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Title: Collaborative learning in higher education : design, implementation and evaluation of group learning activities
Issue Date: 2016-07-05

—— CHAPTER I ——
General Introduction

Chapter 1   General introduction

Collaborative learning is a frequently used learning approach in higher education curricula. In collaborative learning "students actively contribute to the attainment of a mutual learning goal and try to share the effort to reach this goal" (Janssen, 2014, pp. 4-5). Educational researchers have emphasised the importance of collaborative learning in higher education. Collaborative learning can (a) promote students' deep-level understanding by engaging in collaborative discourse and collaborative argumentation (Nussbaum, 2008), (b) contribute to students' motivation and shared knowledge construction (Hämäläinen & Vähäsantanen, 2011; Hmelo-Silver, 2004; Johnson & Johnson, 2003), (c) foster the development of higher-order thinking skills and metacognitive skills (Johnson & Johnson, 2009), and (d) enhance the development of prosocial behaviour such as showing empathy and helping others (Gillies, Ashman, & Terwel, 2008; Järvelä, Volet, & Järvenoja, 2010). Furthermore, collaborative learning prepares students for learning and working in teams during further education and future work. Teamwork in their academic education is a first step to initiate their professional development (Slotte, Palonen, & Salminen, 2004). Additionally, collaborative learning prepares students for participation in a society of networking and sharing information (Koroneou, Paraskeva, & Alexiou, 2013). All in all, collaborative learning shows potential for learning and development in higher education settings, under the condition that it is carefully designed and facilitated.

    Teachers play an essential role in both the design and facilitation of collaborative learning activities (Gillies & Boyle, 2010; Onrubia & Engel, 2011; Oortwijn, Boekaerts, Vedder, & Strijbos, 2008). The teacher as a designer is crucial for successful collaborative learning. For example, teachers can decide on group size and group constellation, choose tasks that are motivational to students and are attuned to their ability level, and prepare students to participate in the collaborative learning (Brown & McIlroy, 2011; Chiriac & Granström, 2012; Gillies & Boyle, 2010). Furthermore, the effectiveness of collaborative learning depends on the facilitating role of the teacher during the collaborative process: the instructor needs to be available for feedback, might intervene to keep discussions on track, can help students stay focussed on the task, and can support the building of relationships (Brindley, Walti, & Blaschke, 2009; Chiriac & Granström, 2012; Onrubia & Engel, 2012). To enhance collaborative learning teachers should model desired interaction and behaviour (Brown & McIlroy, 2011). The focus of this dissertation is on the role teachers have in the design, implementation and evaluation of collaborative learning in higher education.

    Not all teachers in higher education acknowledge the advantages and benefits of collaborative learning, and not all teachers design and implement collaborative learning in an effective manner. Some teachers believe that collaborative learning does contribute to the development of social skills, but not to the acquisition of academic knowledge (Frykedal & Chiriac, 2011). Teachers can also experience difficulties in supporting and guiding students during collaborative learning (McLoughlin, 2002). Furthermore, teachers find the assessment of collaborative learning problematic, because they have difficulties in determining what to assess and how to assess collaborative learning and they feel uncertain about (contradictory) demands concerning this assessment, such as whether it should be formative or summative, whether it should be focused on the product or the process, or whether it should be assessed by the teacher or by peers (Frykedal & Chiriac, 2011). Teachers may have concerns regarding free-riding of students (Cohen, 1994; Panitz, nd) and

teachers may find it difficult to achieve a good balance between individual accountability and group accountability (Ross, Rolheiser, & Hogaboam-Gray, 1998). Another problem is that preparations for collaborative learning are generally insufficient or even non-existent (Janssen, 2014; Gillies & Boyle, 2010; Ross et al., 1998). Moreover, some teachers doubt whether their students will learn what they need to learn when they work on a collaborative assignment, because students are not always capable of working and learning collaboratively in an effective manner (Franssen, Kirscher, & Erkens, 2011; Gillies & Boyle, 2010).

In the literature, nine causes are described for students not attaining the desired learning outcomes of collaborative learning: (1) students and teachers experience resistance towards collaborative learning (Payne, Monk-Turner, Smith, & Sumter, 2006; Smith, Sorensen, Gump, Heindel, Caris & Martinez, 2011), (2) teachers are not convinced they can successfully implement collaborative learning in their own context (Abrami, Poulsen, & Chambers, 2004), (3) the technology used in blended or online environments to support collaborative learning causes problems, because of the teachers' limited technology literacy or the lack of user-friendly technology (Dillenbourg, 2013), (4) the design of collaborative learning in practice is often not grounded in design guidelines from the literature (Hämäläinen & Vähäsantanen, 2011), possibly because teachers are unfamiliar with this literature or because scientific results are hard to translate into practice, (5) the different aspects of the design, such as the guidance, the task type, and the instructions on how to collaborate, are not sufficiently aligned (Dennen & Hoadley, 2013; Hämäläinen & Vähäsantanen, 2011; Strijbos, Martens, & Jochems, 2004), (6) collegial collaboration is not yet everyday work-practice within educational organisations and therefore teachers have little opportunity to develop their collaborative creativity that may lead to better designs for collaborative learning environments for the students (Hämäläinen & Vähäsantanen, 2011), (7) the effectiveness of collaborative learning largely depends on how core aspects such as positive interdependence, individual accountability and interaction are designed and implemented (Johnson & Johnson, 2009; Strijbos et al., 2004), (8) many aspects of the design and implementation of collaborative learning need refinement to maximise its effectiveness (Koh, Wang, Tan, Liu, & Ee, 2009), and (9) collaborative learning is sometimes used for reasons of efficiency only. For example, teachers want to save time for teaching and grading a very large group of students and therefore let students work together and use group grades. Dennen and Hoadley (2013) stress that it is very important for successful collaborative learning to consider the collaborative premise: teachers should justify why student interdependence is an important part of the learning process, and in what manner collaboration with other students is needed for the attainment of the learning goals. In other words: if students can achieve all learning goals by working individually, collaborative learning has no added value, and students may even become reluctant to invest effort in the group process.

The abovementioned findings from literature might lead to a conclusion that teachers generally are not very positive about either designing or implementing collaborating learning in their teaching. Consider the following interview excerpts of teachers who reflect on collaborative learning in their teaching. The first teacher shortly describes her/his experiences with students' capability to collaborate:

> 'You could ask students: is your group working alright? And they'll all say that they're fine. And then, one hour before the deadline a girl comes into your office, crying and saying: "Ben did nothing at all and I'm doing all the work".

> Those things come up at the last moment. They have difficulty in talking to each other about the way they behave. Yes, I do sound cynical but it is a generation hardly able to talk face-to-face.'

A second teacher articulated that the problems that may occur in collaborative learning could be due to the expertise of the guiding teacher:

> 'Students are able and willing to learn to collaborate with appropriate guidance, but many teachers do not know how to communicate with students and how to guide them during collaborative learning.'

The importance of teacher guidance is also stressed by a third teacher, who articulated the need for sufficient and appropriate guiding of collaborative learning as follows:

> 'I think the guiding teacher is crucial in the collaboration process. He is the one that can confront students with their behaviour, guide a group in the right direction and discuss dilemmas. You cannot just tell students, "Here you are: your group assignment. Please complete it with four students and show us the results in three weeks".'

These three quotes from interviews with teachers in higher education illustrate that the guidance by the teacher and the interaction between students clearly are issues in the implementation of collaborative learning in higher education settings. Problems in the implementation of collaborative learning may not, and probably will not, lead to students' attainment of the desired learning outcomes.

1.1 Problem statement

The different causes of unsuccessful implementation of collaborative learning motivated the problem statement of this dissertation: "Collaborative learning in higher education often does not lead to the desired learning outcomes, because of problems teachers experience with the design and implementation of collaborative learning".

The central assumption in this dissertation is that collaborative learning can lead to students' learning outcomes, if (1) properly designed and implemented, (2) taking the collaborative premise into account, and (3) grounded in recent scientific research findings about effective collaborative learning. Possible learning outcomes may be (a) knowledge acquisition, (b) motivation and engagement, (c) higher-order thinking skills, (d) metacognitive skills, (e) social/collaborative skills, and (f) preparation for students' future profession, professional development, and participating in the society of networking and sharing information.

In the literature, the terminology used for collaborative learning differs. Instead of collaborative learning, cooperative learning, problem-based learning, group work and team-based learning are also used. These terms all originate from the constructivist view of learning and instruction (Kirschner, Martens, & Strijbos, 2004) and they have in common that students need to work together to attain learning benefits that cannot be attained by working individually. During the development of this thesis the focus shifted from collaborative learning as a general teaching method to group learning activities.

This shift was made to distinguish between collaborative learning as a teaching method used during lessons amongst other teaching methods and group learning activities, in which students work collaboratively on a group assignment during a time period longer than one lesson. In this dissertation, a group learning activity (GLA) is defined as a curriculum activity in which students learn collaboratively and which covers a time period that is longer than one lesson.
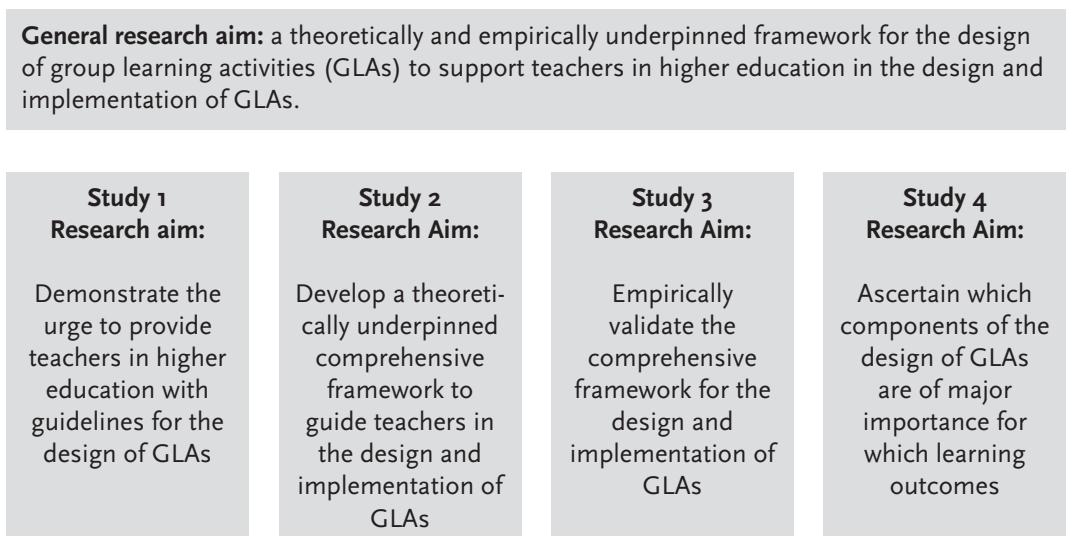
1.2   Aim of the dissertation

Conclusions from the abovementioned literature suggest that teachers in higher education should be more supported in the design, implementation and evaluation of GLA in order to improve the effectiveness. Therefore, the central aim of this dissertation is to provide insights into how teachers in higher education can be supported in the design, implementation and evaluation of GLAs by developing a theoretically and empirically underpinned framework for the design of GLAs. The use of this framework may improve learning outcomes of GLAs, and contribute to professional development of teachers and teacher educators.

1.3   Overview of the dissertation

The next sections describe four studies that were conducted to accomplish the research aim. Figure 1 visualises the relationship between the four studies and the chronological order of the studies.

Figure 1. Visualisation of the research aim of the dissertation and the four studies.

General research aim: a theoretically and empirically underpinned framework for the design of group learning activities (GLAs) to support teachers in higher education in the design and implementation of GLAs.

Study 1 Research aim:	Study 2 Research Aim:	Study 3 Research Aim:	Study 4 Research Aim:
Demonstrate the urge to provide teachers in higher education with guidelines for the design of GLAs	Develop a theoretically underpinned comprehensive framework to guide teachers in the design and implementation of GLAs	Empirically validate the comprehensive framework for the design and implementation of GLAs	Ascertain which components of the design of GLAs are of major importance for which learning outcomes

In the first study, practices and beliefs concerning collaborative learning were explored among teachers in higher education. This exploration emerged from the observation that teachers have a need for specific guidelines to cope with the problems they encounter in the design and implementation of collaborative learning.

During the second study, the focus of the research narrowed from collaborative learning in general to GLAs, to distinguish between collaborative learning as a teaching method used during lessons amongst other teaching methods and group learning activities, in which students work collaboratively on a group assignment during a time period longer than one lesson. This second study investigated to what extent approaches for the design of GLAs are similar, and which aspects of the various approaches are crucial for the design of GLAs. This resulted in a thematic review, synthesising different approaches for the design of group learning activities into one theoretically informed framework. In the third study, this framework was empirically validated using interviews with teacher educators. The final study examined the aspects valued by students in implemented designs of group learning activities, distinguishing the various components of this framework.

Chapter 2:   **Collaborative learning in higher education: teachers' practices and beliefs**

In the first study, practices and beliefs of teachers about collaborative learning were explored to investigate the assumption that there is a need for more insights into collaborative learning design in higher education and for guiding teachers in this complex matter.
Teachers' educational beliefs and personal theories of teaching and learning strongly influence their classroom practices (Cochran-Smith & Zeichner, 2005; Evans & Kozhevnikova, 2011). The research questions were: (1) How do teachers in higher education characterise collaborative learning in their educational practices?, (2) What is the relationship between the frequency in collaborative learning practices and teachers' beliefs about collaborative learning?, and (3) What is the relationship between the variety in collaborative learning practices and teachers' arguments for applying collaborative learning in their lectures?.

In this study 115 teachers from five faculties of a university of applied sciences in a large city in the Netherlands participated. They completed a survey on three topics: 1) effort beliefs (i.e. beliefs about the amount of effort students are willing to dedicate to collaborative learning), 2) learning beliefs (i.e. beliefs about the effect of collaborative learning on learning outcomes) and 3) motivational beliefs (i.e. beliefs about the effects of collaborative learning on motivation). The survey consisted of 33 items with pre-structured answering options regarding teachers' beliefs about collaborative learning. Three open-ended questions concerned the way in which teachers applied collaborative learning, whether and how students were credited and whether peer-assessment was used. Ten randomly selected teachers participated in follow-up interviews; two from each of the five faculties: Teacher Education, European Studies, Communication Management, Health Care and Technology, Innovation and Society. The transcribed interviews were used to obtain more detailed information about the practices of the teachers.

The results revealed problems with the design and the implementation of collaborative learning in the practices of teachers in higher education. The conclusion was that there is indeed a need for formulating theoretically-informed practical guidelines to provide professionals in education with the opportunity to utilise collaborative learning in such a way that it leads to desired learning outcomes.

Chapter 3:   A comprehensive framework for the design of group learning activities in higher education

In order to meet the need for theoretically underpinned practical guidelines for teachers, a thematic review of approaches for designing collaborative learning in higher education was performed. During the literature search, collaborative learning was further specified as Group Learning Activities (GLAs). GLAs can be found in face-to-face, online (also referred to as Computer Supported Collaborative Learning) and blended learning environments. Various frameworks for the design of GLAs exist, but they differ in their design components and how the design process is structured. This review aimed at generating a comprehensive framework for the design of GLAs in higher education from a constructivist view on learning and instruction. Reiser (2001) suggests that when constructivist views are used in instructional designs, those designs include that learners have to work together to solve complex and realistic problems, and examine those problems from multiple perspectives, thereby becoming aware of their own role in the knowledge construction process. The following research questions were formulated to develop a framework for the design of group learning activities: (1) How can the components of designing GLAs be synthesised into one comprehensive framework?, and (2) How can teachers in higher education use this framework in the design of GLAs?.

A literature search was performed from which 14 peer-reviewed meta-studies (such as narrative reviews, meta-analysis and theoretical abstractions) for the design of GLAs were selected. As a starting point for the analysis, the study of Strijbos et al. (2004) was used, which defines and describes six components for the design of GLAs. The analysis resulted in two additional components and an extension of three of Strijbos et al.'s (2004) original components. The newly developed comprehensive framework for the design of GLAs consists of eight components: (1) interaction, (2) learning objectives and outcomes, (3) assessment, (4) task characteristics, (5) structuring, (6) guidance, (7) group constellation, and (8) facilities. From the studies reviewed, design decisions were distilled to provide teachers with more specific guidance for the design of each component.

To synthesise the components into one comprehensive framework and to formulate implications for the practice of teachers in higher education, it was determined whether the components should be designed in a specific order. Furthermore, the alignment between the components had to be explicated. Alignment implies that (a) decisions made in the design of each component are related to the design of other components and (b) all steps in the design are attuned with one another. For this purpose the ADDIE-model was used.

The framework was called the Group Learning Activities Instructional Design (GLAID) framework. The GLAID framework can guide educational designers and teachers in higher education with the complex process of designing GLAs. Additionally, the framework can be used for the monitoring and evaluation of GLAs. Finally the GLAID framework can be used to interpret the outcomes of research on GLAs.

Chapter 4:   Teacher educators' design and implementation of group learning activities

The GLAID framework is a theoretically underpinned framework to design and implement GLAs. In order to empirically validate the GLAID framework, it was necessary to verify whether teachers use the components and alignment when designing and implementing GLAs.

Teacher educators were selected as participants. Teacher educators design and implement GLAs on a regular basis as it is an important part of the curriculum in teacher education. Moreover, unlike other higher education teachers, they train their student teachers to implement GLAs in their future classrooms. Consequently, they can be considered to be expert educational designers of GLAs. The following research question was formulated: 'How do teacher educators design and implement GLAs, and to what extent do their considerations match with the GLAID framework?'.

Twenty-three teachers of teacher education programmes (primary education) of six universities of applied sciences in the Netherlands participated in individual face-to-face semi-structured interviews. The following topics were covered in the interviews: (a) the design of GLAs, (b) the implementation of GLAs (the experiences of teacher educators with students working on GLAs), and (c) the evaluation of the implementation of GLAs and the learning outcomes in relation to the designed learning objectives. The transcribed interviews were subjected to selective coding, which was guided theoretically by the design components of the GLAID framework. It was also coded whether teacher educators addressed the alignment between those components. The interviewees were not familiar with the GLAID framework, and were not informed about the framework and its components.

Teacher educators addressed all components of the framework. However, the facilities component was only addressed by a minority of the teacher educators. Teacher educators did not mention new components in the interviews and underlined the importance of the alignment between the components, an integral aspect of the framework. The interviews revealed that the components of the GLAID framework are not only grounded in the academic literature, but are used by practitioners as well. Furthermore, it was concluded that the GLAID framework can be useful as a practitioner guide in teacher education and higher education for teachers who wish to design, implement and evaluate GLAs.

Chapter 5: **Student teachers' evaluation of design components related to perceived learning outcomes**

After empirically validating the GLAID framework, an exploration was conducted as to how students experience the various components of GLAs when they work on such a group assignment and what components they perceive to have contributed to their learning outcomes. Student perception of the learning outcomes and their appreciation of the design components of GLAs are an indication of the satisfaction of students with the curriculum (Bowman, 2010). For teacher educators it is important to not only design good quality group assignments that contribute to a high quality curriculum, but also to design and implement GLAs that are highly valued by their students. Positive student evaluations of GLAs lead to positive evaluations of the learning outcomes, thereby diminishing students' resistance to group work (Smith et al., 2011).

In the literature, two variables are considered to be mediators for learning outcomes: student (verbal) interaction (Strijbos et al.,; Janssen, 2014) and engagement (Ferreira, Cardoso, & Abrantes, 2011; Reyes, Bracket, Rivers, White, & Salovey, 2012). Four research questions were formulated: (1) What is the relationship between students' evaluations of the design of GLAs and their perceived knowledge increase?, (2) What is the relationship between students' evaluations of the design of GLAs and their perceived learning outcomes for the future profession?, (3) To what extent do engagement and verbal interaction mediate the relationship between students' evaluations of the design of GLAs and their perceived knowledge increase?, and (4) To what extent do engagement and verbal interaction mediate the relationship between students' evaluations of the design of GLAs and their perceived learning outcomes for the future profession?.

GLAs were studied as they naturally occur in teacher education programmes. The (perceived) learning that takes place in those GLAs relates to how students value (a) the design aspects themselves and (b) the implementation of those design aspects. Teacher education students ($N = 290$) from six Dutch universities of applied sciences completed a survey with pre-structured answering options about how they value different design components of the GLA(s) they worked on.

The results showed that the more student teachers valued task characteristics and group constellation, the more they perceived that they had attained learning outcomes regarding knowledge. Furthermore, task characteristics and guidance were positively related to their perceived development as primary school teachers. Finally, verbal interaction mediated both kinds of learning outcomes and engagement only mediated the learning outcomes for their perceived development as primary school teachers.

Chapter 6: Discussion and conclusion

In chapter 6, the main findings are summarised. The attainment of the central aim of this dissertation will be evaluated. Subsequently, methodological and theoretical considerations and limitations will be described. Finally, practical implications for the design and implementation of group learning activities in higher education will be discussed, as well as ideas for further research that could extend the findings.