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—— SUMMARY ——

Collaborative learning in higher education: design, implementation and evaluation of group learning activities

Group learning activities are frequently implemented in higher education. A group learning activity (GLA) can be defined as a curriculum activity that covers a time period that is longer than one lesson in which students learn collaboratively. 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.

However, not all teachers in higher education design and implement GLAs in an effective manner. 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.

Study 1:   Collaborative learning in higher education: teachers' practices and beliefs
With the first study, the practices and beliefs of teachers about collaborative learning were explored to investigate the assumption that there is a need for knowledge about the design of collaborative learning 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 and thus their design of collaborative learning. 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?.

The respondents were 115 teachers from five faculties of a university of applied sciences in a large city in the Netherlands. They completed a survey on three topics: effort beliefs (i.e. beliefs about the amount of effort students are willing to dedicate to collaborative learning), learning beliefs (i.e. beliefs about the effect of collaborative learning on learning outcomes) and motivational beliefs (i.e. beliefs about the effects of collaborative learning on motivation). Three open-ended questions concerned the way in which teachers applied group learning activities, 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 of 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 showed that most of the participating teachers designed and used collaborative learning in their lessons, but the variety in collaborative learning practices was quite limited. The teachers regarded the design of collaborative learning as a complicated task and they stated that the implemented design often did not lead to the desired learning outcomes. The teachers pointed out that they design collaborative learning intuitively, based on their own experience. They would appreciate designing collaborative learning in

collaboration with colleagues. Furthermore, they stressed that the time they can spend on the design of GLAs is limited.

The teachers' beliefs about the positive effects of collaborative learning on students' learning outcomes and student motivation were clearly more positive than their beliefs regarding the amount of effort that students are willing to spend on working collaboratively. Teachers who stated that they apply collaborative learning are more positive about students' effort in working collaboratively and also more positive about learning effects of collaborative learning, compared to teachers who claimed not to practice collaborative learning. The arguments presented by teachers for the use of collaborative learning are more student-oriented than teacher-oriented. The results also indicated that the more teachers varied in their collaborative learning practices, the more student-oriented arguments they used for applying collaborative learning.

In summary, the results of this study justified further research into collaborative learning and how teachers could be supported in designing effective collaborative learning.

Study 2:   **A comprehensive framework for the design of group learning activities in higher education**

During the second study, the focus of the research narrowed from collaborative learning in general to group learning activities (GLAs), to distinguish between collaborative learning as a teaching method used during lessons alongside other teaching methods and GLAs, in which students work collaboratively on a group assignment during a time period longer than one lesson. The objective of the second study was to develop an approach for the educational design of GLAs by investigating how various components for the design of GLAs could be synthesised into one theoretically informed comprehensive framework. GLAs can be found in face-to-face, online (also referred to as Computer Supported Collaborative Learning) and blended learning environments. Various models for the design of GLAs exist, but they differ in their design components and how the design process is structured. The following research questions were formulated to develop a comprehensive framework for the design of GLAs: (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?.

In order to answer the research questions fourteen meta-studies that describe design components of GLAs were analysed. Eight components for the design of GLAs were extracted: (1) interaction, (2) learning objectives and outcomes, (3) assessment, (4) task characteristics, (5) structuring, (6) guidance, (7) group constellation, and (8) facilities. These components were inserted into a general model for instructional design, the ADDIE model, to shape the alignment between the eight components and guide the order in which the components can be designed. This resulted in a comprehensive framework for the design of group learning activities: the GLAID framework. In step 1, the characteristics of the students, the teachers, and the curriculum are determined, as well as the collaborative premise. In step 2, the design process of a GLA starts with designing the interaction, the learning objectives, and the assessment simultaneously. This is followed by step 3a, in which the instructional methods, task characteristics, structuring of the collaboration, and guidance, are designed. In step 3b, the logistics are designed: the group constellation and the facilities.

In each step and between each step, the components should be aligned with each other in order to ensure an effective design (linear and cyclical alignment). In step 4, each design

component should be monitored separately and in alignment with (all) other components. If necessary during the implementation, components and their alignment should be adjusted. In step 5, the evaluation of the components and their alignment can help in effective reflection on the processes and outcomes of the designed GLAs and inform the redesigns of GLAs.

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.

Study 3: **Teacher educators' design and implementation of group learning activities**
The aim of the third study was to empirically validate the GLAID framework. Accordingly, the research question of this study was formulated as follows: 'How do teacher educators design and implement GLAs, and do their considerations match with the GLAID framework?'. Teacher educators design and implement GLAs on a regular basis as it is an important part of the curriculum in Teacher Education. Moreover, in contrast to other higher education teachers, they train their student teachers to implement collaborative learning in their future classrooms. Consequently, they are considered to be expert educational designers of collaborative learning amongst the population of higher education teachers.

Twenty-three teachers in Teacher Education Programmes (primary education) of six universities of applied sciences in the Netherlands participated in individual face-to-face semi-structured interviews. 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, although the facilities component was only mentioned by some teacher educators. It should be stressed that this facilities component is important to include in the design of GLAs, because — no matter how well a GLA is designed — without the necessary space, time, and support, students will not be able to attain the learning objectives of a GLA. The interviews revealed that many teacher educators encounter problems with the structuring component. Teacher educators did not mention new components in the interviews and underlined the importance of the alignment between the components, which is an integral aspect of the framework. The conclusion was 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.

Study 4: **Student teachers' evaluation of design components related to perceived learning outcomes**
The next step was to explore the relationship between student teachers' evaluations of the design GLAs related to the learning outcomes. The research questions that were investigated were: (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 interaction mediate the relationship

between students' evaluation of the design of GLAs and their perceived knowledge increase?, and (4) To what extent do engagement and interaction mediate the relationship between students' evaluation of the design of GLAs and their perceived learning outcomes for the future profession?

The implementation of GLAs in six teacher education programmes was examined. Teacher education students (N = 290) from six Dutch universities of applied sciences completed a survey with pre-structured answering options.

The results of the analyses indicated that students' evaluation of task characteristics and group constellation were related positively to a perceived increase of knowledge. Furthermore, a positive relationship was found between students' evaluation of task characteristics and guidance on the one hand, and students' perceptions of benefits of GLAs for their professional development on the other hand. Additionally, the results revealed that students' self-reported verbal interaction mediated the relationship between the evaluation of GLA design and both kinds of perceived learning outcomes. The self-reported student engagement only mediated in the relationship between the evaluation of GLA design and perceived learning outcomes for the future profession.

Regarding the different components, the fourth study provided the following insights: (a) the evaluation of task characteristics directly and indirectly related positively to both kinds of perceived learning outcomes and explained the largest proportion of variance of all design components, (b) full mediation was found for student engagement with the evaluation of the structuring component, the guidance and the group constellation on the one hand, and on the other hand the learning outcomes for the future profession, and (c) in contrast to what was expected, no relationship was found between the evaluation of assessment and the mediators, or between assessment and the learning outcomes.

General conclusions

Teachers in higher education design and use GLAs, but they regard the design and implementation as a complex task they perform intuitively. They also mention that their efforts mostly do not lead to the desired learning outcomes. Therefore, a theoretically informed framework to support teachers in the design and implementation of GLAs was developed. The components of this GLAID framework and their alignment can be recognised in the description of the design and implementation of GLAs of experts, in casu teacher educators. Consequently, the GLAID framework was considered to be empirically valid. Students valued components of the GLAID framework as contributing to their perceived learning outcomes, whereby task characteristics, guidance and group constellation were evaluated as the main components related to the perceived learning outcomes, mediated by the evaluation of student interaction and engagement.

Reflecting on the central aim of this thesis, it can be concluded that the GLAID framework contributes to insights into the improvement of the learning outcomes and teachers in higher education may use it as a support to design, implement and evaluate GLAs. Future research can contribute to developing this framework from a general design tool to a framework that provides specific support for teachers to design, implement and evaluate GLA.