COOPERATIVE LEARNING IN HIGHER EDUCATION

A STUDY OF THE INFLUENCE OF COOPERATIVE LEARNING ON STUDENTS' APPROACHES TO LEARNING

This thesis is submitted as part of the fulfilment of the requirements for the degree of Doctor of Philosophy at the Faculty of Business and Social Sciences at Aarhus University.

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To avoid conflicts concerning copyright or double-publication, the Appendix is printed separately.

a) Paper 1: 'Cooperative learning in higher education social sciences: A review' (Ready for submission)
b) Paper 2: 'The impact of cooperative learning on student engagement: Results from an intervention' (Accepted for publication in *Active Learning in Higher Education*)
c) Paper 3: 'When student-centred teaching fails: Explaining the relation between approaches to learning, perceptions of the tutorial, and responses to student-centred teaching' (Ready for submission)
d) Questionnaire (in Danish)

Like all young men I set out to be a genius, but mercifully laughter intervened.
Clea, Lawrence Durrell

Don't you always learn something as long as you're curious? ☺
Written comment to the survey question 'Which parts of the tutorials did you not learn from?'

FOREWORD

Dear Reader and dear Committee, this prologue marks the beginning of my dissertation. In the following chapters, you will read about cooperative learning, how higher education students respond to cooperative learning, and, especially, how cooperative learning affects the way students engage in learning. However, I would like to reflect on the past three years for a few moments in order to describe what initially motivated me to engage in this project, what I learned during these years, and, most important, how my thinking about the whole project gradually changed.

What initially motivated me were my experiences with being both a student and a student teacher in Quantitative Methodology at the Department of Political Science, Aarhus University. Here, the following scenario would often unfold:

> *10.15 The tutorial begins. Susan [the tutor] recapitulates the main points from last week's tutorial and outlines today's topic.*
>
> *10.23 Four students walk to the front of the class to do the first of today's four presentations.*
>
> *10.24 While they are struggling to start their PowerPoint presentations and connect their laptops to the projector, a student in the audience asks: 'Do you put it on AULA [the learning management system]?' One of the presenters replies: 'No [laughter]. Sure we do.'*
>
> *10.25 The presentation proceeds. The audience is very quiet. The sound of the presenters talking is accompanied by the sound of clacking from fingers rapidly moving across keyboards.*
>
> *10.34 End of presentation. Susan: 'Any questions?' Silence. Susan: 'Are there any questions for ME?' Silence. A student asks: 'If equality [as a concept] comes up at the*

examination, is it then enough to have these three positions [on equality]?' Susan sets out explaining the topic herself.

10.40 The next presentation begins.

Narrative based on field notes from two tutorials.

While this situation is a narrative based on field notes, in essence it is typical of the tutorials I participated in during my six years at the department. As a student, I found such tutorials demotivating and dull. As a tutor, I struggled to stimulate students to engage in discussion – with varying success, I might add.

In early 2009, after my graduation with an MSc in political science, I was employed as a research assistant at the Centre for Teaching and Learning, and it was at this time, while preparing my research proposal, that I came across cooperative learning. This instructional method was described as an 'Educational psychology success story' (Johnson & Johnson, 2009). Millis and Cottell (1998, p. 8) wrote: 'Faculty in higher education can feel assured, also, that, although much of the research in the last decades has been conducted at the kindergarten through twelfth grade level, its benefits […] seem to be universal.' Johnson, Johnson, and Smith (2007, p. 22) wrote in the *Educational Psychology Review*:

> *The research on cooperative learning is like a diamond. The more light you focus on it, the brighter and more multi-faceted it becomes. The power of cooperative learning is clearly illuminated by the magnitude of the effect sizes, but the more you read the research and the more closely you examine the studies, the better cooperative learning look […] the research on cooperative learning has a validity and a generalizability rarely found in the educational literature. It has been conducted over eleven decades by numerous researchers with markedly different orientations working in different colleges and countries. Research participants have varied as to economic class, age, sex, nationality, and cultural background. The researchers have used a wide variety of tasks, subject areas, ways of structuring cooperative learning, and ways of measuring dependent variables.*

And indeed, looking through some of the reviews of cooperative learning (Johnson & Johnson, 1989; Roseth, Johnson, & Johnson, 2008; Springer, Donovan, & Stanne, 1999), there were hundreds of studies about cooperative learning. Even so, within the cooperative learning literature, there were still calls for additional research, for example, cross-cultural validation (Johnson, Johnson, & Smith, 2007).

I became very intrigued with this literature. Here was a chance to both contribute to a field of research and, at the same time, study an instructional method that had the potential to stimulate students' engagement in tutorials.

My initial research question was very simple. I wanted to show that cooperative learning works! You might think of my reasoning as naïve. You may also think that this was hardly a

research question – and you would be right. Nevertheless, this was my point of departure when beginning my scholarship.

In the spring of 2010, I did a small-scale pilot-study with one tutor in the course *Political Theory* at the Department of Political Science, Aarhus University. I tested a questionnaire, observed how the students reacted to cooperative learning, and interviewed some of them in focus group interviews. In the spring of 2011, when the course was again offered, I set up the full scale intervention.

Much happened in those three years, and I will not spoil the plot. You will have to read my study to see whether cooperative learning 'worked'. However, during those three years my thinking about this project changed significantly.

If I were to identify the biggest change during those three years, it would be the very research question. My initial goal was to *demonstrate* that cooperative learning *works*. I ended up *wondering* how students *respond to* cooperative learning and *why* they responded very differently. These are very different questions and they indicate how my thinking changed during the project.

First, there are the students. Today, it strikes me as odd that, when reading about cooperative learning, the students are absent. Cooperative learning is based on social interdependence theory which states that how the learning environment is structured determines the students' learning. Hence, the important thing is the *structure*. The students implicitly follow. I learned that, indeed, the formal structure is important when learning in tutorials. But this is only half the story. The students clearly *perceived* cooperative learning very differently. And they *responded* to cooperative learning differently, too. Clearly, students did not just act within the given structure that was cooperative learning. This was puzzling to me. How could they perceive the exact same instructional method in such different ways? In many ways, I began studying an instructional method, but ended up studying the students.

This puzzle also affected the focus of my research because suddenly there was something that I had to 'explore' and there was something to 'explain'. When I started, I invested great effort in designing the intervention to maximise internal validity and choosing the most reliable statistical method to compare pre-scores to post-scores. The interviews that I did were more of a validation of quantitative results, a stepchild of the quantitative data, if you will. This changed. Suddenly, the interviews were the key to explaining why the students could perceive cooperative learning so differently. The qualitative analysis was by no means an easy task. I

had to begin from scratch and my preference for well-ordered and transparent quantitative analysis was severely challenged. Nevertheless, even though the analysis of the interviews was at odds with my quantitative comfort zone, I learned very much from these data. They allowed me to understand vicariously the students' experience. This dissertation is about cooperative learning, especially the students' experience of cooperative learning.

ACKNOWLEDGEMENTS

First of all, I would like to thank all the students who were involved during the intervention, and especially the students whom I interviewed. Being a former student myself, I thought that I knew their perspective. Yet, I found out that I still had much to learn. I am also indebted to Dr Søren Flinch Midtgaard, who allowed me to introduce cooperative learning in his course, and to the tutors who invested considerable time and effort before, during, and after the implementation of cooperative learning in their tutorials.

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Finally, I warmly thank my fiancée Maria. Completing a Ph.D. is a long journey and I am glad that she has supported me all the way.

CHAPTER 1. INTRODUCTION AND THEORY

Modern universities are facing challenges due to the increasing number of young people attending higher education. The sheer number of students raises the question of how to organise teaching-learning activities (TLAs) that allow the students to become active learners and engaged participants in academic discussions within their disciplines rather than passive spectators (Rocca, 2010). In addition, the mass university faces a heterogeneous student body. Many of these students, motivated by career opportunities or other external motivation, might need situational motivation to engage in deep levels of learning that are necessary to reach the necessary deep level of understanding of the often complex phenomena studied at the university level (Biggs & Tang, 2011; Entwistle, 2009).

Within the last decade, 'student-centred' instructional methods have become increasingly popular in higher education (Baeten, Kyndt, Struyven, & Dochy, 2010; Lea, Stephenson, & Troy, 2003), and one such method is *cooperative learning*. Cooperative learning principles, or structures, were developed in the 1960s and onwards (Johnson, Johnson, & Smith, 1998b) as a response to the competitive and individualistic learning environments in North-American primary schools. Since then, the principles and structures have been adopted at the secondary and post-secondary level (Millis, 2002; Millis & Cottell, 1998; Millis, 2010; Dansereau & Johnson, 1994; Johnson et al., 1998b; Johnson et al., 2007; Johnson, Johnson, & Smith, 1998a). Millis and Cottell (1998) have claimed that cooperative learning is able to stimulate deep approach to learning in higher education students and within recent years cooperative learning has become increasingly popular at the university level (Cavanagh, 2011; Hammond, Bithell, Jones, & Bidgood, 2010; Hillyard, Gillespie, & Littig, 2010). Influential scholars such as Biggs and Tang (2011) and Fink (2003) have recommended cooperative learning as an important teaching-learning activity for university students. Hattie (2009) found that cooperative learning was one of the more effective means of instruction compared to a plethora of other factors influencing academic achievement.

A similar development can currently be witnessed in Denmark. Following the release of a Danish version of *Cooperative Learning* (Kagan & Stenlev, 2006), cooperative learning structures are now being used in Danish primary schools (Andersen, 2012), high schools (Klausen, 2011; Beck, 2011), adult education (Wahlgren, 2010), and higher education (Schmidt, 2006).

The university teacher's everyday decision to adopt one or the other teaching-learning activity (e.g., cooperative learning) may be more or less reasoned. She might adopt teaching-learning activities based her conceptions of learning; she might choose the instructional methods that seemed to work in the past; or she may simply choose to teach in the way that is as 'usual'. No matter the reasons, the university teacher chooses on a daily basis how to organise teaching-learning activities. This choice, however, should be informed by empirical evidence (Hattie, 2012).

Given the increasing popularity of cooperative learning at the university level in general, and at Danish universities in particular, it is timely to empirically assess the potential of cooperative learning as a teaching-learning activity.

In this first chapter cooperative learning as a concept is described, the theory underlying cooperative learning will be explained, and the empirical evidence in support of cooperative learning will be reviewed. Since cooperative learning has been suggested to promote deep approach to learning among higher education students, theories of deep approach to learning at the university level will be reviewed, followed by a discussion of the congruence between these theories and cooperative learning principles. Finally, gaps within the cooperative learning literature will be identified and the project's research questions will be presented.

1.1 Conceptualising cooperative learning

Cooperative learning is a generic term that refers to a number of methods for organising and conducting classroom instruction by means of carefully structured group interaction, for example, Jigsaw, Academic Controversy, Cooperative Integrated Reading and Composition, Student-Team-Achievement-Division (Johnson & Johnson, 2009). Most of these methods were developed during the 1970s and 1980s (Johnson, Johnson, & Stanne, 2000). Kagan (2001) described more than 100 cooperative learning activities. Being aimed towards instruction in elementary schools, these methods expressed a reaction opposing the competitive and individualistic nature of the North-American educational system at the time (Johnson & Johnson, 2009); hence, the theory, research, and development of cooperative learning

activities are strongly rooted in the North-American primary educational system (Bruffee, 1995; Johnson & Johnson, 1989; Springer et al., 1999; Slavin, 1996).

Compared to other forms of peer learning, the distinguishing features of cooperative groups are the *structural* properties of peer interaction. The cooperative learning literature argues that efficient cooperation depends on two elements: *positive interdependence* and *individual accountability* (Millis & Cottell, 1998; Millis, 2010; Hornby, 2009; Dansereau & Johnson, 1994; Johnson & Johnson, 1989; Johnson & Johnson, 2009; Slavin, 1994; Johnson et al., 2007); thus, while a plethora of cooperative learning structures can be found within the literature, they all adhere to these two structural properties (Johnson et al., 2000). Johnson and Johnson (1989) have suggested three additional elements: face-to-face interaction, deliberate training of social skills, and group evaluation of the process.

Positive interdependence means that each student within the group should perceive that his or her individual academic achievement is positively dependent on the achievement of the other members of the group and vice versa. Such positive interdependence is supported by clearly defined group goals or, alternatively, rewarding each member of the group based on the achievement of the group in unison. Individual accountability means that, eventually, each student is assessed individually in order to prevent social loafing. Other means of assuring individual accountability are keeping groups small (2–4 members) to make the contribution of each group member apparent (Johnson, Johnson, & Smith, 1991). In a controlled experiment with trainee teachers, Hornby (2009) showed that the members of groups in which positive interdependence and individual accountability was present achieved better than the members

Figure 1.1 Cooperative learning as a subset of collaborative learning and active learning

Note: Based on Prince (2004)

of groups in which no such interdependence or accountability was structured.

Although conceptually different, *cooperative* and *collaborative* learning are often used synonymously and therefore there is considerable confusion in the literature about what distinguishes these two forms of peer learning (Bruffee, 1995; Matthews, Cooper, Davidson, & Hawkes, 1995). Millis and Cottell (1998) regarded cooperative learning as a more structured form of collaborative learning in which the teacher exhibits greater control of tasks and goals. Prince (2004) argued that conceptually cooperative learning is a subset of collaborative learning which again is a subset of active learning (see *Figure 1.1*). While active learning describes instructional methods in which the students are motivated to actively engage in discussions, collaborative learning describes instructional methods motivating students to engage in active learning within small groups. Cooperative learning, then, is a subset of collaborative learning, stressing the structural properties of group learning (i.e., positive interdependence and individual accountability). Springer, Stanne, and Donovan (1999) conceptualised cooperative learning as a structured and systematic instructional strategy in which the goals, procedures, and reward structures are explicitly stated in advance. In contrast, collaborative learning was conceptualised as relatively unstructured processes in which the students themselves negotiate goals, agree on procedures, and define problems.

1.2 COOPERATIVE LEARNING THEORY

The many forms of cooperative learning do not follow from one single theoretical perspective. Scholars within the cooperative learning literature often refer to such disparate fields as philosophy of education, social psychology, cognitive psychology, and behaviourism and educational theorist such as Morton Deutsch, Kurt Lewin, Jean Piaget, Lev Vygotsky, and John Dewey (Roseth et al., 2008; Springer et al., 1999; Millis, 2010; Johnson & Johnson, 1989). While the grounding in so many fields of psychology is seen as strength of cooperative learning (Johnson & Johnson, 1989), it naturally causes some confusion as to whether one can speak of a cooperative learning theory as such.

Springer et al. (1999) distinguished between motivational, affective, and cognitive perspectives on cooperative learning. Dansereau and Johnson (1994) distinguished between social-behavioural perspectives and cognitive developmental perspectives. Slavin (1994) also distinguished between motivational and cognitive perspectives on cooperative learning but later distinguished between motivational, social cohesion, cognitive, and developmental perspectives (Slavin, 1996) as shown in *Table 1.1*.

Table 1.1. Theoretical perspectives on cooperative learning

Theoretical perspective	Assumptions
Motivational (behavioural) perspectives	If students are rewarded for cooperation or if their achievement is in part contingent upon the achievement of fellow group members, they will help each other in order to maximise their own outcome.
Social cohesion perspectives	If students value peers and are dependent on each other they will be likely to help one another to reach their goals.
Developmental perspectives	Interaction with peers is likely to result in cognitive disequilibrium. Inadequate reasoning will be exposed, and higher-quality understandings will emerge.
Cognitive elaboration perspectives	Retention of knowledge in memory needs cognitive restructuring. Explaining material to someone else is an effective means of elaborating.

Note: Based on the categorisation of Slavin (1996).

1.2.1 Motivational perspectives and social interdependence theory

Whether from a motivational perspective or from the perspective of social interdependence theory, the task and goal structure set up by the teacher is argued to affect the students' motivation to exert effort. The very basic assumption underlying all cooperative learning structures is that 'the way in which social interdependence is structured determines how individuals interact within the situation which, in turn, affects outcomes' (Johnson & Johnson, 1989, p. 5).

Such interdependence among individuals can exist in three forms. *Positive interdependence* (cooperative goal structures) exists when students in a group share similar goals and when the individual student's goals depend on the actions of the group. Cooperative learning theory posits that when goals are structured cooperatively, students will be likely to seek outcomes that are beneficial to the other members of the group. *Negative interdependence* (competitive goal structures) exists when students can only reach their goals if their fellow students do worse. For example, students being graded relatively to their peers (norm-referenced grading) will be embedded in a competitive goal structure. Lastly, *no interdependence* (individualistic goal structures) exists when the individual's achievement of his or her goals is unrelated to the efforts and achievement of peers (Johnson & Johnson, 1989; Johnson & Johnson, 2009).

The different theoretical perspectives mainly differ in respect to how interdependence is assumed to motivate the individual, that is, either by self-interest or by social responsibility. From a motivational perspective (or a behaviouristic perspective as Johnson and Johnson [1989] would denote it), students will be motivated to help each other and invest effort when they perceive that it will affect the way in which they are themselves rewarded ultimately. The

basic premise is this: If the students' outcomes are dependent on the behaviour of their peers, they will be motivated to engage in behaviours that help the group to be rewarded. Such incentives at the group level will induce students to encourage goal-directed behaviour among their fellow group members. Theorist from this perspective will stress the importance of building group rewards (tangible or symbolic) into cooperative learning exercises (Slavin, 1989).

From the perspective of social interdependence theory, knowing that one's performance affects the performance of fellow student within the group is believed to create *responsibility forces* which stimulate the students' efforts to achieve and help group-mates to achieve (Johnson & Johnson, 1989; Johnson & Johnson, 2009). Negative interdependence is predicted to result in oppositional and detrimental student interaction, while no interdependence is argued to results in the absence of student interaction. Positive interdependence, however, is argued to lead to 'promotive interaction', that is, students helping each other, providing information, and assisting each other in reaching their shared goal (Dansereau & Johnson, 1994; Johnson & Johnson, 1989; Johnson & Johnson, 2009; Roseth et al., 2008). Theorist from this perspective will stress the importance of structuring tasks in which the students share the same goals as well as exercises that promote the development of positive peer relationships (Johnson & Johnson, 1989).

1.2.2 Cognitive and developmental perspectives

Largely based on developmental cognitive theories of Piaget and Vygotsky, cooperative learning theory holds that working together face-to-face on open-ended tasks facilitates cognitive growth and higher-level thinking. Cooperative learning structures are an opportunity for students to present their ideas and perceptions and hear the perspectives of fellow students. Cooperative learning theory predicts that students learn from interaction with peers because cognitive conflicts will arise leading to the exposure of inadequate reasoning and, ultimately, more sophisticated understanding (Slavin, 1994; Springer et al., 1999; Johnson & Johnson, 1989).

Cooperative learning theory also draws on cognitive elaboration theories holding that in order for knowledge to be stored in memory the learner has to engage in some sort of elaboration of the material. Cooperative learning offers the opportunity for students to engage in such elaboration such as orally explaining concepts to someone else; listening critically to the explanation offered by fellow students within the group; paraphrasing other students'

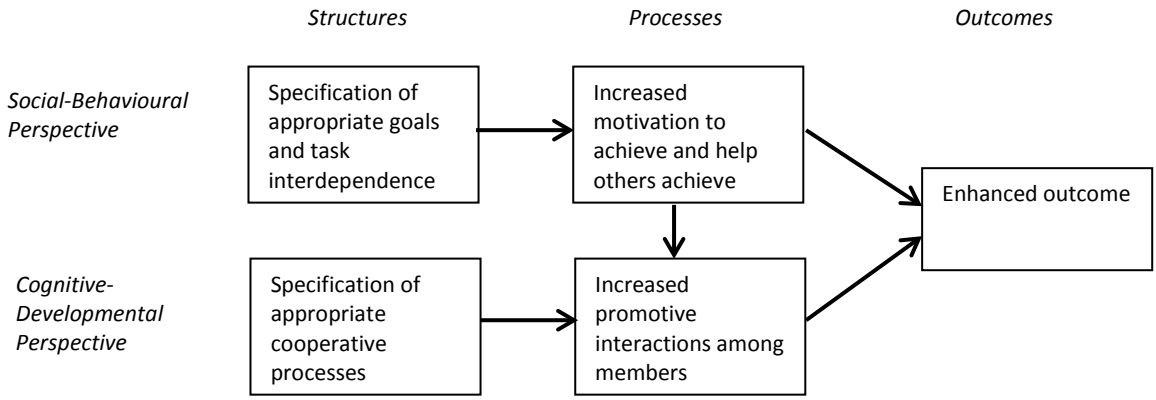
knowledge and perspectives; giving and receiving feedback; and revising one's position when being confronted with peers' opposing points of view (Slavin, 1994; Johnson & Johnson, 1989; Johnson et al., 1998b).

Slavin (1996) noted that research within the cognitive tradition has normally taken place in short-time laboratory like settings. He also noted that the developmental researchers almost exclusively studied young children in settings which had little resemblance with real-life school subjects. Cognitive elaboration research would usually involve college students.

1.2.3 An integrated model of cooperative learning

The cognitive and motivational perspectives on cooperative learning are neither mutually exclusive nor contradictory (Slavin, 1996). Rather, they emphasis different aspects of cooperation and different causal mechanism that are assumed to explain how the structuring of group tasks ultimately results in the enhanced learning outcome of the individual student.

Figure 1.2 A model of cooperative learning



Note: Based on Dansereau and Johnson (1994).

Figure 1.2, which is based on a similar model in Dansereau and Johnson (1994), depicts an integrated model of the relation between cooperative learning structures and individual learning. Setting up cooperative learning goal structures that promote a sense of positive interdependence is argued to enhance learning outcomes via a) increased motivation to achieve and help fellow group members achieve, and b) increased promotive interaction among group members. Both the increased motivation and the promotive interaction among peers is, then, predicted to enhance the individual student's learning outcome.

1.3 EMPIRICAL EVIDENCE IN SUPPORT OF COOPERATIVE LEARNING

The empirical evidence supporting cooperative learning theory is, indeed, comprehensive. Johnson and Johnson (1989) reviewed a total of 378 studies and found evidence supporting the claim that cooperative goal structures were related to higher performance than competitive and individual goal structures. These findings have been confirmed in subsequent reviews and meta-analyses of cooperative learning in general (Slavin, 1996; O'Donnel & Dansereau, 1992; Johnson et al., 2000; Johnson & Johnson, 1989) and in reviews of cooperative learning within delimited student populations: college students (Johnson et al., 1998a; Johnson et al., 1991); high-school and college chemistry students (Bowen, 2000); students in post-secondary and professional education (Johnson et al., 2007); undergraduates in science, mathematics, engineering, and technology (Springer et al., 1999); students in their early adolescences (Roseth et al., 2008); and engineering students (Prince, 2004). *Table 1.2* provides an overview of major meta-analysis within the cooperative learning literature.

While these reviews unanimously support the efficacy of cooperative learning in educational settings, certain characteristics of the research should be noted that raise questions about the generalisability of findings. First, cooperative learning structures were originally developed in order to promote learning in primary schools (Dansereau & Johnson, 1994; Johnson & Johnson, 1989; Slavin, 1996) and the majority of studies included in subsequent reviews address the primary and secondary levels of education (see e.g., Johnson et al., 2000).

Second, cooperative learning has been developed and evaluated primarily within the North-American educational system (Johnson & Johnson, 1989). For example, 73 per cent of the studies included in the meta-analysis by Roseth et al. (2008) and 98 per cent of the studies in the Johnson and Johnson (1989) meta-analysis were conducted in North-America. The Springer et al. (1999) meta-analysis included North-American studies only. It is questionable whether results from the North-American educational context readily transfer to the European and, in particular, the Scandinavian contexts (Klausen, 2011), and within the cooperative learning literature calls for inter-cultural validation of findings have been made (Johnson et al., 2007).

Table 1.2 Overview of major meta-analyses of cooperative learning relating to academic achievement

Bibliography	Student population	Studies	Effect of CL on achievement	Other dependent variables
Johnson & Johnson (1989)[f]	Preschool until adult education (all disciplines)	378	*d*=0.67[b] and 0.64[c]	Interpersonal attraction, Social support, Self-esteem, Time on task, Attitudes towards task, Quality of reasoning, Perspective taking
Slavin (1994)	Elementary and secondary students	60	(Median) ES = 0.21	–
Johnson et al. (1998b)	College students (18 years or older)	168	*d*= 0.49[b] and 0.53[c]	Peer relationships Self-esteem
Springer et al. (1999)	Undergraduates in SMET courses	39	*d*=0.51	Persistence Attitude
Bowen (2000)	High school and college chemistry courses	15	*d*=0.34	–
Johnson et al. (2000)	Kindergarten to adult education	164	*d*=0.18-1.04[d]	–
Roseth et al. (2008)	Middle-school, ages 12–15, (all disciplines)	148	ES[a]=0.46[b] and 0.55[c]	Positive peer relationships

Note: There is positive evidence of the same studies being included in several of the meta-analyses. For example, there is a considerable overlap of studies between the Springer et al. (1999) and the Bowen (2000) study.
[a] Effect sizes calculated with a corrected version of Hedge's unbiased estimator (see Roseth et al., 2008); [b] Compared to competitive learning environments; [c] Compared to individualistic learning environments; [d] The meta-analysis compared eight specific CL-methods and no single average was reported. Effects sizes varied within this range; [e] Calculation method not reported; [f] The Johnson and Johnson (1989) meta-analysis employs a very broad definition of achievement including the less transparent 'level of performance, productivity' (see Johnson and Johnson, 1989, p. 39).

Third, scholars have argued that research on cooperative learning has suffered from a 'black-box approach' (Peterson & Miller, 2004) which means that research has focused primarily on the impact of cooperative learning on academic achievement and less on the processes of learning one must assume mediates the impact of cooperative learning (Dansereau & Johnson, 1994; Springer et al., 1999). In addition, major reviews of cooperative learning are yet to consider the students' perception of and experience with cooperative learning despite educational research demonstrating the pivotal influence of students' perception of their situation within a given context (Prosser & Trigwell, 1999; Marton, Hounsell, & Entwistle, 2005). Webb and Palinscar (1996) noted that black-box studies comparing the effects of different instructional methods on learning outcomes do not explain why effects arise and therefore called for studies of how students experience cooperative learning.

1.4 THE USE OF COOPERATIVE LEARNING IN HIGHER EDUCATION

Regarding the use of cooperative learning in higher education, the book *Cooperative Learning for Higher Education Faculty* (Millis & Cottell, 1998) is especially interesting because it argues that cooperative learning stimulates deep approaches to learning. It is also interesting because it is a rare example of scholars within the cooperative learning literature referring to scholars within higher education research such as Noel Entwistle, Paul Ramsden, and Ference Marton.

Following the argument presented by Millis and Cottell (1998), cooperative learning stimulates deep approaches to learning in the following ways: It supports a sense of ownership and control in learning which is related to intrinsic motivation; it supports active rather than passive learning; it provides sources of inspiration other than the teacher; and it provides an opportunity in which students are encouraged to connect to their prior experience and existing knowledge (Millis & Cottell, 1998, p. 38).

In line with the theoretical perspectives on cooperative learning presented previously, Millis and Cottell (1998) also emphasised the motivational and cognitive aspects of peer interaction, that is, an increased sense of responsibility and willingness to invest effort, and a setting in which students 'engender critical thinking [because they] experience important activities such as identifying and challenging assumptions, and exploring and imagining alternatives' (p. 42). Millis and Cottell (1998) did not propose that cooperative learning should be the only means of teaching; instead, '[I]n a given class period, cooperative learning offers students and faculty a structured, on-task means to foster learner activity and learner interaction' (p. 38).

The writing of Millis and Cottell (1998) is important, because a link between cooperative learning and deep approaches to learning is proposed. Recently, Millis (2010) restated that cooperative learning is likely to lead to deep learning. Yet, neither Millis and Cottell (1998) nor Millis (2002, 2010) provided empirical evidence in support of their claim.

1.4.1 GENERALISABILITY AND CONTEXT DEPENDENCY

The claim that cooperative learning can be successfully used in higher education raises the question of whether theory and research conducted with children can be transferred to higher education students. As already described, cooperative learning has been used with and developed for children. Therefore, theory, research, and practical guidelines have been focused towards this age group, especially the cognitive-developmental theories referring to works of Piaget and Vygotsky. Scholars within the cooperative learning literature do not agree on to which extent theories and research of cooperative learning aimed at school children

does validly apply to older students and different educational settings. Millis and Cottell (1998) argued that faculty could rest assured that the positive findings in studies with primarily school children also apply to higher education. Johnson, Johnson and Smith (2007, p. 22) claimed that 'research on cooperative learning has a validity and a generalizability rarely found in the educational literature'. Other scholars within the field, however, are more reluctant. Dansereau and Johnson (1994), for example, called for explicit attention to the context in which cooperative learning is applied:

> *[…] most of the highly publicized techniques […] are considered to be general purpose ones, useful in a large number of content arenas, with a variety of different types of learners. Furthermore, the underlying principles guiding the development and implementation of cooperative scenarios […] are often described as being context-independent. As a result, cooperative learning approaches are being implemented in a wide range of instructional settings with only minimal evaluation and tailoring. Given the limited arenas in which they have been developed, primarily grades 2-9, it seems likely that these approaches and the principles that they are built on will not always match specific contextual constraints and learner characteristics.* (Dansereau and Johnson, 1994, no pages numbers [html-edition], my underlining).

Dansereau and Johnson (1994) went on to propose age and situation-specific differences that need be considered when using cooperative learning with adults. First, the subject matter and tasks facing adult students are often much more complex, typically requiring a much greater emphasis on comprehension rather than memorisation. Second, the learners themselves are at a higher cognitive developmental stage than are children. This means that adults might be more likely to see the intrinsic cognitive and social value of engaging in cooperative learning activities. On the other hand, adults have often well-establish (but unfortunately sometimes inadequate) strategies for learning that make them more defensive about their learning and thinking skills (Dansereau & Johnson, 1994).

1.4.2 The Springer, Stanne, and Donovan meta-analysis

The impact of cooperative learning has been empirically investigated in a variety of educational settings. However, to the best of my knowledge, only one systematic review has addressed the impact of cooperative learning on university students' academic achievement. Springer et al. (1999) reviewed the impact of small-group learning (including cooperative learning) in undergraduate science, mathematics, engineering, and technology (SMET) courses and programmes. Based on 49 independent samples from 37 studies, the authors found that students learning within small groups achieved better than students who were not exposed to cooperative or collaborative learning (d=0.51). The authors also found, that the difference in sizes of effects was substantially small and statistically insignificant when comparing pure cooperative learning to collaborative learning. In addition, students learning within small

groups exhibited greater persistent (*d*=0.55) and more positive attitudes towards the course (*d*=0.46).

While these findings are promising, some serious limitations were noted by the authors themselves. First, the generalisability of the meta-analysis was limited by the study's inclusion criteria. Only, studies of SMET-discipline at North-American post-secondary institutions were included. Second, the studies included in the meta-analysis did fail to describe what was assessed as academic achievement in the first place: 'The general lack of detailed descriptions of the assessment instruments and the types of tasks associated with each assessment in the research reports that we analysed impede clarity' (Springer et al., 1999, p. 40).

The Springer et al. (1999) meta-analysis was used by Millis (2010) as supporting evidence that cooperative learning increases higher education students' achievement. Nevertheless, it is important to be aware that the review did not consider the influence of cooperative learning on students' approaches to learning nor did it provide clear evidence that cooperative learning leads to greater conceptual understanding.

1.5 THEORIES OF LEARNING IN HIGHER EDUCATION

Cooperative learning has been developed primarily for use with school children and research of cooperative learning has also been conducted most frequently in the context of primary schools and with school children as subjects. Slavin (1996) explicitly addresses that theories appropriate in explaining the impact of cooperative learning at the primary and secondary level do not readily transfer to higher education. Which theoretical lens is appropriate depends in part on the context in which the phenomenon is studied and the educational outcomes of interest. Bruffee (1995), a proponent of *collaborative* learning, even claimed that cooperative learning should *only* be used in primary and secondary education.

Entwistle (1984) argued that theories of learning 'must have "ecological validity" – that is, the theories must be derived from the settings to which they are to be applied. Otherwise there can be little confidence placed in the utility of the theory' (Entwistle, 1984, p. 10). This section presents two interrelated theories of learning in higher education and discusses to which extent cooperative learning principles and theories correspond with these. The two theories are constructivist learning theory and student approaches to learning theory.

1.5.1 CONSTRUCTIVIST LEARNING THEORY AND THE ROLE OF DIALOGUE

It has been suggested that the constructivist theory of learning is especially appropriate in higher education (Jonassen, Mayes, & McAleese, 1993; Tynjälä, 1999) and educational researchers within the field of learning in higher education frequently refer to basic constructivist principles (Biggs & Tang, 2011; Hounsell, 2005b; Entwistle, 2009).

Constructivism is not a unified theory and different positions can be identified emphasising different aspect of learning such as an emphasis on the social context and culture or on the more individual aspects of learning. However, these theories are complementary rather than contradictory and common tenets can be identified (Tynjälä, 1999). At its most basic, constructivism is a theory of knowing. It rejects the idea that knowledge can be transmitted from one individual to another or that knowledge can be passively received. Meaning has to be constructed by the individual by relating new experiences to existing knowledge and previous experience (Entwistle, 2009). Hence, learning is an active and to some extent an idiosyncratic process often described by the metaphor of *constructing* knowledge (Tynjälä, 1999; von Glaserfeld, 1995; Pritchard & Woollard, 2010). While the construction of knowledge happens within the individual student, learning is heavily influenced by the individual's interaction with the social world:

> *Individualistic experiences, perceptions, and constructions do not mean that it is impossible for individuals to construct essentially the same understanding for any object or event in the external world. Common understandings regularly result from social negotiation of meaning which is supported by collaborative construction of knowledge. Understandings [...] can be negotiated between learners and teachers* (Jonassen et al., 1993, p. 234).

Even though meaning is socially negotiated, this does not imply radical relativism. In academia, not all understandings are equally valid. In higher education, the students' understandings and ways of thinking and treating evidence have to adhere to the standards that are accepted within the academic discourse and the ways of thinking and practising within the particular discipline (Entwistle, 2009).

Constructivist learning theory does not readily imply any specific instructional method (Gergen, 1995); nevertheless, some principles and guidelines have nevertheless been proposed. Because learning in the constructivist sense is an active and continuous process of constructing and reconstructing knowledge (Tynjälä, 1999) teachers should ultimately be concerned with 'what the student does' (Biggs & Tang, 2011). Also, because students might attribute very different meanings to the same phenomenon due in part to students' previous knowledge and conceptions, interaction and cooperation among peers and with teachers are

essential for individual understandings and interpretations to meet (Tynjälä, 1999). Thus, argument and dialogue are considered very important ways to reach understanding (Pritchard & Woollard, 2010). In the constructivist sense, teaching is about creating opportunities for students to elicit their (mis)understanding, reflect on their understanding in the light of contradictory perspectives, and receive feedback. Hounsell (2005b) argued that teaching was to 'engage with students in a collaborative quest for commonality of meaning' (p. 243).

The pivotal emphasis of cooperative learning on interaction between students is in clear alignment with pedagogical implications from constructivist learning theory. Cooperative learning not only creates an opportunity for students to share their understanding and elicit conceptions, it to some degree 'requires' interaction in setting up motivational structures in which it is necessary for all members of the group to contribute. The emphasis within the cooperative learning literature on promoting learning activities such as articulating ones understanding, explaining to others, and having to agree on concepts in the light of opposing arguments (Johnson & Johnson, 1989; Johnson et al., 1998a) is also congruent with a constructivist perspective of knowledge building as a continuous process of constructing and reconstructing knowledge within a social setting. In cooperative groups, students need to put forward their own conceptions and contribute with their personal understanding, they will hear how other students understand concepts or solve problems at hand, and, having to work out a common solution or answer, they will have to reflect on and revise their personal understanding when different from that of their peers.

However, other properties of cooperative learning may conflict with a constructivist perspective on teaching. First, cooperative learning being a generic theory of cooperation does not consider the specific content or object of cooperation. Thus, for cooperative learning to be in line with constructivist pedagogic principles, the particular task given to students should be one of understanding rather than memorising or merely reproducing. Cooperative learning in itself is an 'empty' structure only likely to promote deep approaches to learning if the subject matter or the task embedded in the cooperative structures is one requiring understanding. Second, some parts of the cooperative learning literature, especially the behaviourist branch emphasising motivation through external rewards, may conflict with constructivist principles. The important demarcation would lie in the implementation of positive interdependence: whether students will need to coordinate efforts in order to obtain tangible or symbolic rewards (reward interdependence) (Slavin, 1996), or whether students cooperate with the

intention of reaching a common goal socially desirable for the group (goal or means interdependence) (Johnson & Johnson, 2009).

1.5.2 Theories of students' approaches to learning

Another well-established theory of learning is the *student approaches to learning* (SAL) theory (Entwistle & McCune, 2004). SAL-theory is closely connected to constructivist learning theory (Biggs & Tang, 2011; Entwistle, 2009). However, whereas constructivism is a generic theory of learning, SAL-theory is a theory of learning within the very context of higher education. It not only addresses learning as such, but especially what deep learning means at the university level. Because it is a central claim within the cooperative learning literature that cooperative learning promotes deep approaches to learning at the university level (Millis & Cottell, 1998; Millis, 2010), SAL-theory adds valuable insights to cooperative learning theory when applied in a university context.

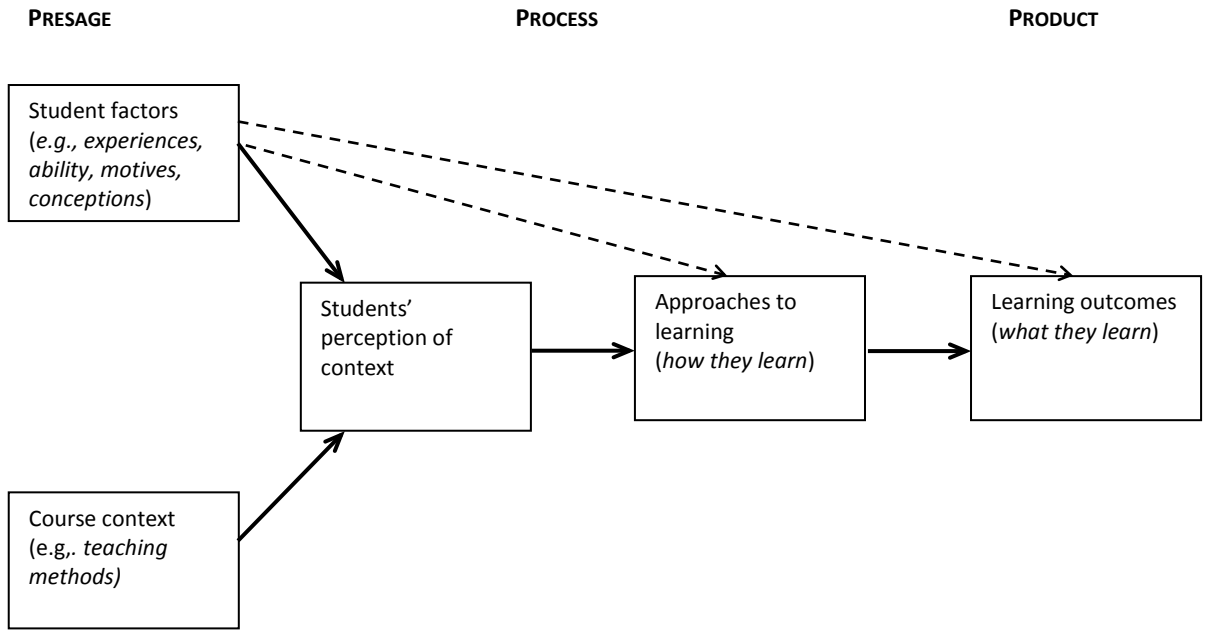
In their seminal phenomenographic studies, Marton and Säljö (1976b; 1976a) studied the different ways students approached the task of reading an academic text. Based on their findings, they distinguished between deep and surface *levels of processing*; whereas some students would focus on the underlying meaning of the text (the deep level) other students would focus merely on the factual information (the surface level). More important, the levels of processing seemed to be intimately related to the students' intentions. The deep-level processing was related with an intention to understand the overall point the author of the text was trying to make, while the surface-level processing was related with an intention to reproduce information. Later, Marton and Säljö (1984) used the term *approaches to learning* including both the process and intentions of learning. Approaches to learning initially described how the students performed particular tasks; however, the concept was soon used at a wider level of analysis. At the same time, Biggs (1987) used survey data to describe how higher education students went about their studying. Based on factor analysis of an inventory of study processes, he, too, found dimensions that were conceptually similar to the deep and surface levels.

Subsequent research has shown that the basic distinction between surface and deep approaches to learning is applicable to a wide range of tasks that face university students (Hodgson, 1984; Laurillard, 2005; Hounsell, 2005a; Ellis, Goodyear, Prosser, & O'Hara, 2006; Entwistle & Entwistle, 1992). A *deep approach* to learning is associated with an intention to understand ideas for oneself and is followed by learning strategies such as looking for patterns

and underlying principles, relating ideas to previous knowledge and experience, checking evidence and relating it to conclusion, and critically examining logic and argument. A *surface approach* is related to an intention to cope minimally with course requirements. The student with such intention will typically be treating ideas and course material as unrelated bits of knowledge, memorise facts, or carry out set procedures without critical reflection (Entwistle, 2009; Marton & Säljö, 2005; Biggs & Tang, 2011). The deep approach is often influenced by factors such as interest in the subject and a sophisticated conception of knowledge. A surface approach, on the other hand, is often associated with high levels of anxiety and fear, a dualistic conception of knowledge, misunderstanding of requirements, or strong external motivation to study (Biggs & Tang, 2011; Entwistle, 2009).

It is important to note that approaches to learning should not be used to label students. Instead, approaches to learning are descriptions of how students approach a particular task within a particular context, and early on Marton and Säljö (1976b) found that approaches were dependent on how students interpreted the task. Subsequent research demonstrated how the students' approaches to learning were related to the students' perception of the context (Prosser & Trigwell, 1999), and Eley (1992) demonstrated how within-student changes in approaches to learning were related to changes in the individual student's perception of the learning environment. Nevertheless, while approaches to learning are essentially variable, there remains an element of consistency and resilience which might reflect personal preferences (Entwistle, 2009). For example, Entwistle and Tait (1990) showed that students consistently relying on a surface approach preferred teaching in which the teacher provided pre-digested information, while students consistently relying on a deep approach valued challenging and stimulating teachers. This complex interplay between the learning context, the students' preferences for contrasting learning environments and their approaches to learning led Entwistle (1991) to conclude that it is the students' *perception* of the learning context rather than the context in itself that influence how students learn.

Figure 1.3. The Presage-Process-Product (3P) model



Note: After Prosser, Trigwell, Hazel, and Gallagher (1994) and Biggs (2003).

The *3P-model* (see *Figure 1.3*) provides an overall theoretical model of the relationship between presage factors (the students' characteristics and the course and departmental context), the process factors (the students' perception of the context and their approaches to learning), and the product (what the students learn). The arrows in bold show the main direction of effects: What the students' learn (the product) is strongly influenced by the students' approaches to learning which is again influenced by how the students perceive the context (both are process variables). The students' perception of the context is affected by the course context in interaction with the characteristics of the student. Biggs (2003) stressed that all components form a system in which a host of interactions might affect the students' learning outcome. For example, students who are very insecure about their abilities might choose a surface approach despite the teaching context supporting a deep approach to learning. Students' that have a very strong intrinsic motivation to study might choose a deep approach even in courses in which memorisation only is rewarded in assessment. Many examples can be given. There is an important implication of seeing learning within an interactive system: what works for one class does not by necessity work for another class. The

course context affects the approaches the students will be *likely* to use, but the relation is not deterministic (Biggs, 2003).

It is a promising finding that students' approaches to learning are variable because it gives teachers in higher education the possibility to design learning environments in which the students are stimulated to use a deep approach to learning which – for many tasks at the university level – is more appropriate than a surface approach to learning (Biggs, 2003; Hounsell, 2005b; Marton & Säljö, 1984). However, while it has been demonstrated that a deep approach is related positively to the students' perception of good teaching, clear goals, and an emphasis on independence and a surface approach is related to a perception of heavy workload and assessment requiring memorisation (Prosser & Trigwell, 1999), it has been far more difficult to predict how students perceive, and subsequently respond to, specific instructional methods. A recent review of 25 studies on the impact of student-centred instructional methods on students' approaches to learning made the puzzling finding that while some studies documented a change towards deeper approaches to learning, other studies documented the exact opposite result (Baeten et al., 2010). Such a review highlights that any instructional method claiming to promote deep approaches to learning need to be tested empirically.

Biggs (2003) argued that peer-directed teaching-learning activities are particularly useful for stimulating valuable learning activities such as elaboration, broadening understanding, gaining insights via the comparison with other's perspectives and understandings. Biggs and Tang (2011) argued that conceptual change is likely to happen when students 'work collaboratively and in dialogue with others, both peers and teachers. Good dialogue elicits those activities that shape, elaborate and deepen understanding' (p. 23). Consequently, cooperative learning might very well stimulate deep approaches to learning, even though it is, in the end, an empirical question.

1.6 Research questions and outline

It has been argued that theory and research on cooperative learning has suffered from a 'black-box approach' in which only the impact on the students' academic achievement is addressed (Peterson & Miller, 2004; Springer et al., 1999; O'Donnel & Dansereau, 1992). It has also been noted that neither empirical evidence nor theoretical argument may readily transfer from the learning of children in primary education to young adults in higher education (Dansereau & Johnson, 1994; Slavin, 1996). The theory and research on students' approaches

to learning adds a number of important insights to the cooperative learning literature that might help 'open the box'. One, empirical research clearly shows that instructional methods that allow for deep approaches to learning do not necessarily result in deep approaches to learning (see e.g., Vermetten, Vermunt, & Lodewijks, 2002). Therefore, whether an instructional method such as cooperative learning is better or worse in stimulating deep approaches to learning and discouraging surface approaches to learning is essentially an empirical question. This study examines the empirical evidence concerning that very question. Two, the student approaches to learning theory sees approaches to learning as a response to the learning environment as perceived by the student. It follows that any evaluation of the appropriateness of an instructional method such as cooperative learning needs to explore the instructional methods through the eyes of the students. Therefore, this study carefully examines how the students experience cooperative learning. Three, within the student approaches to learning literature a number of survey inventories have been developed and validated over time that specifically measure the deep and surface dimensions of students' approaches to learning (Entwistle & McCune, 2004, provide a comprehensive overview). These inventories, having high construct validity, are valuable data collecting instruments that allow a reliable measurement of the relationship between cooperative learning instructional methods and students' approaches to learning.

The aim of this study is to assess the impact of cooperative learning on students' learning in the context of higher education. Biggs (2003) defined good university teaching as structuring an aligned learning environment in which surface approaches to learning are discouraged and deep approaches to learning are stimulated. Millis and Cottell (1998) and Millis (2010) argue that cooperative learning, as a teaching-learning activity used in higher education classes, is supportive of and congruent with deep approaches to learning. Thus, an empirical assessment of the influence of cooperative learning on university students' approaches to learning is an interesting area for educational research. In this project, two research questions were asked:

a) *To what extent does cooperative learning influence university students' approaches to learning?*
b) *How do students in the university context experience cooperative learning?*

Table 1.3 provides an overview of the three papers that constitute the project. The project's two research questions, mentioned above, recur in all three papers although in slightly different forms. What differentiates the papers is mainly the type of data analysed, the type of analysis conducted, and the focus of attention in each paper. For example, the students'

perception of cooperative learning was analysed in *Paper 2*. However, the short written comments did not allow for the same depth of analysis as the semi-structured interviews presented in *Paper 3*.

Table 1.3. Overview of the project's three papers, research questions, methods, and data

	Full title	Research questions	Design, methods and instruments	Data
1	Cooperative learning in higher education social sciences: A review	1) Does cooperative learning increase university students' academic achievement? 2) How does cooperative learning affect students' learning strategies and behaviours? 3) How do university students perceive cooperative learning?	Method of systematic review (Littel, Corcoran, & Pillai, 2008)	Twenty-three empirical studies
2	The impact of cooperative learning on student engagement: Results from an intervention	1) To what extent does cooperative learning increase students' engagement in tutorials? 2) How do undergraduates perceive cooperative learning?	One-Group Pretest-Posttest Design (Shadish, Cook, & Campbell, 2002; Kember, 2003; Kember, Charlesworth, Davies, McKay, & Stott, 1997); R-SPQ-2F-DA (Lassesen, 2009); quantitative data analysis (Agresti & Finlay, 2009)	Survey data, mainly quantitative (n=141)
3	When student-centred teaching fails: Explaining the relation between approaches to learning, perceptions of the tutorial, and responses to student-centred teaching	1) How do approaches to learning reveal themselves in the way students engage in tutorials? 2) How are the students' approaches to learning related to their perceptions of the tutorial setting? 3) How do students with a surface approach perceive of and respond to student-centred TLAs?	Semi-structured interviews (Kvale, 2002); qualitative data analysis (Miles & Huberman, 2005)	Twenty-four semi-structured interviews with 12 students

The first paper reviewed the existing empirical evidence concerning the impact of cooperative learning in higher education. In line with earlier reviews, the review examined the effect of cooperative learning on academic achievement. Next, studies were reviewed that investigated the impact of cooperative learning on students' learning strategies and learning behaviours. This broader concept not only included students' approaches to learning but also other conceptualisations of learning strategies which conceptually compare to the approaches to learning (Entwistle & McCune, 2004). Finally, studies of the students' perception of cooperative learning were synthesised.

To examine the impact of cooperative learning on students' approaches to learning an intervention was performed. The second paper presents an analysis of the survey data collected. The study compared the students' levels of engagement before and after the

cooperative learning intervention. The term 'engagement' included both students' approaches to learning, measured via the revised two-factor *Study Process Questionnaire* (Biggs, Kember, & Leung, 2001), as well as the students' participation in class discussions (Rocca, 2010) which was measured via an in-class participation scale (described in *Section 2.3.1*). Finally, the written comments provided valuable indications of how the students perceived of the cooperative learning experience.

The third paper presents an analysis of the qualitative data collected by in-depth interviews with 12 students subjected to cooperative learning. The study offers an in-depth description of how approaches to learning reveal themselves in the strategies students adopt when participating in tutorials and the study shows how approaches to learning are associated with the students' perception of the tutorial settings. These findings form the basis for the subsequent analysis of how students perceive of and respond to cooperative learning.

1.7 Outline

The three papers are appended to the dissertation and in each paper a detailed description of data, methods, and results is provided. This concluding paper presents the overall results and considerations related to the project. It also presents salient issues that could not be discussed in depth within the limits of the three papers. For example, the strengths and weaknesses of the intervention design are discussed in more detail here than in the second paper.

Chapter two describes the project's overall methodological properties: case selection, intervention design, and data collection instruments. Chapter three gives a summary of the results from each of the three papers. Subsequently, in chapter four, the results from the study are discussed in the light of cooperative learning theory as well as results from other empirical studies. Strengths and weaknesses are discussed in chapter five, and the project's overall conclusions and implications are presented in chapter six.

CHAPTER 2. METHODS

In order to produce data to answer the research question, an intervention with cooperative learning was performed in a real-life higher educational setting. Whereas some issues concerning design, methods, and data analysis were described and discussed within the limited space of the papers, other issues were described only superficially. Therefore, in this chapter, a more detailed description of the case, the intervention design, and the survey instruments is presented.

2.1 CASE SELECTION AND CASE DESCRIPTION

The reasons for choosing the *Political Theory* course as a case were practical as well as theoretical. The practical reasons were that the senior professor in the course was willing to invest time and effort to help the researcher and then engage in collaboration over two subsequent years as were the tutors. Professors in other courses and within other disciplines were contacted during the project's early phases, but for various reasons, they declined to participate in the study. The researcher did not teach, which is a strength of this study (Johnson et al., 2000; Springer et al., 1999). However, as a consequence, the researcher was dependent on the kindness and collaboration of other faculty.

Because the aim of the study was to provide insights into a broader phenomenon (to test how higher-education students would respond to and perceive cooperative learning), the theoretical considerations was that the case had to be representative of a broader set of cases, that is, a *typical* case (Gerring, 2007). The representativeness of the case is discussed in depth in *Section 5.5.1*. Moreover, the course had to be large enough to secure adequate statistical power to detect potential changes in the students' learning behaviour and thus increase the study's *conclusion validity* (Shadish et al., 2002). Therefore, seminars and other small-scale courses, often at the graduate level, were not as attractive to the study as the much larger undergraduate courses with several hundred students. Finally, because the aim of the study was to test whether cooperative learning as a teaching-learning activity was able to

stimulate deep approaches to learning, the course had to have intended learning outcomes and assessment criteria congruent with deep approaches to learning (Biggs, 2003).

Political Theory is a 5 ECTS, one-semester course at the Department of Political Science and Administration, Aarhus University. Teaching consists of weekly two-hour lectures in combination with two-hour tutorials in which students in parallel tutorial groups of 20–25 meet with a tutor to discuss their answers to work sheet questions. The intended learning outcomes were that the students be able to account for, compare, and critically assess key political concepts and schools of political thought (Aarhus Universitet, 2012). The final exam consisted of five essay-type questions which the students were to answer with a maximum of 300 words per question. Questions targeted diverse parts of the curriculum and students' were asked to describe, relate, discuss, critically evaluate, and apply principles from the Political Theory literature. For example, the students had to apply the principles to discuss positions for and against the assimilation of foreign citizens in Denmark as put forward in a feature article by two Danish members of parliament.

It should be noted that the students in the same semester attended two other mandatory courses: Quantitative Methods (15 ECTS) and Micro Economics (10 ECTS). Thus, compared to these, the Political Theory course had an inferior position in that particular semester. Other departmental characteristics should also be noted. The Political Science programme is popular in Denmark and the high-school grade point average needed to enter the programme is high. As is common in Danish higher education, the students are assessed exclusively on their performances on the end-semester examinations. There are no mid-semester assignments, taking part in teaching sessions is voluntary, and no grades or extra points are given for participation or other extra-assessment performances. For the first two years of their studies, students in the Political Science programme follow mandatory courses. Lectures taught by senior staff are combined with weekly tutorials taught by senior students.

In the department, most students are members of voluntary study groups of 3–5 members meeting outside classes. The student presentations (the teaching-as-usual) have been an integral part of tutorials in all courses for many years. Typically, each question is delegated to a voluntary study group, and that group is expected to prepare a presentation and consult the tutor during office hours to have the presentation approved. Often the groups present short written hand-outs that are uploaded to the learning management system. Although student presentations have been recognised as an instructional method activating students during tutorials (Girgin & Stevens, 2005; Race, 2001) disadvantages have been noticed in the

department for some years. While a fraction of the students (those doing the presentation) would often become very involved in the tutorials, the majority of the students seemed rather passive and only occasionally joined plenum discussions. In many respects, the tutorials relying on students' presentation often degenerated into mini-lectures such as have been experienced at other universities (Kember, 1997; Biggs, 2003).

During the intervention, the students' presentations were substituted for cooperative learning groups in order to promote active student engagement in tutorials and to stimulate deep approaches to learning. At the beginning of each tutorial session the students were randomly assigned to ad hoc groups with three or four peers from other out-of-class study groups. In those groups, students were instructed to explain and discuss their prepared answers to the worksheet question; to compare the different answers; and to agree on a common answer that the group was to soon present to the rest of the class. The instructions were written on a paper handed out to each cooperative learning group, since scripted cooperation is more effective than non-scripted cooperation (O'Donnel & Dansereau, 1992). As with the presentations, the cooperative learning activities were followed by plenum discussion. Thus, the cooperative learning accounted for about one-fourth of the time spent in tutorials.

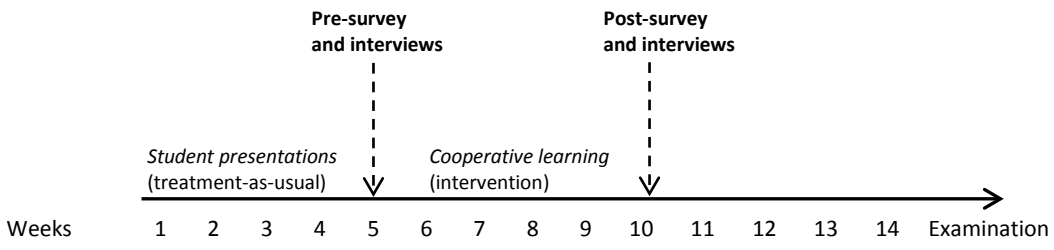
2.2 THE QUASI-EXPERIMENTAL DESIGN

Prior to the main study, a pilot study was conducted in the spring semester of 2010. One tutor and two tutorial classes were subjected to cooperative learning for three weeks. A preliminary questionnaire was tested and a total of three focus-group interviews were conducted. These data served for adjustments of the questionnaire and to gain experience with cooperative learning before intervening on a full scale. The data collected during the 2010 semester were not included in subsequent analysis.

The following year, in the spring semester of 2011, the full-scale intervention was conducted. In the first five weeks, students' presentations dominated tutorial interaction as usual. In the five subsequent weeks, weeks six through 10, cooperative learning was implemented in the tutorials (see *Figure 2.1*). The students were informed of the intervention and the research project at the beginning of the semester without revealing the purpose of the study. The student cohort was already divided into eight sections of 20–25, and each section was taught by one of four senior students. The researcher did not teach. To assure adherence to cooperative learning principles, the researcher met with the tutors prior to and during the intervention and the exact implementation of cooperative learning in the tutorials was agreed

on. A minor adjustment was undertaken after the first cooperative learning tutorial. The researcher also observed selected tutorials prior to and during the intervention. Observation notes were taken, but these were not included in subsequent data analysis.

Figure 2.1 The quasi-experimental design and data collection



It was decided to end the intervention well before the nearing of the final examination to avoid potential sources of bias. For example, test anxiety has been found to be related to surface approaches to learning (Lassesen, 2012). After the intervention the tutors and students agreed among themselves whether they would proceed with cooperative learning or if they would return to presentations. Interestingly, the students taught by the first tutor decided to return to presentations. The students taught by the second and third tutors chose to combine cooperative learning and students' presentations, while the students taught by the fourth tutor continued using cooperative learning until the end of the semester.

2.3 DATA COLLECTION AND SURVEY INSTRUMENTS

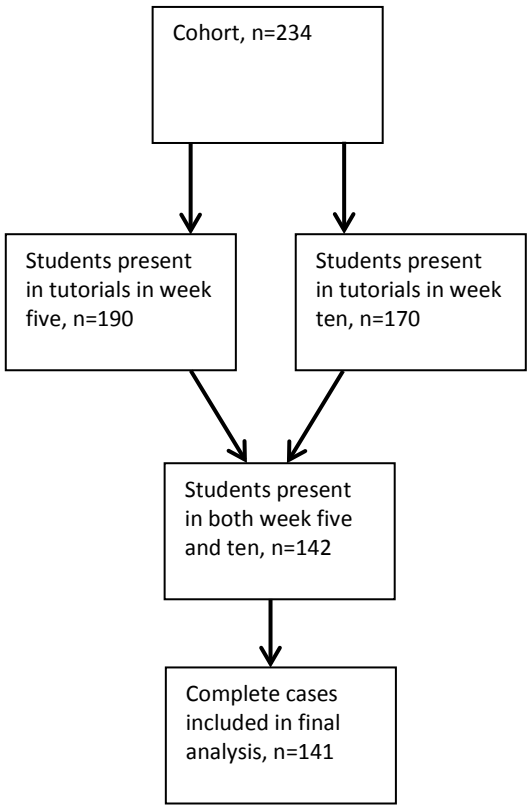
When conducting interventions in real-life educational settings, Kember (2003) recommended the collection of various types of data such as quantitative and qualitative data. Data were collected twice during the intervention. Two almost identical questionnaires were handed out to all students being present in the fifth and tenth tutorial, that is, at the end of the teaching as usual (just before the intervention) and at the end of the intervention. The first questionnaire was answered by 190 students, and the second questionnaire was answered by 170 students, which in both instances was 100 per cent of the students present. In the end, 141 students provided enough data to conduct an analysis of within-subject change scores (see *Figure 2.2*).

2.3.1 Reliability and validity of the survey instruments

The revised two-factor *Study Process Questionnaire* was developed in order to measure the students' deep and surface approaches to learning (Biggs et al., 2001) and the instrument has also been recommended for detecting change in the students' approaches to learning in response to educational innovations (Kember et al., 1997). Since the Danish version of the questionnaire (R-SPQ-2F-DA) had already been validated (Lassesen, 2009), only the reliability of scales were examined for this particular sample. The reliability statistics for the *deep approach scale* (α=.805) and *surface approach scale* (α=.793) were found to be satisfactory (De Vaus, 2002).

Because the R-SPQ-2F-DA does not address the students' participation in discussions in particular, 25 additional items were developed and included in the questionnaires that were handed out to the students. Initially, the *in-class participation scale* was part of a questionnaire including three additional scales that were not analysed subsequently (a *responsibility scale*, a *preparation scale*, and a *perceived learning outcome scale*). The dimensionality of the 25 items was tested in an exploratory factor analysis. In this process, six items were deleted. Four components with eigenvalues greater than one emerged in the final principal component analysis. These components accounted for 64.3 per cent of variance. All items loaded greater than 0.4 on one of four components after varimax rotation (Tabachnick & Fidell, 2007). At this point, it was decided only to use the in-class participation scale in subsequent analysis and to abandon the remaining three scales (it was assessed by the author that they lacked theoretical support and thus had questionable construct validity).

Figure 2.2 Survey data collection



Note: Response rates in both week five and ten = 100 per cent (of students present that day)

The in-class participation scale comprised six items: 'In tutorials I often share my personal understanding of course material'; 'In tutorials I often contribute to discussion with comments'; 'I often try to answer when my tutor poses a question'; 'Often a tutorial passes by

without me saying anything out loud'; 'I mostly feel quiet passive during tutorials'; and 'I am an active participant in tutorials and I often join discussions'. The reliability statistic for this scale was high (α=.917). The in-class participation scale is conceptually similar to the operational definition of participation offered by Rocca (2010), that is, making comments, asking questions, and signalling a willingness to participate in discussions. Operational definitions similar to this have been used in numerous studies (Floyd, Harrington, & Santiago, 2009; Fritschner, 2000; Nunn, 1996; Sidelinger & Booth-Butterfield, 2010; Weaver & Qi, 2005). *Table 2.1* shows the inter-correlations between the final three scales: in-class participation, deep approaches to learning, and surface approaches to learning.

Table 2.1 Pearson's r correlations between the three dependent scales used in the quantitative data analysis

Scales	Number of items	Cronbach's alpha	Inter-scale correlations (Pearson's r)		
			1.	2.	3.
1. In-class participation	6	.917	–	.589*	-.379*
2. Deep approach	9	.805	.589*	–	-.600*
3. Surface approach	10	.739	-.379*	-.600*	–

Note: * p<.05, N=141.

Finally, each questionnaire comprised two open-ended questions for which the students were asked to described how they had experienced the last four weeks and to mention what they had learn from and what they had not learned from.

The full and original questionnaires (in Danish), including items that were not used in the final analysis, are enclosed in the Appendix. Questionnaire items that were included in subsequent analysis have been translated into English (see above for the in-class participations scale and see Lassesen, 2009, for the deep approach to learning scale and surface approach to learning scale). Those survey items that were not used in subsequent analysis have not been translated.

2.3.2 In-depth interviews

Twelve students were interviewed in week five and again in week 10. These students were picked at random from the list of students signed up for the course; however, the researcher took measures to ensure that the sample represented male and female students as well as students taught by each of the four tutors. Prior to the interviews, an interview guide was

developed and tested in a pilot interview. The interviews were audio-recorded and later transcribed by a research assistant. The assistant was given a list of instructions concerning the transcription (e.g., symbols indicating pauses and interrupted sentences) and the researcher and the research assistant met to discuss the transcription of the first interview to ensure the quality and level of detail in the translation from audio to text.

A detailed description and discussion of the interview data and the qualitative data analysis is presented in *Paper 3*.

CHAPTER 3. SUMMARY OF RESULTS

In this third chapter the main results from three papers are reported. The full-length papers are included in the Appendix.

3.1 SUMMARY OF *PAPER 1*

The aim of the first paper *Cooperative learning in higher education social sciences: A review* was to review the impact of cooperative learning on student learning. In 2010, the ERIC and PsycINFO databases were systematically searched. In addition, 12 higher education research journals were hand-searched. For studies to be included in the review, they had to have been published in English-language peer-reviewed journals between 1991 and 2010; target higher education students within the social sciences (Smesler & Baltes, 2001); clearly adhere to the principle of positive interdependence within cooperative learning theory (Johnson & Johnson, 1989); and be conducted in real-life educational settings. Studies relying on both qualitative and quantitative methods were included; however, quantitative studies had to be intervention studies in order to be included. Using these criteria, a total of 23 studies were identified and included. In accordance with the 3P-model (see *Section 1.5.2*) the influence of cooperative learning was examined regarding three topics: a) students' learning outcomes, b) students' learning behaviours (the process of learning), and c) students' perceptions of cooperative learning.

3.1.1 LEARNING OUTCOME

Eighteen studies of cooperative learning related to students' academic achievement. In six studies cooperative learning was related to higher academic achievement compared to the teaching as usual. In eight studies, no significant differences were found between cooperative learning and control conditions, and in four studies results were mixed. It should be noted that the 18 studies offered no or only vague definitions of academic achievement. In 12 of the 18 studies academic achievement was measured as performance on multiple-choice tests.

3.1.2 Learning strategies

None of the 23 studies included in the review directly addressed the impact of cooperative learning on students' approaches to learning. Nevertheless, two studies used inventories and constructs that were conceptually comparable to student approaches to learning (Entwistle & McCune, 2004). In the first study, Griffin et al. (1995) used the *Motivation and Strategy Use Survey* (Greene & Miller, 1993) to assess the impact of cooperative learning on strategies of students in an undergraduate psychology class. No statistically significant impact of cooperative learning was found on the following scales: *learning goal*, *performance goal*, *perceived ability*, *deep processing* (comparable to organised study), and *shallow processing* (comparable to a surface strategy). However, students in the cooperative learning condition, on average, scored higher on the *self-regulation* scale than students in the control condition. In the second study, Bicen and Laverie (2009) introduced cooperative peer-assessment in a marketing class. Compared to pre-test, students increased their scores on the following scales: *perceived autonomy*, *intrinsic motivation*, *deep learning (organisation)*, *deep learning (elaboration)*, *meta-learning*, *perceived confidence*, and *task mastery orientation*. The intrinsic motivation and deep learning scales in the Bicen and Laverie (2009) study were conceptually congruent with the deep motive and the deep strategy concepts within the theory of approaches to learning. Thus, contrary to the study conducted by Griffin et al. (1995), the Bicen and Laverie (2009) study suggested that cooperative learning stimulated a deep approach to learning.

3.1.3 Perceptions of cooperative learning

Based on qualitative data, eight studies described the students' perception of working cooperatively. Although the studies were very different concerning the qualitative data material and type of qualitative analysis performed, their overall findings were quite similar. In general, cooperative learning was perceived by students as creating an opportunity to engage in discussion and as providing a space in which they were encouraged to engage actively with the subject matter (Waite & Davis, 2006; Finlay & Faulkner, 2005; Kelly & Fetherston, 2008). Students also perceived cooperative learning as an incentive to work harder and be more persistent (Waite & Davis, 2006; Finlay & Faulkner, 2005; Kelly & Fetherston, 2008; Onwuegbuzie & DaRos-Voseles, 2001; Hassanien, 2007). On the other hand, the increased openness to student involvement and the interdependence among students caused some students to resent cooperative learning. General distrust towards peers' knowledge, preoccupation with knowing the exact 'right' answer, and heavy reliance on the teacher were

some of the factors inhibiting students from fully engaging in cooperation with peers (Griffin et al., 1995; Waite & Davis, 2006; Finlay & Faulkner, 2005). In the study by Phipps, Phipps, Kask, and Higgins (2001), students seemed to value the lecture format and considered it the proper way to be taught at the university level. They also preferred taking notes to engaging in discussion. This suggests that cooperative learning was conflicting with students' perceptions of 'good' teaching at the university level. In other studies, cooperative learning was found to be disliked by students who were intolerant to ambiguity and uncertainty (Waite & Davis, 2006) or students who conceptualised learning as transmission of information from expert to novice (Kelly & Fetherston, 2008).

3.1.4 Methodological characteristics of studies

In addition to the reported results, the methodological characteristics of the studies were interesting in themselves. All but one study were from English speaking countries. Eighteen studies were from the North-American educational systems. In 13 studies, the teacher could positively be identified as the researcher, but this number might be even higher as some studies were not explicit on this point. Eighteen studies evaluated the impact of cooperative learning on students' academic achievement. Yet, only limited information of the nature of academic achievement was displayed. In 12 studies, the students' achievement was based on their performance on multiple-choice tests. Multiple-choice tests can in principle be used to measure the depth of students' conceptual understanding (Hake, 1998). However, the studies' operational definitions of academic achievement – for example, 'subjects [ability] to recall accurately information from topics discussed' (Westmyer, 1994, p. 14) – did suggest that the multiple-choice tests were used to measure memorisation rather than conceptual understanding.

3.1.5 Implications from findings

The review proposed interesting areas for further and deeper investigation of the influence of cooperative learning on student learning at the university level. First, limited empirical knowledge existed regarding the influence of cooperative learning on the qualitative aspects of students learning, especially regarding the relation between cooperative learning and deep approaches to learning. Only the studies by Bicen and Laverie (2009) and Griffin et al. (1995) adopted instruments able to measure constructs reflecting deep and surface learning, and the results were ambiguous. Second, studies of the students' perception of cooperative learning revealed both acceptance and resistance to cooperative learning and researchers have

cautiously proposed factors that may have influenced the students' attitudes towards cooperative learning, including students' conceptions of proper university teaching, students' conception of learning, and lack of tolerance towards ambiguity. These results called for a deeper analysis of the factors contributing to why some students embrace cooperative learning instructional methods and some students strongly resent working within cooperative learning groups. The study, reported in the following papers, addressed these questions.

3.2 Summary of *Paper 2*

The second paper, *The impact of cooperative learning on student engagement: Results from an intervention*, reported the results from the 10-week intervention in tutorials in the political science programme. The study's aim was to test 1) whether cooperative learning would increase the students' engagement in tutorials, and explore 2) how students would perceive cooperative learning.

In the first five weeks, the tutorials were conducted as usual. In the following five weeks cooperative learning was introduced as a significant part of the tutorials. The students' approaches to learning were measured using a Danish version (Lassesen, 2009) of Biggs' R-SPQ-2F inventory (Biggs et al., 2001). In addition, an *in-class participation* scale was developed to measure the students' willingness to engage in discussion. Out of a cohort of 234 students, a total of 142 students filled out both the pre- and post-intervention surveys, resulting in a total of 141 usable cases (one case was excluded because of too many missing answers). Using a dependent samples t-test, within-subject changes were measured and analysed.

3.2.1 Students' approaches to learning and in-class participation

On average, no statistically significant changes in the students' approaches to learning could be found; neither on the deep approach to learning scale ($t[140]=-0.930$, $p>0.05$, $r=0.08$) nor the surface approach to learning scale ($t[140]=-0.553$, $p>0.05$, $r=0.05$). However, students on average scored higher on the in-class participation scale after engaging in cooperative learning ($t[140]=-2.405$, $p<0.05$, $r=0.199$).

3.2.2 Students' attitudes towards cooperative learning

Following the analysis of the quantitative survey data, the students' written responses to the open-ended survey questions were analysed. As a first step, the students' descriptions of their experience with cooperative learning were classified, and, in cooperation with a research assistant, each respondent was coded as exhibiting a mostly positive, mostly negative, or

ambiguous attitude towards cooperative learning. Forty-five per cent of the students were mostly negative towards cooperative learning, 27 per cent were mostly positive, and for the remaining 27 per cent, the positive and negative aspects of cooperative learning seemed to outweigh each other, thus, they were coded as ambiguous.

An interesting trend in the data was found: The students' attitudes towards cooperative learning were heavily dependent on which of the four tutors had led the tutorials. Eighty-five per cent of the students taught by *Tutor 1* were mostly negative towards cooperative learning. In comparison, only between 29 and 35 per cent of the students being taught by *Tutors 2*, *3*, and *4* were mostly negative towards cooperative learning. These differences suggest that the tutors' implementations of cooperative learning or their personal attitudes towards cooperative learning might have considerably affected the students' responses to cooperative learning.

Table 3.1. Undergraduates' attitude towards cooperative learning as part of tutorials

	Mostly positive	Positive and negative	Mostly negative	N
Tutor 1	5%	11%	84%	37
Tutor 2	32%	38%	29%	34
Tutor 3	34%	37%	29%	35
Tutor 4	41%	24%	35%	29
Total	**27%**	**27%**	**45%**	**135**

Source: *Paper 2.*

Subsequently, the written comments were analysed in greater detail to identify which aspects of cooperative learning were experienced positively and which were experienced negatively. Eight reoccurring themes were identified. When described positively, cooperative learning was experienced as a) allowing students to become more active and less passive during tutorials, and b) stimulating students to develop new perspectives due to the close interactions in group discussions. However, the following themes described the perceived negative aspects of cooperative learning: c) peers being unprepared or ignorant; d) group discussion being perceived to be superficial or redundant; e) different perspectives being perceived as only adding to confusion; f) students calling for the tutor to take greater control and cover the right answers; g) students fearing they would miss main points; and h) the syllabus being considered too difficult for students to fully comprehend.

3.3 SUMMARY OF *PAPER 3*

During the 10-week intervention 12 students were interviewed before and after the implementation of cooperative learning in the tutorials. The qualitative analysis of these interviews was reported in the third paper, *When student-centred teaching fails: Explaining the relation between approaches to learning, perceptions of the tutorial, and responses to student-centred teaching*. Three interrelated research questions were addressed: 1) How do approaches to learning reveal themselves in the way students engage in tutorials; 2) How are students' approaches to learning related to their perceptions of the tutorial setting?; and 3) How do students with a surface approach perceive and respond to student-centred teaching-learning activities?

3.3.1 STUDENTS' APPROACHES TO LEARNING IN TUTORIALS

In the first part of the qualitative analysis, students' approaches to learning within the tutorial were described. *Table 3.2* summarises how deep and surface approaches to learning compare

Table 3.2. Comparison of deep and surface approach to learning within the tutorial setting

	Deep approach	*Surface approach*
Taking notes	*Puts it in own words (paraphrasing)* *Writes notes in order to understand* *Notes main points*	*Reproduces verbatim what was said* *Writes notes in order to pass exam* *Notes as many facts as possible*
Listening	*Notices what is said (content)* *Looks for underlying meaning* *Focuses on what is not understood* *Compares to own understanding*	*Notices who says it (e.g., tutor vs. peers)* *Looks for correct answers* *Focuses on what is supposed to be 'the point'* *Disengages when 'solution' has been found*
Engaging in (internal and external) dialogue	*Judges the plausibility of statements* *Wonders and asks questions* *Comes to tutorials with questions in mind*	*Labels statements as right or wrong* *Accepts answers without further reflection* *Empty buckets ready to be filled*

Source: Paper 3.

on a variety of learning activities. Preoccupation with eliciting the exact right answer; verbatim note-taking and taking as many notes as possible in order to recall at the exam; and accepting information from authority figures (typically the tutor) without further reflection were characteristic of a surface approach to learning from tutorials. In contrast, the following aspects were characteristic of a deep approach to learning within tutorials: an intention to understand and an awareness of what was yet to be understood; trying to grasp the underlying meaning and seeing the overall principle; and engaging in rich inner or open dialogue (e.g., asking questions).

What was striking was that the same learning 'activity' could take very different forms depending on the students approach. For example, a deep approach to learning was associated with taking notes in a manner that would contribute to the student's personal understanding of concepts. Contrarily, a surface approach was related to taking notes in a mechanical fashion in order to maximise the quantity of information stored in the notes.

3.3.2 Students' perceptions of tutorials

In the second part of the qualitative analysis the students' perceptions of the tutorial were examined. Three overall themes were identified: students' perceptions of the *tutor*, students' perceptions of *peers*, and the perceived function of the *tutorial* per se (see *Table 3.3*). The perceptions of the students relying on a surface approach to learning were compared to the perceptions of the students relying on a deep approach to learning.

Students who exhibited a deep approach to learning tended to see the tutorials as an arena in which they, contrary to the lecture, were welcome to apply their knowledge and test their understandings. In general, they appreciated input from peers and considered them to be capable academic colleagues. The tutor was respected for his or her knowledge and expertise; however, students relying on a deep approach, in general, preferred the tutor to take the role of a knowledgeable chairman which means that the tutor was expected to complement the students' individual learning rather than take the role of a junior lecturer.

In comparison, students eliciting a surface approach to learning tended to perceive the tutorial as a small-scale, interactive lecture that served the primary function of ensuring that the students could 'get' enough notes to cope with the examination. These students tended to view the tutor as an expert authority and expected the tutor to cover readings and point them towards the correct answers on the task set. They did not particularly value the contributions of peers or themselves. Peers were largely perceived as fellow ignorants. This does not mean that students relying on a surface approach to learning were demeaning of their peers; simply, the inputs of peers in discussion were perceived as inefficient compared to an exposition by the tutor.

Table 3.3. Key dimensions in the students perception of the tutorial context

Dimensions	Opposite ends of the continuum	Description	Sample quotes
Perception of tutor	Expert authority	Tutor is expected to elicit the correct answers and guarantee that the syllabus is covered. Going through the readings in an almost lecture-like fashion is much valued and preferred. Tutor should cut off comments that are not relevant to what students are officially supposed to learn. When the tutor says something you can be certain that it is 'right'.	*… so you wait until someone like in authority who knows what they're talking about … who like tells you how to sort the sheep from the goats.*
	Knowledgeable chairman	Tutor is respected for his/her knowledge and tutor input is valued; however, tutor is not expected to cover the material. Students are willing to take an active role and the tutor is to chair the session, giving feedback, correcting misunderstandings, and keeping discussion on track. Tutor's knowledge is only but one interpretation and can be challenged.	*… the instructor is like in control as far as that's necessary and like keeps the teaching on track […] someone who's in control but can easily pull back as well.*
Preferred use of tutorials	Small-scale lecture	Pivotal that the syllabus is fully covered and the right key points have been told. In general, there is no point in 'going about in circles' if the 'right' answer is already 'out there'. Coverage of the syllabus should be comprehensive, correct and efficient. Misunderstandings or personal interpretations are irrelevant.	*It's all about going to class and getting the right answers.*
	Arena to revise understanding	The tutorial is an arena in which students can continue the work of understanding theories and concepts. There should be time for students to test, elaborate, and apply their knowledge in discussions.	*I suppose I also expect that in tutorials you work with the material in a slightly different way because you can discuss it […] you can play an active part in the discussions.*
Perception of peers	Fellow ignorants	No mentionable gain from other students' input expected. Great distrust towards peer comments. Syllabus considered too complex for students to fully understand. Peers are sources of confusion rather than clarification. One should not speak when not certain of relevance of question or correctness of answer.	*If we reach our own conclusions, I tend to feel that they're wrong.*
	Academic colleagues	Input from peers is valued and differing perspectives are often integrated within a greater personal understanding. Comments are generally welcome unless they are 'off the wall'. It is ok to be wrong if one does not dominate discussion.	*Well, all your classmates don't think the same way you do […] so that gives you the chance to get a different perspective on these things […] and that gives you the chance to widen your horizons.*

Note: Quotes are taken from *Paper 3*.

Table 3.3 summarises these findings. It is important to note that the labels (for example, 'expert authority' versus 'knowledgeable chairman') should be considered ends on a continuum rather than discrete categories. Students relying on a surface approach to learning would tend towards one side of the continuum while students relying on a deep approach to learning would be likely to reveal perceptions leaning toward the other end for the continuum. However, these were tendencies and, as such, overlap did occur.

3.3.3 Responses to cooperative learning

These findings guided the third part of the qualitative analysis. Because, the students relying on a surface approach were considerably more sceptical towards the value of student participation than students relying on a deep approach, it was expected that students with a surface approach would be less positive towards cooperative learning than students relying on a deep approach. This hypothesis was only confirmed in part as *Table 3.4* shows.

Table 3.4. Students' approaches to learning in the tutorial and their preferences for particular teaching-learning activities

	Preferred presentations	Preferred cooperative learning
Surface approach	Kate, Claudia, Robert	Michael, Oliver
Deep approach	James, Victoria	Arthur, John, Sally

Note: Margret and Kirsten (both with a deep approach) suggested a combination of both TLAs
Source: *Paper 3*

Three out of the five students relying on a surface approach did prefer the pre-cooperative learning teaching-learning activity which was presentations. They objected to cooperative learning because peer interaction increased the chances of discussing topics or concepts that had been misunderstood and, thus, wasted precious time in which the syllabus could have been 'covered', correct and in detail. Cooperative learning meant that there were no students designated as experts (as when some students would do a presentation) and this meant that there were fewer 'reliable' sources of information other than the tutor. Because the students relying on a surface approach to learning were focused on collecting correct and comprehensive information and storing it in the form of notes, cooperative learning was clearly inferior to presentations. In this respect, these students' attitudes towards cooperative learning were congruent with their approach to learning and their perceptions of the tutorial's purpose.

Two students, also relying on a surface approach to learning, preferred cooperative learning, which was contrary to what was expected. They appreciated being more active during tutorials and they both found that they had learned from listening to and discussing with peers. They also reported less verbatim note-taking and less 'waiting' for the tutor to teach. We could cautiously interpret this finding as supporting the claim that cooperative learning discourages a surface approach. On the other hand, while these two students might have adopted a weaker surface approach they still did not adopt a deep approach to learning. For example, they still relied on the tutor 'covering' the syllabus and their preparation was still mediocre.

Since the students relying on a deep approach to learning were very self-directed and seemed to engage in learning activities both as active and silent participants, there was no expectations that these students would prefer either of the teaching-learning activities. As is shown in *Table 3.4*, three of these students preferred cooperative learning while two students preferred presentations. In addition, two students preferred a combination of presentations and cooperative learning to organise tutorial interactions.

3.3.4 Norms and expectations

What is even more interesting is how the implementation of cooperative learning changed the norms and expectations associated with the tutorial setting. The presentations (which were used prior to the intervention) were related to a clear division of labour among the students. Students doing a presentation were expected to prepare well, they were trusted to deliver the correct information, and they naturally dominated discussions. Students not doing the presentation could rely on 'being served' the most important points. If the presentation was good, preparation would be considered almost unnecessary. This mind-set changed when cooperative learning was implemented in tutorials during the intervention. The notion of a division of labour among students disappeared; it became legitimate and required of all students to prepare and to participate in discussion to some degree. As one student put it, they had the chance to play a more active role. However, this change in mind-set did not seem to discourage a surface approach to learning, nor was it appreciated by all the students. Nevertheless, it is interesting that both cooperative learning and presentations were associated with distinct sets of norms and expectations regarding what were considered appropriate learning behaviours and interactions.

CHAPTER 4. DISCUSSION

4.1 COOPERATIVE LEARNING AND DEEP APPROACHES TO LEARNING

Within the cooperative learning literature, it has been claimed that cooperative learning is an effective teaching-learning activity at the university level and it has been claimed that cooperative learning promotes deep approaches to learning (Millis, 2002; Millis & Cottell, 1998; Millis, 2010). Unfortunately, the empirical evidence presented in this thesis does not, at this point, support such claims. In the review presented in *Paper 1*, only two studies utilised survey instruments and scales that conceptually aligned with the surface and deep approaches to learning. Bicen and Laverie (2009) showed that after the implementation of cooperative learning, students increased their scores on the *intrinsic motivation* and *deep learning* scales, which suggests that the use of cooperative learning stimulated the use of deep approaches to learning. On the other hand, Griffin et al. (1995) found no measurable change on scales that were conceptually similar to the deep and surface approaches to learning. Results presented in *Paper 2* do not support the claim either. Students' in-class participation increased with implementation of the cooperative learning format, but only very small and statistically non-significant changes in the students' use of surface and deep approaches to learning could be measured.

These ambiguous results are puzzling because they do not match the impressive effect sizes documented in previous meta-analyses of cooperative learning interventions (Springer et al., 1999; Johnson et al., 2000; Johnson & Johnson, 1989; Roseth et al., 2008). Nevertheless, there are plausible explanations for the apparent discrepancy. The most obvious explanation is this: None of the reviews or meta-analyses referred to in the literature review (see e.g., *Table 1.2*) explicitly considered approaches to learning or other constructs reflecting deep learning. Rather, reviews of the cooperative learning literature have primarily focused on academic achievement. As an example, the meta-analysis most relevant to this study, the meta-analysis by Springer et al. (1999), exclusively addresses academic achievement. The authors themselves noted that lack of detailed descriptions of assessment instruments impeded clarity of what had, in fact, been measured and they also cautioned that many standard tests used in

the studies tended to assess content knowledge rather than higher-order thinking skills. The same could be said of the studies included in the review presented in *Paper 1*. The frequent use of multiple-choice assessment formats and some of the descriptions offered in the studies strongly indicated that what had been measured was primarily students' retention of content knowledge. Whereas content knowledge may be necessary to gain understanding within an academic discipline, it is not, in itself, a valid indicator of deep learning. All this means that even though there is empirical evidence showing that cooperative learning is related to increased academic achievement, this does not imply that cooperative learning also leads to deeper levels of understanding or deep approaches to learning.

We should note that the claim advanced by Millis and Cottell (1998), that cooperative learning stimulates deep approaches to learning, rests on two assumptions that can both be questioned. The first is the implicit assumption that results from research at the kindergarten through 12th grade level plausibly predicts the influence of cooperative learning in a university context (Millis & Cottell, 1998, p. 5). Such extrapolation is dubious since the learners, the context of learning, and the object of learning are very different depending on the level of education (Dansereau & Johnson, 1994). The second assumption, implicitly made, is that a learning environment allowing for activities that are associated with deep approaches to learning will also stimulate deep approaches to learning. This seems, at first, to be a plausible train of thought; yet, principles of learning do not readily imply teaching imperatives (Marton & Booth, 1997). Cooperative learning might be congruent with deep approaches to learning within the context of higher education; for example, cooperative learning allows for the expression of ideas, active participation in discussion, ownership of the learning process, the elaboration of knowledge associated with explaining and substantiating one's understanding. Still, while cooperative learning might *support* deep approaches to learning, this does not mean that it will inevitably *lead* to deep approaches to learning. Whether cooperative learning stimulates deep approaches to learning is, in the end, a hypothesis that needs to be tested empirically, and so far, the claim is not support by the empirical evidence.

4.2 THE PERCEPTION OF COOPERATIVE LEARNING

Within the student approach to learning literature, students' perception of the context has long been recognised as mediating the impact of the context itself on students' approaches to learning (Eley, 1992; Prosser & Trigwell, 1999). In recent years scholars have started to investigate how cooperative learning is actually perceived by higher education students (Cavanagh, 2011; Hillyard et al., 2010; Hammond et al., 2010; Kelly & Fetherston, 2008).

In this study, students seemed to agree that cooperative learning allowed for every student to become active within the tutorial and, thus, cooperative learning was perceived as an instructional method very open to student input. While this student-centeredness was welcomed by some students, other students became very frustrated. Hillyard et al. (2010) found that students' appreciation for cooperative learning was dependent on students' valuation of peers' perspectives, and a number of studies have found that students tend to be very sceptical towards input from peers (Kelly & Fetherston, 2008; Phipps, Phipps, Kask, & Higgins, 2001; Finlay & Faulkner, 2005). Similarly, in this study, many students were sceptical towards not only peers' contribution but also their own. Students relying on a surface approach, especially, tended to view peers as fellow ignorants – not because they thought that their peers in particular were ignorant, but because they thought that 'students' compared to 'tutors' were ignorant. As one student, Claudia, tellingly stated in the interview for *Paper 3*, 'If we reach our own conclusions, I tend to feel that they're wrong.' Seen from this perspective, peer interaction will not be valued nor found to be meaningful.

Students' perceptions of the tutor and their perceptions of the purpose of the tutorial also seemed to influence their experience of cooperative learning. For example, students relying on a deep approach were likely to perceive the tutorial as an arena in which they were allowed to try out their understanding and the tutor was perceived as a knowledgeable chairman. Students relying on a surface approach were likely to perceive the tutorial as a small-scale lecture in which the tutor was expected to take the role of a quasi-lecturer. Thus, perceptions of the tutor and the tutorial as related to a surface approach are apparently inconsistent with the principles of cooperative learning and might explain resistance towards peer interaction. These findings are consistent with other recent studies. For example, Kelly and Fetherston (2008) found that cooperative learning conflicted with a transmission model of teaching and learning in which the teacher was considered an expert and expected to transmit his or her knowledge to students. Phipps et al. (2001) found that students would oppose cooperative learning because they perceived the lecture as the proper way to teach at the university level. An interesting venue for further research could be to explicitly investigate how the students' conceptions of teaching and learning influence the way they perceive of cooperative learning.

4.3 Explaining the difficulty of affecting students' approaches to learning

Biggs (2003) defined good teaching as creating teaching-learning activities that will promote deep approaches to learning and discourage surface approaches to learning. Cooperative

learning structures support learning activities that have been associated with deep approaches to learning such as active involvement in the learning process, perspective-taking and dialogical thinking, and taking responsibility for learning (Millis & Cottell, 1998). The problem seems to be that the group of students we would so much like to affect by means of student-centred teaching – students tending towards a surface approach to learning – are the ones *least* likely to appreciate active involvement and peer interaction.

We might begin to understand why it is so difficult to stimulate deep approaches to learning by means of student-centred teaching-learning activities (Baeten et al., 2010) such as cooperative learning. Cooperative learning establishes a framework, and within this framework, the students are free to act. However, the framework itself does not lead the student to act in any particular way. As has been shown in this study and in numerous other studies of learning in higher education, it is the way students *perceive* the context that influences their learning strategies (Prosser & Trigwell, 1999). Complicating matters, students may perceive the same context differently (Eley, 1992). The paradox is this: Teachers may use cooperative learning in their courses in order to stimulate students who are relying on a surface approach to learning to adopt a deep approach to learning; yet, the very students likely to rely on a surface approach to learning are the ones least likely to see the point in interacting with peers.

And indeed, it is important that the students 'see the point'. As Marton and Säljö (1984) stated; if we require the students to accomplished tasks that are characteristic of deep approaches to learning without targeting the students' motivation and conceptions of what is meaningful, we are likely to address merely the symptoms rather than the cause of surface approaches to learning. In such instances, students may just technify the task and respond to it in ways that serve their own ends (Marton & Säljö, 1984; Vermetten et al., 2002). For example, some of the students interviewed did, as was required, engage in discussion within the cooperative learning groups; however, in reality, they were only waiting for the tutor to elicit the correct answer.

4.4 Basic assumptions underlying cooperative learning theory

The findings from this study are interesting because they challenge some of the basic assumptions underlying cooperative learning theory. One such basic premise is that '[h]ow social interdependence is structured <u>determines</u> how individuals interact within the situation which, in turn, affects outcomes' (Johnson & Johnson, 1989, p. 5, my underlining). In other

words, the cooperative learning literature assumes that the context of learning is perceived uniformly by students and that students respond to the context in the same way. Such structural determinism might explain why the major reviews of cooperative learning focus on neither students' perceptions of cooperative learning nor the learning strategies adopted by students. However, as the present study and other recent studies of cooperative learning demonstrate, students' perceptions of cooperative learning structures cannot be taken for granted.

Another unfortunate consequence of such structural determinism is that cooperative learning theory hardly considers the role of the teacher. The present study showed that students' attitudes towards cooperative learning were strongly dependent on the tutor (*Paper 2*) and the study by Hillyard et al. (2010) suggested that students' appreciation of group work was dependent on teachers' clarity in explaining the purpose of group work. In the Springer et al. (1999) meta-analysis, cooperative learning had greater effects on students' academic achievement in those studies in which the teacher was also the one conducting the study. All this evidence suggests that teachers' commitment, enthusiasm and ability to explain the purpose of cooperative learning are important moderators affecting the efficacy of cooperative learning. Again, the structures do not imply deep approaches to learning by themselves. They have to be interpreted, and the teacher seems to play a pivotal role in how structures are interpreted by the students.

Based on predominantly cognitive developmental perspectives, cooperative learning theory assumes that peer interaction is likely to result in disagreement causing cognitive disequilibrium. In the process of resolving disagreement, cooperative learning theory furthermore predicts that incomplete or wrong conceptions will be exposed and students will, eventually, reach more complete understandings (Johnson & Johnson, 1989; Slavin, 1994). The empirical evidence from both this study and the qualitative studies reviewed in *Paper 1*, however, strongly suggests that disagreement among students does not necessarily promote deeper understanding. One barrier seems to be some students' lack of academic self-efficacy and their distrust in the capability of their peers. A number of studies reviewed demonstrated that many students distrusted the knowledge of others. In addition, this study showed how some students not only distrusted the knowledge of others but also their own capability as students. They did not see themselves or their fellow students as legitimate participants in academic discussion. Another barrier might be the students' conceptions of knowledge. Numerous of the students' comments presented in *Paper 2* and *Paper 3* were characteristic of

a dualistic and quantitative conception of knowledge. For example, some students complained that cooperative learning ‘created bad notes’ and that there had to be more focus on what was ‘right’ and ‘wrong’ (see *Table 2* in *Paper 2*).

Whether because of a dualistic conception of knowledge or distrust in the efficacy of peers and self; such factors are potential barriers to a constructive process of learning based on student interaction. As a result, disagreement will be more likely to result in a deadlock rather than the assumed exposure of misconceptions. Hence, the assumption that disagreement and the resulting cognitive conflict may act as a driver of more sophisticated understanding may be heavily dependent on the students’ openness to other’s ideas as well as the students’ tolerance towards ambiguity.

CHAPTER 5. STRENGTHS AND LIMITATIONS

In this section, the strengths and limitations of the study are discussed. The discussion will be general, which means that strengths and limitations will be discussed here only if they concern the project in general or if limited space in the individual papers precluded an in-depth discussion.

5.1 THE CONCEPTUALISATION OF COOPERATIVE LEARNING

In this study, cooperative learning was defined in accordance with the principles that are fundamental to cooperative learning theory, that is, for peer learning to be considered *cooperative learning* it had to adhere to the principles of positive interdependence and individual accountability (Johnson & Johnson, 1989). This particular definition of peer learning and its grounding within a specific theory has both strengths and weaknesses, which became apparent in the review presented in *Paper 1*. The clear definition of cooperative learning allowed the construction of clear inclusion criteria and a high degree of construct validity concerning the independent variable, cooperative learning. Nevertheless, the very definition of cooperative learning led to the exclusion of many studies of instructional methods relying on peer interaction that did not adhere to the principles of positive interdependence and individual accountability. In the end, the total number of studies included, 23, became rather small. A greater number of studies could have been reviewed if the definition of cooperative learning had been relaxed (such as in the Springer et al. [1999] review), and this could possibly have strengthened the conclusions drawn from the review. On the other hand, relaxing the definition of cooperative learning would seriously weaken the construct validity of the independent variable (cooperative learning) and thus the entire literature review.

Concerning the literature review (*Paper 1*), the limited number of studies ultimately included was also a result of the exclusion of disciplines outside the social sciences (Smesler & Baltes, 2001). The main reason for this eligibility criterion was that a review of cooperative learning within the SMET disciplines already existed. In retrospect, this choice may have been

inexpedient. The Springer et al. (1999) meta-analysis is more than a decade old, it only included eight 'pure' cooperative learning studies, it was restricted to studies in North-American institutions, and finally, it only related cooperative learning to academic achievement, thus overlooking the quality of students' approaches to learning. Apparently, studies focusing on both cooperative learning and student approaches to learning are so rare that rather wide eligibility criteria seem necessary in future reviews of the cooperative learning literature.

5.2 THEORIES DISCUSSED

Because the project's aim was to assess the efficacy of cooperative learning, the study has referred to with cooperative learning theory and discussed its findings in comparison to the assumptions underlying this particular theory. As a consequence, other theories about the nature of peer interaction, such as collaborative learning theory (see e.g., Bruffee, 1995), have not been discussed.

That being said, student approaches to learning theory has been referred to extensively throughout this thesis. There are two reasons for this. First, since the question was whether cooperative learning is an appropriate instructional method at the university level, it would have been odd to ignore the theory regarding student learning in higher education, which has been grounded in 40 years of higher education research. Second, proponents of cooperative learning in higher education (Millis & Cottell, 1998; Millis, 2010) have argued that cooperative learning promotes not only academic achievement but also deep approaches to learning. The literature on students' approaches to learning offers theory, empirical evidence, and inventories specifically aimed at the construct of deep approaches to learning. In addition, the 3P-model proved a valuable analytical framework when focusing on the factors that mediate the impact of any change in the teaching context.

5.3 THE QUASI-EXPERIMENTAL DESIGN IN AN AUTHENTIC SETTING

Quasi-experimental studies are rather rare in higher education journals (Hutchinson & Lovell, 2004) compared to other research designs such as cross-sectional designs. The *one-group pretest-posttest design* was chosen for this particular study even though this design is generally considered inferior to control-group designs (Shadish et al., 2002). For example, Campbell and Stanley (1963) did not even consider the one group pretest-posttest design a quasi-experimental design. Kember (2003), on the other hand, warned against the threats to

validity caused by control-group designs and, therefore, recommended alternatives (Kember et al., 1997).

No single experiment can successfully avoid all threats to validity at once and, in a world of limited resources, researchers must accept trade-offs among types of validity (Shadish et al., 2002). In addition, threats to validity are context specific (Shadish et al., 2002; Kember, 2003). This means that the strength of a study's design must be assessed with close attention to the context in which the study is conducted.

It has been very clearly demonstrated that students' approaches to learning are strongly dependent on the context of learning and students' perception of the context (Prosser & Trigwell, 1999). Therefore, it was a high priority for this study that it be conducted in a real-life and authentic educational setting in order to maximise ecological validity. For the same reason, several meta-analyses of cooperative learning have included studies only if they were conducted in natural programmatic settings (Springer et al., 1999; Bowen, 2000; Johnson et al., 2000; Roseth et al., 2008). However, maximising ecological validity also meant that the use of a control-group design became highly problematic. Kember (2003) offers an in-depth discussion of the risks related to control group designs when conducting research in real-life educational settings in general and higher education in particular. The same risks also relate to the crossover design (Shadish et al., 2002: 268) that was considered but ultimately abandoned. Here, I shall only mention the considerations relevant to this particular study.

Table 5.1. Overview of the study's strengths and weaknesses

	Strengths	Weaknesses
The case (context)	Authentic educational setting Intended learning outcomes and assessment criteria requiring deep approaches to learning	Competition from other courses in the semester
Intervention design	Same tutors teaching both the pre- and post-condition Teacher not researcher Equal treatment of students Comparison of within-student change scores	Lack of control group leading to potential bias due to maturation, history, and sequencing Short length of intervention
Instruments and data collection	Use of the R-SPQ-2F-DA to measure approaches to learning	Limited theoretical grounding for the in-class participation scale No data for academic achievement

The greatest threat to the quasi-experiment, had a control-group design been used, would probably have been that students would have been taught and, thus, treated differently. Empirically, real-life experimental studies in which students perceive that they are not given the same opportunities as other participants have encountered great difficulties and even resulted in the termination of the experiment due to student dissatisfaction and protest (Kember, 2003). Shadish et al. (2002) noted that the greatest threats from such reactive effects exist in natural experiments in which the respondents are able to communicate and must be assumed to be aware of differential treatment. The respondents in this study clearly were able to communicate; thus, reactive effects were a likely scenario. At the Department of Political Sciences, Aarhus University, student complaints over problems relating to the curriculum and exams are not infrequent and, in line with Kember (2003), I determined that the risks associated with a control-group design would seriously jeopardise the project.

Other sources of bias were also avoided by not using the control-group design. For example, the cohort was taught by four tutors, each tutoring two groups of 25–30 students. It would have been unrealistic to ask tutors to teach one group as usual and one group using cooperative learning. Thus, the only solution would have been to have two tutors teach as usual and two tutors teach using cooperative learning. As a consequence, there would have been perfect co-variation between instructional method and designated tutor and, therefore, any differences in students' approaches to learning could just as well have been attributed to the influence of the individual tutor (e.g., the rapport between tutor and students).

In the end, a one-group pretest posttest design was chosen, even though this exposed the findings to several well-known threats to validity due to potential sources of bias such as maturation, history, and sequencing (Shadish et al., 2002). For example, cooperative learning was implemented after the teaching-as-usual tutorials and was thus inevitably being compared to how 'things used to be' (sequencing). Moreover, cooperative learning was implemented in the middle of the semester, when the increasing workload from other courses may have affected the students' willingness to invest effort in this particular course (history). In addition, cooperative learning was introduced at a time when students were becoming increasingly familiar with the subject matter and with the thinking and reasoning within the political theory discipline (maturation). These weaknesses should be taken into account when judging the validity of the findings from this study.

Some other design characteristics should be noted. First, contrary to many of the studies included in reviews of cooperative learning the author of this study did not teach the students

himself. Springer et al. (1999) showed that the effect sizes related to cooperative learning were bigger in studies in which the researcher was also teaching, and Johnson et al. (2000) called for studies in which the investigator was independent of the teachers. Thus, the researcher not being the teacher allowed for a more rigorous test of the efficacy of cooperative learning as an instructional strategy in higher education.

Second, the intervention with cooperative learning lasted only five weeks, which is only one third of the semester's duration. This might work both for and against finding positive effects for cooperative learning. There might have been a novelty effect for cooperative learning which means that cooperative learning might have been perceived positively because it introduced variation to the teaching-as-usual. On the other hand, novelty might as well have provoked negative attitudes. The students in this particular department were used to extensive use of student presentations (the pre-condition) in tutorials. The interviews revealed that many of the students thought that student presentations were perceived as *comme il faut* ('what you do') in university tutorials and thus assumed to be 'effective' and in line with the departmental culture. Cooperative learning, on the other hand, was 'an experiment' that had to prove its worth. In this light, five weeks was not long to establish a routine. The effect of cooperative learning might have been dampened by the overall departmental culture.

5.4 Survey instruments

Some scholars have cautioned against a 'black-box approach' within the cooperative learning literature in which studies primarily assess the impact of cooperative learning on students' academic achievement (O'Donnel & Dansereau, 1992; Springer et al., 1999; Peterson & Miller, 2004). Others have noted that studies of the impact of cooperative learning on academic achievement have often not described, in detail, the operational definition of achievement (Springer et al., 1999). Thus, it was unclear whether the studies included in the Springer et al. (1999) meta-analysis defined and measured academic achievement in accordance with a quantitative or a qualitative conception of knowledge (Dahlgreen, 2005; Marton, Dall'Alba, & Beaty, 1993).

The strength of this study is the utilisation of a survey instrument that allows us to assess the influences of cooperative learning on the processes of learning and the quality of these processes in terms of surface and deep approaches to learning. The Danish translation of the R-SPQ-2F (Biggs et al., 2001) has already been validated with a sample of Danish students and

is thus a strong and reliable instrument that includes both a deep approach to learning scale and a surface approach to learning scale (Lassesen, 2009).

Another scale, the in-class participation scale, was developed for this study in order to measure the extent to which students engaged in discussion during classes (see *Section 2.3.1*). The scale was based on the operational definition offered in an extensive review of the student participation literature: that is, 'asking questions, raising one's hand, and making comments' (Rocca, 2010, p. 188). While this is in line with numerous studies relating to student engagement in classes (Floyd et al., 2009; Fritschner, 2000; Nunn, 1996; Sidelinger & Booth-Butterfield, 2010; Weaver & Qi, 2005), the short-comings of this operationalisation should be noted when interpreting results. First, the scale focuses on the fairly overt behaviour of engaging verbally in conversation with peers. While dialogue is an important aspect in teaching and learning because it elicits students' misconceptions and allows teachers to direct their guidance and feedback (Biggs, 2003; Hounsell, 2005b; Bligh, 2000), silence in itself cannot be taken to mean inactivity. Behavioural activity is not the same as cognitive activity (Meyer, 2009; Mayer, 2004). This also became very clear from the interviews presented in *Paper 3*; for example, students relying on a deep approach to learning would engage in very rich inner dialogue and thinking without necessarily engaging in discussion. Second, the in-class participation scale is a quantitative measure of *how much* the student engages in discussion. It does not measure the qualitative dimension of participation. Rocca (2010) stated that the qualitative dimension of participation is a measurement challenge that is yet to be overcome. This study has not managed to solve this particular measurement problem; however, the interviews reported in *Paper 3* would be an interesting source for developing items for an improved in-class participation scale.

In the course of my studies, I came across an alternative scale that, in retrospect, would have been very interesting to include in the study. The *organized effort* scale, which is part of the *Short Revised Experience of Teaching and Learning Questionnaire* (ETL project team, 2012), measures the degree of effort and organisation exhibited by students in their studies. This scale would have been interesting to include in order to test the central hypothesis within cooperative learning theory that students working within cooperative goal structures are likely to invest greater effort than those in more traditional contexts.

Finally, it was not possible to design an instrument to measure the students' learning outcomes. Because all the students in the sample were subjected to both cooperative learning

and teaching as usual, grades from the final examination could not be used as a measure for academic achievement.

5.5 External validity – learning from the singular case

External validity addresses whether the findings from one sample or context plausibly extend to other contexts or samples (Shadish et al., 2002). Because the study reported here is bound within a given context, constituting a case, the question of external validity essentially becomes a question of how much can be learned from the singular case. This is no trivial question and different epistemological stances can be taken regarding it. Stake (2000) distinguished between an *intrinsic* case study in which the purpose of the study is the case in itself and an *instrumental* case study in which the case is examined mainly to provide insights of a phenomenon larger than the case itself. The author of this study leans towards the latter position; the main aim of the intervention was not to study students in the Political Theory course in the year 2011; rather, it was to study how students in higher education respond to cooperative learning.

5.5.1 Comparability

How, then, can we learn from a single case? One approach to assessing the external validity of a study is by *comparison*, which means that what we can learn from a single case is related to how the case is like or unlike other cases. As a consequence, the researcher must describe the case in sufficient detail to let the readers judge for themselves how the case compares to the contexts in which the readers are themselves embedded (Stake, 2000; Miles & Huberman, 2005). Therefore, a detailed description of the case was offered in S*ection 2.1*.

In many respects, the course was similar to other courses at the university level with respect to the use of lectures and tutorials in parallel and the complexity of the subject matter. Regarding the former, the teaching was a combination of weekly lectures in which a senior lecturer covered the overall principles, and tutorials, in which the students, led by a senior student, were to apply their knowledge. The combination of weekly lectures and tutorials is fundamental to teaching at many universities (Anderson, 2005; Biggs, 2003). Second, the students were introduced to a complex subject matter requiring not only memorisation of facts and procedures but also genuine understanding of the different theoretical positions, the skill of applying their knowledge to real-world phenomena, and the skill of critically evaluating the coherence of the different theoretical positions (Aarhus Universitet, 2012). Thus, the course required complex knowledge and skills expected at the university level (Marton et al.,

1993; Dahlgreen, 2005; Biggs, 2003). This is an important characteristic of the case, since we could not expect cooperative learning to stimulate deep approaches to learning in courses in which a surface approach would be appropriate.

However, in other respects the case might have been atypical. First, the course Political Theory was only a 5 ECTS course in a 30 ECTS semester, and, thus, it was competing with two courses that were weighted more in respect to ECTS-points and the students' grade-point averages. Several of the students described that Political Theory was less of a priority for them than the two other courses that semester, and this tendency seemed to grow stronger over the semester. This is a major weakness of the study since Anderson (2005) found that students' self-reported participation in tutorials was negatively related to competition from other course-work and lack of preparation.

Second, while cooperative learning was not part of the tutorial sessions prior to the intervention, nearly all students were organised in voluntary study groups meeting *outside* of classes. Thus, there was an already established system of informal peer interaction prior to the intervention. The quasi-experiment then, strictly speaking, measured the change associated with integrating cooperative learning in *formal* teaching-learning activities in addition to voluntary and informal learning activities.

Third, contrary to the often competitive and individualistic nature of the North-American educational system (Johnson & Johnson, 2009; Slavin, 1996), peer interaction and collaboration is an essential part of the Danish educational system at the primary educational level. In effect, the students in this case would have already had considerable experience with working in groups. For example, many of the students, in their written comments, described their attitudes towards 'matrix-structures'. This demonstrates that the students had already experienced cooperative learning in high school or earlier, since the expression 'matrix-structure' (although indeed a cooperative learning structure) was never mentioned by the researcher or the tutors facilitating the cooperative learning tutorials. We can only speculate how such prior experience might have influenced the intervention. It might have given the students the necessary social skills to cooperate effectively with peers. However, their prior experiences may also have biased their attitudes towards cooperative learning (Dansereau & Johnson, 1994).

The low salience of the course compared to other courses, the existence of informal study groups outside of classes, and students' prior experiences with group work in primary school

and high school potentially makes this a 'harder' case than courses or educational systems in which students do not work together in any form prior to the intervention. This is because the difference between the teaching-as-usual and the intervention may not as marked as in other educational settings. On the other hand, we should note (as described in both *Paper 2* and *Paper 3*) that the students in this case did in fact *perceive* a fundamental change in the way in which the tutorials were organised as well as a change in the mind-set and expectations regarding the tutorial (see *Section 3.3.4*). This suggests that the case provided a valid, although not perfect, context to test the claim that cooperative learning stimulates deep approaches to learning. However, as Kember (2003) stated, in naturalistic educational studies, there is no equivalent of a placebo, and, therefore, any innovation will always be tested against some other type of teaching. This is a condition inherent of the authentic context.

5.5.2 CONFIRMABILITY

Another approach to assessing the external validity is by evaluating the congruence of the study's results with existing theory or empirical research (Miles & Huberman, 2005, p. 279). In this study, cooperative learning did not substantially or significantly affect the students' deep or surface approaches to learning. This finding is in line with Griffin et al. (1995) but not with the findings of Bicen and Laverie (2009). Three studies is a very tenuous empirical basis to justify any conclusions concerning whether or not cooperative learning is likely to promote deep approaches to learning. Thus, the results from this study should not stand alone. We can, however, conclude that, at this point, the claim that cooperative learning stimulates deep approaches to learning within higher education is not backed by empirical evidence.

Considerably more research backs the findings that are based on the study's qualitative data. For example, a number of studies have documented both positive and negative aspects of cooperative learning experiences, as perceived by university students (Hassanien, 2007; Finlay & Faulkner, 2005; Kelly & Fetherston, 2008; Waite & Davis, 2006; Onwuegbuzie & DaRos-Voseles, 2001; Griffin, McCown, Quinn, & Driscoll, 1994; Griffin et al., 1995). These studies, this project, and research not directly related to cooperative learning (Prosser & Trigwell, 1999; Marton et al., 2005) provide very clear evidence that students' perception of the cooperative learning experience cannot be taken for granted. A number of the above mentioned studies also suggest, in line with this study, that the students' attitudes towards cooperative learning is affected by the students conceptions of 'good' teaching and 'appropriate' learning in higher education.

CHAPTER 6. CONCLUSION AND IMPLICATIONS

One of the pivotal aims of this study was to investigate whether cooperative learning structures would stimulate deep approaches to learning. The findings, however, suggest that the students least likely to appreciate cooperative learning were, in fact, the student already relying on a surface approach. Furthermore, the students who were already adopting a deep approach to learning in the course were the ones most open to the idea of cooperative learning. Whereas students on average became more active in discussions during tutorials in which cooperative learning was adopted, students' approaches to learning, on average, remained unchanged.

Apparently, cooperative learning had only a limited effect on students' engagement in learning during tutorials. While the results from this study do not rule out the potential benefits of cooperative learning in higher education, at minimum, they call for a moderation of the 'extravagant enthusiasm' (Hornby, 2009) that one sometimes finds in teaching manuals and reviews of cooperative learning such as Millis and Cottell (1998) stating that faculty could rest assured that the benefits of cooperative learning seem universal. Cooperative learning may be congruent with deep approaches to learning and even *support* deep approaches to learning, but that does not mean that cooperative learning will necessarily *stimulate* deep approaches to learning.

Thus, the study also calls for moderation in the belief that the organization of the teaching-learning environment itself leads to high quality learning. As we have been reminded by Ramsden (1992), one teaching method might be better or worse than another within a given situation; still, in the end, the efficacy of a teaching method remains an empirical question. At the present point in time, the empirical evidence, unfortunately, does not support the claim by Millis and Cottell (1998) that cooperative learning stimulates deep approaches to learning in higher education students, and clearly, more studies are needed before a more valid conclusion can be reached.

6.1 IMPLICATIONS FOR RESEARCH

There are hundreds of studies of cooperative learning (Johnson et al., 2000; Johnson & Johnson, 1989; Roseth et al., 2008; Springer et al., 1999) and within higher education the number of studies investigating the impact of cooperative learning on student learning is rising as cooperative learning becomes more accepted by university teachers. Rather than more of the same, studies that ask questions others than the ones that have already been asked are needed.

The review presented in *Paper 1* showed that research on cooperative learning is still very focused on the influence of cooperative learning on the product of learning rather than on the process of learning. The review also suggested that research hitherto has focused mainly on the quantitative aspects of learning rather than on the qualitative aspects of learning; for example, none of the 18 studies included in the review accounted for whether grade-point averages reflecting academic achievement took account of different levels of understanding of the subject matter. Today, a number of inventories have been developed in order to measure the qualitative dimensions of students' approaches to learning including the *Short Revised Experience of Teaching and Learning Questionnaire* (ETL project team, 2012), the revised two-factor *Study Process Questionnaire* (Biggs et al., 2001), and the revised *Approaches to Studying Inventory* (Tait, Entwistle, & McCune, 1998). Such instruments have high construct validity and are, thus, valuable indicators of whether the use of cooperative learning initiates changes in students' learning strategies that is desirable in higher education (Kember et al., 1997). Hence, studies of cooperative learning employing such instruments would contribute to a greater understanding of if and how cooperative learning promotes deep learning. At this point, the argument that cooperative learning promotes deep approaches to learning is theoretical. The empirical question needs to be addressed by more studies.

Another interesting question is: What explains students' attitudes towards cooperative learning? This study has offered one possible explanation: Students preferring for the tutor to cover the syllabus in a lecture-like fashion with limited student input tended to be more negative towards the cooperative learning experience than students preferring a more open discussion format in which student participation was encouraged. Other studies have interpreted resistance towards cooperative learning as reflecting a transmission model of teaching and learning. Future research directly address, whether dualistic conceptions of learning negatively affects students' attitudes towards cooperative learning.

The survey data, especially the written comments, reported in *Paper 2* strongly suggest that the teacher has a profound impact on students' responses to cooperative learning. While the proportion of students favouring and opposing cooperative learning were roughly equal in the classes taught by three of the four tutors, students taught by one of the tutors strongly resented cooperative learning. Nothing in the data indicated that this tutor was not liked; thus, this finding raises questions of how and to what extent the teacher moderates the influence of cooperative learning. Future research could investigate the impact of moderating factors such as the teacher's enthusiasm, the teacher's belief in the efficacy of cooperative learning, and the teacher's approaches to teaching and conceptions of teaching and learning. This would contribute to a research literature in which studies are often conducted by the same persons who are also teaching the course (Springer et al., 1999; Johnson et al., 2000).

6.2 IMPLICATIONS FOR UNIVERSITY TEACHERS

This study should not discourage teachers in higher education from using cooperative learning in tutorials. Nevertheless, the findings suggest that there are certain realities of which teachers need to be aware when using cooperative learning in their classes. First, teachers need to know that cooperative learning is not a 'silver bullet'. The reviews and meta-analysis of cooperative learning are indeed impressive; yet, faculty should know that these results do not necessarily apply to higher education. At this point, the evidence of the efficacy of cooperative learning in higher education is still ambiguous.

Second, teachers should not expect that simply implementing cooperative learning structures will, in itself, promote deep approaches to learning. Students respond to cooperative learning in ways that are meaningful to them, and the 'structures' do not interpret themselves. Instead, students interpret the structures based on their current situations. Meta-communication might be important here; that is, the purpose of cooperative learning needs to be explained. This may be particularly important in situations in which a strong transmission model of teaching and learning is prevalent among the students.

Third, even though the purpose of cooperative learning might be clearly communicated to the students, they still may not value cooperative learning if the cooperative learning activities are not perceived to be aligned with assessment. Biggs (2003) stressed constructive alignment, but – we might add – even constructive alignment might not be enough if it is not perceived by the students. As long as students perceive, as did a significant proportion of the students in this study, that the best preparation for the examinations is collecting as many notes as

possible, cooperative learning, or any other student-centred instructional method, is bound to fail. Hence, clear meta-communication about the purpose of cooperative learning should be accompanied by clear explanation of how active engagement in discussions with peers is aligned with the skills and knowledge required and assessed on the final exam. As stated by Prosser and Trigwell (1999, p. 87), 'Good teaching is teaching that tries to see the learning and teaching context from the student's perspective. It helps us understand the context in which they are situated and it helps students understand why the material is being taught, and what it is they should learn.'

Finally, because cooperative learning structures will always be interpreted by students within their given situations, we cannot expect that cooperative learning as *intended* will be congruent with cooperative learning as *responded* to. This calls for continuous evaluation. Hattie (2012) recently called for a teaching paradigm in which the teacher critically reflects in light of evidence about his or her teaching. Prosser and Trigwell (1999) urged university teachers not only to organize a learning environment that is likely to promote deep approaches to learning but also seek feedback as to how students perceive their teaching. This seems to be sound advice also to faculty adopting cooperative learning. University teachers should choose to implement cooperative learning teaching-learning activities if they are congruent with the intended learning outcomes of the course. Moreover, teachers should continue to use cooperative learning teaching-learning activities if they, in fact, stimulate and support the approaches to learning appropriate to learning within the discipline. This is ultimately an empirical question.

SUMMARY IN ENGLISH

Background: Cooperative learning is becoming increasingly popular in primary, secondary, and post-secondary education. Within recent years cooperative learning has also been used by university teachers and influential higher education scholars such as John Biggs and L. D. Fink have recommended cooperative learning.

Theory and literature review: Cooperative learning has been defined as highly structure peer interaction adhering to the principles of *positive interdependence* and *individual accountability*. Drawing on a number of related psychological theories, cooperative learning theory posits that students will achieve better when being subjected to cooperative goal structures rather than competitive or individualistic goal structures. This is because, cooperative learning hypothesises, the very structure of the tasks, goals, and resources will determine how individuals interact within a given situation and, ultimately, affect the individuals' performances. Based on motivational theories, cooperative learning theory holds that cooperative goal structures will motivate students to engage in *promotive interaction*. This interaction is proposed to stimulate higher-level cognitive strategies.

The growing popularity of cooperative learning in higher education has been fuelled by scholarly work by Barbara Millis and James Cottell claiming that cooperative learning will promote deep approaches to learning. However, despite the substantial number of studies of cooperative learning conducted over the decades, this claim seems to rest on theoretical argument rather than empirical evidence. In a review of studies relating the use of cooperative learning in higher education, only two studies were found that utilised instruments capable of measuring the students' approaches to learning. The results from these studies were ambiguous. In addition, the review also confirmed the need for studies of how students within higher education do in fact experience cooperative learning.

Aim: The aim of the study was to answer two overall research question. a) To what extent does cooperative learning influence university students' approaches to learning? b) How do students in the university context experience cooperative learning?

Methods and design: Using a one-group pretest posttest design, cooperative learning was introduced in the tutorials of a political science course at a Danish university. Data were collected using a questionnaire including a Danish translation of the revised two-factor *Study process Questionnaire*. In addition, twelve undergraduates were interview before and after the intervention.

Quantitative results: No statistically significant within-student changes on the deep approach to learning scale ($t[140]=-0.930$, $p>0.05$, $r=0.08$) or on the surface approach to learning scale ($t[140]=-0.553$, $p>0.05$, $r=0.05$) could be found. However, when being subjected to cooperative learning, the students' average scores on the in-class participation scale, which measured the degree of student engagement in discussion, increased ($t[140]=-2.405$, $p<0.05$, $r=0.199$).

Qualitative results: All students were asked to describe their positive and negative experiences of cooperative learning in writing. The following positive themes were identified based on the written responses: cooperative learning was a) allowing students to become more active and less passive during tutorials, and was b) stimulating students to develop new perspectives due to the close interactions in group discussions. However, the following negative aspects of cooperative learning were also described: c) peers being unprepared or ignorant; d) group discussion being perceived to be superficial or redundant; e) different perspectives being perceived as only adding to confusion; f) students calling for the tutor to take greater control and cover the right answers; g) students fearing they would miss main points; and h) the syllabus being considered too difficult for students to grasp.

Twelve students were interviewed before and after the intervention. These interviews allowed for a more in-depth analysis of the students' responses to cooperative learning. First the students' approaches to learning within the tutorial setting were analysed. A surface approach to learning was shown in verbatim and mechanical note-taking, preoccupation with eliciting the 'correct' answers from the tutor, and accepting information from authority figures (typically the tutor) without any personal reflection. Contrary, an intention to understand for one self, an awareness of what needed to be understood, trying to grasp the underlying

meaning and overall principle, and engaging in rich inner dialogue was characteristic of a deep approach to learning.

Next, the students' perceptions of the tutorial were compared to their approaches to learning. Students relying on a surface approach to learning tended to perceive the tutorial as a small-scale interactive lecture, the tutor as an expert authority, and their peers as fellow ignorants. Students relying on a deep approach to learning were likely to perceive the tutorial as an arena in which they were welcome to apply and use their knowledge. They were also likely to appreciate the input of peers and preferred the tutor to strike a reasonable balance between covering key point and withdrawing to let students discuss themselves.

Based on these findings, it was hypothesised that students relying on a surface approach to learning would be less receptive to cooperative learning than students relying on a deep approach to learning. This hypothesis, however, was only partly confirmed.

Discussion: Neither the literature review nor the findings from the intervention support the claim that cooperative learning stimulates deep approaches to learning. The present evidence, unfortunately, is too scarce and ambiguous to justify more solid conclusions about the relation between cooperative learning and approaches to learning. Furthermore, the qualitative findings suggest that one of the basic assumptions in cooperative learning theory – that students will act uniformly according to the formal structures – should be modified. Students responded to cooperative learning in a way that was coherent with how they perceived the cooperative learning activities, but for some students cooperative learning as intended differed significantly from cooperative learning as perceived.

Conclusion and implication: While this study's findings do not disqualify cooperative learning as a worthwhile teaching-learning activity in higher education, it calls for a moderation of the often very positive praise of cooperative learning and its effects. Future studies of cooperative learning in higher education need to use valid instruments reflecting deep and surface approaches to learning. As to university teachers, they should continue to include cooperative learning as part of their teaching if it aligns with the intended learning outcomes of the course and the learning activities necessary to meet these goals. However, teachers should invest great effort in explaining the purpose of using cooperative learning and continuously monitor how students actually perceive and respond to cooperative learning.

RESUME PÅ DANSK

Baggrund: Igennem årene er kooperativ læring (*cooperative learning*) blevet mere og mere populær i den amerikanske folkeskole, på det gymnasiale niveau og på mellemlange og lange videregående uddannelser. Undervisningsformen er ligeledes blevet anbefalet af toneangivende forskere inden for universitetspædagogikken så som John Biggs og L. Dee Fink, og i de senere år har vi ligeledes i Danmark kunnet opleve, at flere undervisere gør brug af kooperativ læring-strukturer.

Teori: Kooperativ læring er blevet defineret som nøje struktureret gruppearbejde, der følger principperne gensidig positiv afhængighed (*positive interdependence*) og individuelt ansvar (*individual accountability*). På baggrund af en række relaterede psykologiske teorier påstår kooperativ læring-teorien, at studerende, som arbejder sammen mod et fælles mål, vil opnå et højere læringsudbytte end studerende, som enten ikke samarbejder eller som ligefrem konkurrerer. Dette skyldes, ifølge teorien, at selve organiseringen af opgaver, mål, og ressourcer, vil afgøre, hvordan individer handler i en given situation og derfor også i sidste ende påvirker den enkeltes udbytte. På baggrund af motivations-teorier forudser kooperativ læring-teorien, at studerende, som deler et fælles mål, vil være mere tilbøjelige til at indgå i konstruktivt samarbejde (*promotive interaction*) med medstuderende, og denne interaktion vil ifølge teorien fremme højere-ordens kognitive processer.

At kooperative læring er blevet mere og mere udbredt på videregående uddannelser skyldes ikke mindst Barbara Millis og James Cottell, der har argumenteret for at kooperativ læring fremmer dybdelærings-strategier. Til trods for et stort antal studier af kooperativ læring, findes der dog kun meget få studier, som faktisk tester denne påstand. I en gennemgang af empiriske studier fandt jeg kun to studier, der anvendte spørgeskemaer, som validt måler dybde- og overfladestrategier, og ingen klar tendens kunne udledes af studierne. Derudover bekræftede gennemgangen, at der kun er forholdsvis få studier af, hvordan universitetsstuderende faktisk oplever kooperativ læring.

Formål: Målet med dette studie var at besvare følgende spørgsmål. A) I hvilket omfang påvirker kooperativ læring universitetsstuderendes læringsstrategier? B) Hvordan opleves kooperativ læring af studerende i en universitetskontekst?

Metode og design: Som et kvasi-eksperimentelt forsøg blev kooperativ læring indført i holdundervisningen på et statskundskabsfag på et dansk universitet. Data blev samlet ind ved hjælp af et spørgeskema, som blandet andet inkluderede en dansk oversættelse af spørgeskemaet *Study Process Questionnaire* (R-SPQ-2F). Derudover blev 12 studerende interviewet før og efter interventionen.

Kvantitative resultater: Der kunne ikke findes nogen statistisk signifikante ændringer i de studerendes læringsstrategier, hverken på dybdelærings-skalaen ($t[140]=-0,930$; $p>0,05$; $r=0.08$) eller overfladelærings-skalaen ($t[140]=-0,553$; $p>0,05$; $r=0,05$). Til gengæld steg de studerendes score på deltagelses-skalaen ($t[140]=-2,405$; $p<0,05$; $r=0,199$), som målte de studerendes aktive deltagelse i diskussionen på holdtimen.

Kvalitative resultater: I spørgeskemaet blev de studerende bedt om at beskrive deres indtryk af kooperativ læring. Når kooperativ læring blev beskrevet positivt, var det fordi den i højere grad end ellers a) tillod de studerende at blive mere aktive og mindre passive i undervisningssituationen, og b) fik de studerende til at se flere nuancer og perspektiver i mødet med andre studerende. Når kooperative læring blev beskrevet negativt, var det på grund af følgende problemer: c) medstuderende som enten var uforberedte eller ikke dygtige nok, d) at diskussionen oplevedes som overfladisk eller overflødig, e) at forskellige perspektiver skabte mere forvirring end afklaring, f) at studerende gerne ville have at underviseren tog mere kontrol med undervisningen, g) at studerende frygtede at de gik glip af vigtige pointer og noter, og h) at pensum blev oplevet for så vanskeligt, at de studerende ikke mente at kunne løse opgaverne tilfredsstillende.

Tolv studerende blev interviewet før og efter interventionen, og disse interview tillod en mere dybdegående analyse af reaktionen på kooperativ læring. Først blev det analyseret, hvordan læringsstrategierne kom til udtryk i en holdtimesammenhæng. En overfladelærings-strategi viste sig ved ordret og mekanisk noteskrivning, at den studerende var meget optaget af at få underviseren til at udlevere det rigtige svar, og ved at den studerende accepterede information uden at selv at vurdere gyldigheden (især når informationen blev givet af personer, typisk underviseren, som den studerende stolede på). Derimod var en dybdelærings-strategi karakteriseret ved et ønske om selv at komme til at forstå og mestre

stoffet, en bevidsthed om hvad den studerende manglede at forstå, et forsøg på at forstå den bagvedliggende mening og de overordnede principper, samt en rig indre og ydre dialog hvor den studerende kontinuerligt forarbejdede stoffet.

Herefter blev de 12 studerendes læringsstrategi sammenholdt med deres opfattelse af holdundervisningen. De studerende, som anvendte overfladelærings-strategier, var tilbøjelige til at betragte holdundervisningen som en interaktiv version af forelæsningen i miniformat. Underviseren blev set som en faglig autoritet, mens de medstuderende ofte blev anset for at være 'med-ignoranter'. De studerende, som viste tegn på en dybdelærings-strategi, derimod, var tilbøjelige til at opfatte holdundervisningen som et sted, hvor de var velkomne til at anvende deres viden. Generelt påskønnede disse studerende de medstuderendes bidrag ligesom de foretrak en underviser, som både evnede at sikre, at hovedpointer blev gennemgået, men også evnede at trække sig tilbage og lade de studerende diskutere med hinanden.

Ud fra disse resultater blev der opstillet den hypotese, at studerende, der anvender en overfladelærings-strategi, vil værdsætte kooperativ læring mindre end studerende, der anvender en dybdelærings-strategi. Denne hypotese blev dog kun delvist bekræftet.

Diskussion: Der kunne ikke findes empirisk belæg for, at kooperativ læring stimulerer brugen af dybdelærings-strategier, hverken ved en gennemgang af forskningslitteraturen eller på baggrund af resultaterne fra interventionen. Det empiriske datagrundlag er desværre for tyndt og resultaterne for modsatrettede til at der kan drages mere håndfaste konklusioner. Herudover tyder de kvalitative resultater på, at en af præmisserne i kooperativ læringsteorien – at de studerendes læringsadfærd vil være bestemt af undervisningens rammer – bør modereres. De studerende reagerede rigtig nok på kooperativ læring i overensstemmelse med den måde hvorpå de oplevede undervisningsformen, men dette var ikke ensbetydende med, at kooperativ læring blev opfattet i overensstemmelse med kooperativ lærings bagvedliggende rationale.

Konklusion og implikationer: Kooperativ læring som undervisningsaktivitet bør ikke afskrives alene på grund af dettes studie og dets resultater. Men når det er sagt, så kalder studiet på et mere realistisk og nuanceret syn på, hvad kooperativ læring formår, særligt i forhold til de ofte meget optimistiske og selvsikre postulater inden for litteraturen. Hvad angår fremtidig forskning bør det fremhæves, at studier bliver nødt til at anvende måleinstrumenter, som validt kan måle dybde- og overfladelærings-strategier.

Hvad angår undervisere på universitetsniveau som anvender kooperativ læring i deres undervisning, kan disse for så vidt blive ved med det så længe kooperativ læring er i overensstemmelse med læringsmålene og de læringsaktiviteter som skønnes nødvendige for at opnå målene for faget. Ikke desto mindre bør undervisere tydeligt forklare, hvad der er formålet med at anvende kooperativ læring og dertil løbende søge feedback om, hvordan kooperativ lærings-aktiviteterne rent faktisk opfattes og anvendes af de studerende.

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