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Title **Literary Learning with Digital Media in Inclusive Settings – Insights and Results from the DBR-Project 'DigiLi' Focusing on Students' Cooperation**

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Abstract The BMBF-funded research project DigiLi takes an interdisciplinary approach to the research question of what potential learning with digital media has to offer in terms of cooperative learning scenarios in inclusive literature lessons. It is crucial for the DigiLi project to enable all pupils access and engagement with

the subject matter. Therefore, the interdisciplinary research cooperation aims to develop and empirically reconstruct digital learning scenarios based on the subject-specific dimension for grades 7/8. These scenarios are oriented towards the learning requirements, interests and needs of the pupils in an inclusive setting. In order to empirically reconstruct a local theory on the learning processes with regard to the subject matter, the project uses Design-based Research as an approach, since it acts as a methodological link to application-oriented development work and creates a connection between science and school practice. This paper focuses on investigating the cooperation between students in relation to their engagement with literary texts in the form of iterative data collection cycles and presents the results of the data analysis. Finally, the article closes with remarks on Design-based Research as an approach for future-oriented research in the field of Literature Pedagogy.

Keywords Design-Based Research, Design Principles, Literary Learning, Digital Media, Inclusion, Cooperation

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Literary Learning with Digital Media in Inclusive Settings – Insights and Results from the DBR-Project 'DigiLi' Focusing on Students' Cooperation

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1.0 Introduction Research meets Design: Literary Learning with Digital Media in Inclusive Settings

The BMBF-funded DigiLi[1] project takes an interdisciplinary approach to the research question of investigating the potential of using digital media in the context of cooperative learning scenarios in inclusive literature classes. The project aims to develop a concept for learning with digital media in inclusive literature classes based on theoretical research approaches and empirical data from the perspective of two disciplines, i.e. Literature Pedagogy as well as Education and Didactics of Inclusion. Furthermore, it pursues the concept of specific, digital and at the same time, accessible learning arrangements and their empirical testing for literature classes in heterogeneous learning groups. In pursuit of this goal, a learning arrangement was developed through multiple design cycles in cooperation with the Inclusive University School of Cologne (IUS) and a media design agency from Cologne. Ultimately, the learning arrangement was realized in form of a web app which allows for an internally differentiated task arrangement for reading a young adult novel in heterogeneous learning groups. The project has produced results both at the research level and at the level of developing specific learning scenarios. In this context, fostering the cooperation between research and school practice plays also a decisive role.

Moreover, the DigiLi project accomplishes not only the often-requested collaboration between Literature Pedagogy and Special Education in addressing contemporary inclusion-related issues, but also uses the research format of Design-based Research (DBR), enabling innovation and the improvement of subject-specific learning through close collaboration with the IUS. This facilitates a connection between research and practice, as well as a transfer between science and school in the field of inclusion. The DigiLi project looks at the complexity of this issue from an interdisciplinary perspective: In the context of inclusive teaching, the emphasis is on practices of cooperation regarding the Common Subject Matter in the design of inclusive learning envi-

[1] DigiLi = Lernen mit **digi**talen Medien im inklusiven **Li**teraturunterricht

ronments. From a standpoint of Literature Pedagogy, the development and investigation of subject-specific learning with digital media in inclusive settings will be explored. The aim is to develop a concept for literary learning in inclusive settings, taking digital media into account. This article describes the theoretical foundation, research approach, intervention and the results of the three-year project. The focus is on the design and construction of an intervention which has been investigated in three DBR cycles regarding literary learning in heterogeneous learning groups.

1.1 Subject-Specific and Inclusive Teaching Perspectives on Literary Learning in Heterogeneous Learning Groups

To address the design of a subject-specific learning scenario for the reading of a young adult novel in grade 7/8, representatives from both inclusive teaching and subject-specific teaching first need to reach a common understanding of inclusion. In the context of the project portrayed here, inclusion is defined in a broad sense, focusing on enabling teaching and learning processes beyond constructions of differences (cf. Dannecker, 2014, p. 212, transl. DigiLi[2]). Thus, the project aligns with the views of the New London Group, an internationally composed research group, who advocate against designing learning environments with a deficit-oriented approach and supports a reflexive approach which aims for the following: "[...] moving beyond programs designed to rectify historical injustices of gender, or race, or class, we need a learning architecture that nurtures an open productive diversity, and a pedagogy of inclusion" (Kalantzis & Cope, 2017, p. 313). Moreover, the Multidimensional Reflexive Didactics (MRD) (transl. Mehrdimensionale Reflexive Didaktik, Ziemen, 2018) was taken into consideration, which sees itself as a universal teaching concept and provides a space of possibilities for learning and development for all students. The reflexive moment pertains to the logic of the field as well as a form of self-reference (cf. Ziemen, 2008; 2013; 2018) and lays the foundation for the understanding that Didactics cannot be reduced to technology or teaching-methodical skills (cf. Ziemen, 2008, p. 7). Reflection encompasses everything that influences the specific implementation of teaching, including fundamental assumptions about being human, about development and learning, processes of education and upbringing, as well as about institutions and organizations. Furthermore, social actors and their habitualisations are taken into account, based on social background, experiences and encounters with society, community, culture, institution (e.g. school), the position of the actors in social fields, the social and cultural capital acquired and acquirable, among other factors (cf. Ziemen, 2008, p. 7). Thus, the MRD serves as an overall construct for a) the specific planning and reflection of educational processes and b) the analysis and reflection of processes in academic contexts. Regarding the DigiLi project, various dimensions were considered, especially the fundamental relationship

[2] Translations made by the DigiLi project are indicated by "transl. DigiLi". The DigiLi team thanks Lea Scholl for the translation, which was carried out using an AI-based tool to some degree.

between the subject matter and the students, which involves the methodical design of teaching with differentiation in learning opportunities (cf. Ziemen, 2018, p. 93; pp. 118 ff.).

1.2 Communication-based Cooperation (on the Common Subject Matter)

Cooperation on the Common Subject Matter (Gemeinsamer Gegenstand, transl. DigiLi) is a central element of Feuser's Developmental-Logical Didactics (DLD) (Entwicklungslogische Didaktik, transl. DigiLi) and enables a variety of communications among learners, making them "socially meaningful to each other" (Feuser, 2019, p. 25, transl. DigiLi). Through project-based classes that allow interdisciplinary work, learners engage with the big questions of humanity, according to Klafki (1996) with "epochal key problems" (ibid., p. 26, transl. DigiLi). Cooperation between learners counteracts isolation and supports collaborative, collective processes. The Common Subject Matter becomes significant in this context, as it is linked to cooperation, communication, and dialog.The term Common Subject Matter seems to exude a certain fascination and is frequently brought up in debates on inclusion in teaching processes. It is important to emphasize that this term is a fixed concept (cf. Feuser, 2013, p. 285). The Common Subject Matter, as defined by Feuser, poses various challenges. It is "not the materially tangible that ultimately becomes the object of learning in the hands of the students, but the central process that stands behind the things and observable phenomena and brings them forth" (Feuser, 2013, p. 285, transl. DigiLi). Consequently, the term includes "two dialectically mediating moments: namely (a) the realisation-relevant aspect of a specific excerpt of the world in the sense of a dimension that can be described as ontological, insofar as the perceptual organs themselves emerged from this in the process of evolution and can be attributed to it, and (b) the realization-forming side of the experience-relevant active engagement of an agent subject with a certain section of the world" (Feuser, 2013, p. 285, transl. DigiLi). Through the cooperation of people with different starting conditions and constraints, insights are generated.

The Activity Structure Analysis (Handlungs-Struktur-Analyse, transl. DigiLi) enables the recognition of leading epistemological and developmentally logical conditions of individuals such as experiencing, perceiving, acting, categorizing, playing and symbolizing (thinking). This ultimately means: "The Common Subject Matter encapsulates what is to be recognized. In terms of pedagogical intention, it concerns what, in its potentiality, can be discovered through active engagement with the collective facts and objects of the class based on topics, and not the facts or objects themselves, as is often observed in teaching practice. They are, so to speak, the background of what is to be recognized and can be perceived, experienced, and thus perceived through action" (ibid., p. 286, transl. DigiLi). Insight is gained through human-world relationships, actions within these, and similarly through human-human relationships (cf. ibid., p. 286). "The human discovers

things through the human and discovers the human through things – in mutual cooperation" (ibid., transl. DigiLi). Overall, it can be observed that cooperation on the Common Subject Matter is a key moment in the developmental-logical teaching. While Feuser's concept focuses on the relation of teachers and students, an understanding of cooperative learning according to Borsch (2015) is also considered in the project since it focuses on cooperation among students.

In cooperative learning, students work in small groups to mutually support each other in building knowledge and acquiring skills. The approach is learner-centered, and the teacher generally takes a background role during the learning process (cf. Borsch, 2015, p. 21; Hasselhorn & Gold, 2013, p. 308). According to Borsch (2015), two fundamental principles are prerequisites for cooperative learning. First: To ensure that cooperative learning actually takes place in a group work, mutual (positive) interdependence has to be established. Positive interdependence is a requirement for the establishment of "cooperative organisational structures" (Borsch, 2015, p. 27, transl. DigiLi). Reinforcement of positive interdependence and thus cooperation can be generated through the (changing) distribution of roles and tasks or targeted task conception that requires cooperation to achieve a common goal (ibid., pp. 28 f.). Second: The importance of students' individual responsibility for their learning success has to be established.

1.3 Literary Learning and Follow-up Communication

People with disabilities are often denied the ability to enjoy and comprehend literary texts. However, empirical studies on cultural participation in out-of-school settings refute this (cf. Wilke, 2016; Groß-Kunkel, 2017). Groß-Kunkel, for instance, concludes: "People with intellectual disabilities can and want to read novels (for example by Siegfried Lenz or Uwe Timm) despite reading difficulties" (cf. Groß-Kunkel, 2011, p. 98, transl. DigiLi). The results of subject-specific research also support these findings. In an early study, Wiprächtiger-Geppert demonstrated that while literature is rarely focused on in special schools, students age 11 to 14 with special needs do possess literary reception skills. Even students without reading abilities or only marginal reading skills participate intensively in literary classroom discussions (cf. Wiprächtiger-Geppert, 2009, p. 277). According to Hurrelmann, literature classes should "consider development-specific motivational and emotional conditions on the reader's side and, not least, provide contexts for negotiating meanings in follow-up communication with others" (Hurrelmann, 2002, p. 13, transl. DigiLi). Hurrelmann explicitly draws upon Jürgen Habermas' theory of communicative agency in her conceptualization, embedding reading competence in a socialization context where the guiding idea is that of the educated subject (cf. ibid., p. 16). With recourse to this model of cultural participation and considering the interdisciplinary integration of theoretical approaches, the communication-based cooperation of students on the Common Subject Matter, in the sense of development-inducing learning (cf.

Feuser, 2013, p. 286), is determined as the starting point of the concept of the DigiLi project.

"The concept of literary learning formulated here is based on the understanding that there are learning processes that are particular to dealing with literary (fictional or poetic) texts" (Spinner, 2019, p. 161, first published 2006). In 2006, Spinner presented eleven aspects of literary learning, covering subjective involvement and the development of a text within the imagination, cognitive approaches such as awareness of perspectives, logic of action and linguistic style, and consciousness of genre-related and literary-historical classification. While these eleven aspects have been highly influential in the subject-specific discussion around teaching, Büker provided a definition as early as 2002. According to her definition, literary learning can be understood as the acquisition of knowledge and skills in dealing with literary texts and their various forms of medial expressions. It aims to enable exploration, enjoyment, as well as productive and communicative engagement with the literary or aesthetic object (cf. Büker, 2002, p. 121).

These considerations suggest that the individuality of text appropriation when reading literary texts in groups needs to be taken into account. Difficulties in understanding and different interpretations can be addressed in a discussion about what has been read. The students' engagement with the literary text can be understood as learning on the Common Subject Matter, which is realized not only verbally but also through gestures and facial expressions.

The focus of initiating subject-specific learning processes in the DigiLi project lies accordingly in enabling access to the literary text and designing learning situations that encourage engagement with the subject matter – also in cooperation with so-called competent others. The representatives of the New London Group also advocate a diversity-sensitive design of inclusive learning settings that are characterized by collaboration, differentiation, as well as stimulating learning objects and discursive negotiations: "The richness of learning is the richness of learning around nuances of perspective and interpretation" (Kalantzis & Cope, 2017, p. 315).

2.0 Research Design

In the DigiLi project, a customized learning arrangement was developed based on a selected full-length text and an (educational) diagnostic assessment of the students' initial learning situations. This arrangement takes into account the individual competency level and experiences of each student. The emphasis is on designing learning scenarios and empirically testing how a media-supported learning offering contributes to addressing the educational concern of cultural participation for all.

With Design-based Research, a research approach was chosen that equally focuses on the development and empirical testing of a learning

arrangement from a subject-specific teaching perspective. The research design aims to develop an "increasingly differentiated and empirically secured local theory on the processes, obstacles, conditions and effects of the specific teaching-learning object" (Prediger et al. 2012, p. 458, transl. DigiLi). At the same time, the empirical findings enable the further development of subject-specific teaching theory regarding learning with digital media in inclusive literature classes.

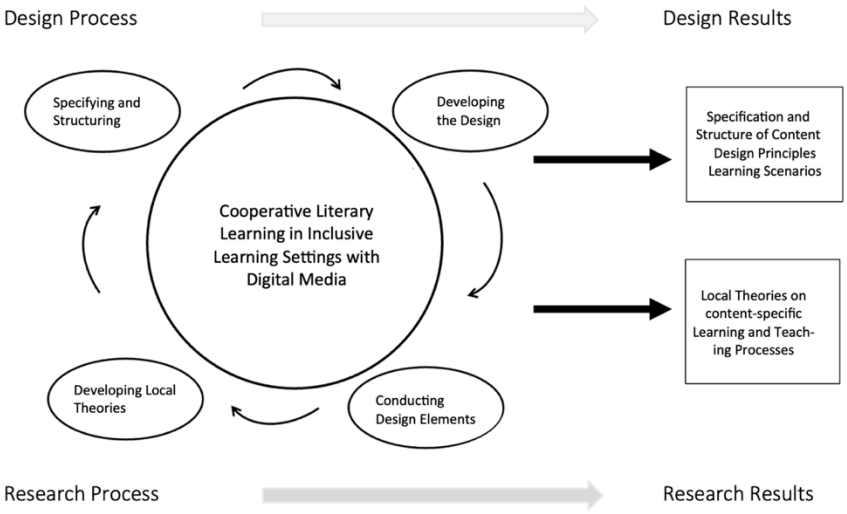

Figure 1: DigiLi Project: Cycle (Illustr. cf. Prediger & Zwetzschler 2013, p. 411.)

In general, the result of the interplay of prospective and reflexive considerations states the iterative design process of design and (re-)design, which is repeatedly flanked by the generation of theories (in reference to the model by McKenney & Reeves, 2012, p. 77). Accordingly, the research in the DigiLi project was characterized by a close interplay of research and development work. Moreover, the development of the digital learning arrangement, beyond the testing of individual learning situations, was embedded in the class design for an entire learning unit at IUS. However, this article focuses on the analysis of one selected aspect within the project. According to Hußmann et al. the so-called design principles are of particular importance, because of their status in the "interplay of design, testing and analysis" (2013, p. 33). Therefore, the following description of the methodological approach focuses on the design experiments regarding the question of student cooperation in relation to the reading of a young adult novel, reflecting also on the role of digital media.

2.1 Research Question

As described, the BMBF project DigiLi addresses the following research question: What potentials arise regarding the use of digital media in the context of cooperative learning scenarios in inclusive literature education and how should cooperative learning scenarios be designed for the subject of interest in grades 7/8 building on existing research

results (cf. Dannecker, 2014; 2018; Dannecker & Maus, 2016; von Brand & Brandl, 2017; Ziemen, 2018, pp. 42 ff.)?

Several consecutive research cycles were conducted, to examine the extent to which a specific task setting, distinguished by cooperative learning opportunities, can enable literary-aesthetic learning in the sense of cultural participation for all. "Step by step (iteratively), the intervention is consequently optimized, initial hypotheses are reformulated, and developmental processes and principles are documented" (Dube, 2018, p. 52, transl. DigiLi). The documentation of the design principles also serves as a criterion for the quality of design research. "The compilation of all data provides information about the conditions and effects of the design elements used" (ibid., p. 53, transl. DigiLi).

2.2 Design Principles

The development work in the DigiLi project focused on the design of a so-called *learning village* (Lerndorf, transl. DigiLi), which is established as a structure at the IUS. It represents an internally differentiated learning arrangement for engaging with a topic in German classes, here: reading a full-length text in composite grades 7/8. The conception of this learning arrangement aims at multimodal follow-up communication on a literary text, with reference to (weekly) planned work. By allowing students to take different learning paths and to learn cooperatively, individualization of learning is achieved, supported by digital media.

The origins of the learning village model are rooted in the pedagogical idea of ‘Learning – individually and together’ developed by von der Groeben as training content. It focuses on the goal of "meeting the diversity of students" (von der Groeben, 2020, p. 8, transl. DigiLi). In this concept, von der Groeben incorporates the vision of an alternative school by the educational scientist Howard Gardner: A school that truly harnesses the learning potential of children and young people cannot be an isolated learning institution but must be a natural community of life and learning for children and adults, a village (cf. ibid., p. 18). In such a village structure, students learn from and with each other in an internally differentiated learning arrangement, following the principles outlined: The range of tasks should resemble a "menu from which students can help themselves" and there should be "no division of students into performance groups and no differentiation according to difficulty or methods" (von der Groeben, 2020, p. 23, transl. DigiLi). With reference to the design of the *learning village* (cf. in detail Carell & Dannecker, 2023, p. 285), the project focused on the development of a task-based setting that aims at cooperation between students in heterogeneously composed groups.

Hence, the project aims at developing a learning scenario on the micro-level and the development of tasks for communicative cooperation on the nano-level (cf. Dube & Hußmann, 2019, p. 21). In this regard the following design form the basis:

- Design principle 1: Development of task formats considering support needs regarding literary-aesthetic learning.
- Design principle 2: Individualization of learning through an internally differentiated learning arrangement involving digital media.
- Design principle 3: Enabling cooperation on the Common Subject Matter using digital media and follow-up communication as a connecting element.

The current article presents the results of the cyclic investigation of a learning scenario within the *learning village*, which focuses on follow-up communication related to the reading of a full-length text. It emphasizes cooperation in heterogeneous learning groups and the role of digital media in this context. In the following, findings from one cycle within the research project are presented, discussing the potential of digital media as support for cooperative learning settings.

3.0 The Development of a Learning Scenario – Design Cycles and Principles

The data collection for the research cycles under consideration took place in the form of (video recorded) cooperative learning arrangements. The data analysis during this cycle was conducted using Qualitative Content Analysis, a method particularly suitable for communication-based materials. In Qualitative Content Analysis, the data was evaluated on a category-guided manner, focusing only on selected aspects. The categories were generated both deductively and inductively (cf. Heins, 2016, pp. 303-306).

The subject sample contains a heterogeneous learning group of students in composite grade 7/8 at the IUS. To enable as much heterogeneity as possible in the participant groups, students were intentionally grouped with the assistance of teachers. In the testing scenarios, students with various educational needs (with a particular focus on intellectual development) as well as different self-concepts and competencies in reading were represented.

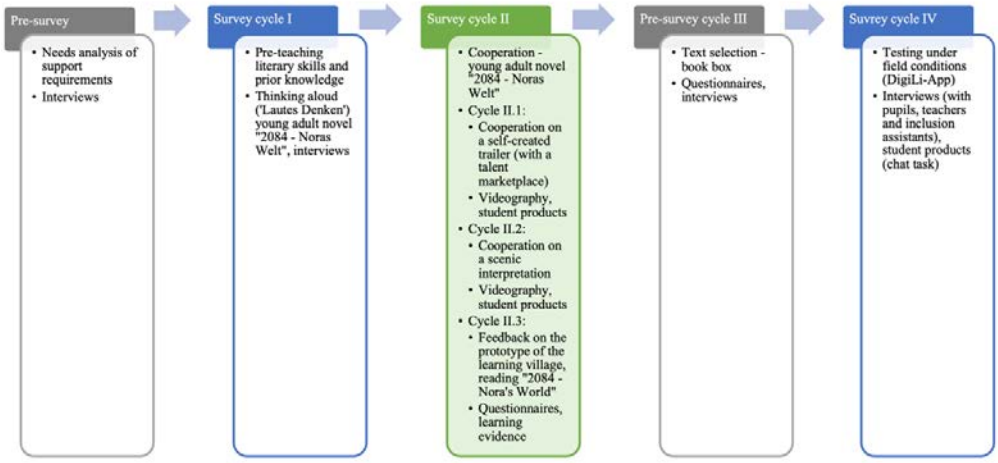

Figure 2: DigiLi Project: Overview of all research cycles

The results from survey cycle II.1 and II.2 are focused upon in the following, concentrating on the question of cooperation within heterogenous learning groups, with a particular emphasis on utilizing digital media to facilitate cultural participation for all. These design experiments focused on the inquiry of students' cooperation concerning a Common Subject Matter in the sense of development-induced learning (cf. Feuser, 2013, p. 286). The primary focus, thus, revolves around the question of communication-based cooperation among students in the context of a follow-up communication related to the literary text.

3.1 Cooperation on the *Common Subject Matter* with *Competent Other*

The results presented here follow the purpose of the learning situations in German classes. This determination focused on the reading of the young adult novel *2084 – Nora's World* by Jostein Gaarder (2015), as well as another self-chosen young adult novel in the context of the Sustainable Development Goals. As the results of the data collection showed, all students, including those with additional support needs, can read. However, understanding the literary text, its analysis, and interpretation requires support from competent others. The exploration led to the design of a learning situation that focuses on dialogic cooperation among students in heterogeneously composed groups. Cooperation with a counterpart, whether it be the teacher, an inclusion support specialist or student, also proved to be relevant in the course of the subsequent cycles. Consequently, an adapted design principle 4: The indispensability of a competent individual was pursued further.

3.1.1 Task for Group Formation: Talent Marketplace

Based on the understanding that, in previous surveys, students requested or demanded the experiment leaders as competent others (cf. Dannecker 2012), the *Talent Marketplace* (Tauschmarkt der Talente, transl. DigiLi) was introduced as a new format within the DigiLi project.

In the data collection presented here for cycle II.1, the *Talent Marketplace* was employed as a starting point for assembling a heterogeneous learning group. It provides an opportunity to offer alternatives to group formation through friendships and to assemble interest-led groups or heterogeneous groups with different competencies.

The cooperative creation and sharing of resources by students, along with their networking on the digitally supported village square, align with the principle of the Commons: In the final chapter of the 'Culture of Digitality', Stalder emphasizes the culture of the Commons or Commoning and participation – as a counter-development to post-democracy (cf. Stalder, 2016, pp. 245-78). These are, in the sense of common goods, "specific forms of social agreements for the collective, sustainable and fair use of common resources" (Helfrich & Stein, 2011, transl. DigiLi). As argued by Stalder (2016), commoning, especially in a culture of digitality, offers opportunities for cultural participation and a socially just and sustainable organization of community (cf. Carell & Dannecker, 2023).

The *Talent Marketplace* was designed as a meeting point using a Padlet. At the IUS, learning from the 'centre' plays a key role (cf. von der Groeben, 2011; 2014; 2020); both in the conception of learning arrangements (at IUS learning villages) and in the physical space, learning is structured from the centre. In the latter, the centre corresponds to the so-called home group time: Here, the learning groups meet in their class community every morning for half an hour in a circle of chairs to discuss the day and current concerns about social events or the respective learning projects for the day. In this way, the students learn to plan their own learning projects independently.

In addition to the centre constituated spatially and by social forms, the Talent Marketplace also provides a visually tangible element through the DigiLi project: an integrated network platform in the digital learning arrangement. This was designed as a developmental product and created on the digital pinboard "Padlet" (cf. Fig. 1). On the Padlet, students document their strengths as well as what they would like to learn (as a note, voice recording, link, or picture). The *Talent Marketplace* is thus to be understood as an invitation to reflect on one's own competencies, to make one's strengths visible, and as 'empowerment' in terms of potential-oriented cooperation.

The idea behind it was to explore to what extent positive interdependencies can be created through the *Talent Marketplace* and what potentials and risks the exchange in the digital space offers for the design of digital and inclusive learning settings. Thus, the design principles included group allocation based on competencies instead of friendship. Within the DigiLi project, students were offered choices where they can assess their own skills using a colour scheme. The items can be expanded by the students. The colour scheme is also inspired by the young adult novel *2084 – Nora's World*, where the present is marked in blue and the future in red. In the learning village for *Nora's World*, items were selected that correspond to the target competencies of the

school curriculum on various levels, including linguistic, literary, communicative (...) levels with regard to various aspects of the novel, which can arouse an interest. The *Talent Marketplace* was realized as a digital tool in order to enable all students to contribute their respective strengths (cf. Carell & Dannecker 2023, p. 291).

The task was:

1. Mark in blue what you are good at. These are all your strengths and talents.
2. Mark in red what you would like to learn from someone.
3. Choose at least one of your talents and enter it into the Padlet: (Link to the Padlet). You can enter as many talents as you like.
4. Throughout the learning village, check the Padlet from time to time: Who has the matching strengths and could help you with a task? And who could you offer support with your talents?

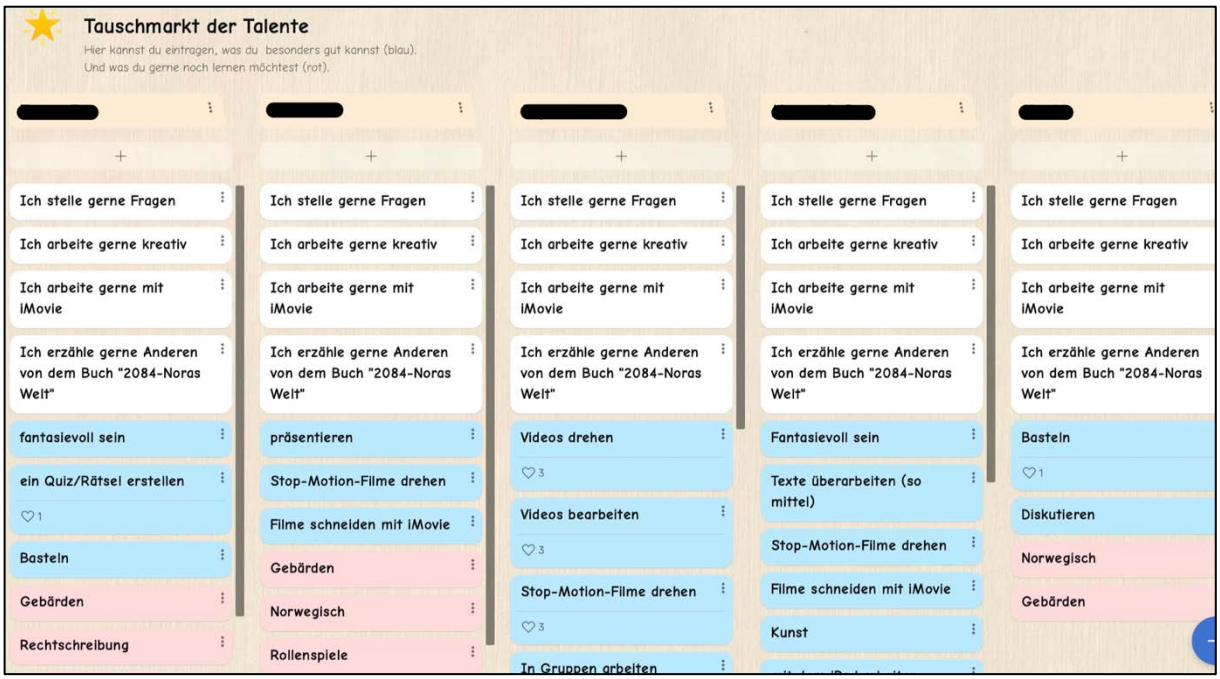

Figure 3: DigiLi Project: Talent Marketplace

During the data collection, after the initial challenges of finding the Padlet and logging in, the students largely assigned themselves to the suggested skills independently, guided by the instructions from the experiment leader (design principle 4) and the colour scheme mentioned before. As support, the experiment leader read aloud the skills once again, and each student was allowed to report when they had assigned themselves to the skill. When assigning the skills on the Padlet, representing the *Talent Marketplace*, it was noticeable that the students could assess their strengths and weaknesses well, and they also supported each other in their assignments:

> S16ZII.1: Are you good at asking questions or do you still want to learn? (00:10:43-9).
> S14ZII.1: Hm (thoughtfully). Still learning, actually.
> S16ZII.1: Do you like to work creatively?
> S14ZII.1: Yes.

S16ZII.1: And do you like working with iMovie?
S14ZII.1: I don't know it very well.
S16ZII.1: So more like still learning.
S14ZII.1: Yes.
S16ZII.1: And I like telling others about the book //2084//. Okay. (00:11:06-8, transl. DigiLi).

The *Talent Marketplace* was introduced by the DigiLi project at the IUS and then handed over to the school's teachers. The *Talent Marketplace* was therefore considered an adaptation of the second design principle and should serve as an aid for group formation. Thus, resulted the design principle 2b: The *Talent Marketplace* contributes to individualization and support by allowing students to contribute their strengths and be assisted in their weaknesses through appropriate group formation. It should also serve to implement design principle 3 with the possibility of a follow-up-communication by working together on a task on a specific topic (because of the specific group formation).

However, it became apparent that the *Talent Marketplace* was initially used by the students (cf. Fig 1, Padlet), but that the tool was not continued consistently. Two of the students, those with special needs (intellectual development or learning support), indicated that they had not been on the *Talent Marketplace* for a long time because they no longer knew where to find it or had forgotten their Padlet password. These results show that the *Talent Marketplace* was not adequately utilized in school. Nevertheless, conversations with teachers revealed that they saw significant potential in the *Talent Marketplace* for cooperative work in both digital and non-digital spaces (cf. field notes). It was also evident that the *Talent Marketplace* was not guided and consistently implemented in teaching (after an initial introduction by the project staff). The reasons cited included a lack of time for the instructing and following up on a new tool (cf. field notes). Instead, established forms of group work, such as friendship groups, continued to be chosen. This was taken into account for the following cycles, so that a task format was needed, which only needs to be explained and introduced once, but then runs independently and which includes the work in (friends) groups. This resulted in the design principle 3b: Priorization of work in (self-selected) groups of friends.

3.1.2 Task for *Follow-up Communication*: Designing a Trailer

This research cycle particularly addressed the question of cooperation in the learning groups within the inclusive school setting. The central design principles were the creatively engaged exploration of the novel, cooperation (on a Common Subject Matter) and exchange (and thereby the use of digital media), here in the use of tablets and digital design tools (design principle 3).

Following the group formation using the *Talent Marketplace* (design principle 2b), four students with and without diagnosed special needs (twice with needs in intellectual development or learning support, two

without) worked on a task for follow-up communication about the young adult novel.

The task was as follows:

"Create a book trailer for the novel *2084 – Nora's World.* Use, for example, the iMovie app on your iPad. You can freely choose how you would like to present the novel 2*084 – Nora's World*. You can also use the results that you have worked on during the learning village."

The students could choose from possible suggestions such as: acting and filming themselves, drawing or presenting the content as a comic, re-enacting scenes and incorporating their own photos or simulating an interview with the author and incorporating it into the trailer.

The group decided to create a film trailer using the iMovie app. They utilized the templates and music suggested by the app.

As a result, a central activity in group work was the selection of scenes and information from the book using suitable images: "What scenes should we take? Should we take scenes at the beginning where she tells that she loves the snow?" (S15ZII.1, 00:17:58-0, transl. DigiLi).

Student S15ZII.1 and S16ZII.1 act as a kind of self-appointed group leaders:

> S16ZII.1: Yes. And then maybe, but hmm (thoughtful), it doesn't snow in winter.
> S15ZII.1: Yes, we can do that. //Because then someone looks for a picture// with a lot of snow and mountains. (.) And sends it to me //via AirDrop.//
> S16ZII.1: //Yes, good.//
> S16ZII.1: //Who wants to// do that?
> S14ZII.1: I'll do that.
> S16ZII.1: Okay.
> S15ZII.1: And then someone else can search: a mountain a bit, that looks the same, just without snow." (00:18:20-7, transl. DigiLi).

Here, on the one hand, it becomes evident that for the students in this learning group, the use and shared handling of the tablet are a matter of course, for example by sending data and images via AirDrop. It also shows a form of cooperation as a distribution of labor in positive dependence on each other through the adoption of roles; however, these roles are not defined and do not occur in consultation with each other (design principle 3c) (cf. section 3.2). As 'leader', one student also supports the other group members and provides assistance, some of which may be unwelcome:

> S15ZII.1: So. Let's see yours with snow. (S15ZII.1 stands up and stands behind S14ZII.1. S15ZII.1 and S13ZII.1, they look at S14ZII.1's tablet and look at pictures together).
> S14ZII.1: No.
> S15ZII.1: Can I just for a moment? (S15ZII.1 takes the tablet and turns it).

S14ZII.1: No. (00:19:18-7, transl. DigiLi).

However, the suggestions and objections of other group members are also taken into account, so that the final product is a trailer created as a team effort (design principle 3):

S16ZII.1: Maybe we can show something else with Nova.
S15ZII.1: Yes, we can do that. [...]
So: A girl who is trying/
S16ZII.1: To save the environment.
S15ZII.1: //Yes.//
S14ZII.1: //To change.//
S16ZII.1: //To save// the world.
S15ZII.1: Yes. (00:27:05-3, transl. DigiLi).

The considerations around the novel's main character Nora are at the centre of the work for designing the trailer: "What could the girl look like? Which image from the internet matches the ideas developed while reading?" The internet research for suitable images, communication, and exchanging ideas about these images shape the conversation during the process for long stretches. It becomes evident that the students sometimes operate within role patterns, e.g., one student assigns tasks to the others, one student checks specific passages in the text again, some take turns in image research. One student seemed to be primarily uninvolved in the group process, especially verbally. Nonverbal objections from the student (S13ZII.1) are generally not picked up by the classmates. Adjusting this might be possible by increasing awareness of nonverbal communication channels. It also appears useful to support the students in assigning and fulfilling roles (design principle 3c). This design principle was explored in the subsequent research and development cycle.

The focus on cooperation is maintained for the next cycle, and the design of the task is modified in the sense of a re-design.

3.1.3 Task for Follow-up Communication: *Freeze Frames*

Cooperation was intended to be foregrounded through a new task focused on engaging with the characters. In this task, cooperation among the students was to be strengthened through rotating roles (design principle 3c). The results were to be captured in the form of freeze frames, documented through photos using the camera app of their tablets.

To assess cooperative learning in heterogeneous groups, two students with special needs around intellectual development from the previous cycle (cf. chapter 3.1) and two students without a specific support focus were selected. This allowed for the observation and comparison of both a heterogeneous learning group and the cooperation and its development within the group. Various sub-questions arose, such as: How can cooperation succeed? How can someone participate? How do the students contribute? How does cooperation function? This necessitates cooperation and mutual assistance. For this, a specific task

format was chosen. The learning facilitator intentionally kept it open-ended, providing guidance only in two instances. The cycle explored the extent to which positive interdependence could arise in the context of engaging with the scenes regarding individual reading experiences.

The creation of freeze frames was chosen as a task because it enables cooperation in the context of action- and production-oriented literature teaching, involving collective reflection on the text and acting with the text (cf. Haas, Menzel & Spinner, 1994, pp. 17-18). Wittenhorst and Bernasconi also emphasize that Action- and Production-oriented Literature Teaching, in particular, offers significant potential for participation for all students, including those with special needs (Wittenhorst & Bernasconi, 2012, pp. 4-5). Thus, the central design principles were the students' creative and productive engagement with the novel (design principle 1b), cooperation (on a Common Subject Matter) using predefined and rotating roles through role cards for task distribution and structuring (design principle 3c) and a task for intensified engagement with the literary text and its character constellations through scenic play and exchange. Furthermore, the use of the tablet and photo app were used as digital tools to support reflection and promote follow-up communication (design principle 3) because of the pupils´easy handling of it. Furthermore, this also entails increased awareness of nonverbal communication channels, which was identified as necessary in the previous cycle.

The task for the cooperative learning activity was: "Build freeze frames of the scenes together. Note: In a freeze frame, the movements and facial expressions of the actors are frozen."

This task was thus focused on gestures and facial expressions. As an orientation and introduction to this learning setting, the presentation and recognition of emotions was introduced in a preliminary exercise. The insights gained from this exploration of emotional expression were incorporated into the subsequent exercise. The students were given four different scene cards, each featuring excerpts from the shared young adult novel *2084 – Nora's World*. These depicted four scenes in which the main character engages in a dialog with another character. The scene cards served as a pattern for the freeze frames and with each new scene there was also a change of roles, so that after the four freeze frames, each student had taken on each role once. Due to the rotating role cards, everyone contributed similarly and was equally 'important' for the scenic interpretation and the shared final product, as each role was assigned and necessary. Therefore, all students were able to participate.

By selecting fewer scenes, a reduction of the workload was intended compared to the discussion of the entire young adult novel (design principle 1c). The distribution of the role cards aims to establish clear areas of responsibility. To support visualization, scenic presentation, and discussion about the novel, costumes and props were provided, along with the indication of a stage situation using cloths and frames.

Based on this, the above-mentioned task was explained and in this context an explanation of the role cards was also provided:

“There are different roles for the freeze frame: 1) Actor (to be assigned twice), 2) Director and 3) Camera person. Decide together who will take on which role. You can switch roles after each scene.” Overall, this was also a task format where it was sufficient to explain the task once and then let it run independently, as it was in the previous survey cycle II.1.

To be able to cooperatively create the freeze frames later, the described preliminary exercise on expressing and recognizing emotions was conducted first. The portrayal and recognition proved to be challenging, requiring several attempts until the correct emotion was guessed. There appeared to be some difficulty in expressing emotions (in situations where the emotions did not exist). They occasionally exchanged ideas about authentic facial expressions such as: "But you never look like that when you're thoughtful. You always look like this" (S17ZIII, 00:04:33-2, transl. DigiLi) or named different terms until they had guessed the correct emotion.

Subsequently, the experiment leader explained the task of the scenic play and then the texts for the scenes were distributed, and some students read the text individually (design principle 2c). Upon the experiment leader’s request, all scenes were then read out loud, and afterward, the student attempted to explain them in their own words. Since each person read a scene and shared it with the other members, the group reached an improved cooperative collaboration by sharing the tasks fairly in order to gain equal importance for all contributions (design principle 3h). The student with special needs managed to correctly summarize some essential aspects of the assigned scene: "My scene is that she goes to Doctor Benjamin //(...)// and yes, says that she is afraid of the environment. I don't know exactly if that's so/ //(...)// Yes, climate change." (S14ZII.2, 00:12:42-5, transl. DigiLi). There is an indication of text comprehension for the student with special needs in intellectual development and learning support. For the student with the focus on intellectual development, this is somewhat more challenging. However, after a short hesitation, he can name the character Nova (S13ZII.2, 00:13:07-2).

Then, the four different freeze frames for the scenes from the novel were created. The students used the costumes and props for this purpose. They always made sure that the costumes and props matched the novel and specifically the scenes. It is noticeable that the students without special needs supported the student with special needs in the area of intellectual development in choosing the costume and partially in dressing up. Here, the student with special needs also participated with ideas regarding her perception of the novel’s character and how a possible implementation could look like.

The scenic design in this task setting as a performative and playful approach "also enables students with disabilities to gain comprehensive experiences with the content and subject matter of a literary work" (Wittenhorst & Bernasconi, 2012, p. 5, transl. DigiLi). This, along with

the assumption that a performative and playful approach can be more accessible than a descriptive-analytical approach, was confirmed by this survey (design principle 1c). This became particularly evident when a student with special needs in the areas of intellectual development and learning engaged with the question of suitable costumes for the roles. She asked questions and formulated her own reasoned suggestions, which were answered and supported by her group members: "S14ZII.2 Actually, the / the ring would be perfect. S18ZII.2: Yes, we'll take that one too" (00:15:45-2, transl. DigiLi). In addition to demonstrating competence in the scenic play, she also shows the ability to cooperate by actively participating in the task's completion: "We can first change how what's his name/ with Dr. Benjamin, (...) that someone else comes than (...) just now. (Looks at S17ZII.2)" (S14ZII.2, 00:25:18-7, transl. DigiLi).

The students' ability to adaptively shape a learning situation was also evident. For example, the students organized the role change themselves and took on the respective tasks of the roles. This mostly happened independently; however, the student with special needs sometimes needed reassurance and looked toward the learning facilitator or group members for guidance. Moreover, they also used the costumes and props in a way that best suited the role (according to their perceptions) and got creative with it: "Can this be turned around? That would be cool! (Looks at the inside of the jacket) I'll turn it around. // (Turns the jacket around)//" (S18ZII.2, 00:17:06-6, transl. DigiLi). The construction of freeze frames (in the sense of action- and production-oriented teaching) can thus reach a broader range of students and enable participation in an actively engaging encounter with literature.

During the oral discussion at the end of the survey, it can be observed that the student with special needs around intellectual development hardly participated. The question arises as to what extent he is cognitively and linguistically capable and willing to contribute. This indicates that more attention must be paid to various forms of communication. In comparison, the other student with special needs participated more actively overall, especially during the final round with statements about the image representation and her experiences of acting. She comments: "If you don't do that/ If you feel it once, but you actually feel it, you're naked. (Raises her eyebrows, looks around and then back down at the floor)" (S14ZII.2, 00:39:43-2, transl. DigiLi). She believes that exposing one's own emotions is akin to being vulnerable, indicating both an existing understanding of roles and the ability to empathize with perspectives. Unlike the other students, she formulated a sincere response. As described, this follow-up communication also revolved around exchanging thoughts about the characters and their relationships. It became evident that digital media was necessary for this, as reflection was only possible based on the photographed freeze frames (design principle 2c). For the most part, competence in handling digital media, in this case, the tablet, was also noticeable. Although the student with special needs in intellectual development often looked at his tablet and was busy with it during the final round, he needed some assistance when taking a photo: "Yes okay, //so////

(walks to S13ZII.2) you have to aim. (Raises his right arm and stands behind S13ZII.2) //Now. Aim. // (Gestures again)" (S18ZII.2, 00:29:00-3). But then he succeeded on his own the next few times: "//So, please. (Looks up from the tablet to S18ZII.2 and S17ZII.2) (incr.). (goes to S18ZII.2 and holds the display in front of S18ZII.2)//" (S13ZII.2, 00:32:24-6, transl. DigiLi).

It became apparent that a heterogeneous group and a construction of content through communication are necessary. The individual students could not have mastered the task on their own; it required each member of the group with their own levels of performance and perspectives to fill the given roles. This way, the potential of the entire group can be harnessed. Cooperation, therefore, thrives on the participation of all (design principle 3c). This can be seen as an argument for inclusion, demonstrating that cooperation can support cultural participation of all. However, it also requires acceptance, as otherwise one can be excluded. In the development of the freeze frames, it becomes clear that students with special needs are accepted in their ideas, strengths, and weaknesses, by students without special needs. This was the idea behind the *Talent Marketplace* (design principle 2b). Nevertheless, the students without special needs have given a lot of direction to the two students with special needs (partly in accordance with the role assignment), for example, 'helping' with dressing and undressing, even though this was not expressed as a wish: "(simply puts the vest on S13ZII.2) Here you go, the cameraman. (Holds the vest so that S13ZII.2 can stretch his arms through and put it on)" (S17ZII.2, 00:16:28-7, transl. DigiLi). For the next cycle attention was paid to the aspect that all students (with and without special needs) (can) contribute equally, and the students without a specific support need do not have to see themselves as the ones who must help if it is not necessarily desired.

It also became evident that the students recognize the presence of a learning facilitator. For instance, one student showed a strong orientation towards the learning facilitator through recurrent glances. In this learning setting, cooperation enabled orientation towards group members in the sense of cooperation with a competent other (design principle 4). This demonstrates the potential and necessity of cooperation in heterogeneous learning groups (design principle 4b).

At several points, it became evident that each student contributed to the overall product with their potential in cooperation, using various communication modes such as verbal (through follow-up communication) as well as gestural, facial, and various tools such as the tablet. The tablet as a starting point of communicative cooperation is also reflected in agreements: "with the tablet facing the scene (...) Should we now?" (S13ZII.2, 00:28:47-0, transl. DigiLi). A broad concept of communication is apparent here. Hence, various strategies emerged on how the students can support each other. The two students without special needs also recognized that the students with special needs wanted to contribute, and they largely accepted these offers or ideas, demonstrating appreciation as in the previously mentioned costume and prop selection. They recognized the dependence of each group

member for achieving the goal. A connection can be made here to the *Talent Marketplace*, where the focus is on potential orientation and learning with and from each other (design principle 2b) (cf. chapter 3.1). This serves as assistance to ensure that everyone can contribute. As each person contributed with different potentials, it also became clear that cooperation allows for mutual development (design principle 2c).

In summary, a distinct form of cooperation, specifically communication-based, becomes apparent (design principle 3c) (cf. Chapter 1.2). This form of cooperation within the realm of special needs education bears similarity to the (communicative) follow-up communication (cf. chapter 1.3) in the context of literary learning. This highlights that the approaches of special/inclusive education and subject-specific teaching can be brought together (design principle 4). To conclude the progression of cooperative learning settings in the digital space, the results will be incorporated into a subsequent cycle.

To achieve this, an additional sub-cycle (cycle II.3) will be initiated to gather opinions on the book selection and the learning village. Based on the findings, a third cycle will then be created, allowing the students (as per their request from cycle II.3) to choose a book for the next learning village. This book will be tested in a final cycle IV with an inclusive learning group using a web app created by DigiLi. In doing so the focus remains on the four basic design principles along with their adapted and further developed versions (cf. Dannecker, 2024).

4.0 Reflection on Design Principles

The analysis of the data led to a reflection on the design principles 1–3 (see chapter 3.2). The following table illustrates the differentiation of the design principles with reference to the data analysis of cycles II.1 and II.2.

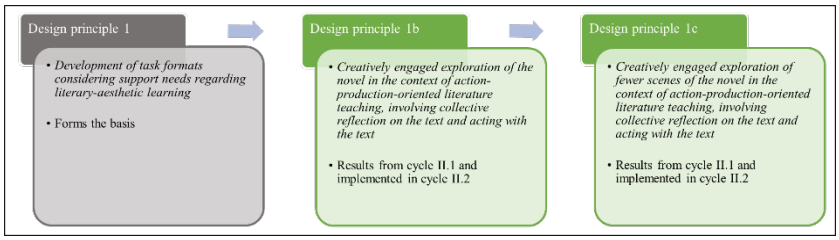

Figure 4: DigiLi Project: Overview of the design principle 1 and its adaptions

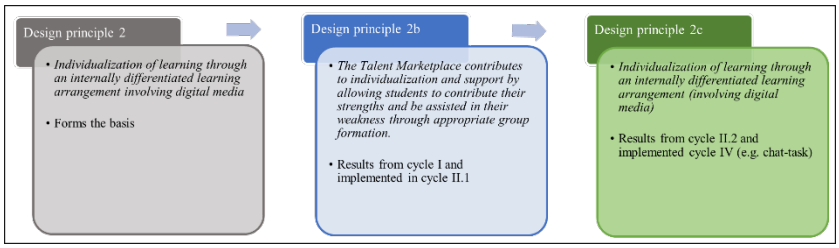

Figure 5: DigiLi Project: Overview of the design principle 2 and its adaptions

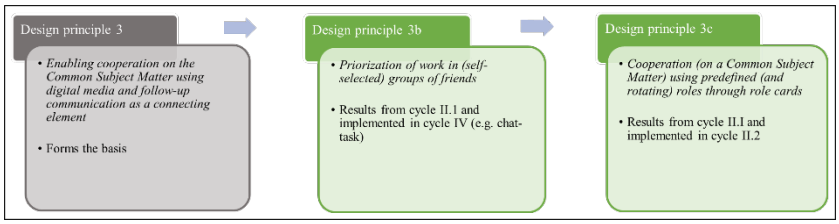

Figure 6: DigiLI Project: Overview of the design principle 3 and its adaptions

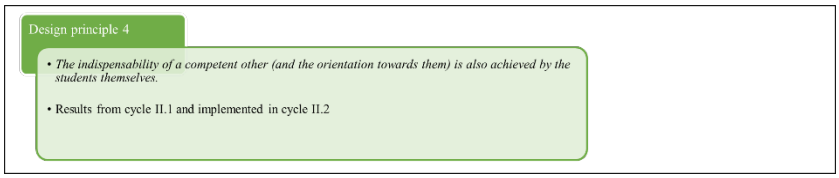

Figure 7: DigiLi Project: Overview of the design principle 4 as a result and a basis for the next research cycle

4.1 Reflection on the Design of the Learning Scenario

4.1.1 *Talent Marketplace* as a Digital Tool for Group Formation

The results of the implementation of the *Talent Marketplace* (cf. Chapter 4.1.1) clearly indicated that the method of group formation based on competencies had not been utilized thus far at the IUS. The mentioned design principles (grouping based on competencies instead of friendships and fostering exchange and networking) could therefore not be pursued further in the research project in this manner. The investigation in the current school setting revealed that the introduction of a new concept, tool, or a new method requires more time-consuming preparation, such as training for the teaching staff.

4.1.2 Trailer Production with regard to the Young Adult Novel

In the context of the trailer production results, the design principles focused on the pupils 'creative and productive engagement with the novel, fostering cooperation, and exchange, along with utilizing the tablet and iMovie as digital design tools. The students showed adept handling of the tablet and those without special needs also demonstrated competence in using the iMovie program. However, the two students with special needs had not worked with the program before. In this case, a cooperative setting is urgently needed for inclusive learning, among other reasons, to counteract a Digital Divide (cf. chapter 1.4).

4.1.3 Creating Freeze Frames in the Cooperative Teams

From the results concerning the freeze frames it becomes apparent within the DigiLi project that a creative and productive approach (creating freeze frames and a photo as the final product) has once again proven to be fruitful. However, there is a need for more substantial exchange, particularly concerning follow-up communication regarding the literary text and personal thoughts and feelings. The assignment of defined roles facilitated a detachment from an external competent other, emphasizing cooperation among the students.

Thus, the results of the freeze frame creation indicated that cooperation in heterogeneous groups offers significant potential for holistic learning. It became evident that positive interdependence is a prerequisite for cooperative organizational structures and the participation of all. Role assignments, especially with role changes, resulted in increased participation by all and provided the opportunity to share the experiential knowledge gathered in the roles. Mutual support and consideration of opinions are also favored due to goal interdependence. Therefore, a heterogeneous group and its resources are necessary to achieve a common goal. This is strongly indicative for cooperation as a path to inclusion.

In this context, the conception and formulation of tasks were particularly highlighted as crucial conditions for the success of cooperative learning. Action- and production-oriented task settings facilitate a more accessible approach to literature, a profound engagement with textual content, and the promotion of imaginative visualization and perspective-taking, especially for students with special needs (cf. Wittenhorst & Bernasconi, 2012, pp. 4-5). However, it is significant that cooperation in heterogeneous groups and scenic plays (in literature classes) should be learned and regularly used to enable the participation of all, to ritualize cooperative learning, and potentially to open it up gradually.

4.2 Reflection on Design-Based Research as a Research Approach

The innovation potential arising from the collaboration between research and school practice is emphasized by Bereiter, who states that the DBR approach is not defined "by its methods but by the goals of those who pursue it. Design-based research is constituted within communities of practice that have certain characteristics of innovativeness, responsiveness to evidence, connectivity to basic science, a dedication to continual improvement" (Bereiter, 2002, p. 321,). The significance of cooperation with teachers for forward-looking educational research becomes evident when considering recent waves of innovation in school practices. It can be observed that digital formats, apps and learning platforms are increasingly used in school practice, yet the empirical foundation of conceptual ideas is often lacking. The same

applies to the potential that arises from considering innovative design approaches and experiences in the conception of inclusive learning situations in school practice. Thus, the two cross-cutting themes of digitalization and inclusion call for two societal transformation processes that have rarely been conceptually linked. However, they are repeatedly identified as research and development desiderata by school practice and subject-specific teaching research (cf. Dannecker & Konya-Jobs, 2021). This assessment highlights, on the one hand, the pressure for action arising from societal transformation processes, and on the other hand, the potential that emerges from considering innovative design approaches and experiences in the conception of inclusive learning situations with digital media in school practice. Therefore, the cooperation between professionally and reflexively acting individuals in school practice and research can be characterized as an essential component of the DigiLi project (cf. Dannecker & Ziemen, in press).

5.0 Conclusion

As the results presented here indicate, cooperation in heterogeneous learning groups can be seen as conducive to learning with regard to the design of inclusive learning arrangements if the latter takes into account the different learning requirements of the pupils, offers clearly structured tasks and at the same time opens up creative freedom. The authenticity of follow-up communication is particularly important here. In the future, students should be encouraged to cooperate in order to enable the cultural participation of all, to ritualize cooperative learning and, if necessary, to open it up step by step.

Following Feuser's idea of the Common Subject Matter, the question of cooperation can be described as the central process behind the things that characterized the DigiLi research project. However, it was not only the cooperation of the students with regard to the question of what potentials exist for the use of digital media in the context of cooperative learning scenarios in inclusive literature lessons, but also the cooperation of all team members within the research project. It has been shown that the cooperation in the multi-professional team of the DigiLi project was constructive and enriching, but also required a high level of commitment from all team members.

On the one hand, the research principle of Design-based Research is associated with the hope of expanding the understanding of science in the research field of Literature Pedagogy (cf. Dube & Dannecker, 2024). On the other hand, the research principle is able to create an exchange with cooperating schools and thus a link between academic and practical school learning as well as a transfer of knowledge between science and school practice in the region. At the same time, it can be assumed that long-term cooperation between schools and universities could initiate processes of school development, provided that time and commitment are found for this. However, such committed

cooperation can be seen as profitable, not only as an individual enrichment for the individuals involved, but also in terms of systemic changes and social challenges.

Finally, cooperation can be described as a basic anthropological human need. People communicate with other people, they provide others with useful information, they imitate others and thus adapt their behaviour. Beyond this, humans enter cooperation, act and pursue goals together and thus create something new for culture and society. "Equipped with a special kind of cultural intelligence that includes species-specific social-cognitive skills and motivations for cooperation, communication, social learning and other forms of shared intentionality, children can increasingly participate in this cooperative group thinking as they grow up" (Tomasello, 2018, p. 15). Last but not least, this is linked to the hope that practices of sharing goods, knowledge and power can be a target perspective of school action and thinking that prepares for ever new challenges in times of social transformation.

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