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Peer-to-Peer in inklusiven Lerngruppen: Peer-Feedback-Diskussionen durch kognitive Aktivierung verbessern

In der vorliegenden Studie werden Merkmale kognitiver Aktivierung in Peer-Feedback-Gesprächen, die dem Konzept *Writing Talks* nach Myhill und Newman (2016) folgen, untersucht. Insgesamt wurden 53 Peer-Feedback-Gespräche in zehn nicht aufeinanderfolgenden Unterrichtsstunden einer inklusiven Lerngruppe der 7. Klasse videografiert und daraufhin untersucht, inwieweit sie als kognitiv aktivierend beschrieben werden können. Die Ergebnisse deuten darauf hin, dass die aufgezeichneten Peer-Feedback-Gespräche insgesamt als kognitiv aktivierend bezeichnet werden können. Aus der Tatsache, dass in einigen Unterrichtsphasen jedoch noch eine starke Leitung durch die Lehrkraft notwendig war, lässt sich schlussfolgern, dass kognitiv aktivierendes Peer-Feedback zunächst trainiert werden muss.

Schlagwörter: Peer Feedback – Schreibgespräche – Inklusion – kognitive Aktivierung

Peer-to-Peer in Inclusive Learning Groups: Improving Peer Feedback Discussions through cognitive activation

The present study addresses cognitive activation in peer feedback conversations that follow Myhill and Newman's (2016) concept of *Writing Talks*. A total of 53 peer feedback conversations in ten non-consecutive lessons in a 7th-grade inclusive learning group were video-recorded and examined to determine the extent to which they could be described as cognitively activating. The results indicate that the recorded peer feedback conversations were cognitively activating overall. However, strong guidance from the teacher was still necessary in some phases of instruction, which suggests that cognitively activating peer feedback needs to be trained first.

Keywords: Peer feedback – writing talks – inclusion – cognitive activation

1 Introduction

In the school context, writing competence proves to be a central key competence for students' academic success. Beyond its epistemic function, which enhances and develops knowledge, writing also encompasses a heuristic function that arises from engaging with linguistic forms and functions. The required level of abstraction results from the demands of presenting thematic relationships in writing, which must first be explored and then reconstructed. Reflecting on the linguistic performance of representation always entails reflecting on language itself (Steffens 2004, 1). Feilke (2000, 1) also acknowledges the importance of writing for the learning process and emphasizes that writing obliges the writer to adopt an analytical and abstract perspective on language. However, in addition to the metalinguistic reflective ability mentioned here, grammatical ability is also fundamentally important for a successful writing process (Feilke & Tophinke 2016). Myhill and Newman (2016) also demonstrate the connection between grammatical skills and writing skills. Through their method of *Writing Talks*, which include discussions about the form-function

aspects of language, they prove that this form of dialogic teaching can increase the quality of writing products. However, the reasons for the success of these *Writing Talks* and their transferability to peer-to-peer discussions – especially in inclusive learning groups – still remain research desiderata.

Some insights into successful dialogic teaching in the classroom have been provided by the findings of Stahns (2013), who operationalized the concept of cognitive activation from the mathematical and scientific domains, and Böhnert (2020), who, in recent studies, demonstrated the potential of cognitive activation for inclusive grammar instruction. It is worth noting that the research presented in this article operates on the basis of a broad understanding of inclusion, which interprets social groupings as products of social attribution processes that must be constantly questioned and reflected upon and thus require an individualized approach (Leiprecht & Lutz 2015, 223). The aim of the present study is to investigate to what extent peer feedback discussions in inclusive learning groups about grammatical forms and functions can be considered cognitively activating.

A more in-depth examination of the topic first requires outlining the concept of cognitive activation. Against this background, the potential of the concept for inclusive peer feedback conversations will subsequently be highlighted.

1.1 Cognitive Activation

In research on teaching quality, it has become generally accepted that students' academic success depends less on so-called “surface structures” and more on the deep structures of instruction (Fauth & Leuders 2022, 3). In this context, cognitive activation, along with classroom management and constructive support, is considered one of the three pillars of high-quality teaching (Klieme et al. 2001, 50–52). Notably, the concept of cognitive activation and constructivism exhibit structural parallels. According to Pauli et al., cognitively activating instruction can be understood as the "promotion of active cognitive construction" (2008, 127), which is essential for student learning success (Mayer 2004, 17). Similarly, Stahns defines cognitive activation as "a deep processing of information through the use of demanding learning strategies that contribute to students' learning progress" (2013, 52). Lipowsky describes cognitive activation as a stimulus “for deeper reflection and an elaborate discussion of the subject matter” (2015, 89–90). According to Stahns (2013), elaborative and organizing learning formats are particularly suited for comprehension-oriented learning (Seidel et al. 2002, 55). These include, for example, students paraphrasing content, or reorganizing existing knowledge structures and transferring them to new contexts. For teachers, implementing cognitive activation requires providing cognitively demanding learning opportunities that stimulate a deeper cognitive engagement with the subject matter. Activities that are considered cognitively activating lead to active engagement with learning content that corresponds to the students' individual learning levels and considers their individual cognitive dispositions, such as prior knowledge, and interests (Pirner 2013, 229). The quality of learning tasks can be further specified based on Gautschi's (2009) criteria for good learning tasks. Gautschi evaluates learning tasks as good if they address a socially relevant issue, meet students’ needs and allow for differentiation as well as various solution approaches (2009, 251–252). However, the practical implementation of this concept can also pose a significant challenge in everyday school life, especially in

heterogeneous learning groups. The provision of cognitively demanding tasks must not only take into account students' individual learning levels, but also, as already mentioned, specifically address their motivation and prior knowledge (Praetorius et al. 2018, 409–413). A lack of differentiation or insufficiently adaptive teaching methods can lead to learners being overwhelmed or under-challenged, which can significantly reduce the effectiveness of cognitively activating approaches. The adaptability of teaching - understood as the ability to flexibly adapt learning opportunities to students' different needs - plays a central role in this. Praetorius et al. (2018) emphasize that adaptive teaching not only supports cognitive activation but also helps to reduce learning barriers and increase learner engagement. Differentiated tasks that offer multiple solutions or different levels of difficulty can better meet the requirements of the concept of cognitive activation in teaching. Peer feedback can be supported, for example, by using clear, structured feedback formats, and adaptive tools such as feedback sheets or visual aids.

The empirical assessment of the potential of cognitively activating instruction based on video studies remains rudimentary, particularly in the field of German didactics. Investigations into the adaptation of the concept for the mathematical and scientific domains are provided by Stahns (2013), who primarily uses video studies from these areas to operationalize the concept of cognitive activation. Notably, the TIMSS-1995 Video Study (Trends in International Mathematics and Science Study) demonstrated a causal relationship between cognitively activating instruction and the students' learning progress (Stahns 2013, 55–56).

This study considered features essential for cognitively activating instruction, including task quality, independent engagement with complex problems, intelligent practice, and discursiveness (Pauli & Reusser 2010, 64). Similarly, the DESI study, which examined the importance of cognitive activation in relation to the linguistic competencies of ninth graders, provides substantial evidence for the positive effect of cognitive activation on the students' performance development (Klieme et al. 2008, 343).

However, the empirical recording of cognitive activation in German lessons has also gained importance in recent years. While earlier studies, such as those by Stahns (2013), mainly focused on mathematical and scientific domains, there is now also substantial research on cognitive activation in reading and writing lessons, for example by Hanisch (2015), and Lotz (2016). These studies demonstrate the positive influence of cognitive activation on learning progress and offer valuable insights for didactic practice. Further studies, such as those by Hlebec (2019), Riegler et al. (2022), and Wiprächtiger et al. (2023) broaden the perspective on cognitive activation even further by emphasizing the role of peer feedback and active engagement with linguistic structures, especially with regard to reflexive, dialogic learning processes, and the integration of linguistic reflection in German lessons.

Studies on cognitive activation in instruction conducted as part of the PISA 2000 study also show that mathematics instruction is perceived by students as more cognitively activating than German instruction. This perception was consistent among respondents regardless of the type of school. A closer examination of the empirical data reveals that features such as *clarity* and *adherence to rules* were perceived as more present in mathematics instruction (Klieme & Rakoczy 2003, 352). Compared to the OECD average, 15-year-old students still

perceive German instruction as less cognitively activating than in international comparison groups, as shown by PISA 2009 (Hertel et al. 2010, 132).

Considering the research findings presented here, it is not surprising that the concept of cognitive activation has increasingly come into focus in German didactic research in recent years. Based on videographic studies, it has been selectively explored how the concept of cognitive activation can be conceptualized and operationalized in the contexts of reading and writing instruction as well as literature instruction. According to Hanisch (2015) and Lotz (2016), cognitive activation in reading and writing instruction can be expressed through the formulation of tasks, their processing, and subsequent reflection on this process. Similar patterns are observed in Winkler's (2017) attempt to adapt the concept for literature didactics. Winkler operationalizes cognitive activation through the implementation of tasks that are compatible with the domain-specific task discourse of literature didactics, and the educational objectives of literature instruction (2017, 93).

Criteria for analyzing cognitive activation in the scientific and mathematical domains are provided by Stahns (2013). These include:

(1) Length and frequency of teachers' contributions;

(2) Nature of students' and teachers' contributions;

(3) Restriction of students (students as prompters);

(4) Learning support during classroom discussions and student work phases;

(5) Handling of errors (ibid., 132).

Given that a subject-specific and precise operationalization of the concept based on video studies remains a desideratum, at least for German didactics, the presented study draws on the categories proposed by Stahns (2013). The focus is on two categories: learning support during classroom discussions and student work phases, and the handling of errors. According to Stahns (2013), both categories are significant indicators of cognitively activating instructional design.

1.2 Peer-Feedback and Metatalk

For the development of writing competence, metaknowledge about language and the language system is indispensable. Metatalk goes beyond mere recognition and understanding of the form of language. It represents "a deeper level of attention 'which supports learners' developing knowledge about the relationship between meaning, form, and function" (Storch 2008, 96). Peer feedback - a targeted form of mutual support between students in the form of a dialogue about writing products (Buhren 2015, 237) - offers considerable potential for initiating discussions about written products during lessons, as it enables a dialogic and exploratory engagement with individual students' texts. In the context of peer feedback, learners can develop declarative metalinguistic knowledge through dialogic processes and consciously make grammatical structures visible by analyzing, evaluating and revising their own and others' texts. This knowledge helps students make more conscious and informed decisions when writing. By gaining knowledge about the grammatical, orthographic, and lexical functioning of language, students' grammatical competence can be consciously promoted. An advantage for students is the enhancement of grammatical proficiency, as they learn to adapt their written products precisely to the requirements of the

writing task. This facilitates writing, which, according to Myhill and Newman, fundamentally involves the selective choice of different options within the language system and combines individual, social and textual components (2019, 361). In this sense, metatalk is "a surfacing of language used in problem-solving" (Swain 1998, 69) fostering awareness of how linguistic decisions shape communicative messages and subtly accentuate them. Myhill assumes that successful writing products require an elaborated metalinguistic understanding: "as the explicit bringing into consciousness of an attention to language as an artifact, and the conscious monitoring and manipulation of language to create desired meanings grounded in socially shared understandings" (Myhill 2011, 250). Writing conversations or peer-feedback in the classroom, in which there is conscious reflection on grammatical, orthographic, and lexical structures of language, are seen by Myhill and Newman (2016) as a tool for further developing students' metalinguistic understanding. While Myhill and Newman (2019) emphasize the importance of teacher-student interactions, peer feedback can play a comparable role as a tool of cognitive activation in student-student contexts. Rakoczy and Pauli (2006) also point out the "evolutionary approach" to dealing with student ideas, which has the potential to stimulate cognitively activating classroom discussions. In this context “evolutionary” refers, on the one hand, to the teachers’ ability to identify or consciously evoke student ideas and, on the other hand, to consider individual solution paths and problem areas. According to Myhill and Newman, dialogic teaching methods are particularly suitable for introducing students to linguistic structures, offering learners a "dialogic space" (Wegerif 2013, 62) as an explorationary space for various levels of the language system (Myhill & Newman 2019, 360). Metatalk offers a way to actively involve learners in reflection processes. In the context of peer feedback, this means that students not only consciously question linguistic decisions but also discuss and adapt them in exchange with their peers. This strengthens students’ ability to use linguistic structures flexibly and to manipulate them consciously in order to meet communicative requirements.

1.3 Text Revision in Inclusive German Instruction

Inclusive German instruction, like other subject teaching, must consider the tension between individuality and collectivity in order to meet the demands of school inclusion. Regarding writing instruction, Ferencik-Lehmkuhl emphasizes the shift towards a more appreciative approach to students' written products, which is particularly crucial in inclusive learning groups where students with and without special educational needs learn together (2021, 6). In this context, Hennies and Ritter (2014, 177) stress the need for learning contexts that allow students to demonstrate their abilities at different levels of language use. Empirical studies (e.g., Ferencik-Lehmkuhl 2021) show that the text revision process, due to its versatility and complexity, meets the heterogeneous conditions of inclusive learning groups and thus demonstrates considerable potential for inclusive instructional practice. Text revision can address linguistic, structural, and content-related aspects but can also include word-, sentence-, and text-level considerations. Additionally, the text revision process provides opportunities for a wide range of methodological and didactic decisions, including scaffolding, teacher assistance, tools, or the simultaneous use of various forms of social interaction, such as individual or group work. This allows for the setting of individual

focal points and emphases in the learning process, adapted to students' learning prerequisites, thereby fostering the development of linguistic competence tailored to the needs of each student (Ferencik-Lehmkuhl 2021, 6–7).

1.4 Reasearch Hypothesis

The evaluation of current research on cognitive activation, peer-to-peer feedback and inclusive German teaching leads to the following hypotheses, which will be investigated in the present study:

H1: Peer feedback conversations promote cognitive activation by encouraging students to consciously reflect on and apply linguistic structures and writing strategies.

H0: Peer feedback conversations that are specifically tailored to the needs of students with special support needs improve their metalinguistic understanding and writing skills.

2 Method

The subject of the present study was peer feedback conversations conducted over ten non-consecutive lessons in the 7th grade of a German secondary school. The inclusive learning group under investigation comprised twenty students: nine boys and eleven girls. Among them were six students diagnosed with special educational needs in the area of learning and one student diagnosed with special educational needs in the area of emotional-social development. The design of the writing tasks, primarily oriented toward the work of Myhill and Newman (2016, 2019), focused significantly on three central aspects: The process of the writing tasks is tailored to the heterogeneity in inclusive learning groups, thereby rejecting a prescriptive view of the learning process in favor of a potential-oriented perspective on learning. Furthermore, the writing tasks exhibit a pronounced co-constructivist orientation. Interaction with peers or the teacher ensures that students receive initial feedback on their written products, thereby accompanying a motivating and process-optimizing effect on the writing process. The conception of the writing task is thus strongly aligned with the "Think-Pair-Share" principle (Lyman 1981) and can be roughly divided into three phases. In the first phase (the Think-Phase), students initially create an individual preliminary text draft. In the second working phase, (the Pair-Phase), this draft can be modified and potentially optimized together with a learning partner or with the assistance and prompts of the teacher. In the final phase of the working process (the Share-Phase), the written product is reflected upon within the plenum, particularly regarding the intentions and actual effects of language choices. The collected suggestions for optimization, indicated by color, are made accessible via a projector. The students can then use these suggestions to create a final version of their own text. As Myhill and Newman emphasize, metatalk and the resulting language reflection can only emerge through an interplay of individual and collective reflection on the written product (2019, 363). However, the application of the *Writing Talks* method requires intensive methodological training for the teacher in order to optimally guide the dialogic and reflective processes. This training could not be fully implemented in the present study, which represents a potential limitation of the investigation.

During the lessons, various topics and text types were the subject of peer feedback conversations. A total of 53 peer feedback conversations were video-recorded and examined to assess their level of cognitive activation. The coding of this qualitative study (Mayring 2015) is based on a category system designed by Kobarg and Seidel (2003) for analyzing classroom discussions. To ensure comparability with the results of Stahns' study, this category system was also applied in the present study on peer feedback conversations (Stahns 2013, 238):

(1) Thinking aloud

(2) Substantive and constructive feedback

(3) Activation of prior knowledge

(4) Practical application reference

(5) Set learners' thinking

(6) Clarifying questions

(7) Using scientific methods

(8) Creating links

(9) Collaborative planning of problem-solving approaches

(10) Critical review of solution approaches

(11) Collaborative summarization

(12) Verbalizing solution approaches

The coding was conducted using a highly inferential four-level scale (0 = Does not apply, 1 = Partially applies, 2 = Mostly applies, 3 = Applies) as outlined by Kobarg & Seidel (2003, 178–180). In order to determine the independence of the coding across the three raters (author and two PhD students who were instructed in the use of the categories proposed by Kobarg and Seidel), the interrater reliability was calculated according to Wirtz and Caspar (2002). The kappa value for the present category system and the coding guide was $\kappa = .720$, which indicates sufficient interrater reliability.

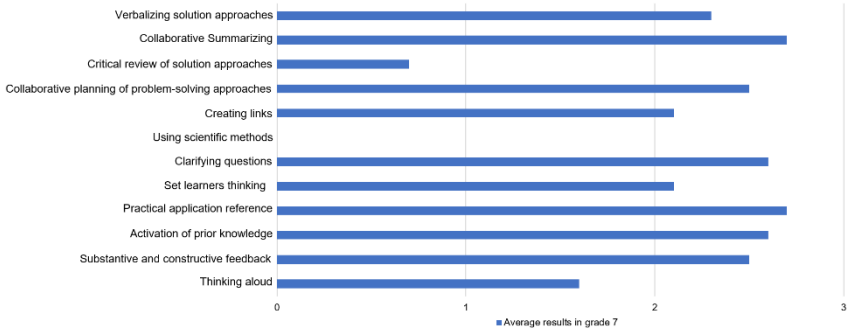
The decision to adopt the category system designed by Kobarg and Seidel (2003) is based on the fact that it provides a comprehensive framework for analyzing key forms of interaction that occur in both teacher-student and student-student interactions. Although the system was originally designed for teacher-led activities, it has been adapted for the context of peer feedback. In particular, categories such as "critical review of solution approaches" have been expanded to reflect low-threshold forms of reflection that are typical of peer interactions.

To illustrate the categories that are considered particularly cognitively activating, examples from the video-recorded classroom lessons are presented in the second part of the results section (3.2), following the global overview (3.1). As described, these examples serve to illustrate cognitively activating instructional sequences.

3 Results

3.1 Supporting learning in the classroom

The results presented here pertain to Stahns' (2013) categories and show the average results for the seventh grade studied. As can be observed from Figure 1, the majority of the investigated categories – i.e., *verbalizing solution approaches* (2.3), *collaborative summarizing* (2.7=, *collaborative planning of problem-solving approaches* (2.6), *creating links* (2.1=, *clarifying questions* (2.6), *set learners thinking* (2.1), *practical application reference* (2.7), *activation of prior knowledge* (2.6), *substantive and constructive feedback* (2.5) – surpass the calculated mean value (1.9). Accordingly, these values can be regarded as indicative of a high degree of learning-facilitative behavior. However, a significant deficit is evident concerning the category of using scientific methods, which is entirely absent in the analyzed instructional sequences.



Note: 0=Does not apply, 1=Partly applies, 2=Mostly applies, 3=Applies.

Fig. 1: Supporting learning in the classroom.

In Stahns' (2013) study, only the category *clarifying questions* exceeded a value of 2 (mostly applies) in the 7th grade. Conversely, values were significantly more positive in the comparison class, the 6th grade, where the values of 10 out of the 12 investigated categories were greater than or close to the mean value. Even concerning these values, which have already been interpreted as an indicator of a high level of cognitive activation during classroom discussion phases, the present results for the 7th grade show a clear improvement.

Following this general overview, three case studies of selected cognitively activating categories are presented and analyzed in more detail.

3.2 Critical Review of Solution Approaches

Example 1: Syntax

The example in Figure 2 shows an excerpt from a student text containing a sentence structure error. The student identified this error himself during peer feedback. The error could possibly be explained by the fact that the subordinating conjunction *weil* ('*because*'), unlike in standard written language, is increasingly used as a coordinating connector in spoken

language, resulting in verb-second word order. This tendency in language usage is also evident in the present written product, where a mixed form of verb-second and verb-final word order occurs, resulting in the repeated use of the past tense form.

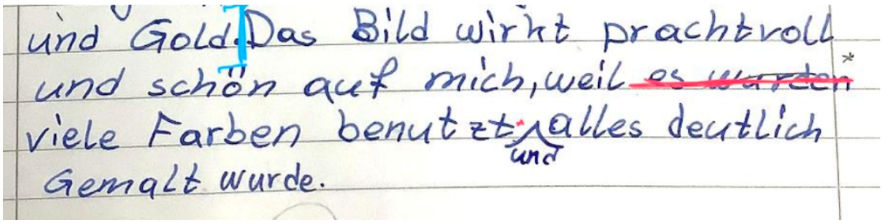


Fig. 2: Writing products of student 1.

[*The picture looks magnificent and beautiful to me because many colors* ~~*were used*~~ (V2) *and everything was clearly painted* (V_{final}).]

***writing talk* student 1 and 2, 09/23/2021, 1:32-2:50**

S1: Jetzt, wenn ich das hier so vorlese, dann denke ich, denk ich, dass was mit dem Satz nicht stimmt. S2: Ja, da steht *weil es wurden viele Farben benutzt*... S1: Das kann man so, glaub ich, nicht sagen, es heißt *weil viele Farben wurden benutzt*... S2: *weil viele Farben benutzt wurden*.

[S1: Now when I read this out loud, I think, I think there's something wrong with that sentence. S2: Yes, it says because many colors were used (V2)*... S1: I don't think you can say that, it says* because many colors were used (*participle before auxiliary instead of V^{final}).. *S2:* because many colors were used participle after auxiliary in V_{final} structures).*]*

This writing talk illustrates the categories *verbalizing solution approaches* as well as *substantive and constructive feedback.* For the learner, the writing talk provides an opportunity to immediately revise the text, such as improving the sentence structure in this case. This example specifically addresses learners who still have difficulties in detecting errors. The diversity-oriented approach allows for the consideration of other diversity categories, whose relevance derives from the subject-specific content and competencies that are intended to be developed through engagement with these subjects. This includes learners whose competencies in error detection can still be improved. Consequences at the didactic level may include individualized differentiation options or classroom support measures, from which this specific group would significantly benefit.

Another example on the syntactical level is illustrated by the following excerpt from a student's text in Figure 3.

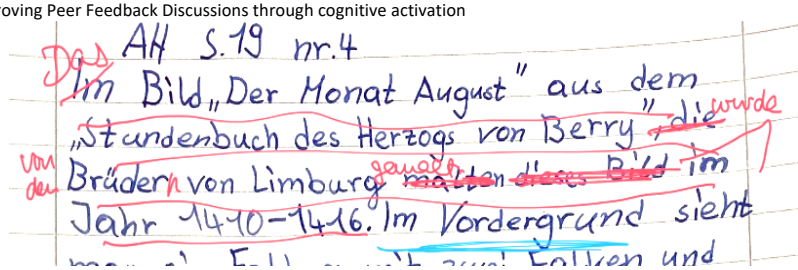


Fig. 3: writing product of student 3

[The painting "The month august" from the book of hours of the Duke of Berry~~, the Limbourg brothers painted this painting in the years 1410-1416~~ (German sentence structure unclear) *was painted by the Limbourg brothers in the years 1410-1416...]*

Writing talk student 3 and teacher 11/11/2021, 4:22-5:08

L: Ich helf dir mal. Kannst du den jetzt – S2: Ach so, wurde… ähm… kann man da, äh, also darf ich dieses Jahr 1416 vorschieben? L: Du kannst machen, was du möchtest. S2: Wurde, äh, im Jahr 1410-1416 von den Brüdern von Limburg gemalt.

T: Let me help you. Can you say it now – S2: Oh, so it was... um... can I, uh, can I advance to the year 1416? T: You can do whatever you want. S3: Was, um, painted in the year 1410-1416 by the Limbourg Brothers.

The teacher's assistance in this example is cognitively activating, as the student is given autonomy and their own thought processes are not only permitted but actively encouraged and required. The teaching-learning arrangement in the present example thus demonstrates a balance between individual, autonomous, and co-constructive work in exploring and reflecting on linguistic structures, enabling learners to derive syntactically correct sentences. Furthermore, the willingness to engage in discussion and to acknowledge alternative ideas has proven productive.

Example 2: Lexis

In the next example, the lexical level was addressed (see Figure 4). During the process of text revision and dialogic exchange, a colloquial expression was replaced by the standard language formulation. At this point, no metacognitive reflection on standard language takes place; rather, an unquestioned orientation toward norms is evident, which nevertheless leads to a more appropriate text through the given peer feedback.

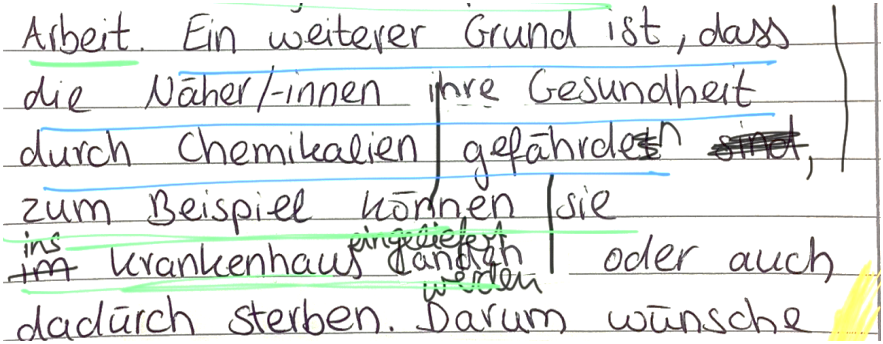


Fig. 4: writing product of student 4.

[*[…] Another reason is that seamstresses endanger their health through chemicals. For example, they can end up in the hospital or even die as a result…]*

Writing talk student 4, 5 and teacher 18/11/2021, 1:12-2:21

L: Wollen wir auf diesen Satz hier nochmal schauen, das kann nicht richtig sein, ne? […] Also es muss mit zwei *s* geschrieben werden, aber lies den Satz mal vor [S4 liest vor ins Krankenhaus landen]. […] S5: Das ist zu umgangssprachlich. Was wird man denn ins Krankenhaus? […] S4: eingeliefert, ins Krankenhaus wird man eingeliefert.

T: Shall we take another look at this sentence here, that can't be right, right? [...] So it must be written with two s*, but read the sentence again [S4 reads* end up in the hospital*]. [...] S1: That's too colloquial. What do you get to the hospital? [...] S2: admitted, you get admitted to the hospital."*

4 Discussion

As can be deduced from the sample presented here, cognitive activation significantly contributes to students' knowledge construction. Among the wide range of possibilities that cognitive activation offers for designing teaching-learning processes, peer-to-peer feedback conversations have also proven to be beneficial for inclusive learning in grammar lessons. The collected data show that students in the examined inclusive learning group become aware of grammatical structures, address them, and collaboratively improve their writing based on feedback. Although peer feedback discussions offer ample scope for constructive, individualized learning, the study results suggest that teacher guidance is necessary at certain points in the seventh-grade class. Without this guidance, students tend to remain at a more or less incremental level in their peer feedback (*it must be written with two* s).

The potential-oriented approach of the *Writing Talks* creates space for individual and collaborative reflection on language at a meta-level, thereby promoting the development and enhancement of grammatical competence. Considering the results of the current pilot study, it can be stated that peer feedback discussions have a cognitively activating effect

when they encourage learners to justify their views, facilitate the exchange of alternative opinions, and address conflicts and suggestions for improvement.

The present study is a case study involving an inclusive seventh-grade learning group. The findings may serve as a starting point for further research, for example to examine the extent to which the results presented here can be transferred to other inclusive learning groups.

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