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Cooperative Collaboration in the Hybrid Space of Google Docs Based Group Work

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Abstract: This study investigates how Google Docs is used and affects group work in classrooms. Inspired by networked learning theory and the concept of learning spaces in education theory, Google Docs group work is conceptualized as a hybrid learning space. Based on close video ethnographic examinations of group work sessions, the analysis focuses upon what the pupils actually do when combining oral and written communication, how the hybrid Google Docs space affects collaborative and cooperative activity, as well as the role of the group's social context. Whereas Google Docs is often associated with collaboration, the findings in this study suggest: (1) that Google Docs in fact helps single group members to establish multimodal leadership to dominate the hybrid learning space of the group work settings; and (2) that Google Docs provides space for non-leaders to make cooperative contributions. This motivates a conceptual reassessment of collaboration and cooperation as working patterns before the paper ends with a discussion of potential pedagogical implications for the use of Google Docs in group work.

Keywords: cooperation; collaboration; Google Docs; hybrid space; video ethnography; networked learning

1. Introduction

Google Drive and its associated products like Google Docs are widely applied digital tools in schools today. Faced with increasing demands for integrating digital technologies in education, many schools and teachers find that Google provides ubiquitous and easy-to-use solutions. Particularly, Google Docs has become a widely applied platform not least because it affords a learner-centered approach in educational contexts due to its functionalities that enable users to easily create, share, and edit documents, spreadsheets, presentations, and forms online [1]. However, new media are always more than simply communications and delivery tools. With new digital potentialities come challenges to rethink pedagogy and to develop new forms of learning activities. Chu and Kennedy address this in their review of online collaborative tools: "there is considerable potential for Google Docs to serve as a platform for collaborative work. However, empirical evidence of the impact on online collaborative work is yet inadequate" [2]. This paper hopes to contribute to this area with empirical findings from a video ethnographic case study paying "attention to the whole ecology" [3] of a group work session using Google Docs at a Danish upper secondary school.

Within research on group work, there has been a tendency "to focus on either face-to-face group work in physical settings or, increasingly, on collaborative learning and group work within online and web based part-time and/or distance learning programmes" [4]. In line with recent, more holistic perspectives within education theory on learning in blended or hybrid spaces [5,6], this paper conceptualizes Google Docs as a hybrid learning space that needs to be examined with attention to pupils' face-to-face collaboration in the physical classroom space as well as in the online, virtual space on their laptops and on Google Docs. Theoretically, the study draws from socio-material perspectives [7]

upon ways material objects have presences that influence human activity. Such perspectives are also reflected within networked learning theory [8,9], which has been established as a central theoretical and practical field for exploring how technologies afford and shape connections "between one learner and other learners; between learners and tutors; between a learning community and its learning resources" [10].

On this basis the paper pursues three research questions: (1) what do pupils actually do when collaborating in a hybrid learning space, in terms of how do pupils combine face-to-face communication and virtual, written communication in the Google document; (2) how does the hybrid learning space afforded by Google Docs affect collaborative and cooperative activity; and (3) how is the group affected by its social context? The next section initiates this by reviewing central theoretical concepts followed by a presentation of the case study in terms of its methodological framework and the organization of the case group. The aim was not to pass judgements over Google Docs as a learning tool as such, but rather to contribute to our understanding of how this tool affects group work and can be leveraged to achieve effective learning.

2. Research Context—Group Work and Networked Learning

Networked learning emerged in the late 1990s as a theoretical and practical research area concerned with exploring how network-based computers can affect learning and promote connections between learners, communities, and learning resources [8]. With the rise of ubiquitous mobile media and social media, it seems to only have become more pertinent to consider the agency of technology in learning contexts. Building upon socio-material assumptions "that new as well as established technologies take part in and contribute to forming school practices" [7], researchers within this paradigm have been interested in not only the digital networking potentials for learning, but have also strived to develop research-based critical approaches avoiding technophobe as well as technophile positions. Applying a social constructivist perspective, networked learning generally emphasizes learning as socially situated, learner-centered activities. "Through their physical properties and embodied intentions, designed objects have effects on human perception and action, but the nature of those connections depends upon an interplay between affordance, interpretation and capability" [11].

J.J. Gibson's affordance concept offers a widely known analytical perspective on the relationship between agents and technology that is based on the idea that the physical environment, including media technologies, always somehow influence our actions. The main idea holds that each medium affords an amount of "possibilities for action" [12]. Importantly, affordances are not qualities imbedded in objects, but emerge in the meeting of the agent and the object. Hence, any media technology must be understood as environments with qualities that frame or shape our actions, without determining them [13]. This means that different agents can access different affordances of the same object according to the agent's capabilities, knowledge and intentions: "Understanding the affordances of a particular technology or space is important because it sheds light on what people can leverage or resist in achieving their goals" [14].

In educational contexts, the affordance concept is useful for capturing the complementary relationship between learners and the learning environment, illustrating that learning technologies are only one of several contextual factors that constitutes affordances for learning [15]. Any given technology affords a range of activities among which some can lead to undesirable, and others can lead to desirable teaching and learning outcomes [16]. For instance, the internet environment affords networked communication which holds desirable potentials for active, learner-centered activities, but also undesirable attention-related challenges. Thus, the holistic character of the affordance concept helps us avoiding simplistic technophile or technophobe positions.

In their exploration of collaborative affordances of virtual spaces, Stevenson and Hedberg establish a situated and holistic perspective on learning, as they highlight three perspectives that are central when examining online collaboration: (1) the task design set by the teacher, (2) the learners' individual experiences and understanding of working online, and (3) the learning environment emerging from the

learners' collaborative actions in the online space [17]. Observing the dynamic relations between these elements is presented as a way to arrive at a close understanding of how collaborative affordances of virtual platforms affect learning within groups. But whereas Stevenson and Hedberg focus on online spaces, it is important to note that online group work is often combined with offline activities as well and that "the affordances of the space can either enhance or inhibit beneficial group dynamics" [5]. Hence, studies in hybrid learning settings have promoted holistic, qualitative methods that closely investigate group work mechanisms in combinations of physical and digital spaces.

In an empirical examination of collaborative groups, Ryberg et al. describe how students "utilize mobile and other technologies to enable them to complete their collaborative work" [4]. They apply the notion of "nomadic work" to describe group activities along three categories, where the first—"orchestration of work phases, spaces and activities"—details how the students' decisions are situated in relation to the specific task as well as the temporal and spatial settings they are working within. The other two categories—"orchestration of multiple technologies" and "orchestration of togetherness"—point out that collaborative learning today involves continuous flexibility where uses of digital and physical technologies are always highly interweaved, and students alternate between collaborative and cooperative work [4]. The three categories roughly correspond to three classic education theoretical categories: pedagogy, learning technology, and social context. But the particular strength in this approach lies in the underlining of the fluidity and interconnectedness not only technologically between digital and the physical dimensions, or pedagogically between collaboration and cooperation, but also the relations between categories which stresses how e.g., students' (i.e., 'pupils' is preferred in this paper due to its case being situated in upper secondary education) senses of social togetherness may play into the groups' work patterns.

By highlighting cooperative as well as collaborative work, Ryberg et al. divert somewhat from the general tendency, in recent decades, to exclusively focus upon collaboration when conceptualizing co-working mechanisms. Google Docs, in particular, have been widely viewed to be an ideal collaborative platform due to its features for sharing, editing, and other web 2.0 functionalities that afford online participation and co-creation [18]. This tendency, influenced by the rise of network technologies and the general constructionist turn within social sciences [19], is also exemplified within the field of computer-supported collaborative learning [20]. Fundamentally, collaboration builds on social constructivist notions of knowledge being created and mutually shared in social relations and denotes activities where participants work together on "a shared social context around a shared goal" [21,22]. On the other hand, cooperation is defined as activities where the participants are working individually on different subtasks and often with individual goals. Cooperative tasks are associated with cognitivist notions of knowledge primarily residing in individual's minds. However, rather than seeing cooperation and collaboration as two opposing work forms, it is more accurate to operate with degrees of cooperative and collaborative forms along a continuum [21]. This more flexible approach to these two co-work concepts will be further explored in the coming sections with specific attention to the ways Google Docs frames the interaction among the pupils and how they work together in terms of collaborative or cooperative patterns.

3. Background and Methods

This paper reports on a case study [23,24] that took place at Ørestad Gymnasium, a Danish upper secondary school known as a digital pioneer school. A pragmatic approach was chosen that aimed to identify and take departure in the existing practices at the school. Ørestad Gymnasium brands itself as "a modern high school with a media profile" [25]. In the attempt to be Denmark's most modern gymnasium and a digital frontrunner, all teaching at the school applies digital platforms and tools. Hence, it was safe to assume that all pupils had experience in working with digital technologies in school. The following sections detail the context and methods of the study.

3.1. Background of the Study

Following preliminary observations and teacher interviews in two first year classes, it was decided to direct attention to a very common activity: group work in the classroom where pupils are situated in groups with their laptops and work on text-related questions in Google Docs. Five groups in two different classes were subjected to video ethnographic studies. Beforehand, all the participating pupils had signed a statement of content and afterwards the collected video data were stored in compliance with the European Union's General Data Protection Regulation (GDPR) rules. One of the groups—recorded in an English class and from now on referred to as "the English group"—is the subject of this paper's analysis. The English group consisted of four girls who were friends and used to working together. Also, the girls were among the best performing in the class according to the class' teachers. Hence, by scoring high in terms of both academic performance and social cohesion, the group possesses qualities of an extreme case. Thus, assuming that the groups in this class have similar digital experiences, we can reasonably expect this group to be among those best positioned to work effectively in the hybrid Google Docs space. In this particular lesson the groups were given approximately 30 min to answer six questions in a Google document about Douglas Coupland's novel *Hey Nostradamus* (about a fictional school shooting) which the class had read. Essentially, this was a largely traditional group work setup where the pupils train English skills through discussing and answering teacher-made questions. In fact, this relatively rigid, teacher-led setup where groups work within a relatively short time frame was common across all five groups studied. In all cases, the addition of laptops and Google Docs meant that their face-to-face community was supplied by a virtual, written communal platform. Thus, these cases are examples of technology being integrated into a traditional pedagogical setting with the potential of supporting and enhancing existing practices and pupils' understanding of the subject.

3.2. Methods

With the influx of digital technologies such as laptops in the classroom, new methods are needed in order to observe learning activities and practices in the hybrid space created by internet-based media [26,27]. The case study approach was chosen to support the paper's aim to provide an in-depth exploration of an example of a group working with Google Docs. While not being representative in a quantitative sense, the case study is ideal for providing particular, evidence-based and holistic insights into the complexities of single cases, which holds potential for being compared to other cases [23,28]. In line with this, multiple qualitative methods, including a combination of ethnographic and multimodal approaches were applied to observe how the pupils chose communicative modes and how contextual factors informed these choices. Due to the emergence of new, digital classroom ecologies, it becomes important to detail how pupils' "interactions and literacy practices are increasingly played out in digital environments" [26]. Thus, collecting data in the physical as well as virtual space makes it possible to pay "attention to the whole ecology" [3] of the group work settings. Hence, after the initial observations and informal teacher interviews were performed in two first year classes it was decided to collect video ethnographic data on group work involving two kinds of sources: a video camera recorded the groups situated around a table capturing their social interactions (Figure 1), and individual screen-recordings captured activity on the laptops. This setup enabled a detailed micro level and multimodal analysis [27] of how the pupils communicated, how they positioned themselves, and how they negotiated ways to work [29] in the hybrid learning space consisting of face-to-face and online Google Docs communication.

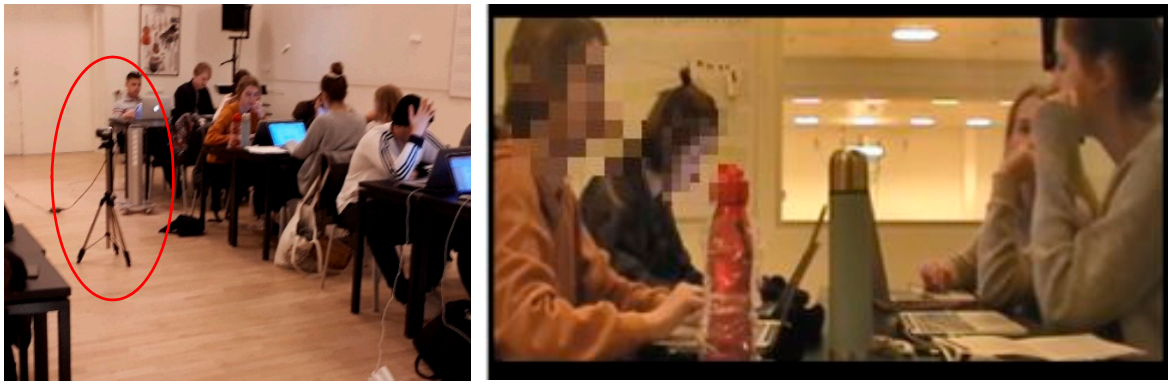

Figure 1. A camera was placed beside the group to film the face-to-face interaction in the group. In addition, screen recordings on each pupils' laptop captured the activity in the virtual space, mainly on Google Docs.

To conclude the data collection, focus group interviews with the recorded pupils were made where the pupils were asked to describe their experiences of the group work session, and elaborate upon and clarify findings from the video data. After the data collection, the data were coded and categorized using the Computer Assisted Qualitative Data Analysis Software (CAQDAS) tool Atlas.ti. In order to address the research questions and illuminate how the group's work in this case was shaped by the Google Docs hybrid space, the videos were coded for ways the pupils alternated their attention between offline and online spaces, including what triggered the alterations. Another important set of codes concerned how they interacted and which roles emerged when working together. During the analysis it became apparent that in all the examined groups, a distinct leader took a dominating position with the other members performing more or less peripheral roles. Hence, the preliminary categories were supplemented with a leadership category coding for different leader activities as well as codes that in particular distinguished between collaborative and cooperative co-working modes.

4. The Spatial and Temporal Organization of the English Group Work Session

Fundamentally, the group work settings examined in this study can be described as complex socially situated activities organized with and around the pupils' laptops. The pupils in the English group constituted a particular social environment shaped by their status as friends, but simultaneously they were affected by the material presence of the physical surroundings, including the particular technologies present. Obviously, the laptops were vital by adding a virtual dimension to the physical group space, thus creating a hybrid space which is detailed in Figure 2. In the physical space the pupils interacted face-to-face, but also individually attended to their printouts of the novel. Meanwhile, in the virtual space, Google Docs' afforded written interaction while, simultaneously, the laptops provide an individual sphere in which pupils seamlessly were able to take a moment to read or research on their own on the task at hand. However, laptops also afforded the less desirable act of hiding from the group work pretending to do task-related matters while actually checking Facebook or other off-task matters.

Before diving into the close analysis, it is helpful to establish a temporal overview of the entire group work session (Figure 3) to highlight how it moved through different phases and activities and how the group members took part along the way. As demonstrated, the group managed to answer four of the six questions.

	Shared space	Individual space
Physical space	Face-to-face interaction at the table	Reading in the novel
Virtual space	The Google document	The laptops (individual writing, searching or off-task activity)

Figure 2. The English group's modes of activity in the different types of spaces.

Time	Phase	Action
0:00–1:37	Question 1	Lise begins writing while Anne and Vicky comments. This question is quickly answered. Laila supplements Lise's answers.
1:37–6:00	Question 2	Lise and Anne discuss the question, with few comments from Vicky. They study the text. Laila, silently, continues to write on question 1.
2:36		Anne takes charge. She reads a passage from the novel, decides on the answer for question 2 and writes it. Lise joins Vicky in writing on question 1.
4:11		Lise and Anne collaborates on question 2. Anne writes.
6:00–16:50	Question 3	They struggle with the question. Everyone participates in discussion. Tendency to discuss in duos (Anne–Lise and Vicky–Laila).
9:44		Anne summarizes their discussion by beginning the answer for question 3 and explains what she has written to the others.
10:40		Lise supplements Anne answer. Anne asks Lise to move her contribution to another place in the document.
12:11–16:50	*Teacher help*	*Lise signals for help and the teacher comes over. Lise and Anne leads the dialogue with the teacher.*
16:50–35:06	Question 4	Laila, again silently, continues to work on question 3 while the other three decide to proceed to question 4. Anne's leader position becomes even clearer. She finds quotes in the text, writes the answers, and sets the pace of the group work. The others comment on Anne's suggestions but also drift to off-topic discussions a few times. Vicky make a few additions to Anne's written answers.
35:06	*The teacher ends the group work session*	

Figure 3. The group work phases and activities.

The overview reveals how the four girls took on four different roles that could be described as follows: Anne: leader; Lise: 1st collaborator; Laila: sweeper; and Vicky: marginal. During the session Anne increasingly took responsibility and her leader activities (highlighted in green) consisted of planning and pacing the group's work, seeking supplementary input from the other members (especially Lise), and deciding on answers. Basically, all these activities are associated with leader functions in leadership research [30]. Moreover, Anne fulfills all three leader roles defined by Goffman [31], as she occupy the function of "animator" (initiating the oral discussions and describing the tasks), "author" (writing the answers), as well as "principal" (deciding on the answers, individually or by including the others). Lise, while writing a few sentences in the beginning, mostly contributed to the oral discussions. Overall, she is best described as having a supporting role to Anne. Vicky also participated in the discussions with Anne and Lise but with little effect in relation to decision-making on the groups' answers. At times the group split into two duos. Anne and Lise are clearly most influential, while Vicky discussed with Laila who otherwise remained largely quiet. However, Laila fulfilled an interesting sweeper function, working parallel to the rest of the group, which will be elaborated upon in Section 6. Finally, it is important to note that Vicky and Lise had forgotten the printed novel. This might explain the lack of written contributions from Vicky and her somewhat hesitant participation in the group session. Lise, on the other hand, tried to manage the situation by borrowing the novel from Anne and Laila, which seemingly helped her to be more involved.

5. Hybrid, Multimodal Leadership

To disclose the finer details within the ways the Google Docs hybrid space configured the English group and the group members positioned themselves, the following analysis will now bring forward a few passages from the session. What characterizes Anne's leader position is that she holds a central position both in the physical space and, somewhat surprisingly, also on Google Doc's virtual shared space. In fact, it appears that in all the observed groups the leaders anchored the leader position by dominating Google Docs. As this goes against the widespread impression that the Google Docs platform provides a shared space for collaboration, let's take a closer look at some of the group dynamics in the English group.

Figure 4 demonstrates how the hybrid space setup allowed Anne (far right) to impose leadership across different modalities, i.e., multimodal leadership. In this instance, the group were struggling a bit with question 2 and this is the point where Anne stepped into the leader role. First, she read a passage from the novel (2.36–3.07). Seemingly unconvinced, Vicky (2nd from right) began signaling for the teacher and Lise (far left) made a hand gesture to enhance a new point (Figure 4a). However, when Anne began to write she managed to interrupt the others resulting in Vicky lowering her hand and Lise turning silent (Figure 4b). Thus, Anne essentially succeeded in pushing through her decision "across modalities".

Figure 4. (a) Lise (far left) makes a hand gesture to emphasize a point and Vicky (2nd right) signals for the teacher to come. **(b)** Anne (far right) begins to write causing Lise and Vicky to stop signaling.

Another instance of Anne's multimodal leadership appeared later when the group worked on question 3. At this point, Anne had already written parts of answer to the question and had established herself as the group's main writer. When Lise contributed to the answer, Anne got her to move her

sentence while pointing with the curser (the red circle) on the document (see Figure 5). By creating space for Lise and pointing with the curser, Anne indicated ownership of the document, and by complying with Anne's request Lise appeared to accept this.

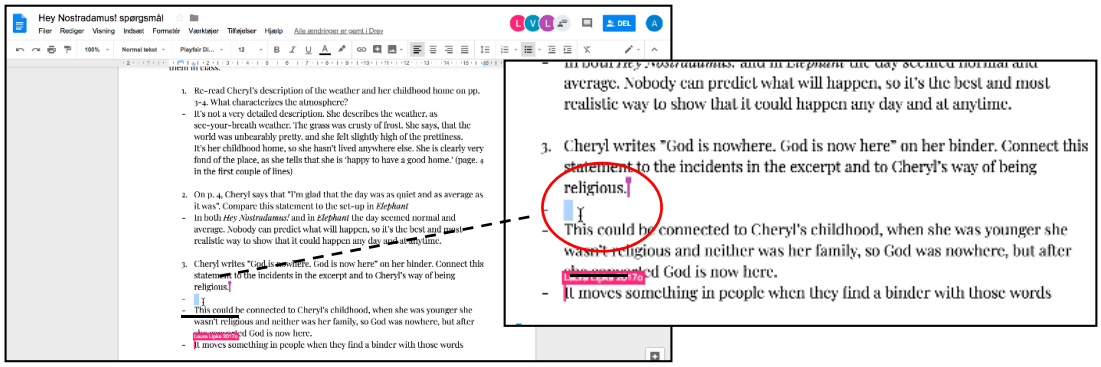

Figure 5. Screenshot from Anne's computer as she points with the curser showing Lise (the anonymized red participant at the bottom) where to move her sentence.

As Anne's leader role grew throughout the group session, when reaching question 4 Anne had become the central force, as animator, author, and principal, dragging the group along. This question asked them to find examples of prayers in the novel, which Anne quickly set out to do. A pattern emerged in which Anne read her findings from the novel for the others to comment, and then she wrote the answers. She regularly kept track on their progress, e.g., by stating "we need two more" (at 25:30), to mark the time for moving on or to draw the group's focus back from off task chats. As mentioned, the girls described themselves as close friends and there were no signs of collaboration problems during the group work session. Hence, Anne's position was not disputed and the social cohesion of the group seemed to affect her leader style. Despite the group's tendency to split into two duos, Anne continuously involved the rest of the group with questions, e.g., "should we use it?" (26:14). As such, Anne can be described as an interactional leader [32], as she based her decisions on dialogue. In contrast, some of the other examined groups contained leaders who applied a representational, less inclusive mode. These leaders decided on answers with minimal or no interaction with the other members. It is important to note that the constructive environment in the English group was not simply dependent upon Anne's interactional leadership mode. Just as important was Lise, Laila, and Vicky's approach as they never appeared frustrated by Anne's leadership. Instead, they were continuously finding ways to supplement Anne.

6. Cooperative Collaboration

When querying the teachers at Ørestad Gymnasium on group work, they unanimously stated that they intended for the pupils to collaborate, in the sense of working together on the same problem as a synchronized and collective activity. In contrast, cooperative working patterns (or "parallel work") in the groups were deemed problematic. However, despite this and the general impression of Google Docs as a collaboration tool, this case study suggests a need for reconsidering the relations between collaboration and cooperation as working methods. This is demonstrated by Laila's peculiar sweeper role. In large parts of the session she worked in parallel to the others (highlighted in blue in Figure 3). For instance, after the group had teacher assistance (at appr. 16:50) Anne, Lise, and Vicky decided to proceed to question 4. Laila, however, continued working on question 3 essentially "sweeping up" behind the others by editing and adding to the others' previous answers (Figure 6). Interestingly, all this happened seamlessly, without anyone commenting or directly arranging for it, which again points to the settled nature of this particular group. In the focus group interview, the group explained how this pattern often happened and that they found the possibility for writing on different questions simultaneously to be a really good feature in Google Docs.

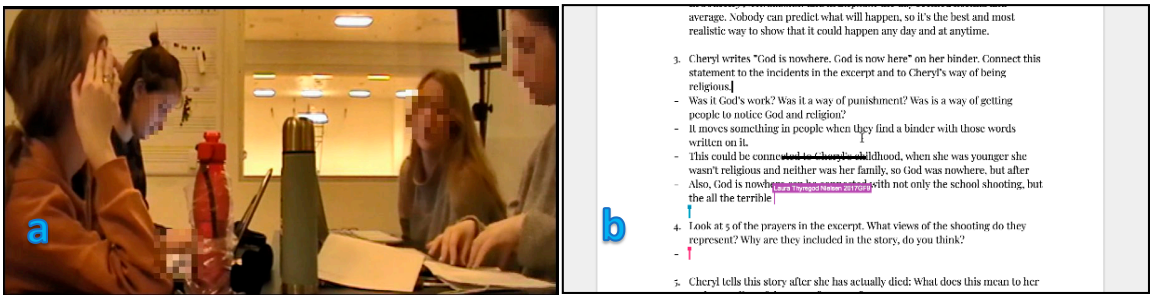

Figure 6. Laila (2nd left in picture (**a**) and purple participant in picture (**b**) writes on question 3 while the others, led by Anne (far right in (**a**) proceed to question 4.

This little sequence illustrates a key characteristic of the space provided by Google Docs. Rather than interacting with the rest of the group, Laila exploited that Google Docs' capacity for simultaneous co-writing allows her to work on a different portion of the task. By temporarily carrying out this parallel, cooperative-like role in relation to the others, Laila seemingly went against the teachers' disapproval of parallel work. However, this sequence demonstrates that the tendency to describe any given group work session as either collaboration or cooperation risks neglecting the finer group work dynamics. It appears that in most cases collaboration and cooperation might better be understood as states or patterns that any forms of group work fluctuate between. Throughout the session, Laila shifted between being engaged in discussions with the other group members and individualistically and silently directing her attention to other parts of the task than the rest of the group. Rather than designating Laila's position as simply cooperative, a term like 'cooperative collaboration' seems more suitable to capture her alternating positions. Hence, to conceptualize group work on Google Docs as processes that develop along a broad, straight collaborative highway on which group members synchronically contribute to the progress seems too simplistic. Following this case, it would be more apt to picture their group work as consisting of a collaborative highway, mainly managed by Anne, which are intersected by cooperative byways such as Laila's parallel work.

7. Discussion

This case study of group work with Google Docs has pointed towards specific ways that a Google Docs hybrid space seems to configure group work. It has been demonstrated and suggested that Google Docs affords single leaders to emerge who dominate both online and offline spaces, and that leadership is established by taking charge of the writing in the Google document. Also, the analysis challenged the widespread impression about Google Docs as a tool for collaboration. These observations open important questions concerning the non-leaders in groups and concerning how Google Docs might afford participation in cooperative manners through alternative byways. These findings will now be discussed in a holistic frame, partly inspired by Ryberg et al. [4], that analyses group work through the interrelatedness between the technological environment, the pedagogical setup, and the social context.

7.1. Multimodality and Fluidity between Spaces

It would be mistaken to exclusively explain the main findings of the study of the English group —i.e., Anne's multimodal leadership and Laila's cooperative sweeper role—with the Google Docs hybrid space. It seems perfectly realistic that, in a paper-based group work setting, Anne would be able to interrupt the other's talk through the act of writing, or that Laila could write answers to other questions on paper in parallel to the rest. However, the effects of Anne's and Laila's actions are enhanced by Google Docs given that everybody can see what Anne and Laila write as they write it. In any case, the two spaces are connected and Anne is best described as a hybrid leader. As demonstrated in the highlighted examples in the analysis, Anne was able to exert influence across modalities thus revealing the fluid borders between online and offline spaces. While Anne's leader

position is rooted in her dominance in the Google document, her use of the printout of the novel is also significant, especially in question 4 where she orchestrated the work through her findings in the text. Indeed, her written leadership in the digital space was also inseparably tied to her role in the physical space where she, together with Lise, was the most vocal.

7.2. Spatially Situated Pedagogy

How do we explain the apparent disconnect between basic Google Docs features that enable participants to, for instance, write, edit, and share content, and this study's findings that associate Google Docs with strong leader positions and limited room for collaboration? While Google Docs provides more written interaction possibilities in comparison to paper-based group work, effectively it remains that in most cases only one person can write a given answer. Hence, in a hybrid space collaboration is most readily afforded in the physical space through oral dialogue. Google Docs, on the other hand, seems to be much more suited to cooperative work patterns, e.g., parallel work that is distributed among the group members. This is what Laila demonstrated as she intuitively exploited the feature for simultaneous co-writing to create space for herself to work cooperatively on a different question than the others.

This points to the pedagogical–technological interconnectedness. The aforementioned disconnect can be described as a design misfit between the Google Docs' "perceived" [33] affordances or even "false" [34] affordances for collaboration registered by the teachers, and Google Docs' seemingly more "real" [33] affordances that invite for parallel co-working modes that we might call "cooperative collaboration" or asynchronous collaboration. It is therefore argued that insights into the learning spaces afforded are a vital prerequisite when designing group work tasks that include digital tools such as Google Docs. Hence, rather than dismiss cooperative, parallel work patterns, teachers ought to consider designing tasks that provide space for all members to be content creators and be active in the Google document. To embrace the Google Docs space's fluid embracement of both collaboration and cooperation, a two-phase session is suggested as an alternative group work design that adheres to the affordances of the hybrid learning space. In this design the group members begin by working individually (or in duos) on given a number of questions each. In the second phase their written answers are presented to the other group members. This design holds at least three key functions: (1) it gives all members ownership and opportunity to contribute; (2) it allows for comments, critique, questions, and supplementary input which should train critical reflections and strengthen the answers; and (3) it increases the chance that all members obtain a high degree of understanding of the groups' collective work. Thereby this design aims to counteract the risk of group members being detached from the work.

One of the absolute key features of digital technology is the connective capacities, as emphasized within networked learning theory. In this perspective, Google Docs seems especially suited to more expansive group work processes allowing for teacher supervision and feedback processes as well as for external communication and network-based work. This might happen through simply incorporating tasks involving information retrieval from the internet or interacting with external resource persons that might add new perspectives to the topic in question. In the case of the English group, this could, for instance, involve contacting American journalists that have covered school shootings.

7.3. Social Cohesion

Even the most thorough pedagogical designs are fundamentally affected by the social dimension of the pupils' learning environment [35]. The English group analyzed here was a relatively harmonious group comprised of four girls used to and seemingly enjoying working together. This high degree of social cohesion resulted in a secure environment where everyone appeared at ease. The group's smooth, silent combination of oral collaboration and written cooperation seemed to be based on their solid social relations. The question remains, though, what happens to non-leaders in groups less used to working with each other and with less social cohesion? Early indications from among the

studied groups at Ørestad Gymnasium suggest a greater risk of non-leaders being cut off and lose of motivation and for leaders to apply a representational and less inclusive form. In a hybrid learning space, the laptops' individual, virtual spaces (cf. Figure 2) may tempt non-leaders to hide and engage in off task matters. Further research is needed upon how and when lack of social cohesion may have negative effects upon leader and non-leader behavior in group work. Therefore, at this point, it is only possible propose a general negative correlation between the social cohesion and the need for pedagogical scaffolding to accommodate non-leaders into cooperative, parallel work modes. So far there is some evidence that scaffolding measures like for instance "task specialization" as proposed by Slavin [35], which create interdependence among group members, can increase performances.

7.4. A Holistic Framework for Designing Group Work

The interconnectedness between three categories—the pedagogical design, the learning spaces afforded by the applied technologies, and the social cohesion of the pupil group—has been proposed as a holistic perspective for discussing the leadership and cooperative patterns found in the studied case. Figure 7 presents a holistic analytic framework to support the design and evaluation of group work that applies digital tools. The interconnectedness between the three categories are illustrated with three corresponding questions that are proposed as central considerations when designing digitally enhanced group work.

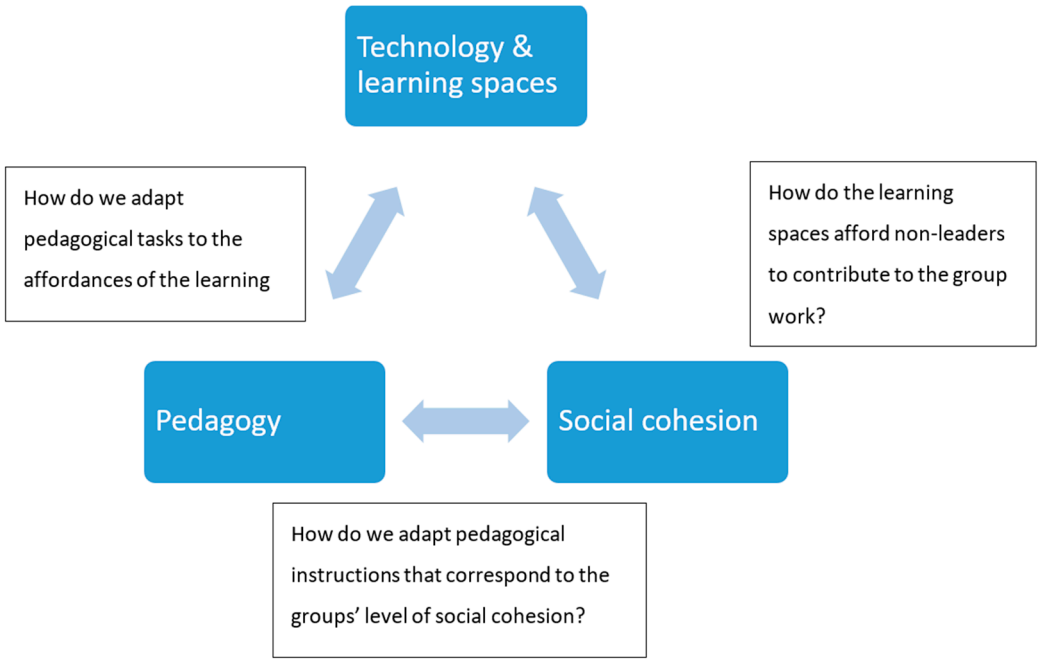

Figure 7. Three-way relationship between technological, pedagogical, and social categories for the evaluation of digitally based group work designs.

Starting to the left, the two-way arrow between 'pedagogy' and 'technology & learning spaces' highlights the importance that any pedagogical design considers which learning activities are afforded by the space in which the pupils work. The two-way arrow to the right points to the importance of noting how different learning spaces afford different ways for groups to interact or avoid interaction. For instance, this aspect is fundamental for the ways leaders and non-leaders relate to the rest of the group. The bottom two-way arrow emphasizes how teachers ought to use their knowledge of the social relations among group members to decide to which degree there is need for task specialization, or if the group is capable of including all members in the work process by themselves.

8. Conclusions

This paper set out to explore three research questions: (1) what pupils actually do when working in groups in a Google Docs hybrid space; (2) how the Google Docs hybrid learning space affects collaborative and cooperative activity; and (3) how the group is affected by its social context. Inspired by holistic approaches related to networked learning theory, affordance theory, and by way of video ethnographic methodology, the case study analyzed how the hybrid Google Docs space configured and affected a group work session in an English class at Ørestad Gymnasium. Two main findings were highlighted from the case study. Firstly, that in all the observed groups single leaders emerged, and that the leadership was founded in taking charge of the online writing in the Google document which simultaneously allowed the leaders to influence the offline sphere. Related to this, a second finding observed that the hybrid Google Docs space seems to afford co-working modes that combine collaborative and cooperative positions. The co-writing functionalities of Google Docs invite for more flexible non-leader positions. Hence, the term 'cooperative collaboration' was proposed as a more accurate description of the group dynamics in the Google Docs hybrid space.

As a case study, this paper is not to be understood as a critique of Google Docs as a learning tool per se. Instead, it hopes to contribute towards more detailed understandings of the multiple ways a learning tool such as Google Docs, and hybrid learning spaces in specific, configures group work. While video ethnography holds promising possibilities for examining hybrid learning, multiple questions regarding learning spaces and the social environment remain in need for further research. Unquestionably, studies of groups working with Google Docs are only at an early stage. We need more studies to improve our knowledge of which kinds of pedagogical designs are more appropriate in different hybrid learning spaces. Likewise, studies with less social cohesive groups could provide most welcome insights into the ways to which leaders and non-leaders affected by a hybrid learning space.

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