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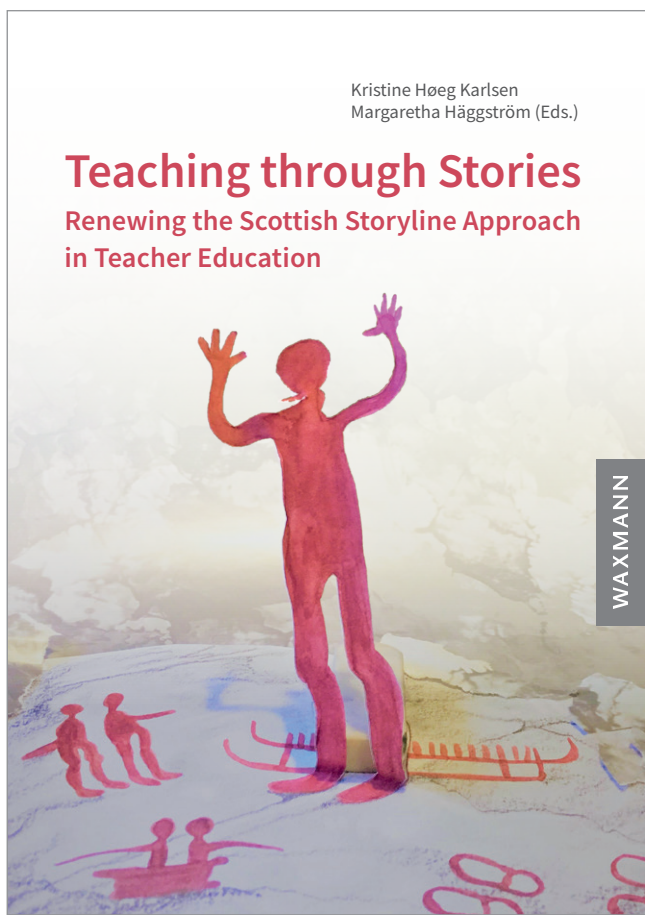
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Chapter 1

Cooperative Learning: The Power of Positive Interdependence in Storyline

Kristine Høeg Karlsen, Heidi Remberg Høeg and Ellen Høeg

Abstract. This chapter examines student teachers' experience regarding cooperative learning which was set up for a Storyline. The data consist of group interviews with a total of 22 students, along with the passive participatory observation of three student groups working with Storyline. The study uses a qualitative, exploratory and interpretive approach to the data analysis. The analysis indicates that the students considered cooperative learning, as the group work was structured in this Storyline, to be valuable for the perception of i) Depth in academic learning, ii) Emotional binding, and iii) Shared responsibility. However, difficulties that might hinder high quality relationships were detected in relation to time pressure and the complementary roles. The study concludes that, although The Storyline Approach offers a good framework and structure for experiencing high-quality group working, sufficient time must be set aside to carry out the cooperative processes initiated by a Storyline.

Keywords: Student teachers; learning; group work.

Introduction

Students in higher education learn more when they are actively involved in their education process (Bonwell & Eison, 1991; Abercrombie, Hushman & Carbonneau, 2019). But, facilitating student activity can be challenging at a time when the level of diversity amongst students and student population numbers in higher education are increasing (Masika & Jones, 2016; OCEF, 2018). From a global perspective, education institutions are facing ever greater demands to improve student learning and demonstrate the effectiveness of their higher education programmes (O'Flaherty & Phillips, 2015). According to Johnson & Johnson (2008), one strategy that educators in higher education can use to alter the role of students from passive to active is to facilitate *cooperative learning* (p. 29). In cooperative learning, students work "in small groups to achieve a shared set of goals relating to academic assignments" (ibid.). Numerous studies have documented that cooperative approaches to learning used in higher education increase academic achievement for students compared with traditional whole-class teaching methods (Erbil & Kocabaş, 2017; Johnson, Johnson, & Smith, 2007; Slavin, 1996, 2013). However, implementing cooperative learning in an appropriate manner can be challenging, and studies have proved that higher education students find group work difficult (Hamilton & O'Dwyer, 2018). This may be because the students do not possess all the knowledge they need from primary and secondary school in order to succeed with cooperative learning in higher education (Le, Janssen & Wubbels, 2018, p. 110).

This study focuses on cooperative learning used in a Storyline as part of a teacher education course in a medium-sized university in South-eastern Norway, involving second-year students on a primary and lower secondary teacher education course covering grades 5–10. The Storyline Approach (TSA)¹ can facilitate the *effective* use of cooperative learning, “as the story format and character involvement spark mutual interest in exploring and resolving issues” (Stevahn & McGuire, 2017, p. 321). The aim of the Storyline was to provide a setting where the students themselves could experience and learn about cooperative learning, and thus increase their knowledge and skills needed when planning for high quality group work for pupils as future professionals.

Internationally, extensive research has been conducted into cooperative learning over the past three decades. Primary and lower secondary school forms the context for the majority of these studies, which amongst other things focus on *the teacher’s use and implementation* of cooperative learning in their own teaching (see Baloche & Brody, 2017; Dyson, Colby, & Barratt, 2016; Emmer & Gerwels, 2002; Taylor, Thomas, Penuel & Sullivan, 2019; van Leeuwen & Janssen, 2019; Veenman, Kenter, & Post, 2000), on the various *impacts* of cooperative learning on achievement and/or performance (García-Almeida & Cabrera-Nuez, 2020; Johnson & Johnson, 2002; Köse, Şahin, Ergü, & Gezer, 2010; Palomares-Montero & Chisvert-Tarazona, 2016), and on the pupils’ *reactions and/or preferences* to cooperative learning (Ellison, Boykin, Tyler, & Dillihunt, 2005; Veenman et al., 2000). Using the teaching training course as a context, many studies also focus on the student teachers’ *attitudes and experiences* of cooperative learning (Hornby, 2009; Kimmelman & Lang, 2019; Raath & Hay, 2019), whilst others present *theoretical foundations and explanations* regarding how cooperative learning can be integrated within teacher education (Buchs, Filippou, Pulfrey & Volpé, 2017; Johnson & Johnson, 2017; Jolliffe & Snaith, 2017), the effects of cooperative learning (Artut & Bal, 2018; Naoe, 2008; Tombak & Altun, 2016), showing the *benefits* of linking teacher and student teacher courses through cooperative learning at university (Kimmelman & Lang, 2019) and *obstacles* to successful student teachers’ cooperation (Le et al., 2017; Opdecam & Everaert, 2018). In a Norwegian and Nordic context, little research has been carried out into cooperative learning (Andreassen, 2010, p. 2), except by Andreassen’s meta-analysis which presents a comprehensive overview of the impact of cooperative learning on the teaching of reading, and Hjertaker’s more practical contributions, inspired by the Johnson brothers when innovating the method for a Norwegian context (see, Hjertaker, 1990; Hjertaker & Hjertaker, 2019; Høeg & Hjertaker, 2019).

However, few studies address cooperative learning within the framework of TSA. A comprehensive review of the international research literature relating to TSA (see chapter 19, Karlsen & Lockhart-Pedersen, 2020) identified just two studies focusing on cooperative learning in a school context. The qualitative study by Stevahn and McGuire (2017) of 19 pre-service teachers examines how Storypath² scaffolds the use of cooper-

1 In this chapter we use the abbreviation TSA developed by Karlsen, Lockhart-Pedersen & Bjørnstad (2019a).

2 Stevahn & McGuire (2017) use the term ‘Storypath’, which is a term introduced by McGuire (1997) as an American adaptation of The Scottish Storyline Approach.

ative learning. They conclude that the method naturally generates positive interdependence among its participants, thereby “scaffolding the efforts of novice teachers to authentically and successfully facilitate cooperative learning” (Stevahn & McGuire, 2017, p. 326). The context of Ahlquist (2019) is Second Language English learning in upper secondary school (age 16–18). She explores how cooperative learning used in a six-week long Storyline based on Michael Grand’s fantasy novel *Gone* (2008), affects the pupils’ willingness to communicate in groups. One of the core findings of this study is that the pupils increased “in their motivation to speak English” (Ahlquist, 2019, p. 387). In general, chapter 19, *A Systematic Mapping of the Research Literature on The Scottish Storyline Approach* (Karlsen & Lockhart-Pedersen, 2020) indicates a strong need for knowledge development both nationally and internationally relating to cooperative learning and TSA, and in particular, more studies within teacher education are required.

In this study, *teacher education* is used as a context and case to investigate how student teachers perceive cooperative learning in a Storyline. The study is part of a larger interdisciplinary research project at Østfold University College, called *The Storyline Approach in Teacher Education*, the aim of which is to investigate TSA from various perspectives, disciplines, educational levels and methodologies. In this study, *Storyline* is defined as “an integrated approach that draws subjects together creating links across the curriculum” (Harkness, 2007, p. 20) in ways that creates “a meaningful partnership for learning” (ibid.). The following research question formed the starting point for data acquisition and analysis:

How do second-year primary and lower secondary student teachers perceive cooperative learning as it was implemented with regards to ensuring high-quality peer relationships in TSA?

Initially, we use an expansive definition of cooperative learning as “the instructional use of small groups so that students work together to maximize their own and each other’s learning” (Johnson, Johnson & Smith, 2014, p. 87). What thus distinguishes cooperative learning from other, less structured, forms of group work, is that they exhibit “positive interdependence” (Millis, 2014, p. 141), which means that students are given “a vested reason to work together” (ibid.).

The remainder of the chapter is structured in the following way: Following the introduction, *part 2* gives an account of the theoretical framework. Johnson & Johnson’s theory (1991) of cooperative learning is placed here in a pragmatic constructivist Deweyan learning perspective (Dewey, 1916). The cooperative work in TSA thus forms the context and framework for the research, and where education is understood as a social and democratic project (Johnson & Johnson, 1991, p. 73). *Part 3* describes the context of the study, where the focus is placed on how the Storyline sequence was planned and executed in order to make the Storyline work cooperatively. This is followed by a description of the data acquisition strategies and analysis in *part 4*. In *part 5* the results of the study are presented and discussed along with the theory of cooperative learning before the chapter concludes with some final remarks.

Theoretical framework

The social and democratic conception of Dewey has directly influenced the development of theories of cooperative learning (Sharan, 2010, p. 301). Dewey (1916) believes that education must be human first and professional second, and that all subject matter is social in nature and that any curriculum and implementation must embody the democratic ideology (pp. 136f.). According to Johnson and Johnson (1991), Dewey argued that “if humans are to learn to live cooperatively, they must experience the living process of cooperation in schools (p. 19). The *nature* of the cooperative work is thus essential for students’ learning, and merely placing students in groups (having them sit side-by-side) to facilitate cooperative work does not “mean that high-quality peer relationships will result and that learning will be maximized” (ibid., p. 35). How the students come to interact with their peers within the group process, is according to Johnson and Johnson (1991) determined by “the type of interdependence structured among students” (p. 30). In high-quality peer relationships, as caring for each other increases,

“so do feelings of personal responsibility to do one’s share of the work, willingness to take on difficult tasks, motivation and persistence in working towards goal achievement, and willingness to endure pain and frustration on behalf of the group” (Johnson & Johnson, 1991, p. 48).

An important element in all Storyline projects is cooperative learning (Ahlquist, 2019; Kocher, 2016). The learning is thus organised in the form of small *working groups* where the students “negotiate task solution, help each other with their presentations and feel safe” (Kocher, 2016, p. 172). A key premise for high-quality cooperation is that the way in which the goals that members of a group work towards are structured, is important in determining how the group members interact (Johnson, 2003, p. 936). The premise is based on Deutsch (1949; 1962), who structures three patterns of interaction amongst individuals in a group based on three types of social interdependency: positive, negative and no interdependency. When a positive correlation exists between the goal attainment of each individual group member, *positive interdependence* is deemed to have arisen within the group, i.e. the individuals “perceive that they can attain their goals if and only if the other individuals with whom they are cooperatively linked attain their goals” (Johnson, 2003, p. 935). Conversely, *negative social interdependency* exists when there is a negative interaction pattern between the group members, i.e. the individual group members perceive that they can only achieve the goal “if and only if the other individuals with whom they are competitively linked fail to obtain their goals” (ibid.). Finally, if there is no link between the goal attainment of each individual and that of others in a group, there is *no interdependence* at all (ibid.).

Positive interdependence, therefore, describes an interaction pattern where the group members are linked to each other in ways which offer the best learning outcome, where each individual’s contribution benefits the group as a whole (Johnson & Johnson, 1991, p. 127). Such an interaction pattern is characterised by the group members: striving for mutual benefits (which benefit all group members), sharing a common fate (they all gain or lose), performance is mutually caused (mutual responsibility and obligation),

shared group identity (based on membership of the group), increased self-efficacy and empowerment (confidence that everyone will exert effort, and that they will succeed), and joint celebrations based on mutual respect and appreciation (ibid., pp. 127–128). There are many different ways of structuring teaching in ways that aim to contribute to the creation of interdependence. Based on Johnson & Johnson (ibid., pp. 62–77), four procedures are elaborated below (illustrated in figure 1).

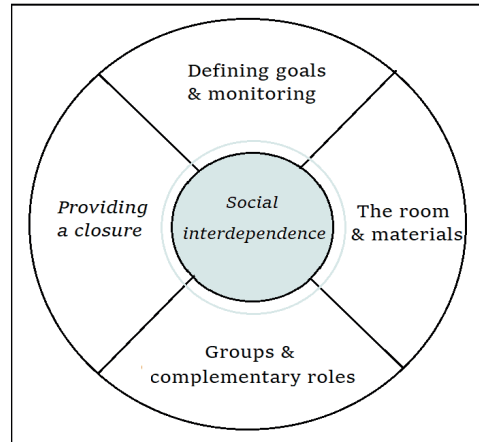


Fig. 1:
A model of structuring social interdependence, based on Johnson & Johnson (1991, p. 62–77)

Defining goals and monitoring

Defining common goals which ensure that students care about each other during the learning process can help to create interdependency within the group. There are two types of objectives which must be defined: academic objectives and collaborative skills objectives (ibid., 1991, p. 62). The objectives must be communicated to the students (ibid., p. 68), along with an explanation as to which theories apply to the task, i.e. the properties or characteristics which define success (Johnson & Johnson, 1991; Sadler, 1987). The criteria must also be structured in a way that ensures mutual social dependency. During learning, the teacher must monitor the students' behaviour and work, and provide the necessary assistance (Johnson & Johnson, 1991, pp. 71f.). The teacher can also offer a group reward, e.g. when the group meets a certain criterion of excellence (ibid., p. 69).

Organising the room and materials

The way in which the room is organised has an impact on the signals that are sent to the students concerning the type of behaviour that is expected (Johnson & Johnson, 1991, p. 66). In cooperative learning, the students must sit sufficiently close to each other to enable them to speak to each other without being disturbed by other groups. It is important that the students sit face-to-face and that they are in eye contact. The materials must be placed ready on the table, and all the members of the group must be

able to see them. The groups must be sufficiently far from each other to minimise noise levels between them.

Determining groups and defining roles

According to Johnson and Johnson (1991), a group is “not truly cooperative if members are ‘slackers’ who let others do all the work” (p. 69). The size of the group is of some importance as regards the work in cooperative learning. Johnson and Johnson (1991) recommend between two and six members. At the same time, they also state that the more members a group has, the broader the range of expertise (and abilities), but this must be set against the skills that the students possess as regards cooperation. In principle, the lower the number of members, the lower the level of competence the students have in interacting cooperatively. Positive interdependency can also be accomplished through the use of complementary and interconnected roles (*ibid.*, p. 67). Linked to each role, various responsibilities are defined which must be fulfilled in order for the group to work effectively. These roles are; summariser, checker, accuracy coach, elaboration-seeker, research-runner, recorder, encourager and observer (see Johnson & Johnson, 1991, p. 67 for an explanation of these roles).

Providing for closure

There are two types of activity which must be summarised (*ibid.*, 1991, p. 75). Firstly, the students must summarise what they have learned. This can be done in the groups or as a whole class, where major points are summarised, and the students are allowed to ask questions. It is then essential that the various groups evaluate how well the group functioned according to the various roles: “What was done well and what could be improved?” (*ibid.*, pp. 75f.). According to Johnson & Johnson (1991), group work must be “enjoyable, lively and pleasant experiences. If no one is having fun, something is wrong” (p. 76). Evaluation within the groups must be based on an agenda which addresses questions that the group members must answer (*ibid.*). One way of doing this could, for example, be for each group to write down (and document) two things that they did really well and one thing that they could do better (*ibid.*). Each group member thus has two types of tasks during the process of cooperative learning: a) helping to complete the task successfully, and b) contributing to good collaboration (*ibid.*).

The context of the research:

An implemented Storyline in teacher education

A total of 60 student teachers preparing to teach grades 5–10 participated in the Storyline that took place over 1.5 weeks of the fourth term. The Storyline focused on sustainable development and was driven forward by eight key questions and included six events and 24 activities. The action in the Storyline took place on a present-day river delta under the following title, *The Norwegian River Delta*. In the following, we describe

the elements in TSA which were specially designed to contribute to high-quality peer cooperation based on what had been done before, during and upon conclusion of the learning process. For a more thorough and holistic description of the various events and activities in the Storyline that took place, see Table 1 chapter 4 *An Exploration of the “mimetic aspects”* (Karlsen, Motzfeldt, Pilskog, Rasmussen & Halstvedt, 2020).

Ahead of the Storyline

The process of planning “The Norwegian River Delta” began no less than a year before it was implemented. Parallel to the development of the story itself (the line, events and activities), the group composition, rooms and use of materials were carefully planned. The students were organised in multidisciplinary groups with as broad a range of expertise and, hopefully, abilities as possible, as this would be an advantage for the tasks they were to perform. Each group, 12 in total, consisted of five students, each with different subjects and subject combinations (insofar as possible). Based on literature on the field and the teacher educators’ experiences from previous Storylines, it was assumed that very few students had any previous experience of cooperative learning. In line with Johnson and Johnson (1991) the groups created were therefore not to be too large and unmanageable, as this would have required very socially skilled students in order to make the work cooperative (p. 64). Because many whole-class events take place during a Storyline, it was desirable to have all groups in the same room. The largest room on campus was booked, to give space between the group tables, and in addition partition walls were erected between the groups. This, to reduce noise levels and create a “room-within-the-room”. Picture 1 gives an insight into the way the room was organised.



Img. 1: The organisation of the classroom using partition walls in order to minimise noise levels between the groups. Credits: Kristine Høeg Karlsen.

During the Storyline

One of the first things to happen in the Storyline (i.e. event 1, activity 3, table 1, chapter 4) was that the students had to draw up a group contract on a separate sheet of paper which had been placed on their table. The contract was to contain 3–4 rules which were formulated in a positive way, and everyone had to sign the contract. A couple of examples of the rules which were formulated are: “We will have a positive attitude towards other people’s ideas” and “In the event of disagreement, the majority will decide”. In event 2 (activity 10), a 15-minute long “subject loop” took place (Paulsen, 1999, p. 188) concerning cooperative learning (cf. Johnson & Johnson, 1991, p. 67). As part of this subject loop, the students were assigned complementary roles as secretary, checker, timer and encourager (two students shared this role), based on Høeg and Hjertaker (2019, p. 109). The students had to collaborate in order to determine the roles that the various members were to have. For example, the secretary was to be the one with the “longest little finger”, so to find out who was to be secretary, the students had to compare the lengths of their little fingers. The shortest one was to be checker, and so on. The intention was to assign the roles in an arbitrary way. To eliminate the possibility of unintentional bias, either by gender or physical attributes, the criteria for selection varied each day, making the roles rotate among the students for the duration of the Storyline.

For the student teachers to be able to accomplish tasks related to the six main events in *The Norwegian River Delta Storyline* (i.e. table 1, chapter 4, Karlsen et al., 2020), the criteria for success were presented and explained both orally and in writing to the students. All the materials that they would need at any one time were placed either on the group tables or on a long table in the middle of the room, so that all the group members would have easy access to them, regardless of whether the materials consisted of *instruments* for the sound orchestra or *rubber & netting* (see picture 2).

Conclusion of the Storyline

Finally, the students had to join a two-fold closure, as Johnson and Johnson (1991) recommend, as part of event 6. First, the groups were broken up and the social objectives evaluated using small pieces of paper, on which members gave each of the other members two pieces of written feedback (i.e. activity 23, table 1 in chapter 4). The pieces of paper were then placed in envelopes and distributed. The academic objectives were then evaluated using an academic test on sustainable development. A reward was given to the group which developed the best product (based on the criteria), as determined by a jury consisting of teacher educators and a representative from the organisation Young Entrepreneurship (i.e. activity 22, table 1, 4). The Storyline was concluded with an on-campus public exhibition of the deltas, puppets and concepts, which lasted three weeks (i.e. activity 24).



Img. 2: Examples of materials which were prepared for the students. The two pictures on the left, show how the instruments are arranged in the middle of the classroom ready for activity 2 (sound orchestra). The two pictures on the right side, show two examples of materials the students could use when making the friezes (activity 5). Credits: Kristine Høeg Karlsen.

Research design and methodology

The study is based on a qualitative research design for data collection and analysis. Both focus group interviews (cf. Kvale & Brinkman, 2015, p. 179) and *participant observation* (cf. Bryman, 2016, p. 423) were conducted. Triangulating data from a number of sources can help to “collect a richer and stronger array of evidence than can be accomplished by any single method alone” (Yin, 2018, p. 63).

A total of seven semi-structured face-to-face focus group interviews were conducted, involving a total of 22 students. The students were recruited using *purposeful sampling* (Patton, 2002, pp. 272–273), where 22 of the 60 students who had taken part in the Storyline were randomly chosen to participate in an interview after the learning programme. 20 of the 22 students agreed to participate, while two opted not to be



Img. 3: Examples of inhabitants living in the Norwegian River Delta, created by the students working in the groups. The picture is taken at the exhibition. Photo: Kristine Høeg Karlsen

interviewed³. Two of the 38 students who were not selected voluntarily agreed to be interviewed, which meant that we ended up with a total of 22 students. Ahead of the Storyline, the students were given verbal information about the research project. Written information was also provided explaining the purpose of the study, data storage, possible consequences of the study and data protection aspects, along with a written declaration of consent, which enabled informed agreement to participate in the study to be obtained from the students. The study is covered by the Norwegian Personal Data Act (Section 31) and has therefore been registered with and approved by the Norwegian Centre for Research Data (2019). Data was processed in accordance with the applicable data protection rules (cf. The Norwegian National Research Ethics committees, NESH, 2016) and in line with our institution's own guidelines for research data (Østfold university college, 2019). In accordance with Kvale and Brinkman (2015), ethical issues were carefully considered throughout the study (p. 97). This applies for example to the safeguarding of confidentiality, which according to the NESH (2016) included both access restriction and the assurance of confidentiality to the informants participating in the study (see Fosshem, 2015), which in this case comprised student teachers.

The interview guide, covering four topics and a total of 37 questions, was designed to be used in various studies within the research project, *The Storyline Approach in*

3 One had to withdraw because of work commitments, while the other did not give a reason.

Teacher Education. In our study, interview questions related to cooperative learning (topic 3) and the student teachers' reflections on using TSA in schools (topic 4) was of most interest. Topic 1 and 2 comprise students' overall experiences with TSA, and the aesthetic and imaginative aspects of Storyline. One example of an interview question could be,

I am now going to ask you questions relating to the way in which the teaching and learning was structured by using complementary roles as timer, encourager, checker, and so on. What were your first thoughts when you were introduced to these tasks?

The interviews were conducted in small group rooms on campus. They were recorded and each lasted an average of one hour. It would have been better to transcribe the interviews ourselves, but this would have been very time-consuming (Bryman, 2016, p. 481). For this reason, an experienced transcriber transcribed the recordings using a *literary style* (cf. Kvale & Brinkman, 2015, p. 212) based on clear guidelines. The transcriptions were then checked against the recordings and found to be adequate for our research purposes. The material which is used as quotations in the chapter was transcribed by the researchers themselves.

In addition to the interviews, three (of the 12) Storyline groups were observed, covering a total of 14 students. The observations give us an insight into the students' behaviour; gestures, facial expressions, glances, what is being said and how, and what they do and how they do it. The focus during the observation process was therefore placed on "directly deducible characteristics associated with the situation, i.e. the participants' interaction with the material and the social environment" (Rautaskoski, 2012, pp. 82–83). As observations will always be value-laden (subjective), it is, according to Yin (2018), a common procedure "for increasing the reliability of observational evidence [...] to have more than a single observer making an observation" (p. 123). In this study, two observers were used, who are members of the teaching staff in the Storyline, and as they take a slightly withdrawn role *during* the observation, passive participatory observations were made. The observation was based on an observation form which defined the key dimensions which were to be observed. The observations in this study had *one* focus, which was to identify how the students made use of the complementary roles they were assigned (cf. Johnson & Johnson, 1991, p. 67). The situation being observed was recorded using *scratch notes* (Bryman, 2016, p. 443), where the notes were written down as accurately and as quickly as possible by hand in a logbook *during* the observation process itself. The notes were then rewritten and tabulated on a PC in order to prepare the observations for analysis. A total of 7½ hours of observations were made. An example from one of the observations is the following text extract. *O* indicates that it is the observer speaking, whilst *T*, *C* and *S* stand for timer, checker and secretary respectively. The times of observation is marked on the left (for example 11:04),

11:04 **O** reads out question two. Repeats it because not everyone quite took it all in. **C** summarises an idea and says: "We can use that; that was a good idea!" **T** points out that they must make sure they stick to the task. **C** "It could be fun to use the mountain (?)". **S** "Yes, we can do that" [...]

11:12 C reads out question 3 (takes the sheet from O). Someone has an idea, and O says, “Yes, we’ll do that – create a problem and fix it” and laughs.

During the study, an open descriptive, interpretive and inductive approach was used for the data analysis grounded in the two basic analytical procedures of Strauss and Corbin (1990): the making of comparisons (pp. 84f.), and the act of asking questions (p. 62). The two procedures were used in accordance with Strauss and Corbin (1990) to give precision and specificity to the arising concepts in the process of categorising data in the open coding process (pp. 62f.). The analysis can be divided into three phases. In the first phase, which Strauss and Corbin refer to as the *conceptualisation* (ibid., p. 63), raw data was coded line-by-line using comparisons and questions (e.g. what is this about, what is being described, is the statement the same as or different from another statement?). During this phase, the material was manually coded in a Word document. Separate events which represent a phenomenon were named. An example is the following statement from Interview H, where the column on the left in Table 1 indicates who of the group members is speaking: 1–2 are students, while *I* stands for interviewer. The column on the right indicates the code which has been assigned to the raw data (cf. transcribed interview).

Tab. 1: Conceptualising Data

Student	Raw Data	Code
2:	I was very surprised we managed to cover all the subjects, so I think it was a lot of fun and good. We got input from everywhere [...]	Input from different subject fields
I:	Can you give a specific example where you needed input from another subject field?	
2:	Well, when we looked at what a river delta was, for example, we had explanations from the perspectives of social science and natural science, along with a general explanation of the words from the Norwegian, so we had everything except physical education [...]	Different explanations from different subject fields
1:	As far as we were concerned, it was fun to see; we also found out that we covered all the subject fields and thought it was fun.	Need for different subject fields

This process resulted in a list of 132 codes in total. The list formed the basis for phase 2 of the analysis, where the codes were systematised into more general categories, a process which Strauss and Corbin (1990) refer to as the actual *categorisation* (p. 65). During this phase, groups of concepts which appeared to concern the same phenomenon were grouped together and given a conceptual and analytical name (ibid., pp. 65, 68). In the above example (Table 1), the three codes were grouped together under the category of *breadth of expertise*. This procedure thus reduces the number of units, if the categories according to Strauss and Corbin (1990) “have conceptual power because they are able to pull together around them other groups of concept or subcategories” (p. 65). During

this final phase, an effort was made to identify patterns across the categories. This is a process where the categories are systematised into three abstract and meaningful themes (cf. Creswell, 2003, p. 193): i) Depth in academic learning: Perspectives and wholeness, ii) Emotional binding: Membership and belonging, and iii) Shared responsibility: Empowerment and commitment. These three themes constitute the results of the study, which are presented in the next part.

Result and discussion

Analysis of the empirical data demonstrates that the students who took part in the Storyline *have* a positive attitude regarding the way in which cooperative learning was used during the process, but some obstacles that hinder cooperative learning were also found. In this section, we will present and discuss in detail the results of the study as an answer to the research questions posed, regarding how second-year primary and lower secondary student teachers perceive cooperative learning the way it was implemented to ensuring high-quality peer relationships through a cross-disciplinary Storyline.

Depth in academic learning: Perspectives and wholeness

The Storyline was set up in such a way that the student teachers had to cooperate in multidisciplinary groups. The analysis indicates that the students experienced that this meant that they could take advantage of each other's expertise and that this offered numerous ways into the academic discussion. They appeared to connect the diversity in expertise with the completion of the task. One student explained that this resulted in,

excellent dynamics in [the work]; the premises and the framework are in any case there for a varied debate or discussion, and provided people are engaged, which we were, then there will be lots of different input, so it was good (Student 1, Interview C).

Another student states that it was precisely the variation in expertise that led to the work being successful. Expressed as follows,

In my group, all the subject fields you can take in our teacher education programme were [represented]. There were five of us and we covered all five subject fields [...] As regards the delta we made, there were those who had explained the delta in one way, those who had a social science background, you got to see different perspectives and collectively we were pretty good (Student 2, Interview B).

The group composition thus contributed to the students experiencing wholeness between the subject fields. This, as one student put it, "did not mean that the mathematics and the science were separate, but that you put things into perspective" (Student 1, Interview H). The students further found that they had to argue for their own point of view during the process, and that the key questions (tasks) were formulated in such a way that they had to cooperate in order to identify good solutions. An example from the observation data can be used as an illustration,

10:30 **O** (observer): “What do you think?” – reads out what she has written. **T** (timer), who is sitting opposite, moves around the table and sits next to her. **T** continues to find pictures/film for the report, **O** continues to write. They continually make brief comments to each other, lots of “yes” and looking across at each other. An obviously positive attitude” (observation in group 1, 5/3).

Based on these results, it is clear that TSA, as it was implemented for second-year students on the teacher education course, facilitates a structure for cooperative learning. The students had to collaborate to achieve shared academic objectives, formulated so that the students had to draw on each other’s expertise in order to identify appropriate solutions. The multidisciplinary groups, which were carefully planned with the aim of creating social interdependence (cf. Johnson & Johnson, 1991, p. 64), meant that the group members possessed a broad range of academic expertise. This helped to ensure that many students experienced good discussions and depth in their learning and gained a richer understanding and new perspectives of the topics they were working on. The analysis further shows that the students challenged each other, and that they had to put a case for their own perspective and thinking, something which according to Johnson and Johnson (1991) characterises a learning-promoting and cooperative student-student relationship (pp. 56f.). As the expertise of each individual group member was an important factor in the success of the task, many students explained that they invested time and energy in the work in order to succeed. We interpret this as an expression of what Johnson and Johnson (1991) define as “mutual investment”, which describes a positive and high-quality interaction meeting if the group’s performances are “perceived to be caused by (i) their own efforts and abilities and (ii) the efforts and abilities of the other group members” (p. 128). That the performance in cooperative learning among the group members are mutually caused, have also been addressed in other studies in the field. Hornby (2009), in their study of third-year Bachelor of Education (B.Ed.), finds that individual accountability and positive interdependence are essential to cooperative learning in facilitating superior learning outcomes (p. 167). Further, Kimmelman and Lang (2019) highlight the importance of building positive interdependence, individual accountability and a sense of community in the group (p. 17). Stevahn & McGuire (2017) show how Storypath by its nature facilitates positive interdependence among pre-service teachers (p. 316).

However, the analysis also shows that the cooperative learning did not work as well for everyone with regard to facilitating depth in the academic learning. Certain elements of the Storyline contributed to dissatisfaction, including short deadlines, too many tasks and general time pressure. At times during the Storyline, a number of tasks had to be performed at the same time, which meant that in many cases the groups had to split themselves up. Short deadlines for individual tasks also contributed to stress. One student said, “... we didn’t have enough time, so we just had to run around, finding things” (Student 3, Interview B). Time pressure is addressed in other studies on cooperative learning as well (see cf. Nattiv et al., 1991), and may affect the depth of the academic and social learning, as, for example, they feel there is neither time for sharing and negotiating opinions, nor establishing the group. Time issues related to cooperative

learning within teacher education need to be further explored in the context of TSA in future studies.

Emotional binding: Membership and belonging

Although the respondents in this study are second-year students on the same grade and programme, the study portfolio was put together in a way which meant that students across subject fields did not meet each other very often and for that reason did not know each other well. By participating in the Storyline, they found that the sense of unity across the subject fields increased. They explained that this group subdivision gave them a chance to get to know their study colleagues and that they considered this to be a “breath of fresh air”. When asked what the best thing about the Storyline was, they all responded that the biggest benefit was the sense of unity and the human aspects of the project. One student expressed it as follows,

[...] working with people I do not normally work with was fun and interesting. You know the people in your class and you know their thought processes, so when you meet new people, the thoughts and socialising are new to some extent (Student 2, Interview A).

Another student reflected on what she considered to be the most important thing that she learned in this project, mentioning that she was a little surprised. She said,

[...] actually what I thought was fun was that you could meet people you did not already know; you strike up a good chord and work well together. Because I think I always want to be with people I already know, because then I know we will work well together. But I've learned that you do not need to know people and that you can be different and still work well together (Student 1, Interview E).

Almost all the students noted that the collaboration and socialising were the major learning outcomes of the Storyline. TSA could therefore perhaps be said to embody a little of the democratic perspectives of Dewey (1916), where academic material which is presented to students must first and foremost be social in nature (p. 136) and structured “to develop social insight and interest” (p. 137). For example, the students used terms such as *enjoyable*, *fun* and *the best thing about the Storyline* when describing the cooperative parts. According to Johnson & Johnson (1991), the group process *must* be “enjoyable, lively, and pleasant” (p. 76); otherwise, something is not right. In other words, the way the cooperative work was structured in this Storyline gave these students some new insights into what makes groups function well (for example, that they can succeed in group work even if they do not cooperate with their *best friend*). There are varied elements in TSA which make the student experience the group work in such manner. Besides group composition, the tasks, the topic of sustainability (which appeared to be affecting many of the students), the face-to-face interaction, and the material available during the learning process, everything carefully planned with the aim of facilitating high-quality group work. Analysis of the interview data demonstrates that the students

especially appreciated the point where the group was disbanded, and they gave each other individual feedback (activity 23). They really enjoyed writing positive feedback to each other and receiving the envelope with the responses from the other members. Because, as one student (in interview D) put it:

- O2: I didn't know whether I had done a good job until I got the notes, so I was pleased.
- I: Afterwards? So you think it was important the way you broke up the group?
- O2: Yes, it was like "Wow, I did a good job?" I was very pleased with the group.

This, together with the joint celebration facilitated closure of the learning process (activity 24), gave the students a feeling of membership, belonging and shared success. We interpret this finding as conveying a feeling of what Johnson and Johnson (1991) describe as being emotionally bound together with other group members in the team, which characterises positive interdependent cooperation (p. 128). This expresses the perception of a *shared identity*, which "binds members together emotionally" (ibid.). That cooperative learning promotes student relationships and has impact on socialisation, confirms what we know from other studies in the field. For example, Watson (1995), who finds that cooperative learning makes the students feel more positive about themselves, and that they also become more competent and skilful when interacting with one another (p. 209). Another study, Johnson and Johnson (2017), discovers that students behave less apathetically and disruptively, stay more on-task, and that they are more pleased, not only with their own success, but also about their groupmates' success, when cooperative learning is used (pp. 288, 290).

Nevertheless, the analysis also shows that a few students considered the group identity to be weak, because not enough time had been set aside to "establish the group", as one student put it, "You need a little time to establish the group, to find a group identity first, before you are launched into all those tasks" (Student 2, Interview C). They believed that if they had been more closely bound to the group members, this would have made a positive contribution to the academic work. In this Storyline-project, several of the student teachers did not know each other beforehand due to different study portfolios. Investing time building relationships in the opening of such a Storyline-project may be important for making the groups work well, in particular for students who need a while to commit to sharing their thoughts and feelings openly.

Shared responsibility: Empowerment and commitment

The way this Storyline was planned and executed, made the students experience a new type of distribution of responsibility in the group work. The complementary roles, in particular, assisted the students to delegate the responsibility which made the work more efficient. Because, as one student put it: "There's no discussion in the group about who collects [materials]. The secretary does it. End of discussion. It saves time" (Student 2, Interview E). The students also found that these roles implied that they could "let go" a little, for example that they could give up some of the responsibilities, because

they knew that the task would be done properly by other members in the group, illustrated by the following statement,

It's probably a good way of sharing out the role of leader between everyone; so that there isn't one person looking after everything and doing everything, and so that everyone has to contribute in the same way to make sure everything gets done" (Student 2, Interview A).

Some students also seemed to grow into the roles they were allocated; they discovered new sides to themselves and new sides to each other. One student explained what happened when they were assigned their roles,

What I found most fun was that I was given the role of secretary; even though I'm the flirtiest one around [laughs]. Then when I spoke to the group, everyone looked at me as if they were thinking that I wasn't that type of person. Then I thought: I can be the secretary. It became much more ordered. Much more achievable. Things fell into place; it could have been a disaster if we had not had the roles [laughs] (Student 1, Interview C).

They thus found that one of the major strengths of cooperative learning was that the traditional role of manager in a group is challenged, that "the responsibility is shared between all the group members, and that it is not the same person who has to take primary responsibility each time" (Student 1, Interview B). Here is a short extract from another interview (C), where the students discuss the advantages of allowing students to try out different roles.

- 3: It's a great way of changing the routines [...] It's good to try out different roles, so that you're not always secretary. Try it.
- 2: I think it would also be good to give the students a chance to find out more about who they are. It's possible to give them an 'aha' experience when they are given tasks which they would not normally choose to do themselves.
- O: It's like me. I [usually] just delegate the responsibility of secretary to someone else in the group. I also make it fun. But when I was given the role here, I thought "I'm going to try it" and I liked it. This would be good at primary and lower secondary school too.
- 3: As secretary, you gain control over the situation. It's great to experience it and not just be the comedian. To grow into it a bit.

With few exceptions, it must be added that the students agreed that it was good that the roles were allocated *randomly*, as this extract from Interview B shows,

- 2: I think giving roles to a group in such a random way [...], I think that was really good. And perhaps a bit challenging too, for example with someone who is not normally a leader becoming checker, or someone becoming secretary who is not accustomed to it, so that you get forced to do it.

- 3: There were four strong personalities [in our group], so I just thought “Wow” [...] This could be exciting because we’re all checkers and everyone is a leader. It actually turned out pretty well [...] and it worked a lot better than I thought it would.

Based on the analysis, it becomes evident that the students found that the complementary roles which were randomly assigned helped to create structure, delegate responsibility and save time. Some students also believed that the roles challenged them to tackle new areas of responsibility and that it gave them a positive feeling of succeeding in a role (e.g. secretary), which they did not initially believe they could do. We interpret this, the joint effort in the group, to be increasing what Johnson and Johnson (1991) define as the *self-efficacy* (p. 128). Cooperative groups, accordingly, thus “empower their members to act by making them feel strong, capable, and committed” (ibid.). Other studies in the field have documented that cooperative learning can facilitate increased self-efficacy and empowerment. For example, Raath and Hay (2019) report from their qualitative study within Education for Sustainable Development, that the students improved in their ability to work cooperatively with their peers, and that they became more motivated and willing to integrate cooperative teaching strategies in their future classes (pp. 73f.). Nattiv et al. (1991) finds that preservice teachers appreciated the opportunity for interaction with their fellow students (p. 223).

However, the inquiry also demonstrates that there was some awkwardness concerning the complementary roles. Some of the students found it challenging to take their roles seriously, and in particularly the role of “encourager,” partly because they found the role a little strange and/or false. As one student put it: “It was very artificial. Terribly artificial. So we cut it out. It was much better when it came unsolicited from someone who was not the person who had been assigned to do it” (Student 2, Interview H). Other students explain that they saw no reason to use the roles, because the collaboration was working well, or because they found that the roles did not cover all the relevant needs (they needed more roles). In the context of teacher education (and TSA), it might be that other complementary roles are needed, to make this aspect of cooperative learning effective. Although the students were given a mandatory lecture on cooperative learning (activity 10), the students interviewed had no earlier experiences with this method, which may explain why some students struggled to use the roles. Unresolved issues related to roles and delegation of the workload, confirm other studies in the field. For example Le et al. (2018) find that that some group members did not make an effort at all when accomplishing the tasks, and that this “free-riding had a negative impact on the learning behaviours of all group members” (p. 110) (see also, Hillkirk, 1991; Nattiv et al., 1991). More research is needed within this field.

Conclusion

In this study, we have examined how primary and lower secondary school student teachers covering grades 5–10 have experienced cooperative learning as a tool for ensuring mutual participation and high-quality relationship in a Storyline. Grounded in

a descriptive and interpretive approach to data analysis (Strauss & Corbin, 1990), the study indicates that students first and foremost consider cooperative learning as part of a Storyline to contribute to depth in academic learning. Throughout the process the students had to more than collaborate in their multidisciplinary groups; they had to listen to others, they had to share their own thoughts, and further argue for their own points of view and, importantly, they had to encourage, support and cajole the weaker or reluctant group members. The students explain having experienced what Johnson and Johnson (1991) define as *mutual investment*, which characterises positive interdependency (p. 127): a perception of being linked together with other group members, and that, in order to succeed, you need all the other members to succeed (ibid.), a belief “that they ‘sink or swim together’” (ibid., p. 55).

Secondly, the student teachers describe a feeling of emotional binding. The composition of the groups allowed the students to work with students they did not know beforehand. The experience of the group work let them see their classmates in a different way, and, as one said, it was like a “breath of fresh air”. This, together with the individual feedback, the way the groups were disbanded, and the *joint celebration* promoted a feeling of membership, of belonging and shared success. The students describe having perceived what Johnson and Johnson (1991) define as *shared group identity*, which characterises positive interdependency (p. 127): a feeling of being confident in the relationships, belonging and joint success.

Thirdly, the students experienced a feeling of shared responsibility. The complementary roles helped the students delegate responsibility, something that made the work more efficient. They reported a feeling of increased *self-efficacy*, where the members of the group were empowered to take responsibility and to act. When individuals have this perception, there is an expression of positive interdependency (Johnson & Johnson, 1991, p. 127), where the responsibility among members is shared: this helps the students to structure the work, to spread workload among all group members, and to save time (i.e. as they don’t need to decide who will do the writing, as this is the secretary’s responsibility). An interesting discovery was that most students found the arbitrary distribution of the complementary roles to be very positive, as this gave them an opportunity to develop new skills, freed from responsibilities that they had had in earlier group work, and also to experience joy when they saw members of the group grow into the roles they had been given.

To summarise the findings of this study, we believe there are grounds for claiming that this Storyline offered a framework for student teachers to gain some experience of the power of positive interdependence. As positive interdependence characterises certain patterns of interaction where group members are striving for mutual benefits, have a shared common fate and group identity, where the performance is mutually caused, the self-efficacy is increased, and finally there is a joint celebration based on appreciation and mutual respect (ibid., 1991, pp. 127–128). Nevertheless, the analysis also shows that the cooperative learning did not act as well for everyone with regard to facilitating high-quality group work. Certain elements of TSA contributed to dissatisfaction, including general time pressure (short deadlines and too many tasks), weak

group identity and awkwardness concerning the complementary roles, with the first mentioned being highlighted by the students as being particularly challenging.

Although *The Norwegian Delta Storyline* did provide these student teachers with valuable and new experiences with group work, not enough time was invested for the students to evolve cooperative skills during the Storyline. As cooperative learning as a strategy was unfamiliar to these students beforehand, they apparently had not yet developed the necessary skills to enable them to learn effectively from group work. Students who have never been taught cooperative learning cannot be expected to possess the skills necessary to collaborate effectively (Johnson & Johnson, 1991, p. 146). The most important implication as regards practice, which can be deduced from this study, is that sufficient time must be set aside to carry out good collaboration processes linked to all the tasks and activities which are initiated in a Storyline. The students would benefit greatly from being introduced to cooperative learning prior to a Storyline, so that they are familiar with the method and the complementary roles, and so that they have a chance to develop their own collaborative skills first. Over time, the skills and competence will advance. According to Johnson & Johnson (ibid, p. 146), it is important that students develop collaboration skills, both with regard to the quality of their study work which takes place in groups, and for them to succeed in their future working lives (when most students will have to collaborate).

Taking the obstacles to high quality group work within a Storyline into account, the conclusion of the study is however, that TSA provides a good framework and structure for teaching student teachers to experience high-quality group work and practise cooperative learning. Nevertheless, more research is needed into how cooperative learning can be integrated into TSA in teacher education in general, and related to time issues, weak group identity and complementary roles, in particular.

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