstrong & Sadler-Smith, 2008). More specifically, online Communities of Learning (CoL) have received a growing amount of attention among practitioners and researchers alike (e.g. Rehm, 2009; Stacey, Smith, & Barty, 2004). CoL are defined as groups of people "*engaging in collaborative learning and reflective practice involved in transformative learning*" (Paloff & Pratt, 2003, p. 17), and build upon the notion that learning is an interactive process, where knowledge is being created while collaborating in social networks composed of diverse groups of people (Hakkarainen, Palonen, Paavola, & Lehtinen, 2004). This collaborative process is stimulated via online (asynchronous) communication, which connects people from across different time zones, as well as geographical and intra-organizational boundaries. CoL can thereby combine the knowledge and experience of diverse groups of employees by creating a broader pool of nonoverlapping knowledge that stimulates participants to share information (Akkerman, Admiraal, Simons, & Niessen, 2006). As a result, organizations can create an incubator for new ideas and thoughts that not only contributes to the learning process of individual employees, but also to knowledge creation process of an entire organization (Schlager, Fusco, & Schank, 2002).

However, although the potential benefits of these types of settings have been identified (e.g. Bunderson & Sutcliffe, 2002), empirical research continues to provide only mixed results (e.g. Jehn, Northcraft, & Neale, 1999). On the one hand, groups of diverse participants have been found to create an atmosphere where members share their experiences, while acquiring various job-related skills and effectively processing new information (Jehn & Bezrukova, 2004). On the other hand, other empirical evidence has shown that members' diverse background characteristics can create varying degrees of anxiety among team members, making them feel uncomfortable in communicating with their colleagues and

thereby inhibiting their cognitive functioning in processing new information (Jehn, 1995). Moreover, it has been suggested that participants' *hierarchical positions* have largely been neglected from the analysis of online collaborative learning activities. Yet, scholars have pointed towards the fact that they constitute an important social resource for organizational power (e.g. Krackhardt, 1990; Wellman, 2001). Even more so, some researchers have suggested that hierarchical positions are a major obstacle to collaborative learning processes (e.g. Romme, 1996). However, past empirical research has either overlooked them (e.g. Bunderson, 2003b), focussed on groups that have continuous face-to-face contact (e.g. Simons, Pelled, & Smith, 1999), or mainly conducted research in a laboratory or classroom setting, which yields no new insights from within actual organizations (e.g. Edmondson, 2002; Schippers, den Hartog, Koopman, & Wienk, 2003).

Taking into account the lacunas of previous studies, and based upon anecdotal evidence and preliminary observations from 30 CoL of an online (collaborative) training program of a large international organization, this manuscript identified four challenges that were in need of further understanding to accomplish the full potential of CoL.

- Challenge 1: What are participants' ex-ante and ex-post perceptions of CoL, and how intensively do they make use of their possibility to engage into discussions?
- Challenge 2: Do hierarchical positions affect participants' general level of activity and performance?
- Challenge 3: Over time, do individuals' hierarchical positions affect their network positions within CoL?
- Challenge 4: What is the impact of hierarchical positions on the cognitive level of participants' contributions within CoL?

Based on empirical evidence from these 30 CoL, where 337 participants from different hierarchical positions engaged into online collaborative learning activities, each challenge was examined in the context of a dedicated study. Thereby, this dissertation was able to provide valuable insights, using different research techniques, on the following overarching research question:

“What is the impact of hierarchical positions on participants' learning behaviour and outcomes within Communities of Learning?”

6.2 Unravelling the Black Box – Overview of Empirical Evidence and Findings

The first identified challenge of this dissertation has been the focus of Chapter 2, which defined CoL and described how they have been implemented in the case of a training program for a large, global organization. Next to this descriptive case study, valuable insights were provided on participants' expectations prior to the start of the applicable training program, their overall level of activity within the CoL, and how they evaluated their learning experience after the completion of the CoL. Chapter 3 then zoomed in on how hierarchical positions affected individuals' overall levels of activity and performance within CoL (Challenge 2). This shed some light on the general impact of hierarchical positions on individuals' behaviour and already allowed to make some first inferences on how important this type of background characteristic is for online collaborative learning activities within organizations. Chapter 4 specifically dealt with Challenge 3 and the social network structure of the investigated CoL. Who is more likely to be at the centre of a CoL? Does this change over time? To what extent are hierarchical positions a determinant for certain network positions? All these and other questions were dealt with in the applicable chapter. Chapter 5 then investigated the cognitive level of discussions (Challenge 4). The resulting findings provided valuable insights on what participants discussed within the CoL, how this changed over time, and whether hierarchical positions differed in their amount of social or cognitive communication. Finally, these findings were combined with the insights of a social network analysis, in order to determine how the cognitive level of participants' contributions influenced their network position within the CoL.

6.3 Implementing CoL in a Global Learning Programme – A Positive Showcase (Chapter 2)

Chapter 2 highlighted five aspects that received particular attention in the design and implementation process of a training program for a large, global organization. First, participants were encouraged to engage into an *open dialogue*. This open dialogue was of great importance as it enhanced the possibility of creating what some scholars have called *(neo-)apprenticeship style learning* (e.g. Gannon-Leary & Fontainha, 2007), where more experienced individuals help their less experienced colleagues with the practical ins-and-outs of how certain concepts and tools are applied in daily operations. In return, less experienced colleagues contribute more up-to-date facts and insights to this relationship. In the context of this dissertation, it has been argued that higher level management can generally be considered as having attained higher levels of experience, while lower level management can mainly be associated with lower levels of experience (Tachibanaki, 1988). Second,

the implemented CoL catered for fluctuating *levels of participation*, due to individuals' regular work schedules that conflicted with the collaborative learning activities. Consequently, all collaborative learning activities were conducted via asynchronous discussion forums, which allowed for continuous levels of activity irrespective of time and place. Third, participants had access to both *public* and *private spaces*. The public spaces allowed for the exchange of experiences and knowledge across all participants of the training program. The private spaces (which constituted the core CoL) were only accessible for a smaller group of participants, which fostered a sense of belonging. Fourth, and highly related to the previous aspect of how the CoL were designed, participants were provided with spaces for *informal discussions*. While this type of information did not directly contribute to creation of new knowledge, it constituted important elements for creating a supportive learning environment, where everybody feels comfortable to engage into discussions. Finally, based on the concept of *situated learning* (e.g. Brown, Collins, & Duguid, 1989), participants collaboratively discussed *real-life* and *current problems*. Merely providing knowledge that is detached from a real workplace context has often yielded only ambiguous learning outcomes (Eraut, 2000, 2004). Hence, participants were actively stimulated and supported in applying new knowledge in the circumstances that they could relate to, e.g. their own working environments.

Next to highlighting a number of key aspects that needed to be taken into account in the design and structure of the CoL in question, Chapter 2 also provided the results of a survey including two questionnaires, measuring participants' (1) prior expectations of the CoL and (2) evaluative perceptions of various aspects of the CoL at the end of the learning experience. Additionally, participants' overall level of activity, as measured by their number of contributions within the CoLs' discussion forums, was reported to provide an indication of how extensive the possibility to engage into discussions was used in the learning process. Considering participants' expectations⁵, there was a considerable appreciation of the fact that participation within the CoL took place via asynchronous discussion forums, and therefore irrespective of time and place. Additionally, participants reported that they believed to achieve better results by learning collaboratively within CoL, as compared to learning individually ($M = 4.23$, $SD = 1.33$). Regarding participants overall activity within the discussion forums, on average, 217.13 messages were posted in the CoL. This was comparable with the outcomes of similar studies on online collaborative learning (Rienties, Tempelaar, Waterval,

⁵ The questionnaire consisted of 24 questions, subdivided into four categories, and was administered with a 7-point Likert scale ranging from 1 (not true for me at all) to 7 (completely true for me). The four categories included (the number of questions are reported in brackets): "Reasons to join the course" (6), "Course design" (4), "Expectations and goals" (10) and "Group collaboration" (4). The response rate for the questionnaire was 93.81 %.

Chapter 6

Rehm, & Gijsselaers, 2006) and provided a first indication that the possibility to openly discuss with colleagues was well-received among participants. Moreover, when comparing participants' overall level of activity within the informal and content-driven discussion forums, clear evidence was found that the content-driven forums were at the centre of attention within the CoL. This finding was in contrast to others studies that found online discussions to be mainly fuelled by social, emotional support (Admiraal, Lockhorst, Wubbels, Korthagen, & Veen, 1998). With respect to the end evaluation⁶, participants indicated that the training program was a valuable learning experience ($M = 6.16$, $SD = 1.36$) and that it provided them with a better understanding of the new concepts and methods to assess their everyday work-related challenges ($M = 5.34$, $SD = 1.16$). Furthermore, they indicated that their expectations seemed to be met and that they still believed to have learned more collaboratively, as in comparison to having to learn individually ($M = 4.66$, $SD = 1.92$).

In sum, Chapter 2 summarized the main elements that need to be considered in setting up CoL and provided empirical evidence on the appreciation of this setup among participants of a global training program. It has therefore been established that CoL constitute a viable option for organizations to train their staff. However, this did not yet consider whether and to what extent differing background characteristics among participants might have influenced their behaviour within CoL. More specifically, as has been suggested by previous research on online communities, do hierarchical positions affect participants' general level of activity and performance (Challenge 2)? Additionally, do individuals' hierarchical positions, over time, affect their network positions within CoL (Challenge 3)? What is the impact of hierarchical positions on the cognitive level of participants' contributions within CoL (Challenge 4)? These were the guiding questions of Chapters 3, 4 and 5, respectively, which will be discussed in the following section.

⁶ The questionnaire consisted of 42 questions, subdivided into six categories, and was administered with a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The six categories included (the number of questions are reported in brackets): "Assessment" (2), "Course design" (6), "Course material" (7), "Community of Learning" (6), "Group collaboration" (4), "Goals and tasks" (4), "Instruction" (6) and "Learning satisfaction" (6). The response rate was 51.15 %.

6.4 “You can take the man out of the hierarchy, but you can’t take the hierarchy out of the man”

6.4.1 *Impact of Hierarchical Positions on Individuals’ Level of Activity & Performance (Chapter 3)*

The underlying research study of Chapter 3 addressed the impact of hierarchical positions on individuals’ level of activity and performance within CoL. This issue has become a growing issue of concern, as participants’ hierarchical positions have repeatedly been suggested to have a considerable impact on collaborative learning processes (e.g. Bunderson, 2003a; Krackhardt, 1990; Romme, 1996). Additionally, past research has either focused on the impact of hierarchical positions on regular working environments (Jehn & Bezrukova, 2004), or did not provide empirical data from real organizations (Edmondson, 2002).

The results provided in this manuscript provided evidence for a significant positive relationship between participants’ hierarchical position and their level of activity⁷. This validated the work of researchers like Yates and Orlikowski (1992), who argued that top management would proactively set the tone during discussions. Moreover, the results of Chapter 3 also clearly suggest that lower level management was generally more passive than their colleagues from higher up the organizational ladder, which further supported the notion that hierarchical positions really did have an impact on individuals’ level of activity. Even more so, focusing on *cognitive* (content-driven) communication, the observed differences were particularly pronounced between members of low and high ($U = 2,279.00$, $p = .01$), as well as low and middle levels of management ($U = 2,941.50$, $p = .01$).

Focusing on the impact of hierarchical positions on individuals’ level of performance, this manuscript argued that there would also be a positive relationship between the two variables, leading higher level management to perform better than their colleagues from lower hierarchical positions⁸. The

⁷In the context of this dissertation, and in line with previous research, the level of activity was assessed on the basis of individuals’ quantitative contributions within discussion forums, measured by the amount of individual participant’s *social* (Café-Talk) and *cognitive* (Content-Driven) posts (e.g. Schellens & Valcke, 2005; Strijbos, Martens, Prins, & Jochems, 2006).

⁸In order to determine individuals’ performance levels, this dissertation employed a two-tier approach. First, participants’ final exam grades for the training program in question were measured. Second, using a coding procedure first developed by Veerman and Veldhuis-Diermanse (2001) and then subsequently validated and extended by Schellens and Valcke (2005), the cognitive level of participants’ contributions was assessed. This coding procedure categorized cognitive (task related) communication into: *New Facts* (e.g. reference to data findings), *Own Experience & Opinions* (e.g. sharing professional experience on the topic), *New Theoretical Ideas* (e.g. definitions of domain-specific terms and methodologies), *Explicitation* (e.g. refining information shared before) and *Evaluation* (e.g. combining and critically discussing previous contributions). Increasing cognitive levels were assigned to participants’ messages, from *New Fact* (low) to *Evaluation* (high). Moreover, messages were coded using

underlying line of reasoning was based on research by authors like Bunderson (2003b), who suggested that higher level managers would be accustomed to integrating information from different disciplines and better at inferring upon new information. On the contrary, lower level management was believed to provide more factual information and insights to discussions. In the context of this dissertation the general guideline for the determination of performance measures was to assign higher values for more complex contributions. Hence, if participants were able to replicate knowledge, for example citing definitions of key terms, they received comparatively low performance measures. In contrast, when participants showed that they were capable of interpreting new information and applying it to their own working environments, they received higher performance measures. Consequently, based on the aforementioned stipulations, it should have been possible to identify a positive relationship between participants' hierarchical position and their observed performance levels. Based on the empirical evidence provided, it was possible to verify this. More specifically, higher level management was able to attain higher scores for their final exam and contributed more and higher levels of cognitive contributions. Another key finding of Chapter 3 is the discovery of a group of *Stars*. The members of this group belonged to the most active and well-performing individuals in their CoL. Moreover, this dissertation showed that membership in the *Star* group was (largely) unrelated to individuals' hierarchical position. The striking element about this was that some representatives of lower level management were able to *get out of the shackles*, actively contribute to the learning process, and show how knowledgeable they were about a certain topic. A possible explanation for this finding could be related to the prior knowledge of participants. Although members of the different hierarchical positions did not significantly differ with respect to this variable, prior knowledge was positively correlated with participants' amount of cognitive communication and performance measures. The potential impact of participants' prior knowledge on their behaviour and performance within learning initiatives has been highlighted by numerous studies (e.g. Dochy & L. McDowell, 1997). It could therefore be argued that this partially explains why some participants have been able to achieve *Star* status within their CoL, while holding lower hierarchical positions.

Overall, the results of Chapter 3 clearly indicate that hierarchical positions are the "*800-pound gorilla*" (Salas & Kozlowski, 2009, p. 468) that participants carry on their backs when engaging in online collaborative learning activities. Moreover, this not only translates into higher levels of activity, but also higher levels of

the "unit of meaning" approach, which accounts for the possibility that a single message can contain more than one "theme" or "idea" (de Wever, Schellens, Valcke, & Van Keer, 2006).

performance. The consequences of these findings become even more far-reaching when considering that participants had to voluntarily share information about their hierarchical positions. Unless they provided this information themselves, their fellow CoL members had no way of knowing this particular detail. Consequently, it really seems that social relationships between members of the same organization are so deeply influenced by hierarchical positions that it affects individuals' behaviour even though they might not know about their underlying relationship. Yet, for some representatives of lower level management it was possible to *break the spell* and emulate the behaviour of higher level management, actively leading their CoL in terms of quantity and quality. However, although this suggests that it is possible for anyone to take a leading role in collaborative learning processes, irrespective of their hierarchical positions, it also remained an exception.

And although these findings already provided a valuable contribution to anticipating how participants will behave within CoL, they did not account for how individual participants interact with colleagues from other hierarchical positions (e.g. de Laat, Lally, Lipponen, & Simons, 2007). For example, if a participant is very active in a learning community, one could assume that she will (over time) become a central figure within the network. Moreover, as Chapter 3 established that higher level management tended to be among the most active, this should translate into a positive relationship between hierarchical position and social network position. Whether this claim could be validated within the CoL, as well as a range of other, related questions, was the focus of Chapter 4.

6.4.2 *The Transferability of Hierarchical Positions into Network Structures of CoL (Chapter 4)*

The purpose of Chapter 4 was to determine whether and to what extent participants' hierarchical positions influenced the network structures of CoL. In order to investigate any possible underlying relationships, a social network analysis (SNA) was employed⁹, which distinguished between *Read-Networks* and *Reply-Networks* (Daradoumis, Martínez-Monés, & Xhafa, 2004). *Read-Networks* captured *indirect links* between participants, which constituted passive connections that could take on the form of reading, but not replying to a colleague's contributions. In case a participant actively reacted to another CoL member's contributions by replying, therefore establishing a *direct link*, this was included in *Reply-Networks*.

⁹All network statistics were computed with the help of UCINET 6.357 (Borgatti, Everett, & Freeman, 2002).

In the context of the investigated *Read-Networks*, no evidence was found on differing network connections and positions between members of different hierarchical positions. This was considered as a preliminary indication that CoL can foster an interpersonal knowledge transfer among participants (Argote & Ingram, 2000), as *everyone read everything*. However, in the context of the *Reply-Networks*, this manuscript clearly indicated that hierarchical positions significantly influenced participants' network positions. First, higher level management contacted more colleagues (higher level of out-degree ties), than lower level management. One possible explanation for this finding has been put forth by authors like Drazin (1990), who stipulated that professionals might not join communities with the intention of learning. Instead, individuals would primarily engage into discussion with colleagues, in order to secure their role, and gain access to and control over information. Similarly, Yates and Orlikowski (1992) argued that higher level management would spend considerable efforts to set the tone in online communication. Second, higher level management was also able to attract more attention (higher level of in-degree ties). Fox (2000) attributed similar findings to lower level management being "*caught in a dilemma*" (p.856). On the one hand, individuals would like to establish their own reputation of being knowledgeable. On the other hand, they are required to consider existing social relationships and rules of conduct. Sutton and colleagues (2000) argued that members from lower hierarchical positions would therefore spent most of their time trying to blend in, and not upsetting the status quo. In practice, this would then translate into lower level management frequently contacting their colleagues from higher hierarchical positions, in order to stay connected and share affirmative posts (Bird, 1994). The observations described above also fed through to participants' degree of centrality within their CoL. More specifically, the higher participants' hierarchical position, the higher their centrality score turned out to be. Generally, this confirms previous studies, which noted that occupying high-level positions within an organization provides individuals with an intrinsic attraction to lower level management (Casciaro, 1998). Moreover, this suggest a type of vortex, where lower level management tried to get connected and, over time, stay in contact with higher level management (Krackhardt, 1990), while they, with only constrained access to valued resources, held more peripheral network positions (Borgatti & Cross, 2003). Finally, this general trend also fed through to individuals' ego networks, which represent "*networks consisting of a single actor (ego) together with the actors they are connected to (alters) [...]*." (Everett & Borgatti, 2005, p. 31). More specifically, higher level management had larger ego networks (size) that also exhibited higher levels of density, as compared to their colleagues from lower level management positions. Finally, when conducting a longitudinal analysis of the underlying data, the findings showed that the severance of the observations increased over time, but was mainly rooted in the first half of the CoLs' existence

(e.g. Bird, 1994; Sutton, et al., 2000). During this *initiation phase*, participants got to know each other's background characteristics, including professional experience and prior knowledge. Additionally, participants were also able to exchange either direct (as part of their introduction to the CoL), or indirect (by making appropriate references) information about their hierarchical positions, which significantly influenced participants behaviour towards each other throughout the CoL. Consequently, facilitators of such communities should pay specific attention to this initiation process, in order to be able to possibly intervene in the discussions and assist the central participants to engage the entire group into the discussions.

Overall, Chapter 4 provided evidence for a *hierarchical vortex*, where higher level management held central positions and attracted more attention and connections from their colleagues, and lower level management was located more towards the fringes of their CoL (Borgatti & Cross, 2003; Krackhardt, 1990). However, what did participants actually talk about? Maybe network ties between individual participants only reflected personal commonalities that have no direct link with the actual content of the training and are therefore difficult to control for by organizers of similar initiatives. This and other similar questions were at the core of Chapter 5, which will be discussed next.

6.4.3 *The Impact of Hierarchical Positions on the Communication Patterns within CoL (Chapter 5)*

Chapter 5 explored whether and to what extent participants' hierarchical positions influenced their cognitive level of communication within CoL. Generally, scholars distinguish between two types of communication that can be observed within online collaborative learning environments, namely *social* and *cognitive* communication (Veerman & Veldhuis-Diermanse, 2001). *Social* communication forms the basis for a relationship between participants that can then lead to more content-driven discussions (Nardi, 2005). The *cognitive* dimension describes communication that is specifically related to the content of discussions and captures aspects of knowledge creation. Here, a further categorization into three broad levels is generally suggested, namely into *basic*, e.g. facts and opinions, *intermediate*, e.g. combining and elaborating information, and *advanced* knowledge, e.g. integrating and evaluating information (Veerman & Veldhuis-Diermanse, 2001).

Based on a content analysis of 3389 messages (4038 units of meaning)¹⁰, this dissertation showed that hierarchical positions again have had a significant impact

¹⁰ The content analysis was, as in the case of chapter 3, based on the extended scheme by Veerman and Veldhuis-Diermanse (2001) (Schellens & Valcke, 2005). However, for the purpose of chapter 5, the analysis was extended to also include non-task related (*social*) types of communication, which have been

on individuals within CoL. The higher the hierarchical position of an individual participant, the higher her cognitive level of communication. In other words, middle and higher level management contributed more advanced levels of knowledge to the discussions than their colleagues from lower hierarchical levels. This was in line with previous research that proposed that top and middle management are better able to infer upon new information, while lower management can better recall factual knowledge (Arts, Gijsselaers, & Boshuizen, 2006). Yet, in contrast to an organizational stereotype that employees lose their understanding of day-to-day facts as they “*move up*” a hierarchical ladder, higher level management also contributed more factual knowledge than their colleagues from lower level management. A possible explanation for this might be inherently situated in their position. Having to oversee and coordinate the activities of a wide range of colleagues, they need to *stay on top of things* and be aware of the most recent and central facts that are relevant for their daily work. Contrary to general expectations, higher level management also contributed significantly more social messages. This has been a remarkable finding, as this type of information has usually been assigned to lower level management (Sutton, et al., 2000). In addition to these previous types of analyses, Chapter 5 also conducted a longitudinal study, which revealed that while participants decreased their amount of *social* communication, they increased their *cognitive* contributions. Moreover, while this tendency was valid throughout the entire duration of CoL for *social* messages, the amount of *cognitive* contributions peaked in the first half of the training program. In combination with the pervious described results, this suggests a certain degree of *(neo-)apprenticeship style learning* (Gannon-Leary & Fontainha, 2007), where participants from different hierarchical positions really seemed to benefit from each other’s input.

The results of the content analysis were then also integrated into a SNA, which only further strengthened the importance of hierarchical positions on individuals’ behaviour within CoL. Higher level management, also based on their higher cognitive level of communication, was again contacted more frequently (in- degree connections) and held more central positions (in-degree centrality) in their CoL than their colleagues. However, as in Chapter 3, the results also identified again a sub-group of “*Stars*” that outperformed their colleagues in terms of cognitive contributions and who really were at the centre of their CoL networks. This is another remarkable finding of this dissertation as it somehow reduces the weight of the “*800-pound gorilla*” (Salas & Kozlowski, 2009, p. 468) that participants have to carry around when engaging in online collaborative learning activities.

categorized into: *Planning* (e.g. establishing rules for the progress of the discussion), *Technical* (e.g. issues concerning the use of the virtual learning environment), *Social* (e.g. acknowledgement of each other’s contributions), and *Nonsense* (e.g. messages related to issues such as weather and hobbies).

However, although this seems to suggest that anyone can take on a leading role within CoL, this also remained the exception. Nonetheless, HRD practitioners should certainly take this finding into account, as it can have far-reaching consequences on how CoL should be set up in the future.

6.5 Practical Implications for future CoL

Based on the different research studies that form the basis for this dissertation, a few implications and suggestions can be formulated that will assist HRD managers to design future CoL, and help (online) facilitators to enhance their understanding of how they can foster the learning process of participants, which in turn contributes to the overall success of CoL.

6.5.1 *Design of CoL*

Chapter 2 highlighted the main characteristics of a successfully designed CoL and underlined their relevance by providing affirmative evaluation results from participants of a global training program. However, based on the results of the remaining chapters of this dissertation, a range of design issues can be summarized that should be taken into account for future CoL.

First, as hierarchical positions play such an important role in collaborative activities within CoL, HRD managers might want to consider assigning different roles to participants. However, instead of aligning these roles to participants' anticipated behaviour (higher level management taking the lead; lower level management observing discussions), lower level management could be asked to perform the task of *discussions leaders*, while their colleagues from the higher level management would be asked to take on the role of *minute-taker*. This could provide representatives of lower level management with a kick-start, effectively catapulting them into the centre of attention. Consequently, they may find it easier to share their knowledge and skills and therefore attain a more central position in the learning process. A possible, positive side-effect would be that they also immediately would train their *leadership* skills. Higher level management, on the other hand, would be implicitly held back and distracted from setting the tone in discussions. Having been assigned to focus more on collecting what has been discussed and not actively steering discussions, this might reduce their dominant role, at least temporarily, and provide more equal opportunities for all participants to actively share their knowledge and insights.

Second, if the assignment of roles according to *weaknesses* might be considered as undesirable, an alternative option would be to stimulate higher level management to (more) actively draw upon the input of their colleagues, thereby allowing also participants from lower level management to gradually move

towards the centre of the CoL network. This could be achieved by designing assignments that build upon a *mentoring system*. Here, higher level management could *take their colleagues from lower hierarchical positions by the hand* and introduce them to more complex information on how certain methodologies are applied in their working environments, while at the same time encouraging them to ask questions and comment on discussions. This could create a *pull-effect*, whereby participants, who generally tend to occupy positions towards the fringe of a learning network, are drawn closer towards the centre. This would make them a more integral part of the CoL and provide them with better opportunities to share their knowledge and insights. Using the analogy of Kozlowski and colleagues (2009), lower level management would thereby be enabled to more easily contribute their own piece to the overall puzzle.

Finally, HRD managers should also incorporate participants' prior knowledge and content expertise into their placement decision of participants within CoL. This could then translate into trying to combine participants that already have (considerable) knowledge about a certain topic with individuals who have lower levels of prior knowledge. Moreover, this information could also be shared among the members of a CoL before the start of collaborative activities. The potential benefit would be to provide participants with a clear overview of whom they are collaborating with. After all, it always helps when you know who your colleagues are (Cohen & Zhou, 1991).

6.5.2 Facilitation of CoL

The previous suggestions have focused on the design of CoL. However, this dissertation also discovered a range of CoL characteristics that should be considered when facilitating similar initiatives in the future. Yet, before introducing the applicable suggestions and implications, it should be noted the topic of how online collaborative learning activities should be facilitated continues to be hotly debated. Moreover, this issue will also be touched upon in the outlook for future research at the end of this chapter.

First, Chapter 2 indicated that online facilitators were well appreciated among participants. Nonetheless, participants also indicated that they would have liked the facilitators to take a more active role in the learning process. Consequently, facilitators could be instructed to become more pro-active, regularly intervene in the learning process and thereby provide even more structure and guidance to participants.

Second, Chapter 4 established that the *Reply-Networks* were not densely connected. This could be considered as an issue of concern, as the applicable networks captured the direct links between participants, and therefore provided a measure of how active individuals engaged into discussions with each other.

Additionally, higher level management turned out to be more embedded within their CoL, as compared to their colleagues from lower level management. As a result, facilitators could strive to act more as *intermediaries* or *knowledge brokers* between otherwise disconnected participants. In practice, this could translate in facilitators recapitulating the contribution of a certain (central) individual and then specifically asking an individual, who is positioned towards the fringe of a CoL, to comment and share her own point of view on the matter. Again, as facilitators can be considered as an *external party* this would circumvent any possible tensions that might otherwise develop due to, for example, lower level management questioning the contributions of higher level management.

Finally, when considering the longitudinal findings of this manuscript, the first half of the CoL has been identified as the crucial timeframe during which the observed effects of hierarchical positions developed and solidified for the rest of the CoL. During the beginning stages of the learning process, participants get to know each other's background characteristics, including professional experience and prior knowledge. Additionally, participants will also exchange either directly (as part of their introduction to the CoL), or indirectly (by making appropriate references) information about their hierarchical positions. This in turn will significantly influence their behaviour towards each other throughout the CoL. Consequently, facilitators of such communities should pay specific attention to this initiation process, in order to try to foster an evenly distributed level of activity, allowing each hierarchical position to capitalize on their strengths, and assisting anticipated central participants to engage the entire group into the discussions.

6.6 Outlook – Next (Possible) Steps

This PhD thesis has provided new insights on how CoL can be implemented within organizations and highlighted the significant impact of hierarchical positions on collaborative learning processes. However, despite these contributions to academic research and organizational practice, this manuscript could also only cover a certain amount of topics. Consequently, future research is needed to further investigate CoL in general and how they can contribute to the activities and outcomes of online collaborative learning processes within organizations. In the following, a few possible research topics will be introduced and discussed that would be interesting to explore in more detail in the future.

6.6.1 *Investigating the nature of Stars*

Building upon the findings of this study, future research should further investigate the nature of the identified *Stars*. This group, which is not confined to a single hierarchical position, can be considered as the driving force behind CoL.

Representatives of this group are more active than their colleagues and really contribute to a continuous inflow of new information and knowledge. Moreover, the cognitive level of their contributions, as well as their overall performance, also exceeds that of their colleagues. Their activity within the CoL can therefore not only be considered as contributing to the overall process of learning, but also to the overall process of knowledge creation CoL. A better understanding of these participants' characteristics and traits would therefore greatly contribute to the understanding of how organizers can identify these individuals ex-ante and compose future CoL, so as to increase the chances of achieving high quality learning outcomes.

6.6.2 *Determining the "Quality of Communication"*

This dissertation employed the content analysis scheme that has been validated and assessed to be well suited to gain an overview of the general cognitive processes that take place within learning communities (de Wever, Schellens, Valcke, & van Keer, 2006). While this provided valuable insights about the cognitive level of participants' discussions and whether and to what extent this might have been affected by their hierarchical positions, it neglected how certain aspects of participants' contributions might have been picked up and further developed by their colleagues. Coding schemes, like the three stage model by Järvelä & Häkkinen (2002), specifically focus on these types of knowledge diffusion between participants. First the level of contributions within a discussion forum is determined. Second, the level of the discussions is identified. Finally, the "*quality of communication*" (Järvelä & Häkkinen, 2002, p. 12) is assessed. The purpose here really is to investigate the extent with which there have been reciprocal discussions and whether participants *stepped out of their box*, critically re-considering their practices and incorporating the views, experiences and contributions of their colleagues. Future research should also explore this type of content analysis, to further contribute to our understanding of how CoL can foster the interpersonal knowledge exchange among participants.

6.6.3 *A Comparison between CoL for (Bachelor) Students and Working Professionals*

This dissertation has repeatedly argued that organizations are continuously looking for new ways and methods to teach and train their employees. However, this search is not confined to organizations only. Instead, institutes of higher education are also increasingly facing demands that call for more flexible and innovative ways of teaching their students. This demand is mainly driven by the

increasing diversity of learners from various educational backgrounds (e.g. Rienties, Tempelaar, Waterval, Rehm, & Gijsselaers, 2006; Vrasidas & Zembylas, 2003). In Europe, the ratification of the Treaty of Bologna has created considerable transitional challenges for incoming university students. While international students might fulfil all requirements to be accepted at a foreign university, they might significantly differ in their actual level of prior knowledge, which can effectively hinder them in their studies. Consequently, numerous types of online (collaborative) activities have been developed that aim at reducing the gap in participants' prior knowledge (Bryant, Kahle, & Schafer, 2005). Moreover, to a large extent, these initiatives either borrow from the concept of CoL, or practically implement them. It would therefore be interesting to contrast and compare the behaviour of students and working professionals within CoL, in order to either draw parallels (what aspects are universally applicable?), or establish clear distinctions (what aspects *only* work for which target group?).

A first attempt to investigate this issue has already been accomplished (Rehm, Giesbers, & Rienties, 2009) whereby the CoL for two different target groups were compared. More specifically, the first target groups was comprised of incoming bachelor students at a Dutch university (N = 100), and the second of working professionals of a global organization (N = 219). Both CoL were based on asynchronous discussion forums and aimed at remediating knowledge gaps in economics. The applicable findings suggested that bachelor students spent considerable more effort in exchanging social information with each other than working professionals. In contrast, as they remained a vibrant part, working professionals seemed to implicitly agree to rather collaboratively discuss content, than to exchange personal information. Finally, bachelor students were more concerned about their online image, while working professionals were more critical about the general circumstances. These findings can be considered as a springboard for further research on the difference and similarities between the two target groups.

6.6.4 *The Impact of Facilitators on CoL for Working Professionals*

Paloff and Pratt (2003) stipulated that online learning communities must be cherished and protected in order to become an effective educational resource. In other words, there is a strong need for the (active) involvement of facilitators (Anderson, Rourke, Garrison, & Archer, 2001). Even more so, according to Cho, Stefanone and Gay (2002), facilitator activity is one of the key processes involved in successful, or unsuccessful, participant interaction. Generally, it has been established that the visibility of online facilitators can vary along the continuum,

from that of *sage on stage* through to *guide on the side* (Mazzolini & Maddison, 2003). According to some research, the guide on the side is the desired mode of facilitator activity, on the grounds that too much instruction reduces interaction among participants (Woods, 2002). In contrast, other studies indicated that limited participation on the part of facilitators can reduce the quality of learning outcomes and jeopardise the social dynamics of collaborative learning (Jones & Issroff, 2005).

However, in addition to these ambiguous findings, past research has mainly investigated the role of facilitators in settings of higher education and neglected their impact on online collaborative learning within organizations. Consequently, as CoL are increasingly acknowledged as an attractive tool to foster knowledge creation within organizations, future research should address this shortcoming and provide empirical evidence on how working professionals should be facilitated in order to enhance the underlying learning processes and outcomes. In order to contribute to this discussion, a first preliminary research study has already been conducted (Rehm, Galazka, Gijsselaers, & Segers, 2012). Based on 210 participants of a global training program, who engaged into collaborative learning via CoL, the study investigated how facilitators' level of activity and type of communication affected the behaviour and performance of participants. Overall, participants did not appear to need much stimulation from facilitators, in order to contribute to discussions. A possible explanation for this might be that at the start of the CoL, participants already possessed considerable practical expertise, as gained through relevant work experience, and did not need as much assistance to actively engage into content-driven discussions with colleagues. Even more so, working professionals seemed to enjoy the challenge of partaking in a debate on a high cognitive level. Hence, it seems that facilitators can safely take the role of *sage on stage* and share a high amount of cognitive contributions, particularly at early stages of a CoL, as this only seems to trigger working professionals to join the discussions and share their own experiences and knowledge. In the future, these preliminary findings should be validated in other organizational settings and combined with a social network analysis. The latter would be particularly interesting, as it allows to determine how dependent CoL really are on the active participation of facilitators. Are the network structures going to crumble when the facilitator are removed from the CoL, or are participants sufficiently stimulated and willing to collaboratively learn about new concepts and methodologies?

6.7 References

Akkerman, S., Admiraal, W., Simons, R. J., & Niessen, T. (2006). Considering Diversity: Multivoicedness in International Academic Collaboration. *Culture Psychology, 12*(4), 461-485. doi: 10.1177/1354067x06069947

- Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing Teaching Presence in a Computer Conferencing Context. *Journal of Asynchronous Learning Networks*, 5(2), 1-17.
- Anis, M., Armstrong, S. J., & Zhu, Z. (2004). The Influence of Learning Styles on Knowledge Acquisition in Public Sector Management. *Educational Psychology: An International Journal of Experimental Educational Psychology*, 24(4), 549 - 571.
- Argote, L., & Ingram, P. (2000). Knowledge Transfer: A Basis for Competitive Advantage in Firms. *Organizational Behavior and Human Decision Processes*, 82(1), 150-169.
- Armstrong, S. J., & Sadler-Smith, E. (2008). Learning on Demand, at Your Own Pace, in Rapid Bite-Sized Chunks: The Future Shape of Management Development? *Academy of Management Learning & Education*, 7(4), 571-586.
- Arts, J. A., Gijssels, W. H., & Boshuizen, H. (2006). Understanding managerial problem-solving, knowledge use and information processing: Investigating stages from school to the workplace. *Contemporary Educational Psychology*, 31(4), pp. 387-410.
- Bird, A. (1994). Careers as repositories of knowledge : a new perspective on boundaryless careers. *Journal of Organizational Behavior*, 15, 325-344.
- Borgatti, S. P., & Cross, R. (2003). A Relational View of Information Seeking and Learning in Social Networks. *Management Science*, 49(4), 432-445.
- Borgatti, S. P., Everett, M. G., & Freeman, L. C. (2002). *Ucinet for Windows: Software for Social Network Analysis*. Harvard, MA: Analytic Technologies.
- Brown, J. S., Collins, A., & Duguid, P. (1989). Situated Cognition and the Culture of Learning. *Educational Researcher*, 18(1), 32-42.
- Bryant, S. M., Kahle, J. B., & Schafer, B. A. (2005). Distance Education: A Review of the Contemporary Literature. *Issues in Accounting Education*, 20(3), 255-272.
- Bunderson, J. S. (2003a). Recognizing and Utilizing Expertise in Work Groups: A Status Characteristics Perspective. *Administrative Science Quarterly*, 48(4), 557-591.
- Bunderson, J. S. (2003b). Team Member Functional Background and Involvement in Management Teams: Direct Effects and the Moderating Role of Power Centralization. *Academy of Management Journal*, 46(4), 458-474.
- Bunderson, J. S., & Sutcliffe, K. M. (2002). Comparing Alternative Conceptualizations of Functional Diversity in Management Teams: Process and Performance Effects. *Academy of Management Journal*, 45(5), 875-893.
- Casciaro, T. (1998). Seeing things clearly: social structure, personality, and accuracy in social network perception. *Social Networks*, 20(4), 331-351.
- Cho, H., Stefanone, M., & Gay, G. (2002). *Social information sharing in a CSCL community*. Paper presented at the Proceedings of the Conference on

Chapter 6

- Computer Support for Collaborative Learning: Foundations for a CSCL Community, Boulder, Colorado.
- Daradoumis, T., Martínez-Monés, A., & Xhafa, F. (2004). An Integrated Approach for Analysing and Assessing the Performance of Virtual Learning Groups *Groupware: Design, Implementation and Use* (Vol. 3198, pp. 289-304): Springer Berlin / Heidelberg.
- de Laat, M., Lally, V., Lipponen, L., & Simons, R.-J. (2007). Investigating patterns of interaction in networked learning and computer-supported collaborative learning: A role for Social Network Analysis. *Computer-Supported Collaborative Learning, 2*, 87-103.
- de Wever, B., Schellens, T., Valcke, M., & Van Keer, H. (2006). Content analysis schemes to analyze transcripts of online asynchronous discussion groups: A review. *Computers & Education, 46*(1), 6-28.
- Dochy, F. J. R. C., & McDowell, L. (1997). Assessment as a tool for learning. *Studies In Educational Evaluation, 23*(4), 279-298.
- Drazin, R. (1990). Professionals and Innovation: Structural-Functional versus Radical-Structural Perspectives. *Journal of Management Studies, 27*(3), 245-263.
- Edmondson, A. C. (2002). The Local and Variegated Nature of Learning in Organizations: A Group-Level Perspective. *Organization Science, 13*(2), 128-146. doi: 10.1287/orsc.13.2.128.530
- Eraut, M. (2000). Non-formal learning and tacit knowledge in professional work. *British Journal of Educational Psychology, 70*, 113-136.
- Eraut, M. (2004). Informal learning in the workplace. *Studies in Continuing Education, 26*(2), 247 - 273.
- Everett, M., & Borgatti, S. P. (2005). Ego network betweenness. *Social Networks, 27*(1), 31-38.
- Fox, S. (2000). Communities of Practice, Foucault and Actor-Network Theory. *Journal of Management Studies, 37*(6), 853-867.
- Gannon-Leary, P., & Fontainha, E. (2007). Communities of Practice and virtual learning communities: benefits, barriers and success factors. *eLearning Papers, 5*(September 2007).
- Guldborg, K. (2008). Adult learners and professional development: peer-to-peer learning in a networked community. *International Journal of Lifelong Education, 27*(1), 35 - 49.
- Hakkarainen, K., Palonen, T., Paavola, S., & Lehtinen, E. (2004). *Communities of networked expertise: Professional and educational perspectives*. Amsterdam: Elsevier.
- Järvelä, S., & Häkkinen, P. (2002). Web-based Cases in Teaching and Learning - the Quality of Discussions and a Stage of Perspective Taking in Asynchronous Communication. *Interactive Learning Environments, 10*(1), 1 - 22.

- Jehn, K. A. (1995). A Multimethod Examination of the Benefits and Detriments of Intragroup Conflict. *Administrative Science Quarterly*, 40(2), 256-282.
- Jehn, K. A., & Bezrukova, K. (2004). A field study of group diversity, workgroup context, and performance. *Journal of Organizational Behavior*, 25(6), 703-729.
- Jehn, K. A., Northcraft, G. B., & Neale, M. A. (1999). Why Differences Make a Difference: A Field Study of Diversity, Conflict, and Performance in Workgroups. *Administrative Science Quarterly*, 44(4), 741-763.
- Jones, A., & Issroff, K. (2005). Learning technologies: Affective and social issues in computer-supported collaborative learning. *Computers & Education*, 44(4), 395-408.
- Kane, G. C., & Alavi, M. (2007). Information Technology and Organizational Learning: An Investigation of Exploration and Exploitation Processes. *Organization Science*, 18(5), 796-812.
- Krackhardt, D. (1990). Assessing the Political Landscape: Structure, Cognition, and Power in Organizations. *Administrative Science Quarterly*, 35, 342-369.
- Mazzolini, M., & Maddison, S. (2003). Sage, guide or ghost? The effect of instructor intervention on student participation in online discussion forums. *Computers & Education*, 40(3), 237-253.
- Nardi, B. (2005). Beyond Bandwidth: Dimensions of Connection in Interpersonal Communication. *Computer Supported Cooperative Work (CSCW)*, 14(2), 91-130. doi: 10.1007/s10606-004-8127-9
- Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science*, 5(1), 14-37.
- Paloff, R., & Pratt, K. (2003). *The virtual student: A profile and guide to working with online learners*. San Francisco: Jossey-Bass.
- Peltonen, T., & Lamsa, T. (2004). 'Communities of Practice' and the Social Process of Knowledge Creation: Towards a New Vocabulary for Making Sense of Organizational Learning. *Problems and Perspectives in Management*(4), 249-262.
- Rehm, M. (2009). Unified in Learning – Separated by Space: Case Study on a Global Learning Programme. *Industry and Higher Education*, 23(4).
- Rehm, M., Galazka, A., Gijsselaers, W., & Segers, M. (2012). *Managing Communities of Learning for Working Professionals: The Impact and Role of Facilitators*. Paper presented at the Educational Innovation in Economics and Business (EDiNEB), Haarlem, the Netherlands.
- Rehm, M., Giesbers, B., & Rienties, B. (2009). *Comparing Communities of Learning for Incoming Bachelor Students & Working Professionals*. Paper presented at the Student Mobility and ICT: Dimensions of Transition, Amsterdam.
- Rienties, B., Tempelaar, D., Waterval, D., Rehm, M., & Gijsselaers, W. (2006). Remedial Online Teaching on a Summer Course. *Industry and Higher Education*, 20(5), 327-336.

Chapter 6

- Romme, A. G. L. (1996). A Note on the Hierarchy-Team Debate. *Strategic Management Journal*, 17(5), 411-417.
- Salas, E., & Kozlowski, S. W. J. (2009). Learning, Training, and Development in Organizations: Much Progress and a Peek Over the Horizon. In E. Salas & S. W. J. Kozlowski (Eds.), *Learning, Training, and Development in Organizations*. New York, NY, United States of America: Routledge.
- Schellens, T., & Valcke, M. (2005). Collaborative learning in asynchronous discussion groups: What about the impact on cognitive processing? *Computers in Human Behavior*, 21(6), 957-975.
- Schippers, M. C., den Hartog, D. N., Koopman, P. L., & Wienk, J. A. (2003). Diversity and team outcomes: the moderating effects of outcome interdependence and group longevity and the mediating effect of reflexivity. *Journal of Organizational Behavior*, 24(6), 779-802.
- Schlager, M., Fusco, J., & Schank, P. (2002). Evolution of an online education community of practice. In K. A. Renninger & W. Shumar (Eds.), *Building virtual communities: Learning and change in cyberspace* (pp. 129-158). New York: Cambridge University Press.
- Simons, T., Pelled, L. S., & Smith, K. A. (1999). Making Use of Differences: Diversity, Debate, and Decision Comprehensiveness in Top Management Teams. *Academy of Management Journal*, 42(6), 662-673.
- Stacey, E., Smith, P. J., & Barty, K. (2004). Adult learners in the workplace: online learning and communities of practice. *Distance Education*, 25(1), 107 - 123.
- Strijbos, J.-W., Martens, R. L., Prins, F. J., & Jochems, W. M. G. (2006). Content analysis: What are they talking about? *Computers & Education*, 46(1), 29-48.
- Sutton, R., Neale, M. A., & Owens, D. (2000). Technologies of Status Negotiation: Status Dynamics in Email Discussion Groups: Stanford University, Graduate School of Business.
- Tachibanaki, T. (1988). Education, occupation, hierarchy and earnings. *Economics of Education Review*, 7(2), 221-229.
- Veerman, A., & Veldhuis-Diermanse, E. (2001). *Collaborative learning through computer-mediated communication in academic education*. Paper presented at the In EURO CSCL 2001. Maastricht: McLuhan Institute. University Maastricht.
- Vrasidas, C., & Zembylas, M. (2003). The Nature of Technology-mediated Interaction in Globalised Distance Education. *International Journal of Training and Development*, 7(4), 271-286.
- Wellman, B. (2001). Computer Networks as Social Networks. *Computers and Science*, 293, 2031-2034.
- Woods, R. H. J. (2002). How Much Communication Is Enough in Online Courses? Exploring the Relationship between Frequency of Instructor-Initiated

- Personal Email and Learner's Perceptions of and Participation in Online Learning. *International Journal of Instructional Media*, 29(4), 377-394.
- Yamhill, S., & McLean, G. N. (2001). Theories supporting transfer of training. *Human Resource Development Quarterly*, 12(2), 195-208. doi: 10.1002/hrdq.7
- Yates, J., & Orlikowski, W. J. (1992). Genres of Organizational Communication: A Structural Approach to Studying Communication and Media. *Academy of Management Review*, 17(2), 299-326.

Samenvatting

Samenvatting

Gedreven door de huidige kenniseconomie zien steeds meer organisaties levenslang leren en kennisgroei als essentieel voor het waarborgen van hun succes (bv. Nonaka, 1994; Peltonen & Lamsa, 2004). In combinatie met de steeds toenemende tijdsdruk en globalisering, heeft dit geresulteerd in een groeiende vraag naar meer dynamische en efficiënte leermethodieken (Yamhill & McLean, 2001). In deze context hebben onderzoekers gesuggereerd dat online samenwerkend leren kan bijdragen tot het leerproces van werknemers (bv. Armstrong & Sadler-Smith, 2008). In het bijzonder krijgen online *Communities of Learning* (CoL) steeds meer aandacht (bv. Stacey, Smith, & Barty, 2004). CoL's worden gedefinieerd als groepen mensen "*engaging in collaborative learning and reflective practice involved in transformative learning*" (Paloff & Pratt, 2003, p. 17), en bouwen voort op de idee dat leren een interactief proces is, waarbij kennis wordt opgebouwd terwijl mensen, met verschillende achtergrondeigenschappen, samenwerken in sociale netwerken (Hakkarainen, Palonen, Paavola, & Lehtinen, 2004). Het samenwerken wordt hierbij gestimuleerd via online (asynchrone) discussiefora, die communicatie tussen deelnemers mogelijk maken en hun de kans geven om kennis en ervaringen uit te wisselen. Zo kan een CoL deel uitmaken van een organisatie en een incubator zijn voor nieuwe ideeën en gedachten. Een CoL stimuleert op deze manier niet alleen het leerproces van individuele werknemers, maar leidt ook tot de kennisvernieuwing van een volledige organisatie (Schlager, Fusco, & Schank, 2002).

Echter, hoewel verschillende voordelen van CoL's genoemd worden in de literatuur (bv. Bunderson & Sutcliffe, 2002), leveren empirische studies ambivalente resultaten op (bv. Jehn, Northcraft, & Neale, 1999). Enerzijds hebben onderzoekers aangetoond dat diversiteit een sfeer kan creëren waarin deelnemers gemakkelijk hun ervaringen met elkaar delen, terwijl ze nieuwe kennis opdoen en hun werkgerelateerde vaardigheden verbeteren (Jehn & Bezrukova, 2004). Anderzijds heeft empirisch onderzoek ook bewezen dat diversiteit verschillende graden van preoccupatie tussen deelnemers kan veroorzaken, waardoor ze ongemakkelijk met elkaar communiceren en hun leerprestatie afneemt (Jehn, 1995). In het kader hiervan hebben studies gesuggereerd dat de hiërarchische posities van deelnemers, als bron van diversiteit, grotendeels genegeerd werden in voorgaand onderzoek naar online samenwerkend leren. Toch hebben enkele studies aangetoond dat hiërarchische posities een grote invloed op leerprocessen kunnen hebben (bv. Krackhardt, 1990; Wellman, 2001). Sterker nog, sommige onderzoekers stellen dat de hiërarchische positie van een deelnemer een belangrijk drempel voor samenwerkend leren kan zijn (bv. Romme, 1996). Nochtans heeft eerder empirisch onderzoek drie voornamelijke tekortkomingen: i) de invloed van hiërarchische posities op leerprocessen werd niet onderzocht (bv. Bunderson,

2003a), ii) de focus heeft op deelnemers gelegen die continu fysiek bij elkaar kwamen (bv. Simons, Pelled, & Smith, 1999), iii) onderzoek heeft geen nieuwe empirische inzichten uit organisaties opgeleverd (bv. Edmondson, 2002; Schippers, den Hartog, Koopman, & Wienk, 2003).

Uitgaande van de veronderstelling dat hiërarchische posities een groot invloed op samenwerkende leerprocessen hebben (bv. Romme, 1996), en op basis van observaties en voorlopige bevindingen van een online leerprogramma van een internationale organisatie, heeft dit manuscript vier uitdagingen geïdentificeerd:

- Uitdaging 1: Wat zijn de ex-ante en ex-post percepties van deelnemers over CoL's, en hoe intensief maken ze gebruik van hun mogelijkheid om deel te nemen aan discussies?
- Uitdaging 2: Hebben hiërarchische posities een invloed op de participatiegraad en prestatie van deelnemers?
- Uitdaging 3: Met verloop van tijd, zijn sociale netwerk posities van deelnemers binnen CoL's beïnvloed door hun hiërarchische posities?
- Uitdaging 4: Wat is de invloed van hiërarchische posities op het niveau van de cognitieve bijdrage van deelnemers binnen CoL's?

Op basis van empirische data uit deze 30 CoL, en met behulp van verschillende onderzoekstechnieken, is elke uitdaging in een aparte studie onderzocht. De resultaten uit dit proefschrift leveren daardoor waardevolle inzichten op in de volgende overkoepelende onderzoeksvraag:

„Wat is het effect van hiërarchische posities op het leergedrag en de prestatie van deelnemers binnen Communities of Learning?“

Overzicht van Empirische Resultaten

CoL binnen een Globaal Trainingsprogramma - een Succesvolle Showcase (Hoofdstuk 2)

Op basis van een casestudie werden in hoofdstuk 2 vijf kenmerken geïdentificeerd die van belang zijn bij het ontwerpen en implementeren van een CoL binnen een internationale organisatie. Ten eerste, werden deelnemers aangemoedigd om deel te nemen aan een *open dialoog*, waarin informatie en ervaringen uitgewisseld konden worden. Ten tweede, hebben asynchrone discussiefora *wisselende participatiegraden* toegelaten, waardoor deelnemers onafhankelijk van tijd en plaats met elkaar konden communiceren. Ten derde, hadden deelnemers toegang tot *publieke* en *private* discussiefora. De *publieke* discussiefora bevorderden de

Samenvatting

uitwisseling van ervaringen en kennis tussen alle deelnemers. De *private* discussie omgevingen vormden de kern van de CoL en waren alleen toegankelijk voor een kleinere groep deelnemers. Ten vierde, werd ruimte voorzien voor *informele discussies*, waarin deelnemers elkaar beter konden leren kennen. Ten vijfde, hebben de deelnemers gezamenlijk aan *reële problemen* gewerkt, waarbij ze gestimuleerd werden om hun nieuw opgedane kennis direct toe te passen in hun eigen werkomgeving. Hoofdstuk 2 heeft verder ook de resultaten uit twee vragenlijsten gerapporteerd, die de (1) ex-ante, en (2) ex-post percepties van de deelnemers over CoL's gemeten hebben. Met betrekking tot hun verwachtingen gaven deelnemers een aanzienlijke appreciatie voor de samenwerkende leeractiviteiten in asynchrone discussiefora aan. In het kader van de ex-post evaluatie, suggereerden de resultaten dat de deelnemers de gezamenlijke leeractiviteiten als waardevol ervaarden. Bovendien werd het algemene activiteitsniveau van deelnemers, bijvoorbeeld het aantal bijdragen binnen de CoL discussiefora, gemeten. Gezien dat het gemiddelde aantal bijdragen per CoL 217.13 berichten was, wat vergelijkbaar is met de metingen uit vergelijkbare studies (Rienties, Tempelaar, Waterval, Rehm, & Gijsselaers, 2006), gaf dit een eerste indicatie dat deelnemers actief gebruik makten van hun mogelijkheid om openlijk met elkaar te discussiëren. Ten slot, gaf hoofdstuk 2 duidelijk aan dat de deelnemers hun aandacht vooral op inhoudelijke discussies binnen de CoL hebben gericht.

Het Effect van Hiërarchische Posities op de participatiegraad en prestatie van Deelnemers (Hoofdstuk 3)

Hoofdstuk 3 analyseerde de invloed van hiërarchische posities op de participatiegraad en prestatie van individuele deelnemers binnen CoL. De resultaten toonden aan dat er een significante positieve relatie tussen de hiërarchische positie van deelnemers en hun participatiegraad, alsook hun prestatie (resultaten voor eindexamen en kwaliteit van contributies) was. Deze bevindingen valideerden de studies van onderzoekers zoals Yates en Orlikowski (1992), die suggereerden dat hoger management proactief de leiding zal nemen binnen (online) discussies. Hoofdstuk 3 gaf ook duidelijk aan dat lager management over het algemeen passiever was dan hun collega's uit hoger management. Echter, voor een kleine subgroep van deelnemers uit lagere hiërarchische posities (*Stars*) was dit niet het geval. Leden uit deze groep slaagden erin om toonaangevend te zijn binnen hun CoL en een vergelijkbare prestatie te leveren als hoger management. Hoewel dit suggereert dat het voor iedereen mogelijk is om aanspraak te maken op een leidende rol binnen CoL, ongeacht hun hiërarchische positie, bleef het bij deze uitzondering.

De overdraagbaarheid van Hiërarchische Posities op de Netwerk Structuren van CoL's (Hoofdstuk 4)

Het doel van hoofdstuk 4 was om de invloed van hiërarchische posities op deelnemers' sociale netwerk positie binnen CoL's te bepalen. Door het leesgedrag van deelnemers te bestuderen, werd gevonden dat een CoL kennisoverdracht tussen deelnemers kan bevorderen (Argote & Ingram, 2000). Echter, als we het actief op elkaar reageren van deelnemers bestudeerden, kwam er een ander beeld naar voren. In dit geval beïnvloedde de hiërarchische positie van deelnemers in belangrijke mate hun netwerk posities. Hoe hoger hun hiërarchische positie, hoe centraler hun netwerk positie binnen de CoL. Een mogelijke verklaring voor deze bevinding zou kunnen zijn dat individuen discussies met collega's starten, niet om te leren, maar om hun rol binnen de organisatie te beveiligen, en controle over informatie te behouden (Drazin, 1990). Een alternatieve veronderstelling is dat lager management "*caught in a dilemma*" (Fox, 2000, p. 856). Enerzijds zijn deelnemers uit deze groep gedreven om hun kennis te delen en zo een reputatie op te bouwen. Anderzijds worden ze geacht bestaande relaties (tussen hiërarchische posities) en gedragsregels te respecteren. Onderzoekers gaven aan dat lager management zich vooral richt op communicatie die de bestaande status quo niet in twijfel trekt (Sutton, Neale, & Owens, 2000) en de positie van hogere management bevestigt (Bird, 1994). Bovendien bleek uit longitudinaal onderzoek dat dit effect over het verloop van tijd toeneemt. Over het algemeen suggereren deze resultaten het bestaan van een *hiërarchische vortex*, waar hogere hiërarchische posities meer aandacht krijgen en daardoor ook een centralere positie in de CoL innemen.

De Invloed van Hiërarchische Posities op Communicatieprocessen binnen CoL's (Hoofdstuk 5)

Hoofdstuk 5 onderzocht of en in welke mate hiërarchische posities een invloed hebben op de communicatieprocessen binnen CoL. In het algemeen maken wetenschappers een onderscheid tussen twee soorten van communicatie die binnen online samenwerkend leeromgevingen plaats vinden, namelijk *sociale* en *cognitieve* communicatie (Veerman & Veldhuis-Diermanse, 2001). *Sociale* communicatie vormt de basis voor een relatie tussen deelnemers en kan vervolgens leiden tot meer inhoudelijke discussies (Nardi, 2005). *Cognitieve* communicatie is gerelateerd aan de inhoud van discussies en bevat aspecten van kenniscreatie. In verband met *cognitieve* communicatie wordt er dan een verdere indeling in drie niveaus aanbevolen, namelijk *basic*, bijv. numerieke feiten en persoonlijke meningen, *intermediate*, bijv. combineren en uitwerken van informatie, en *advanced* kennis, bijv. integreren en evalueren van informatie (Veerman &

Samenvatting

Veldhuis-Diermanse, 2001). Op basis van een inhoudsanalyse van 3184 berichten uit discussiefora, gaf onze studie beschreven in hoofdstuk 5 duidelijk aan dat hiërarchische posities een belangrijke invloed hebben op de soort van communicatie die individuen binnen een CoL voeren. Hoe hoger de hiërarchische positie van een individuele deelnemer, hoe hoger het aantal (hoger) cognitieve contributies. Bovendien, in tegenstelling tot wat verwacht wordt, heeft hoger management ook meer sociale communicatie gevoerd dan hun collega's uit lagere hiërarchische posities. Verder kwam uit een longitudinale studie naar voren dat terwijl de sociale communicatie van alle deelnemers over het verloop van tijd daalde, hun niveau van cognitieve communicatie verhoogde. Een combinatie van een inhoudsanalyse en een sociale netwerkanalyse onderbouwde nog een keer de belangrijke rol van hiërarchische posities op het gedrag van deelnemers binnen een CoL. Hoger management, mede omwille van het hogere cognitieve niveau van hun bijdragen, werd vaker gecontacteerd en namen meer centrale posities in dan hun collega's uit lagere hiërarchische regionen. Echter, zoals in hoofdstuk 3, werd een kleine subgroep van *Stars* geïdentificeerd. Maar, hoewel dit suggereerde dat (in principe) iedereen een leidende rol binnen CoL op zich kan nemen, bleef dit wel weer een uitzondering. Dit neemt niet weg dat organisatoren van toekomstige CoL's hiermee wel rekening zouden moeten houden, omdat deze omstandigheid verstrekken gevolgen kan hebben op het ontwerpen en implementeren van CoL.

De praktische Implicaties voor CoL's

Ontwerp van CoL

In hoofdstuk 2 wordt gewezen op de belangrijkste kenmerken van een succesvol ontworpen CoL. Echter, gebaseerd op de resultaten van de overige studies gerapporteerd in dit proefschrift, kunnen er een aantal aandachtspunten op een rijtje worden gezet die voor toekomstige CoL's van belang zijn. Ten eerste, gezien dat hiërarchische posities een belangrijke rol spelen binnen CoL's, zouden organisatoren kunnen overwegen om, gebaseerd op verwachte gedragspatronen, verschillende rollen aan de deelnemers toe te wijzen. Zo zouden deelnemers uit lagere hiërarchische posities kunnen worden gevraagd om de rol van discussieleider op zich te nemen, terwijl hun collega's uit hoger management de rol van notulist kunnen bekleden. Ten tweede, stel dat het toewijzen van rollen niet wenselijk is, zou het introduceren van een *mentorsysteem* een alternatief kunnen zijn. Hierin zou hoger management kunnen aangeven hoe complexe informatie en bepaalde methodes in de praktijk toegepast kunnen worden, en hun collega's uit lagere hiërarchische posities stimuleren om vragen te stellen en discussies te voeren. Ten derde, en de voorkennis en inhoudelijke expertise van werknemers in

rekening brengend, zouden organisatoren een voordelige leeromgeving kunnen creëren door het bij elkaar brengen van werknemers met verschillende achtergronden. Dit zou dan vervolgens vertaald kunnen worden in CoL's die, onder andere, bestaan uit deelnemers die al (veel) kennis over een bepaald onderwerp hebben, alsook uit personen die minder voorkennis hebben. Bovendien zou de informatie over de voorkennis en inhoudelijke expertise van werknemers ook aan het begin van een CoL onder de deelnemers verspreid kunnen worden. Het potentiële voordeel hiervan zou kunnen zijn dat de deelnemers al een beeld krijgen met wie ze samen gaan werken.

Faciliteren van CoL

Naast de suggesties over hoe een CoL te ontwerpen, heeft dit proefschrift ook een aantal aandachtspunten opgeleverd die zich richten op het faciliteren van soortgelijke initiatieven in de toekomst¹¹. Ten eerste, de resultaten uit hoofdstuk 2 tonen aan dat de begeleiders positief werden gewaardeerd door de deelnemers. Niettemin, gaven deelnemers ook aan dat zij de begeleiders graag in een meer actieve rol in het leerproces hadden gezien. Begeleiders zouden dus aangestuurd kunnen worden om pro-actiever het leerproces te steunen en wellicht ook te sturen, en er voor te zorgen dat nog meer structuur en begeleiding aan de deelnemers wordt verleend. Ten tweede, uit hoofdstuk 4 kwam er na voren dat terwijl deelnemers wel de bijdragen van elkaar gelezen hebben, ze nauwelijks antwoord op elkaar gaven. Echter, een toegevoegde waarde van CoL ligt in het actief discussiëren van deelnemers. Om dit proces te bevorderen kunnen begeleiders proberen om als *informatieschakel* te fungeren tussen anders losgekoppelde deelnemers. In de praktijk zou dit kunnen betekenen dat begeleiders bijdragen van een bepaalde (centrale) individu herhalen en dan aan deelnemers die zich aan de rand van een CoL netwerk bevinden, vragen om hierop te reageren. Ten derde, de longitudinale analyses hebben de initiële fase van het bestaan van een CoL als cruciaal geïdentificeerd, dewelke de effecten van hiërarchische posities vormen en verstevigen. Als gevolg hiervan zouden begeleiders specifiek aandacht kunnen besteden aan deze fase, met als doel een gelijkmatiger verdeeld activiteitsniveau onder de deelnemers te creëren.

¹¹ Echter, is het van belang om aan te geven dat het onderwerp van hoe online leren aangestuurd zal moeten worden (in het algemeen) een veel besproken thema is. Om rekening te houden met deze discussie wordt er specifiek aandacht besteed aan het eind van dit hoofdstuk, waar een overzicht gegeven wordt van mogelijke vervolgstappen van dit onderzoek.

Toekomstige Onderzoeksthema's

Dit proefschrift heeft nieuwe inzichten opgeleverd over hoe CoL's gebruikt kunnen worden binnen organisaties. Bovendien heeft dit manuscript gewezen op de aanzienlijke invloed van hiërarchische posities op samenwerkend leren binnen CoL's. Ondanks deze waardevolle bijdragen aan wetenschappelijk onderzoek en het bedrijfsleven, kon dit manuscript slechts een bepaalde hoeveelheid onderwerpen omvatten. Daarom kan dit manuscript als een bouwsteen beschouwd worden waarop verder onderzoek op het gebied van CoL kan bouwen. In het navolgende zullen een aantal mogelijke thema's geïntroduceerd en besproken worden die interessant zijn om in toekomst verder uit te werken en te onderzoeken.

Kenmerken van de Stars subgroep

Voortbouwend op de bevindingen van dit proefschrift, dienen toekomstige studies onderzoek uit te voeren naar de kenmerken van de vastgestelde *Stars* subgroep. Meer inzicht in de eigenschappen van deze groep kan bijdragen aan het begrijpen van hoe organisatoren in de toekomst CoL's kunnen opzetten, om zo de kansen tot het bereiken van hoge leerresultaten te verhogen.

„Kwaliteit van Communicatie“

Hoewel dit proefschrift gebruik maakt van een inhoudsanalyse die bij uitstek geschikt is om een algemeen overzicht van cognitieve processen binnen leergemeenschappen vast te stellen (de Wever, Schellens, Valcke, & van Keer, 2006), heeft de methode ook zijn beperkingen. Coderingsschema's, zoals het drie fasen model van Järvelä & Häkkinen (2002) richten zich specifiek op vormen van kennis verspreiding tussen deelnemers, die vaststellen in welke mate deelnemers, op basis van de inzichten en ervaringen van hun collega's, hun eigen gedrag kritisch overwegen. Toekomstig onderzoek zou dit soort inhoudsanalyse kunnen implementeren. De resultaten hiervan zouden een aanvullende bijdraag kunnen leveren aan het begrip van hoe CoL's de communicatie tussen deelnemers kunnen bevorderen.

Vergelijking tussen CoL's in het hoger onderwijs en het bedrijfsleven

Dit proefschrift heeft herhaaldelijk betoogd dat een CoL waardevol is voor het trainen van medewerkers. Echter, deze toegevoegde waarde beperkt zich niet tot organisaties alleen. In plaats daarvan worden CoL's in toenemende mate ook binnen instellingen voor hoger onderwijs opgezet, aangeboden en ingebed in het

regulaire curriculum. Het zou daarom interessant zijn om het gedrag van deelnemers, uit deze twee verschillende soorten instellingen met elkaar te vergelijken. De resultaten hiervan zouden onderzoekers in staat stellen om mogelijke parallellen te trekken (welke aspecten zijn universeel toepasbaar?), of duidelijke verschillen te ontdekken (welke aspecten *slechts* werk voor welke doelgroep?).

De effecten van begeleiders op het gebruik van CoL's in het bedrijfsleven

Paloff en Pratt (2003) constateerden dat CoL's beschermd en gekoesterd moeten worden om een effectieve methode voor samenwerkende leren te zijn. Met andere woorden, er is een nood aan (actieve) betrokkenheid van de begeleiders (Anderson, Rourke, Garrison, & Archer, 2001). Eerder onderzoek op dit gebied heeft vastgesteld dat de zichtbaarheid van online begeleiders kan variëren langs het continuüm, van *sage on the stage* tot met *guide on the side* (Mazzolini & Maddison, 2003). De voorstanders van de *guide on the side* methodiek, waarbij de begeleider vooral aan de zijkant blijft en nauwelijks inhoudelijk commentaren op de discussies geeft, beargumenteren dat te veel instructie de interactie tussen deelnemers kan verhinderen (Woods, 2002). Echter geven de aanhangers van de *sage on the stage* handelwijze aan dat beperkte deelname vanuit de kant van begeleiders de kwaliteit van leerresultaten kan verminderen en de sociale dynamiek van samenwerkend leren in gevaar kan brengen (Jones & Issroff, 2005). Voorafgaand onderzoek heeft vooral naar de rol van begeleiders binnen het hoger onderwijs gekeken en hun invloed op CoL's binnen organisaties ontkend. Gezien het feit dat CoL's binnen organisaties steeds meer aandacht ontvangen, zou toekomstig onderzoek zich hierop kunnen richten. Hoe afhankelijk zijn CoL's van de actieve deelname van begeleiders? Zullen sociale netwerk structuren in elkaar vallen als begeleiders verwijderd worden uit CoL's, of zijn de deelnemers voldoende gestimuleerd en bereid om samen met elkaar te leren zonder continu gestimuleerd te worden? De antwoorden op deze vragen zouden meer inzicht kunnen opleveren over hoe CoL's (beter) begeleid kunnen worden, om zo de toegevoegde waarde te vergroten.

Referenties

Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing Teaching Presence in a Computer Conferencing Context. *Journal of Asynchronous Learning Networks*, 5(2), 1-17.

Samenvatting

- Argote, L., & Ingram, P. (2000). Knowledge Transfer: A Basis for Competitive Advantage in Firms. *Organizational Behavior and Human Decision Processes*, 82(1), 150-169.
- Armstrong, S. J., & Sadler-Smith, E. (2008). Learning on Demand, at Your Own Pace, in Rapid Bite-Sized Chunks: The Future Shape of Management Development? *Academy of Management Learning & Education*, 7(4), 571-586.
- Bird, A. (1994). Careers as repositories of knowledge : a new perspective on boundaryless careers. *Journal of Organizational Behavior*, 15, 325-344.
- Bunderson, J. S. (2003). Recognizing and Utilizing Expertise in Work Groups: A Status Characteristics Perspective. *Administrative Science Quarterly*, 48(4), 557-591.
- Bunderson, J. S., & Sutcliffe, K. M. (2002). Comparing Alternative Conceptualizations of Functional Diversity in Management Teams: Process and Performance Effects. *Academy of Management Journal*, 45(5), 875-893.
- de Wever, B., Schellens, T., Valcke, M., & Van Keer, H. (2006). Content analysis schemes to analyze transcripts of online asynchronous discussion groups: A review. *Computers & Education*, 46(1), 6-28.
- Drazin, R. (1990). Professionals and Innovation: Structural-Functional versus Radical-Structural Perspectives. *Journal of Management Studies*, 27(3), 245-263.
- Edmondson, A. C. (2002). The Local and Variegated Nature of Learning in Organizations: A Group-Level Perspective. *Organization Science*, 13(2), 128-146. doi: 10.1287/orsc.13.2.128.530
- Fox, S. (2000). Communities of Practice, Foucault and Actor-Network Theory. *Journal of Management Studies*, 37(6), 853-867.
- Hakkarainen, K., Palonen, T., Paavola, S., & Lehtinen, E. (2004). *Communities of networked expertise: Professional and educational perspectives*. Amsterdam: Elsevier.
- Järvelä, S., & Häkkinen, P. (2002). Web-based Cases in Teaching and Learning - the Quality of Discussions and a Stage of Perspective Taking in Asynchronous Communication. *Interactive Learning Environments*, 10(1), 1 - 22.
- Jehn, K. A. (1995). A Multimethod Examination of the Benefits and Detriments of Intragroup Conflict. *Administrative Science Quarterly*, 40(2), 256-282.
- Jehn, K. A., & Bezrukova, K. (2004). A field study of group diversity, workgroup context, and performance. *Journal of Organizational Behavior*, 25(6), 703-729.
- Jehn, K. A., Northcraft, G. B., & Neale, M. A. (1999). Why Differences Make a Difference: A Field Study of Diversity, Conflict, and Performance in Workgroups. *Administrative Science Quarterly*, 44(4), 741-763.
- Jones, A., & Issroff, K. (2005). Learning technologies: Affective and social issues in computer-supported collaborative learning. *Computers & Education*, 44(4), 395-408.

- Krackhardt, D. (1990). Assessing the Political Landscape: Structure, Cognition, and Power in Organizations. *Administrative Science Quarterly*, 35, 342-369.
- Mazzolini, M., & Maddison, S. (2003). Sage, guide or ghost? The effect of instructor intervention on student participation in online discussion forums. *Computers & Education*, 40(3), 237-253.
- Nardi, B. (2005). Beyond Bandwidth: Dimensions of Connection in Interpersonal Communication. *Computer Supported Cooperative Work (CSCW)*, 14(2), 91-130. doi: 10.1007/s10606-004-8127-9
- Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science*, 5(1), 14-37.
- Paloff, R., & Pratt, K. (2003). *The virtual student: A profile and guide to working with online learners*. San Francisco: Jossey-Bass.
- Peltonen, T., & Lamsa, T. (2004). 'Communities of Practice' and the Social Process of Knowledge Creation: Towards a New Vocabulary for Making Sense of Organizational Learning. *Problems and Perspectives in Management*(4), 249-262.
- Rienties, B., Tempelaar, D., Waterval, D., Rehm, M., & Gijssels, W. (2006). Remedial Online Teaching on a Summer Course. *Industry and Higher Education*, 20(5), 327-336.
- Romme, A. G. L. (1996). A Note on the Hierarchy-Team Debate. *Strategic Management Journal*, 17(5), 411-417.
- Schippers, M. C., den Hartog, D. N., Koopman, P. L., & Wienk, J. A. (2003). Diversity and team outcomes: the moderating effects of outcome interdependence and group longevity and the mediating effect of reflexivity. *Journal of Organizational Behavior*, 24(6), 779-802.
- Schlager, M., Fusco, J., & Schank, P. (2002). Evolution of an online education community of practice. In K. A. Renninger & W. Shumar (Eds.), *Building virtual communities: Learning and change in cyberspace* (pp. 129-158). New York: Cambridge University Press.
- Simons, T., Pelled, L. S., & Smith, K. A. (1999). Making Use of Differences: Diversity, Debate, and Decision Comprehensiveness in Top Management Teams. *Academy of Management Journal*, 42(6), 662-673.
- Stacey, E., Smith, P. J., & Barty, K. (2004). Adult learners in the workplace: online learning and communities of practice. *Distance Education*, 25(1), 107 - 123.
- Veerman, A., & Veldhuis-Diermanse, E. (2001). *Collaborative learning through computer-mediated communication in academic education*. . Paper presented at the In EURO CSCL 2001. Maastricht: McLuhan Institute. University Maastricht.
- Wellman, B. (2001). Computer Networks as Social Networks. *Computers and Science*, 293, 2031-2034.

Samenvatting

- Woods, R. H. J. (2002). How Much Communication Is Enough in Online Courses? Exploring the Relationship between Frequency of Instructor-Initiated Personal Email and Learner's Perceptions of and Participation in Online Learning. *International Journal of Instructional Media*, 29(4), 377-394.
- Yamhill, S., & McLean, G. N. (2001). Theories supporting transfer of training. *Human Resource Development Quarterly*, 12(2), 195-208. doi: 10.1002/hrdq.7
- Yates, J., & Orlikowski, W. J. (1992). Genres of Organizational Communication: A Structural Approach to Studying Communication and Media. *Academy of Management Review*, 17(2), 299-326.

About the Author

Biography

Martin Rehm (1979) obtained his Master degree in International Economics Studies at Maastricht University. In 2003, he became lecturer at the School of Business and Economics at Maastricht University. In 2004, Martin started his career on the general topic of "*online learning*" as a project team member of a Dutch initiative that designed and implemented online remedial teaching courses (Economics) for incoming Bachelor students. From 2006 onwards, he became project manager e-Learning at the Maastricht Graduate School of Governance (MGSoG), where he acquired, coordinated, and participated in a variety of different (blended) learning projects. For Maastricht University this included projects like "*Learning & Working*" and "*Support & Help for Academic Researchers by using IT (SHARE-IT)*". External partners, for which Martin has worked, include the United Nations Children's Fund (UNICEF), the United Nations Relief and Works Agency for Palestine Refugees (UNRWA) and the Russian Ministry for Economic Development.

In 2009, Martin Rehm started his Ph.D. at the MGSoG, in cooperation with the School of Business and Economics at Maastricht University. His general research interests include online collaborative learning, web 2.0 for education, distribution of innovation within (learning) networks and Communities of Learning (within organizations).

From 2013 onwards he will be employed as senior researcher at the MGSoG and UNU-MERIT.

List of Publications & Presentations

Publications

- Rehm, M., Gijsselaers, W., Segers, M. (2012). *Hierarchical positions and their influence on network structures within Communities of Learning*. In B. Rienties, P. Daly, S. Reeb-Gruber, K. Reid, & P. van den Bossche (Eds.), Proceedings of the 19th EDINEB Conference The Role of Business Education in a Chaotic World (pp. 262-270). Haarlem: FEBA ERD Press
- Rehm, M., Galazka, A., Gijsselaers, W., Segers, M. (2012). *Managing Communities of Learning for Working Professionals: The impact and role of facilitators*. In B. Rienties, P. Daly, S. Reeb-Gruber, K. Reid, & P. van den Bossche (Eds.), Proceedings of the 19th EDINEB Conference The Role of Business Education in a Chaotic World (pp. 100-107). Haarlem: FEBA ERD Press
- Rehm, M., Henning, F., Bruynickx, J, Beumer, K., Versteegen, D., van Merriënboer, J. (2012). *Support & Help for Academic Researchers by using Information Technology (SHARE-IT)*. In B. Rienties, P. Daly, S. Reeb-Gruber, K. Reid, & P. van den Bossche (Eds.), Proceedings of the 19th EDINEB Conference The Role of Business Education in a Chaotic World (pp. 117-122). Haarlem: FEBA ERD Press
- Rehm, M., Gijsselaers, W. & Segers, M. (2010). *Diversity in Communities of Learning: The Influence of Hierarchical Position on Individuals' Activity and Performance*. In S. Halley, C. Birch, D. Tempelaar, M. McCuddy, N. Hernández Nanclares, S. Reeb-Gruber, W. Gijsselaers, B. Rienties & E. Nelissen (Eds.), Crossing Borders in Education and Work-based Learning (pp. 300-307). Maastricht: FEBA ERD Press
- Noteborn, G., Rehm, M. & Mullican, D. (2010). *Two Options – One Virtual World: Does it make a difference whether we talk or chat in SecondLife?*. In S. Halley, C. Birch, D. Tempelaar, M. McCuddy, N. Hernández Nanclares, S. Reeb-Gruber, W. Gijsselaers, B. Rienties & E. Nelissen (Eds.), Crossing Borders in Education and Work-based Learning (pp. 449-454). Maastricht: FEBA ERD Press
- Rehm, M., Giesbers, B., & Rienties, B. (2009). *Comparing Communities of Learning for Incoming Bachelor Students & Working Professionals*. In N. Brouwer, B. Giesbers, B. Rienties & L. Van Gastel (Eds.), Student Mobility and ICT: Dimensions of Transition (pp. 143-150). Amsterdam: FEBA ERD Press.
- Rehm, M. (2009). Unified in Learning – Separated by Space: Case Study on a Global Learning Programme. *Industry and Higher Education*, 23(4).

- Rienties, B., Tempelaar, D., Dijkstra, J., Rehm, M., & Gijsselaers, W. H. (2008). Longitudinal study of online remedial education effects. In P. Van den Bosche (Ed.), *Advances in Business Education and Training* (Vol. 1, pp. 43-59): Springer
- Rienties, B., Tempelaar, D., Waterval, D., Rehm, M., Gijsselaers, W. (2006). Remedial online teaching on a summer course, *Industry and Higher Education*, 20(5), pp. 327-336.
- Rienties, B., Tempelaar, D., Dijkstra, J., Rehm, M. (2006). An Online Remedial Teaching Model used in Practice. In T. Lillemaa (Ed.) *Proceedings of the 12th International conference of European University Information System (EUNIS) 2006*, Tartu, Estonia. pp. 266- 272.
- Tempelaar, D., Rienties, B., Rehm, M., Dijkstra, J., Arts, M., & Blok, G. (2006). An online summercourse for prospective international students to remediate deficiencies in Math prior knowledge: the case of ALEKS. In Seppällä, M., Xambo, S., Caprotti, O., (eds). (2006). *Proceedings of WebALT 2006*. Technical University of Eindhoven, The Netherlands. pp. 23-36.
- Rienties, B., Dijkstra, J., Rehm, M., Tempelaar, D. & Blok, G. (2005). Online Bijspijkeronderwijs in de Praktijk (Online Remedial Teaching in Practice). *Tijdschrift voor Hoger Onderwijs*, Vol 4, pp. 239-253

Presentations

- Rehm, M., Gijsselaers, W., & Segers, M. (2012). *Do hierarchical positions influence participant's network behaviour within Communities of Learning?* Paper presented at the AECT 2012, Louisville, Kentucky, USA.
- Rehm, M., Henning, F., Bruynickx, J., Beumer, K., Verstegen, D., & van Merrienboer, J. (2012). *Building bridges between academic tribes: Group Blogging for young researchers across academic disciplines*. Paper presented at the AECT 2012, Louisville, Kentucky, USA.
- Rehm, M., Gijsselaers, W., & Segers, M. (2012). *Communities of Learning in Organizational Training: The influence of participants' hierarchical positions on communication behaviour and learning processes*. Paper presented at the EARLI (SIG14) 2012, Antwerp, Belgium.
- Rehm, M., Gijsselaers, W., & Segers, M. (2012). *Hierarchical positions and their influence on network structures within Communities of Learning*. Paper presented at the EDiNEB 2012, Haarlem, the Netherlands.
- Rehm, M., Galazka, A., Gijsselaers, W., & Segers, M. (2012). *Managing Communities of Learning for Working Professionals: The impact and role of facilitators*. Paper presented at the EDiNEB 2012, Haarlem, the Netherlands.

- Rehm, M., Henning, F., Bruynickx, J., Beumer, K., Verstegen, D., & van Merrienboer, J. (2012). *Support & Help for Academic Researchers by using Information Technology (SHARE-IT)*. Paper presented at the EDiNEB 2012, Haarlem, the Netherlands.
- Rehm, M., Gijsselaers, W., & Segers, M. (2011). *Diversity in Communities of Learning: The Influence of Hierarchical Position on Individuals' Activity and Performance*. Paper presented at the AERA 2011, New Orleans, USA.
- Rehm, M., Gijsselaers, W., & Segers, M. (2011). *Einmal Chef, immer Chef? Der Einfluss hierarchischer Positionen auf Online Communities of Learning*. Paper presented at the PAEPS 2011, Erfurt, Germany.
- Rehm, M., Gijsselaers, W., & Segers, M. (2010). *Diversity in Communities of Learning: The Influence of Hierarchical Position on Individuals' Activity and Performance*. Paper presented at the EDiNEB 2010, London, UK.
- Rehm, M., Gijsselaers, W., & Segers, M. (2010). *The Impact of Hierarchical Structures on Activity Patterns in Communities of Learning*. Paper presented at the JURE 2010, Frankfurt, Germany.
- Noteborn, G., & Rehm, M. (2010). *You only Live Twice - Teaching in Secondlife: What does the trick?* Paper presented at the Student Mobility and ICT: World in Transition Den Haag, The Netherlands.
- Noteborn, G., & Rehm, M. (2010). *You Only Live Twice: Does it matter whether we Talk or Chat in Secondlife*. Paper presented at the OnlineEduca 2010, Berlin, Germany.
- Noteborn, G., Rehm, M., & Mullican, D. (2010). *Two Options - One Virtual World: Does it make a difference whether we talk or chat in SecondLife?* Paper presented at the EDiNEB 2011, London, UK
- Rehm, M., Giesbers, B., & Rienties, B. (2009). *Comparing Communities of Learning for Incoming Bachelor Students & Working Professionals*. Paper presented at the Student Mobility and ICT: Dimensions of Transition, Amsterdam.
- Rehm, M. (2008). *Unified in Learning - Separated by Space, Case Study on a Global Learning Programme*. Paper presented at the OnlineEduca 2008, Berlin, Germany.
- Rehm, M. (2008). *Unified in Learning - Separated by Space: Case Study on a Global Learning Program*. Paper presented at the Student Mobility and ICT: Can E-LEARNING overcome the barriers of Life-Long learning?, Maastricht University.

MGSoG Dissertation Series

Dorcas Mbuvi

Utility Reforms and Performance of the Urban Water Sector in Africa

MGSoG Dissertation Series, nr 31 (2012)

Lina Salanauskaitė

Distributional Impacts of Public Policies:

Essays in Ex-Ante and Ex-Post Evaluation

MGSoG Dissertation Series, nr 30 (2012)

Esther Schüring

To Condition or not – is that the Question?

An Analysis of the Effectiveness of ex-ante and ex-post Conditionality in Social Cash Transfer Programs

MGSoG Dissertation Series, nr 29 (2012)

Joe Abah

Strong Organisations in Weak States

Atypical Public Sector Performance in Dysfunctional Environments

MGSoG Dissertation Series, nr 28 (2012)

Zina Samih Nimeh

Social Citizenship Rights: Inequality and Exclusion

MGSoG Dissertation Series, nr 27 (2012)

Lenka Eisenhamerová

Legitimacy of 'Humanitarian Military Intervention'

MGSoG Dissertation Series, nr 26 (2011)

Sonila Tomini

Informal Payments for Health Care Services in Albania

MGSoG Dissertation Series, nr 25 (2011)

Jinjing Li
Dynamic Microsimulation in Public Policy Evaluation
MGSoG Dissertation Series, nr 24 (2011)

Aziz Atamanov
*Rural Nonfarm Employment and International Migration as Alternatives to Agricultural Employment:
The Case of Kyrgyzstan*
MGSoG Dissertation Series, nr 23 (2011)

Frieda Vandeninden
Poverty Alleviation: Aid and Social Pensions
MGSoG Dissertation Series, nr 22 (2011)

Juliana Nyasha Tirivayi
*The Welfare Effects of Integrating AIDS Treatment with Food Transfers:
Evidence from Zambia*
MGSoG Dissertation Series, nr 21 (2011)

Agnieska Ewa Sowa
Who's Left Behind? Social Dimensions of Health Transition and Utilization of Medical Care in Poland
MGSoG Dissertation Series, nr 20 (2011)

Emmanaouil Sfakianakis
The Role of Private Actors in the Provision of Public Goods with Applications to Infrastructure and Financial Stability
MGSoG Dissertation Series, nr 19 (2011)

Siu Hing Lo
White Collars Green Sleeves
An Interorganizational Comparison of Determinants of Energy-Related Behaviors among Office Workers
MGSoG Dissertation Series, nr 18 (2011)

Treena Wu
*Constraints to Human Capital Investment in Developing Countries:
Using the Asian Financial Crisis in Indonesia as a Natural Experiment*
MGSoG Dissertation Series, nr 17 (2011)

Henry Espinoza Peña
*Impact Evaluation of a Job-Training Programme for Disadvantaged Youths:
The Case of Projovent*
MGSoG Dissertation Series, nr 16 (2011)

Florian Tomini
*Between Family and Friends
Understanding the Interdependency of Private Transfers*
MGSoG Dissertation Series, nr 15 (2010)

Michał Polalowski
*The Institutional Transformation of Social Policy in East Central Europe:
Poland and Hungary in comparative and historical perspective*
MGSoG Dissertation Series, nr 14 (2010)

Maha Ahmed
*Defining, Measuring and Addressing Vulnerability:
The Case of Post Conflict Environments*
MGSoG Dissertation Series, nr 13 (2010)

Pascal Beckers
*Local Space and Economic Success
The role of spatial segregation of migrants in the Netherlands*
MGSoG Dissertation Series, nr 12 (2010)

Victor Cebotari
*Complicating Demands in Ethnically Diverse Societies
Ethnopolitical Contention and Identity Values in Europe*
MGSoG Dissertation Series, nr 11 (2010)

Dennis Gyllensporre
*Competing and Complementary Perspectives on the EU as a Crisis Management Actor:
An Examination of the Common Security and Defence Policy through the Lenses of
Idealism and Realism*
MGSoG Dissertation Series, nr 10 (2010)

Judit Vall Castello
*Business Cycle and Policy Effects on Labour Market Transitions of Older and Disabled
Workers in Spain*
MGSoG Dissertation Series, nr. 9 (2010)

Keetie Roelen

False Positives or Hidden Dimensions: the definition and measurement of child poverty

MGSOG Dissertation Series, nr. 8 (2010)

Denisa Maria Sologon

Earning Dynamics in Europe

MGSOG Dissertation Series, nr. 7 (2010)

Melissa Siegel

Money and Mobility: Migration and Remittances

MGSOG Dissertation Series, nr. 6 (2010)

Jessica S. Hagen-Zanker

Modest Expectations: Causes and effects of migration on migrant households in source countries

MGSOG Dissertation Series, nr. 5 (2010)

Mirtha R. Muniz Castillo

Human Development and Autonomy in Project Aid: Experiences from four bilateral projects in Nicaragua and El Salvador

MGSOG Dissertation Series, nr. 4 (2009)

Christiane Arndt

Governance Indicators

MGSOG Dissertation Series, nr. 3 (2009)

Britta Augsburg

Microfinance – Greater Good or Lesser Evil?

MGSOG Dissertation Series, nr. 2 (2009)

Geranda Notten

Measuring and Managing Poverty Risks

MGSOG Dissertation Series, nr. 1 (2008)