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Peer feedback on academic writing : effects on performance and the role of task-design

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General Introduction

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Context of the Study

Following the agreement between the Ministry of Education, Culture and Science and the Association of Universities in The Netherlands on improving study success at universities, Leiden University initiated the Taskforce Study Success in 2008. The taskforce's primary aim was to provide recommendations for increasing study success and decreasing student attrition across bachelor (BSc) programs, for which it proposed a variety of strategic measures in its 2009 report. These proposed measures related to issues such as assessment policy, student engagement, guidance, and supervision. Important aspects thereof included, among others, students' active participation, feedback, and systematic attention for the skills required to successfully write a BSc thesis. One aspect of Leiden University's measures included the facilitation of educational research to further support evidence-based decision making on these issues. In this context, the current thesis focused on the use of formative peer feedback to enhance students' performance on academic writing tasks. As academic writing is an integral part of curricula across disciplines, insights into the design of formative peer feedback and its effects on students' academic writing performance are informative for a broad array of higher education teachers and educational advisors.

Peer feedback is reported both as being reliable and as being beneficial to the students' development of domain specific skills (e.g., Nelson & Schunn, 2009; Cho & Schunn, 2007; Cho & MacArthur, 2010, 2011; van Zundert, Sluijsmans, & Merriënboer, 2010). In addition to the potential learning benefits, peer feedback can be a practical instructional method. Its potential practical advantages become increasingly salient when considering two interrelating factors: the relatively complex nature of academic writing tasks and higher education teaching staff's available time. The provision of formative feedback on complex, open-ended tasks is a time-consuming procedure for higher education teaching staff. Here, its immediacy, frequency, and volume (Topping, 1998) make peer feedback a potentially efficient alternative formative feedback practice. The salience of these practical benefits increases as student enrollment

numbers increase. Both in OECD countries (OECD, 2016) and in the specific context of The Netherlands (CBS, 2017), participation in higher education has steadily increased between 2004 and 2014. Moreover, since the year 2000 the increase in student enrollment has led to increasing student-to-teacher ratios and, consequently, increasing time-pressure for higher education teaching staff (VAWO, 2015, 2015; SoFoKleS, 2016). The growing availability and user-friendliness of – often web-based – applications that facilitate the peer feedback process (see Luxton-Reilly, 2009, for an overview) partly ameliorates these effects of increasing student-to-teacher ratios. In addition, such applications can increase higher education (HE) teaching staff's options with respect to the instructional design of peer feedback tasks, facilitate access to empirical data, and as such stimulate empirical research. In summary, peer feedback could simultaneously be beneficial to students' academic writing performance and could be a practical alternative formative feedback practice for which the opportunity for empirical research is growing.

In this light, it is not surprising that research into peer feedback on academic writing in higher education has gained momentum in the last two decades (see Figure 1). Despite specific calls by, for example, Topping (1998) and Strijbos and Sluijsmans (2010), the proportion of well-controlled peer feedback studies that focus on students' learning outcomes has remained low. This thesis contributes to the knowledge base by investigating the relation between peer feedback and higher education students' writing performance through a quantitative lens. In doing so, this thesis aims to advance our knowledge on the extent to which peer feedback impacts students' academic writing and on how specific aspects of task design relate to student performance.

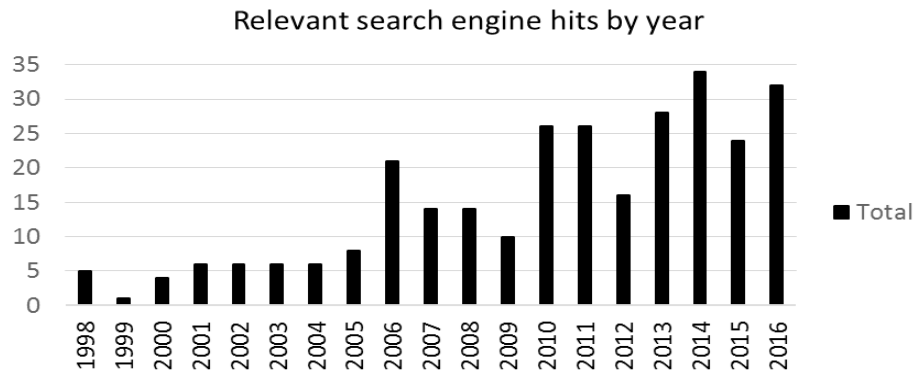

Figure 1. Journal articles on peer feedback with academic writing in higher education, sorted by year. Frequencies based on search criteria and initial selection of relevant articles in meta-analysis (Chapter 2).

Conceptual Framework

Terminology

Formative peer feedback. In his seminal article on peer assessment in colleges and universities, Topping (1998) defined peer assessment as 'an arrangement in which individuals consider the amount, level, value, worth, quality or success of the products or outcomes of learning of peers of similar status' (p. 250). The clarity of this definition with respect to the equal status between learners and the diversity of aspects that can be assessed is regarded as valuable for the current thesis. However, this thesis focuses on formative peer feedback, and Topping's definition does not explicate that the assessment is fed back to the assessee for the purpose of enhancing his or her learning. Therefore, this thesis additionally borrows from Shute (2008), who defined formative feedback as 'information communicated to the learner that is intended to modify his or her behavior for the purpose of improving learning' (p. 154). Taken together, formative peer feedback is defined here as *all task-related information that a learner communicates to a peer of similar status which can be used to modify his or her thinking or behavior for the purpose of learning*. Because this definition encompasses *all* task-related information that is communicated between peers, formative peer feedback may

range from basic grades or rankings to elaborate comments, as long as it can be used to improve subsequent learning. Consequently, this definition of formative peer feedback encompasses both 'peer feedback' and 'peer assessment', insofar these reflect different practices in the literature.

Academic writing assignments were defined as writing assignments within the particular academic curriculum that included the hierarchical organization of writing goals that students could accomplish through iterative planning, writing and revising (e.g., Hayes & Flower, 1987). In the empirical studies of this thesis, these considered essay assignments on theoretical concepts (chapters three and five) or theoretical claims or dilemmas (chapter four). In the empirical on-campus studies (chapters three and five) these assignments were written in students' native language (Dutch). Students were required to write in English in the open online course (chapter four).

Framework of peer feedback design variables

In order to facilitate a systematic investigation of the effects of peer feedback, Topping (1998) provided a typology of 17 variables that he considered to be the most important varying parameters across studies. These variables addressed, for example, the directionality of contact between peers (e.g., one-way or reciprocal), the ability of peers (same or different), and how contact was arranged (e.g., distance or face-to-face). One conclusion of Topping was that future research would contribute most when it explicitly described participants' characteristics, the design of the peer feedback task and the research design. Later studies reorganized and/or expanded Topping's set of variables in different ways. For example, van den Berg, Admiraal and Pilot (2006b) rearranged these 17 variables to be included in one of four clusters, whereas van Gennip, Segers and Tillema (2009) grouped these same variables into three clusters. In what currently is the most comprehensive overview of variables that are relevant for the design of peer feedback tasks, Gielen, Dochy and Onghena (2011) expanded the total number of variables to 20. They rearranged these variables to fit one of five clusters: 1) decisions concerning the use of peer assessment (e.g., setting, objectives), 2) the link between peer assessment and other elements of

the learning environment (e.g., alignment with curriculum), 3) the interaction between peers (e.g., role of assessed student), 4) the composition of groups (e.g., ability matching) and 5) procedural management (e.g., feedback format, training/guidance).

Research Aims

The current thesis builds upon these developments and this framework with three general aims in mind. First, this thesis aims to investigate the empirical evidence for the effects that peer feedback has on students' academic writing performance, and to investigate what the role of specific peer feedback design variables is in explaining differences in students' writing performance. Hence, the overarching research question is: *To what extent does formative peer feedback impact higher education students' academic writing performance, and what is the influence of specific aspects of peer feedback task-design on writing performance?* The second aim of this thesis is to be of practical value for higher education teachers and educational advisors. This means that this thesis focuses on peer feedback design variables that tend to be relatively controllable for higher education teaching staff. The third aim concerns the research *approach*, and follows the calls by, for example, Topping (1998, 2010) and Strijbos and Sluijsmans (2010). Specifically, the current thesis aims to incorporate well-controlled research designs. Also, it aims to be optimally transparent in order to facilitate the process of cumulative knowledge building. This means that this thesis is as explicit as possible in its descriptions of participant characteristics, peer feedback task- and research design, and that the anonymized data and syntaxes are openly accessible online.

Overview of the Thesis

The overarching research question is addressed in chapters two through five, whereas chapter six builds on the implications of chapter five by describing an instrument to assess students' beliefs about peer feedback. Chapter two describes a meta-analysis that was conducted to assess the impact of formative peer feedback in higher education students' academic writing. A total of

287 full-texts were assessed, of which 24 articles were considered eligible for inclusion. Two sets of analyses were conducted. First, the impact of peer feedback was compared to a baseline (no feedback), to self-assessment, and to feedback from teaching staff. Second, two mixed-effects model analyses were conducted to assess the moderating role of two peer feedback design variables that were perceived as controllable by higher education staff: the nature of the peer feedback (grades, comments or a combination of both) and the number of peers a student engaged with during peer feedback (one or multiple).

Chapter three describes an empirical study investigating the effects of students' ability match on the nature of the peer feedback and subsequent writing performance. Contrasting two competing theoretical rationales in the literature, 94 first-year undergraduate students in an Education & Child Studies course were anonymously matched into either a homogeneous dyad (with a similar ability peer) or a heterogeneous dyad (with a different-ability peer). The relation between dyad composition and the nature of the peer feedback was explored, with the latter being defined in terms of peer feedback *aspects* (content, structure, style) and peer feedback *functions* (analysis, evaluation, explanation, revision). Finally, it was explored how dyad composition and peer feedback nature were related to students' writing performance.

Chapter four follows up on chapter three by exploring how the ability match between participants in a massive open online course (MOOC) related to their performance on a subsequent writing task. As the number of MOOCs continues to grow, and as the number of MOOC participants tends to run in the thousands, peer assessment is often applied because it is a scalable way to assess complex, open-ended tasks. In this chapter, post-hoc analyses were conducted based on the data from a MOOC on Terrorism and Counterterrorism by Leiden University. Based on prior performance indices within the MOOC, 565 participants were categorized as relatively low, intermediate or high ability authors. In contrast to the on-campus study in chapter three, participants wrote two different essays, each of which was assessed by 4-6 randomly assigned peers. Regression analyses were conducted to assess a) whether the average ability of peer reviewers had influenced the extent to which participants improved their

writing between the first and second essay and b) whether the average ability of peer reviewers differentially impacted the writing performance increase of low, intermediate and high ability authors.

Chapter five aims to disentangle the effects that either providing or receiving peer feedback can have on students' academic writing performance. More specifically, this chapter contrasted the writing performance increase of peer feedback providers and –receivers in the context of an authentic academic writing task on campus. In total, 83 first-year undergraduate students in an Education and Child Studies course were assigned to either the role of peer feedback provider or –receiver. All students first submitted a draft essay, engaged in anonymous, online peer feedback in accordance with their assigned role of peer feedback provider or –receiver, and submitted a final essay after the peer feedback phase. In addition to the direct relation between feedback role and writing performance, the role of the peer feedback nature and students' perceptions thereof were investigated. In particular, it was explored which peer feedback aspects and functions influenced the extent to which students perceived the received peer feedback to be adequate, and to what extent they were willing to improve their writing based upon it. The outcomes and implications are discussed in relation to the training of students for the peer feedback process and in relation to students' support for, and beliefs about peer feedback.

Chapter six builds upon the discussion and implications of chapter five, and describes the development of a questionnaire to assess students' peer feedback beliefs. Students' beliefs about peer feedback are likely to be shaped by their cumulative experience of multiple peer feedback occurrences over time and, in turn, are likely to influence their perceptions and behavior. However, a comprehensive measure of students' peer feedback beliefs appears to be missing, and prior studies vary in terms of both approaches and outcomes. This makes it difficult to align research findings and to draw meaningful inferences upon these findings. To this end, the concise though comprehensive Beliefs about Peer Feedback Questionnaire (BPFQ) was developed. Based on the different themes covered in the literature, four scales were conceptualized: 1) valuation

of peer feedback as an instructional method, 2) valuation of peer feedback as an important skill, 3) confidence in own peer feedback quality and 4) confidence in quality of received peer feedback. The construct validity of the questionnaire was separately tested in an exploratory phase, based on a cohort of 219 second-year students in Biopharmaceutical Sciences, and a confirmatory phase, based on a first-year cohort of students in Education and Child Studies (N=121).

Taken together, these chapters aim to enhance our current understanding of the effects that formative peer feedback may have on higher education students' academic writing performance, as well as our understanding of the role that specific aspects of peer feedback task-design have in explaining differences in students' writing performance. These chapters address different aspects of peer feedback task-design as embedded in the framework of Gielen, Dochy, & Onghena (2011), including the nature of peer feedback (chapters two, three and five), the number of peers with whom a student engages (chapter two), the ability match between students (chapters three and four) and students' feedback role (chapter five). Here, an important theoretical contribution is their relatively controlled design combined with their focus on students' academic writing performance. An important practical contribution of these chapters follows from the relatively controllable nature of these design aspects of peer feedback tasks. Generally speaking, this should allow higher education teaching staff to incorporate these findings into their teaching practice, which could contribute to the development of students' academic writing skills.