

B Qualitätskriterien für Online-Lernszenarien

B.1 Designing Formative Feedback Guidelines for Group Development Stages in Virtual Collaboration

Research

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During the last decades, collaborative learning as a pedagogical strategy in HE has been attracting growing interest by both scholars and practitioners. However, its methodological potential is still insufficiently used in practice, especially in the virtual context. This paper provides deeper insights into the challenges of designing formative feedback in virtual group work from an e-tutors perspective. Therefore, seven expert interviews were conducted to investigate how formative feedback can be designed in the group development phases according to Tuckman & Jensen (1977). The interviews were analyzed using qualitative content analysis according to Gläser & Laudel (2010). The applied codes were formed both deductively and inductively and discussed afterwards. In line with other studies like Johnson et al. (2002), the results have revealed that Tuckman's group phase model is also applicable in virtual settings. In a further step, this paper derives practical implications for e-tutors by identifying specific guidelines on how to structure formative feedback in each of the group development phases.

Keywords: Virtual Collaboration, Formative Feedback, Group Development

1 Introduction

During the last decades collaborative learning as a pedagogical strategy in HE has been attracting burgeoning interest by both scholars and practitioners (Kirschner & Paas, 2001; Topping, 2005; Johnson et al., 2007; Maraza-Quispe et al., 2019). The choice to operate in blended mode implies that students work together in small groups, exchange their expertise, and deliver a joint solution (Slotte & Herbert, 2008). Scholars generally agree that collaborative learning represents an important instructional method, that has a positive impact on higher performance, increased effort, and persistence of students (Barron, 2000; Aoun, 2008; Chadha, 2018). However, even though collaborative learning promotes deep learning and motivates students to engage in social interaction, its methodological potential is still insufficiently used in practice (Johnson et al., 2007; Scager et al., 2016). Some researchers have emphasized that just forming learning groups does not automatically lead to effective collaboration (Khosha & Volet, 2013).

There are various model propositions to explain how groups develop over time. The most frequently cited, supported, and adapted is Tuckman's group development model from 1965 (Jahng, 2012). Johnson et al. (2002) stated that this concept of stages is also relevant for virtual group work. One of the biggest challenges that occurred for both students and educators was caused by the fact that virtual settings require a different strategy for leading collaborative groups, stimulating their successful performance and assessing them (Bukvova et al., 2010). Hence understanding the peculiarity of collaborative group work in a virtual environment and feedback activities to promote and measure student knowledge is of importance.

The link between the two constructs in HE remains largely unexplored, not to mention that there is a lack of practical recommendation on how to arrange formative feedback in this context. The aim of this study is to address existing knowledge gaps by posing the following research question: *How can formative feedback in the field of virtual, collaborative group work in HE contribute to accomplishing team development stages?* To answer this question, semi-structured interviews were conducted with 7 experts and a qualitative content analysis was applied.

Following the introductory chapter, this paper proceeds with a description of the theoretical background, explanation of methodology and details the nature of semi-structured interviews and qualitative content analysis. Hereupon, the results and discussion of the empirical findings are outlined and practical implications for e-tutors are derived.

2 Theoretical Background

Formative feedback is defined as information which is given by an agent to modify the thinking or behavior of a student with the intention to have a lasting influence on students learning. Formative feedback can be given in various forms, such as hints, corrections, or examples, and at different times during the learning and working process (Shute, 2008). Feedback applied in an educational context is often addressed as a vital component that helps students improve their skills, ability to acquire new knowledge and achieve higher results (e.g., Sadler, 1983; Cohen, 1985; Astin, 1991; Pengelly, 1993; Azevedo & Bernard, 1995). In this context Drew (2001) and Haughney et al. (2020) emphasized – that investigated students' perception of factors that helped them evolve and learn in higher education – the importance of giving feedback not only during examinations at the end of the semester (summative feedback) but also during the learning process itself (formative feedback). The researcher underlined that to achieve academic success, students must receive feedback on a regular basis and refine their strategies within the whole learning phase (Drew, 2001; Haughney et al. 2020). Thus, both summative and formative feedback are proved to be of a high value for a student. Yet the studies and opinions on how to give feedback appropriately are inconsistent (Shute, 2008) and guidance on how to improve feedback is still lacking (Orrell, 2006).

Tuckman's initial model consists of four stages – forming, storming, norming and performing. During the forming phase the group members start to get to know each other, and they get familiar the group work tasks. In the second phase, storming, conflicts, and difficulties appear. Those conflicts arise for example because of role and power struggles, not fulfilled tasks or not clearly defined responsibilities. When the group members start to solve those problems and have an understanding of what needs to be done to solve the tasks and stay committed to the common goals, the group is in the norming phase. This phase is followed by the performing phase in which the group works the most productive on tasks and as a group. The adjourning phase, which was added later from Tuckman & Jensen in 1977 is the concluding phase in which the group members may look back at their work and draw conclusions (Tuckman, 1977). As mentioned, there are more approaches that seek to explain how groups develop over time. Gersick's (1988) punctuated equilibrium model is a two-phased approach which departs from the linear group phase models like Tuckman's. Gersick (1988, 1989, 1991) states that groups develop over time through the sudden formation, maintenance, and sudden revision of a "framework for performance". However, Johnson et. al. (2002) explored in their studies on how virtual learning groups develop over time that Tuckman's group phase model fits better in context with virtual group work. They observed that virtual groups went through the initial phases of Tuckman's model, although not every group showed clear signs of a storming phase. Tuckman's group phase model is used in this paper to understand how teams develop over time and to explore how formative feedback can be applied in each phase effectively.

3 Methodology

To investigate the research question empirical social research in the form of expert interviews with a semi-structured interview guideline were chosen. The qualitative data obtained in the interviews was analyzed with qualitative content analysis.

3.1 Expert Interview

Expert interviews are used to generate factual information and place the experts as functional representatives in the focus of the study (Liebold & Trinczek, 2009; Bogner et al., 2014). The focus of the analysis is on the perspectives and actions of the experts and less on the person per se (Flick, 2009). Insights can be generated about special knowledge, which arises from certain activities or functions (Misoch, 2015).

In the context of this paper, seven expert interviews were conducted to obtain a sufficient sample. In the first step, the experts were selected by judgement sampling (Taherdoost, 2020). All experts had to be e-tutors or teachers who work or have worked in HE and have accompanied a group in at least one virtual collaboration at Technische Universität Dresden.

In the second step, an interview guideline was developed to provide guidance during the conversation and ensure the collection of qualitative oral data (Bogner et al., 2014; Misoch, 2015, Yin 2015). The conceptional framework of the developed questionnaire was based on the previously described theoretical background. The interview guideline followed Misoch's (2015) structure, and contained question sets regarding the experts' background (introductory phase), experts experience in the context of formative feedback and group development process (main phase) along with the evaluation of the influence of formative feedback on the group development stages (concluding phase). In the third step, the interviews were conducted virtually by two interviewers. The average duration of an interview was 22 minutes. During the introductory part of the interviews, the procedure, and the understanding of formative feedback and Tuckman's Group Phase Model were explained to gain a common understanding as a basis for the following questions. To ensure the best possible comparability, all areas of the interview guide, regardless of its structure, were carried out and in some cases, follow-up questions were asked to obtain a meaningful answer. In addition, one interviewer participated in all interviews to obtain different perspectives and minimize bias in the results.

3.2 Qualitative Content Analysis

After conducting the expert interviews, the interview discussions were transcribed in full, as condensed recordings of interview conversations would represent a subjective and non-reproducible result of interpretations (Gläser & Laudel, 2010). The transcription rules of Dresing & Pehl (2018) were used, which correspond to the transcription rules of Gläser & Laudel (2010). Accordingly, a simple transcription system was followed, which refrains from recording dialects, sounds of understanding and word loops (Dresing & Pehl, 2018).

Next, a qualitative content analysis according to Gläser & Laudel (2010) was conducted. This selection is justified on one hand that Gläser & Laudel (2010) derived their methodology from Mayring's approach and modified it so that a comprehensible and less complex evaluation of the text is possible. On the other hand, the focus of the approach is on the extraction of raw data. The category assignment is done both inductively and deductively (Gläser & Laudel, 1999). This enabled the authors to first form categories deductively from the theoretical considerations. Subsequently, the categories were adapted during the coding of the material by inductively creating new categories. In the end, this process resulted in the following five main categories, each with at least three subcategories: *Expert Background*, *Group Phase Model by Tuckman & Jensen (1977)*, *Design of formative feedback*, *Applied feedback types and Perceived success factors of team collaboration* (Appendix 9).

4 Results

In a qualitative study, experts were asked about their experience regarding formative feedback in virtual group work. In this section preliminary findings on how formative feedback in the field of virtual, collaborative group work in HE contributes to accomplishing team development are described.

4.1 Expert Background

The analysis of the expert background included all characteristics that qualify an e-tutor as an expert. The results revealed that experts had an average e-tutor experience of 2 years ($M=2.0714$). The number of accompanied groups per expert ranged from 3 groups (minimum) to approximately 40 groups (maximum), with a mean number of 13 groups ($M=13.2857$).

4.2 Group Phase Model by Tuckman & Jensen (1977)

The experts were completely in agreement – the group phase model according to Tuckman & Jensen (1977) is also visible in virtual group work settings. Experts D and E added that phases can be of different strengths and sometimes run parallelly. Expert F explained that the virtual framework hovers like a cloud over the entire collaboration and should be considered and Expert C concluded that the technical grounding should be part of the Forming Phase. In this context, the experts named characteristics of the phases Forming, Storming and Performing and therefore other three sub-categories emerged inductively. The phases Forming and Storming were described by Expert B as “critical” and more time-consuming than in the analogue. Further descriptions of phases coincide with the original phase model by Tuckman & Jensen (1977) and do not need to be explained further.

4.3 Design of Formative Feedback

This main category includes the experience of an expert in connection with the design of formative feedback in the context of virtual collaboration.

Forming Phase: Five experts stated that forming phase needs more feedback than the other phases. It should be related to the group and formalities and aim to motivate the group to socialize and enable them to use the platform. Expert F stated that in international projects e-tutors should contact the group saying: “*Hey guys, you will probably have different mindsets, treat each other with respect (...)*” (Expert F). Such formative feedback can include checklists for FAQ, typical mistakes that can be avoided, instructions on how to use @-functions. Two experts contradicted this and mentioned that group needs time to discover the platform and mindsets on their own (Expert B&G).

Storming Phase: Six experts confirmed that the storming phase requires more additional and detailed feedback. Expert E contradicted that but stressed that e-tutors still should pay close attention to the work processes during the Storming Phase. Expert F added that in case of major conflicts constructive formative feedback should be provided.

Norming Phase: Expert B stated that in this phase the focus rather shifts to the individuals and their development or learning process. Furthermore, Expert F suggested that e-tutors should check whether formative feedback, given during the previous phases, got implemented.

Performing Phase: Expert B highlighted self-reflections as part of the task in the performing phase, to recognize what is going well or poorly and identify potential for improvement. Expert F supports and mentions that e-tutors can praise the group for their achievements and give formative feedback only in case of severe conflict or major problems.

Adjourning Phase: Four experts confirmed that this phase requires no formative feedback. Expert B mentioned that e-tutors can motivate the group to reflect on what was done and achieved. The experts F&G highlighted the importance of a wrap-up and defining areas for improvement, especially if the group must keep on working together.

General Recommendations: Experts F&G have mentioned aspects that should be considered throughout the whole virtual collaborating process. For example, formative feedback should have a supportive effect and not a corrective one. This can be reached with the help of I-messages, sandwich feedback method, asking questions about the opinion of the group and how team members perceived the given formative feedback. It is also important to write in a friendly and positive manner, pay attention to tone and style, express yourself clearly, give formative feedback that the group can implement. The timing of the feedback is crucial as well and it should always be done promptly. In order to summarize the results of the empirical part regarding this chapter, table 1 includes recommendations for the design of the formative feedback in a structured way.

Table 1: Recommendations for formative feedback

Phase according to Tuckman	Recommendations for formative feedback
<i>Forming Phase</i>	<ul style="list-style-type: none"> • phase needs more formative feedback than the other phases • at the start give the group members some time to discover the platform and roles on their own • formative feedback should be related to the group and formalities and aim to motivate the group to socialize and enable them to use the platform • make the group aware of different cultures in case of international projects • include checklists for FAQ, typical mistakes that can be avoided
<i>Storming Phase</i>	<ul style="list-style-type: none"> • phase requires more additional and detailed feedback • e-tutors still should pay close attention to the work processes during this phase • in case of major conflicts constructive formative feedback should be provided
<i>Norming Phase</i>	<ul style="list-style-type: none"> • focus on the individuals and their development or learning process • check whether formative feedback, given during the previous phases, got implemented
<i>Performing Phase</i>	<ul style="list-style-type: none"> • self-reflections as part of the task to recognize what is going well or poorly and identify potential for improvement • e-tutors can praise the group for their achievements • formative feedback only in case of severe conflict or major problems
<i>Adjourning Phase</i>	<ul style="list-style-type: none"> • phase requires no formative feedback • the group can be motivated to reflect on what was done and achieved • organise wrap-up and define areas for improvement, especially if the group must keep on working on another case study
General recommendations for giving formative feedback	
<ul style="list-style-type: none"> • formative feedback should have a supportive effect and not a corrective one; • application of I-messages, sandwich feedback method, questions about the opinion of the group and how team members perceived the given formative feedback; • friendly and positive manner, pay attention to tone and style, express yourself clearly, provide feedback promptly; • provide formative feedback that the group is able to implement. 	

4.4 Applied Feedback Types

Based on the experiences, opinions, and assessments the experts commented related to different types of feedback the following five feedback types were categorized:

Formative individual feedback: Giving individual feedback during virtual collaboration is mostly untypical. Experts E&G argue that e-tutors only have a limited time capacity, that individual feedback would not be transparent for the rest of the group and that it requires a lot of sensitivity so that it does not have a negative effect. However, it was also mentioned that it can be helpful or needed when problems arise with individual group members.

Formative group feedback: Group feedback is an elementary instrument for e-tutors in context with virtual collaboration. It is transparent and can be used to stimulate discussions and motivation within the groups (Experts B&E). Despite limited capacities, the expert can give high-quality feedback to the group, as he can concentrate on this. Two of the experts also mentioned that this kind of feedback can be used to stimulate reflection within the group.

Formative verbal feedback: Expert A mentioned that verbal feedback has the advantage of gestures, and facial expressions to avoid misunderstandings and provide variety. However, it was also stated that verbal feedback can be forgotten, and group members might remember negative criticism only.

Formative written feedback: The experts only shared positive experience and opinions on this type of feedback. Their statements were justified by the fact that formative written feedback can be reviewed over time and thus fully considered. Also, it can be given more flexibly, and the e-tutor can make better use of his capacities. Furthermore, it can stimulate exchange and discussion e.g., under a post or in group chats (Expert A,D&G).

Formative automated feedback: Expert D mentioned automated feedback. A bot had given the group feedback on their activity on the platform. It could only be evaluated quantitatively and not qualitatively. However, the expert did not receive any feedback from the groups on how they perceived this tool.

Five out of seven experts highlighted the positive influence of formative feedback on virtual group work. The experts C&E stated that feedback supports the group development. Expert C mentioned: „*If the group works in itself, then I can take their work to the next level, yes.*”. This includes that the success of the group and success of the feedback depends on group characteristics such as work ethic and chemistry of the group. Expert E discovered that groups deal very differently with feedback. Expert C reported:

„If the basic substance of a group is not consistent, [...] then as an e-tutor I can basically do what I can, but the result will be not of high quality or not extensive.“ It was emphasized that the influence of the feedback on the success of the group depends on the quality, feasibility, and acceptance of the feedback. In this context, Expert F underlined that it depends on the suitability of an e-tutor and the relationship and acceptance between the e-tutor and the group.

5 Conclusion

This paper provides deeper insights into the challenges of designing formative feedback in virtual group work. Therefore, seven expert interviews were conducted to investigate how formative feedback can be designed in the group development phases according to Tuckman & Jensen (1977). The interviews were analyzed using qualitative content analysis according to Gläser & Laudel (2010). The applied codes were formed both deductively and inductively.

The underlying study has implications for group development processes in virtual collaboration along with the application of formative feedback to facilitate the group development. In compliance with previous research by Johnson et al. (2002) the expert interviews have revealed that Tuckman's group phase model is also applicable in virtual settings. However, some experts have observed that these group phases can occur shortened, parallelly or overlap. The first three phases were identified as the most critical ones due to variety of social, technical, and organizational challenges. Therefore, the formative feedback in these phases is particularly important to ensure that the team development phases are successfully managed. It can be given in a written form for the whole group to ensure transparency and possibility to review recommendations over time. Surprisingly, two of the experts contradicted this and stated that groups members should try to overcome the mentioned challenges on their own. Despite that we would recommend e-tutors to find a balance between supporting the students and letting them work independently. The decision should be based on following criteria: (1) whether there are any major conflicts; (2) if the group is able to develop effectively; or (3) if the group is asking for guidance. General guidelines on how to structure formative feedback effectively in each of the phases are explained in Chapter 4.3. Also, the group constellation represents a key aspect in determining if groups can go through the phases successfully. Hence, formative feedback from e-tutors cannot support a group that does not have any willingness to develop.

As with any empirical investigation, this study is not without limitations. These affect the composition and size of the sample, the ability to remember and the authenticity of the response behavior. The sample included both active and inactive e-tutors, which could lead to memory deterioration.

In the future researchers could focus on interviewing only active e-tutors. Furthermore, all e-tutors gained their professional experience working at Technische Universität Dresden, accompanying the course that lasts one semester. The results should therefore be viewed critically for general validity. For this reason, group work outside the HE context should be also examined as well as group work that falls below or exceeds the time frame of one semester. In addition to that, future studies could consider interviewing students as well to get a more holistic view.

The applied research method enabled us to gain first insights into the topic of formative feedback given by e-tutors that can facilitate the group development stages in a virtual learning environment. The expert interviews allowed us to discover hidden information in connection to the design of formative feedback. However, the underlying qualitative results should be further verified with the quantitative research. For example, further research could use our findings as a basis for the development of surveys for e-tutors and students to gain more precise information about recommended actions.

In sum, the results contribute to the research on successful development of learning processes. First practical implications can be used by e-tutors working in HE who accompany groups in a time frame that lasts about one semester. Since there is an increasing tendency of internationalization and digitalization, the virtual collaboration has become a tool of growing importance.

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